

## EMI MEASUREMENT AND TEST REPORT

Report No. : JNDL-NU-15E-0061

Product Name : IP Gigabit Video Phone

Model Name : LIP-9071


Applicant : Ericsson-LG Enterprise Co., Ltd  
77, Heungan-daero 81eon-gil, Dongan-gu, Anyang-si, Gyeonggi-do,  
Korea

Test Standard : FCC CFR47 Part 15 Subpart B,  
ICES-003 Issue 5(2012),  
ANSI C63.4-2009

Date of Test : December 02, 2015 ~ December 05, 2015

Date of Issue : December 09, 2015

This Report applies only to the model named in the title of this report. It is the responsibility of manufacturer to assure that the additional production units of this product are manufactured with identical, electrical and mechanical components. Test results apply only to the particular equipment and functionality described in this test report. This Report should not be reproduced except in full, without the written approval of JNDL Laboratory.

Modified by :   
Young-Min Bing / EMC Engineer

Reviewed by :   
Rex Lee / EMC Leader

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## 1.0 GENERAL DESCRIPTION

### 1.1 APPLICANT

Company Name	Ericsson-LG Enterprise Co., Ltd.
Address	(Hogye-dong, R&D Center) 77, Heungan-daero 81beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 431-749, South Korea

### 1.2 MANUFACTURER

Company Name	Ericsson-LG Enterprise Co., Ltd.
Address	(Hogye-dong, R&D Center)77, Heungan-daero 81beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do, 431-749, South Korea

### 1.3 FACTORY

Company Name	LN SRITHAL Comm Co., Ltd.
Address	71/12 MOO 5 BANGNA TRAD RD, KM 52 THAKARM BANGPAKONG CHACHOENGSAO 24130 THAILAND

### 1.4 TEST LABORATORY

Company Name	JNDL Laboratory. CO., LTD.
Site 1	(B 114~115 Kungang Penterium IT Tower, KwanYang-Dong), 282 HagUi-Ro, DongAn-Gu, Anyang-Si, Kyunggi-Do, Korea
Site 2	(Ho-Dong),113 Yejig-Ro, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-100, Korea.
Test firm Registration No.	424614
IC Company No.	11206A

Note : Our Laboratory is accredited and designated in accordance with the provisions of Radio Waves Act and International Standard ISO/IEC 17025:2005 by RRA.

Site 1 : Conducted emissions and Radiated emission above 1GHz test site(Registration on FCC)

Site 2 : Radiated emission below 1 GHz test site(Registration on FCC and IC)

## 2.0 GENERAL INFORMATION OF EUT

### 2.1 BASIC DESCRIPTION OF EUT

Trade Name	Ericsson-LG Enterprise Co., Ltd. (iPECS)
Product Name	IP Gigabit Video Phone
Model Name	LIP-9071
Added Model Name	IP9871
Serial No.	Prototype
Class	Class B
Rating	DC 48 V, 0.3 A (Model:L4803D-USA, Manufacturer:TEN PAO INDUSTRIAL CO LTD)

The LIP-9071 phone is an advanced business communications terminal that employs the iPKTS and/or SIP Protocol standards to control and manage real-time communications. The phone employs a Mini-tab running the Android OS as a display and user control interface. The Phone application is permanently installed and provides the user with access to all the features and functions of the Call server host plus the interaction with other communications aware apps with a truly intuitive user touch interface. In addition, the Mini-tab is loaded with apps for Contacts, Calendar, Video, etc. to improve productivity and ease of use.

The LIP-9071 has external device interface for USB, Micro USB and HDMI display. USB devices can be connected via the USB port. But The main purpose of micro USB is for debugging by installation engineer. An optional AC/DC adapter is available for use when the network connection does not support IEEE 802.3af up to class 4 PoE (Power over Ethernet).

### 2.2 OPERATING MODES AND CONDITIONS

Test Mode	Operating Condition
Mode 1	Call and LAN communication status with AC/DC Adaptor
Mode 2	Call and LAN communication status with POE

EUT was tested according to the following operation modes provided by the specifications given by the manufacturer, and reported the worst emissions.

EUT can configure an optional expansion module.

## 2.3 PERIPHERAL EQUIPMENT

Description	Model	Serial No.	Manufacturer
Notebook	NT500RSK	0FLD91BG300128Z	Samsung Electronics Co., Ltd
Notebook Adapter	AD-6019	BA44-00082A	Dongguan Samsung Electro Mechanics
LCD Monitor	U2414Hb	CN-01D83G-74261-51E-62HL	Dell
Dongle	C-U0006	820-003926	Logitech
Keyboard	K220	1235SC101FL8	Logitech
Mouse	M150	M-R0025	Logitech
Ethernet Switch	ES-2024GP	-	LG-Ericsson Co., Ltd.
IP PABX	UCP600	310THKY137965	Ericsson-LG Enterprise Co., Ltd.
IP Gigabit Video Phone	LIP-9071	-	Ericsson-LG Enterprise Co.,Ltd.
Direct Station Select	LIP-9024LSS	-	Ericsson-LG Enterprise Co.,Ltd.

## 2.4 INPUT/OUTPUT PORTS

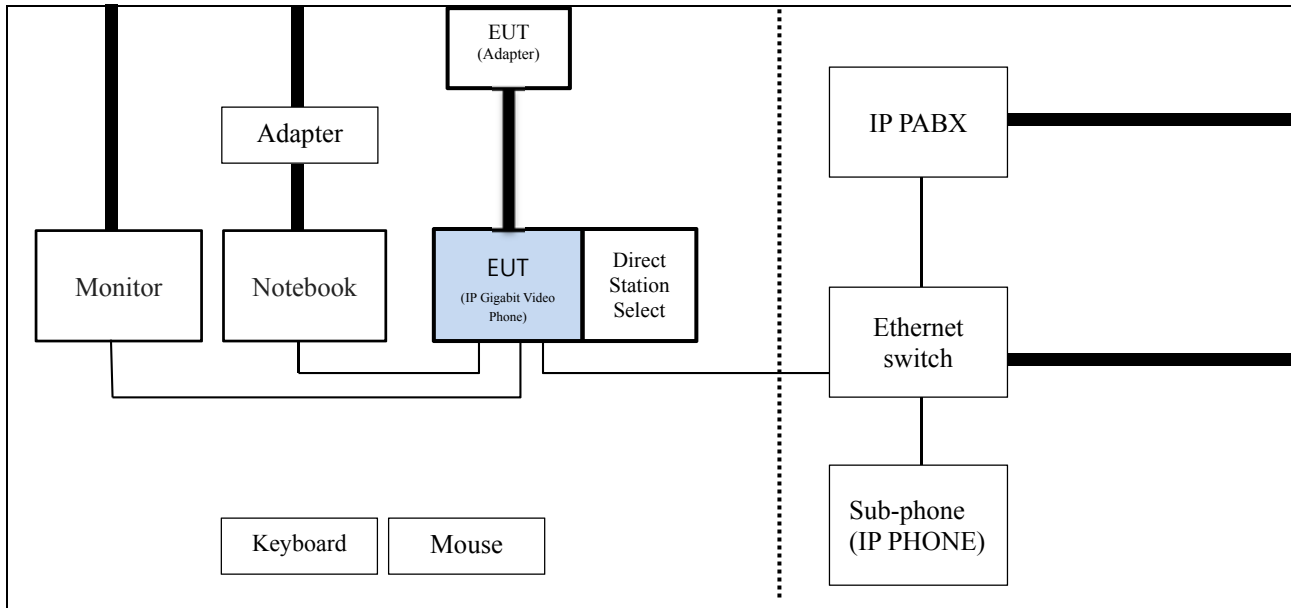
Name	Type*	Cable Length	Cable Type	Comments
Model1				
EUT	RJ-45	2.0	RJ-45	Connect to Notebook
	HDMI	1.5	HDMI	Connect to Monitor
	RJ-45	3.0	RJ-45	Connect to Ethernet switch
	AC In	2.0	Line	AC Outlet
Notebook	DC In	1.5	Din	AC/DC Adaptor
Adaptor	AC In	1.2	Line	AC Outlet
Monitor	AC In	1.5	Line	AC Outlet
Mode2				
EUT	RJ-45	2.0	RJ-45	Connect to Notebook
	HDMI	1.5	HDMI	Connect to Monitor
	RJ-45	3.0	RJ-45	Connect to Ethernet switch
Notebook	DC In	1.5	Din	AC/DC Adaptor
Adaptor	AC In	1.2	Line	AC Outlet
Monitor	AC In	1.5	Line	AC Outlet
* Type: AC - AC Power Port      DC – DC Power Port      N/E – Non-Electrical TP - Telecommunication Port      I/O - Signal Input or Output Port (not involved in process control)				

## 2.6 INTERNAL OPERATING FREQUENCIES OF EUT

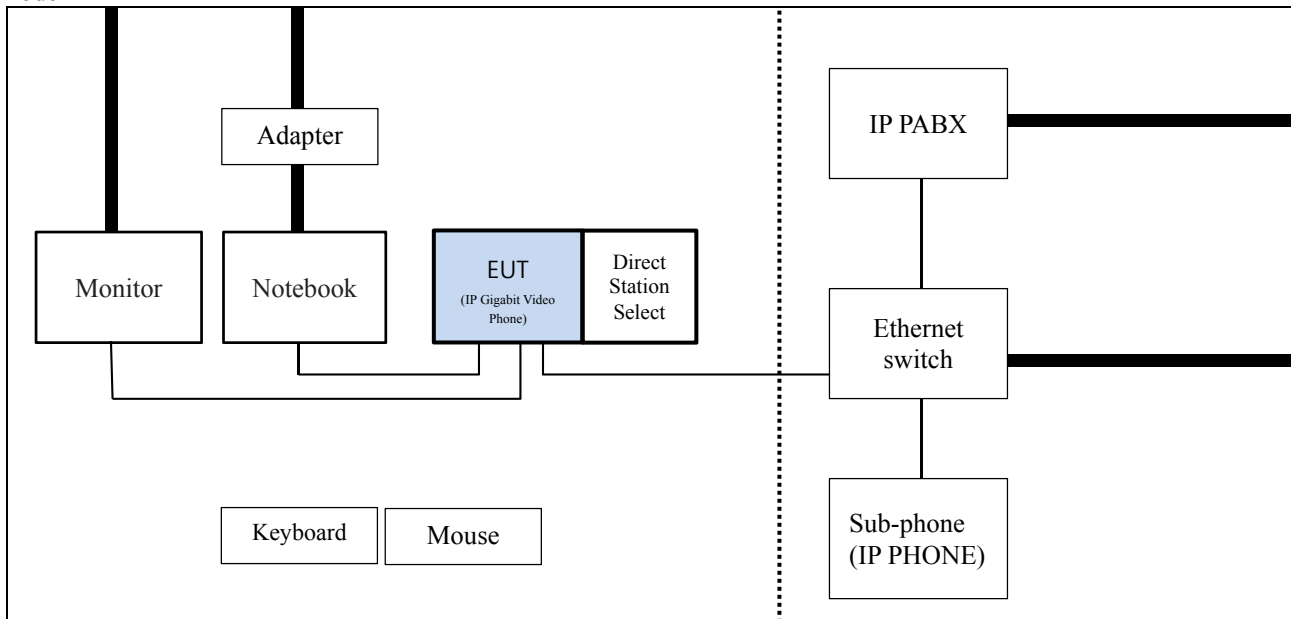
Frequency (MHz)	Description
996 MHz	CPU

## 2.7 TEST CONFIGURATIONS

Mode 1



Mode 2



———— Interface cable,      ————— Power cable

## **2.8 MODIFICATIONS**

- None

## **2.9 VARIATION COVERED BY THIS REPORT**

- None

### 3.0 TEST SUMMARY

#### 3.1 STANDARD FOR METHODS OF MEASUREMENT

Basic Standard	Test Type	Result	Remarks
FCC Part 15 Subpart B ICES-003 Issue 5(2012) ANSI C63.4-2009	Conducted Emissions	PASS	AC/DC Adaptor
	Radiated Emission (below 1 GHz)	PASS	30MHz ~ 1 GHz
	Radiated Emission (above 1 GHz)	PASS	1 GHz ~ 40 GHz

Note : The EUT has been tested / evaluated and passed the above standards.

#### 3.2 MEASUREMENT UNCERTAINTY

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

Measurement	Frequency	Uncertainty
Conducted Emission	150 kHz ~ 30 MHz	2.2 dB $\mu$ V
Radiated Emission	30 MHz ~ 1 GHz	4.3 dB $\mu$ V/m
	1 GHz ~ 6 GHz	5.0 dB $\mu$ V/m

This uncertainty represents an expanded uncertainty expressed at approximately than 95% confidence level using a converge factor of  $k=2$ .



## 4.0 CONDUCTED EMISSION TEST

### 4.1 LIMITS OF AC POWER-LINE

Class	Frequency [MHz]	Limit [dB $\mu$ V]	
		Quasi-peak	Average
A	0.15 ~ 0.5	79	66
	0.5 ~ 30	73	60
B	0.15 ~ 0.5	66 to 56	56 to 46
	0.5 ~ 5	56	46
	5 ~ 30	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.

### 4.2 TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due Date of Calibration	Used
EMI RECEIVER	PMM9010	Narda S.T.S/PMM	697WW40306	2016.09.14	■
Software	PMM Emission Suite	Narda S.T.S/PMM	-	-	■
EMI Test Receiver	ESCI7	ROHDE&SCHWARZ	100933	2016.09.01	□
	ESCS 30	ROHDE&SCHWARZ	845553/0026	2016.09.02	□
Software	ESxS-K1 Ver.2.10	ROHDE&SCHWARZ	-	-	□
LISN(2line)	ENV216	ROHDE&SCHWARZ	101456	2016.09.02	■
LISN(2line)	ENV216	ROHDE&SCHWARZ	101457	2016.09.02	■

### 4.3 TEST PROCEDURE

- The EUT was placed 0.4 m from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50  $\Omega$  / 50  $\mu$ H of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.

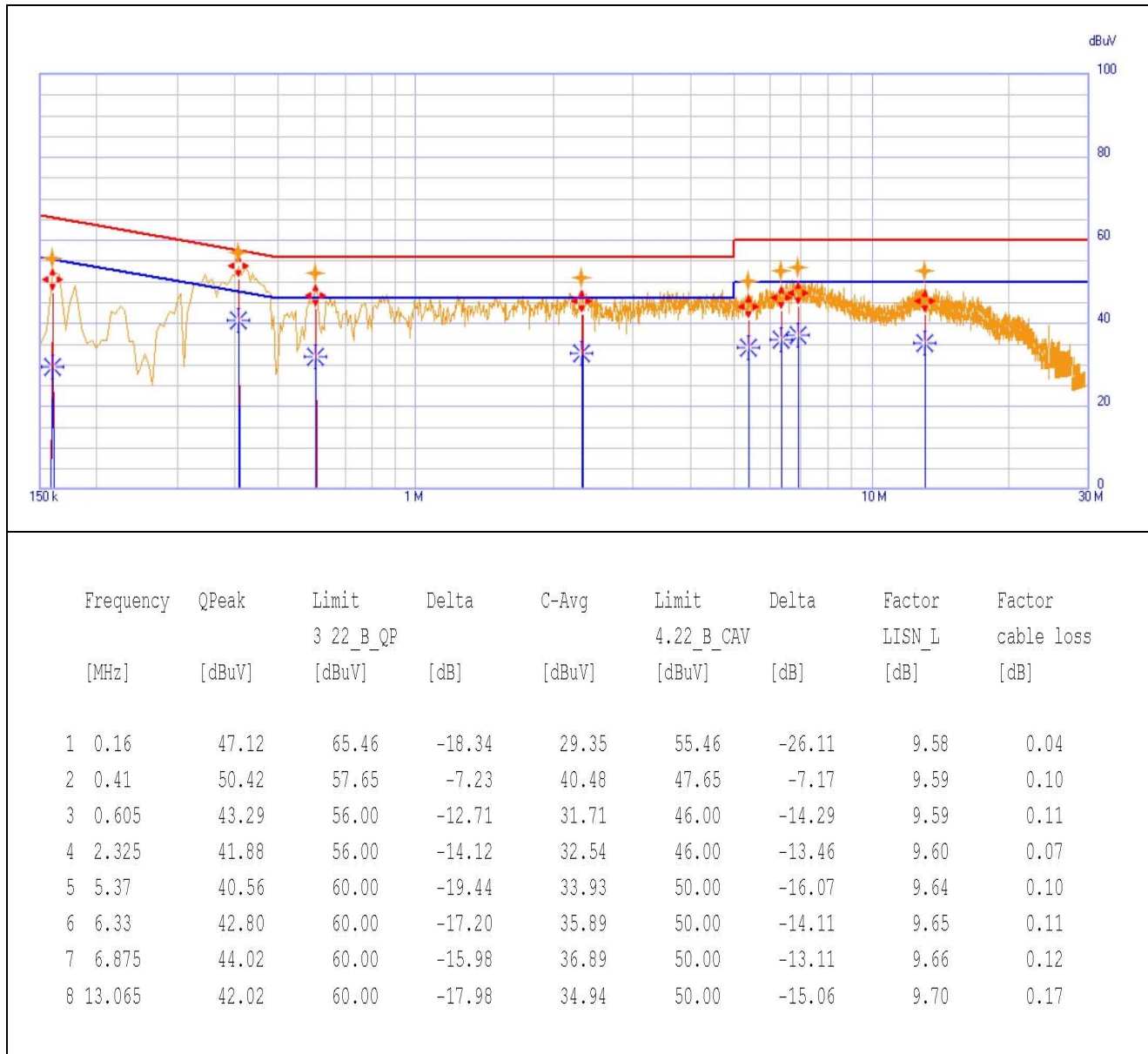
#### 4.4 ENVIRONMENT CONDITIONS

Test Site	Shield Room
Temperature	20 °C
Relative Humidity	41 % R.H.

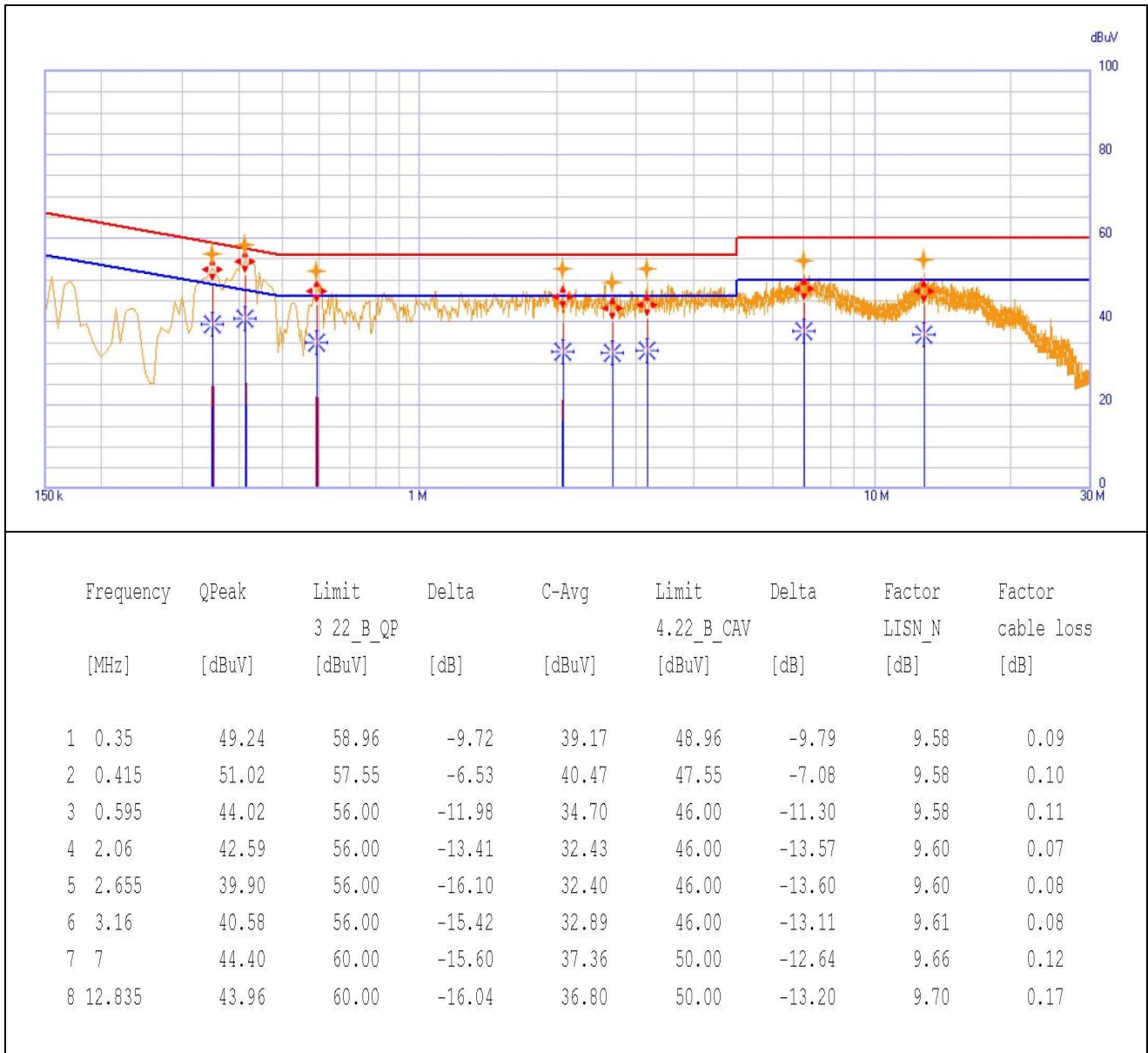
#### 4.5 TEST RESULTS

Test Mode	Model	Test Date	December 02, 2015
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##### [HOT LINE]



[NEUTRAL LINE]



If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

## 5.0 RADIATED DISTURBANCE (BELOW 1 GHz)

### 5.1 LIMITS FOR RADIATED DISTURBANCE

Frequency range MHz	Quasi-peak limits [dB $\mu$ V/m]	
	Class A (10 m)	Class B (3 m)
30 ~ 88	39.1	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.4	46.0
Above 960	49.5	54.0

Note 1: The lower limit shall apply at the transition frequency.  
Note 2: Additional provisions may be required for cases where interference occurs.

### 5.2 TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due Date of Calibration	Used
EMI Receiver	ESVS 30	ROHDE&SCHWARZ	828525/005	2016.09.01	■
Trilog-Broadband Antenna	VULB 9168	SCHWARZBECK	9168-505	2017.03.15	■
Turn Table	EMRT2012	EM Engineering	RT9812201	N/A	■
Antenna Master	EAM-40	DAEIL EMC Engineering	N/A	N/A	■
Antenna Master, Turn table Controller	DE-2000	DAEIL EMC Engineering	N/A	N/A	■

### 5.3 TEST PROCEDURE

- Radiated emission testing was performed at a Open field test site. The EUT was placed on a turntable top 0.8 m above ground. The table rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters or 10 meters from the EMI receiving antenna, which was mounted on a variable-height antenna tower.
- The antenna height was varied between 1 meter and 4 meters above ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set to make the measurement.
- 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.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

## 5.4 ENVIRONMENT CONDITIONS

Test Site	Open field test site
Temperature	8 °C
Relative Humidity	51 % R.H.

## 5.5 TEST RESULTS

Test Mode	Model	Test Date	December 05, 2015
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Freq. [MHz]	Read Level [dB(μV)]	Pol. [H/V]	Ant. Height [m]	Corr. Factor		Limit [dB(μV)/m]	Level [dB(μV)/m]	Margin [dB]
				Ant. Factor [dB/m]	Cable loss [dB]			
375.74	23.2	H	2.6	15.10	4.31	46	42.61	3.39
504.51	14.3	H	1.8	18.33	6.92	46	39.55	6.45
552.68	14.1	H	1.6	19.27	7.28	46	40.65	5.35
594.93	15.4	H	1.5	20.09	7.59	46	43.08	2.92
624.88	15.8	V	3.3	20.48	7.80	46	44.08	1.92
647.19	13.5	V	3.4	20.74	7.96	46	42.20	3.80

Test Mode	Mode2	Test Date	December 05, 2015
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Freq. [MHz]	Read Level [dB(μV)]	Pol. [H/V]	Ant. Height [m]	Corr. Factor		Limit [dB(μV)/m]	Level [dB(μV)/m]	Margin [dB]
				Ant. Factor [dB/m]	Cable loss [dB]			
221.97	23.9	H	4.0	10.65	4.33	46	38.88	7.12
350.28	22.1	H	2.8	14.62	4.58	46	41.30	4.70
375.74	20.8	V	1.0	15.10	4.31	46	40.21	5.79
594.93	14.4	H	1.5	20.09	7.59	46	42.08	3.92
624.88	15.7	V	3.3	20.48	7.80	46	43.98	2.02
647.19	12.2	V	3.4	20.74	7.96	46	40.90	5.10

\* Polarization (Pol.): H = Horizontal, V = Vertical

\* Level [dB(μV/m)] = Read Level [dB(μV)] + Correction Factor [dB/m]

\* Correction Factor [dB/m] = Antenna Factor [dB/m] + Cable Factor [dB]

\* Margin = Limit – Level

## 6.0 RADIATED DISTURBANCE (ABOVE 1 GHz)

### 6.1 LIMITS FOR RADIATED DISTURBANCE

Class	Frequency range GHz	Limit [dB(μV/m)]	
		Peak	Average
A (3 m)	1 ~ 5	80	60
	5 ~ 40	80	60
B (3 m)	1 ~ 5	74	54
	5 ~ 40	74	54

Note: The highest internal source of a EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes.

1. If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.
2. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.
3. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz.
4. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, whichever is less.

### 6.2 TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due Date of Calibration	Used
EMI Receiver	ESCI7	ROHDE&SCHWARZ	100933	2016.09.01	■
Software	E3 Ver.8	AUDIX	-	-	■
Low Noise Amplifier	TK-PA6S	TESTEK	140001	2016.09.02	■
Horn Antenna	BBHA 9120D	SCHWARZBECK	1215	2016.02.10	■
Turn Table	ACT-T 120	AUDIX	N/A	N/A	■
Antenna Master	AM 3500-A	AUDIX	N/A	N/A	■
Antenna Master, Turn table Controller	EM1000	AUDIX	060601	N/A	■

### 6.3 TEST PROCEDURE

- Radiated testing was performed at a 3 meters semi-anechoic chamber. The EUT was placed on a turntable top 0.8 m above ground. The table was 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters from the EMI receiving antenna, which was mounted on a variable-height antenna tower.
- The antenna height was the center of the EUT. Both horizontal and vertical polarizations of the antenna were set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was fixed to height at the center of the EUT and the rotatable table was turned from 0 degree to 360 degrees to find the maximum reading.
- The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

### 6.4 ENVIRONMENT CONDITIONS

Test Site	3 m Semi-anechoic Chamber
Temperature	19 °C
Relative Humidity	41 % R.H.

### 6.5 TEST RESULTS

Test mode	Model	Test Date	December 02, 2015
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Freq. [GHz]	POL [V/H]	CORRECTION FACTOR [dB(μV)]		AMP [dB]	AF [dB/m]	CL [dB]	LIMIT [dB(μV)/m]		RESULT [dB(μV)/m]	
		PK	C-AV				PK	C-AV	PK	C-AV
1.40	V	58.46	39.02	43.86	25.55	4.34	74	54	44.5	25.1
1.59	H	63.51	39.59	43.78	25.70	4.65	74	54	50.1	26.2
1.78	H	53.32	39.58	42.92	25.83	4.91	74	54	41.1	27.4
2.08	V	55.08	37.76	43.29	26.20	5.27	74	54	43.3	25.9
2.40	H	53.85	35.63	43.08	27.14	5.77	74	54	43.7	25.5
3.20	V	48.96	33.24	39.55	28.72	6.73	74	54	44.9	29.1

\* Polarization (Pol.): H = Horizontal, V = Vertical

\* Level [dB(μV/m)] = Read Level [dB(μV)] + Correction Factor [dB/m]

Ex. 35 dBμV/m = 25 dBμV + 10 dB/m

\* Correction Factor [dB/m] = Antenna Factor [dB/m] + Cable Factor [dB] - AMP Gain[dB]

Test mode	Mode2	Test Date	December 02, 2015
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Freq. [GHz]	POL [V/H]	CORRECTION FACTOR [dB(μV)]		AMP [dB]	AF [dB/m]	CL [dB]	LIMIT [dB(μV)/m]		RESULT [dB(μV)/m]	
		PK	C-AV				PK	C-AV	PK	C-AV
1.40	V	60.17	39.00	43.90	25.56	4.35	74	54	46.2	25.0
1.59	V	68.12	42.69	43.78	25.70	4.65	74	54	54.7	29.3
1.63	H	53.31	38.40	43.62	25.73	4.71	74	54	40.1	25.2
2.08	H	52.54	36.95	43.29	26.20	5.27	74	54	40.7	25.1
2.40	V	56.17	35.74	43.08	27.14	5.77	74	54	46.0	25.6
3.17	H	46.69	34.36	39.98	28.70	6.69	74	54	42.1	29.8

\* Polarization (Pol.): H = Horizontal, V = Vertical

\* Level [dB(μV/m)] = Read Level [dB(μV)] + Correction Factor [dB/m]

Ex. 35 dBμV/m = 25 dBμV + 10 dB/m

\* Correction Factor [dB/m] = Antenna Factor [dB/m] + Cable Factor [dB] - AMP Gain[dB]



## 7.0 PHOTHOGRAPHS OF THE TEST CONFIGURATION

### 7.1 CONDUCTED EMISSIONS

<Front>



<Rear>



## 7.2 RADIATED EMISSIONS (BELOW 1 GHz)

<Front>

Mode 1



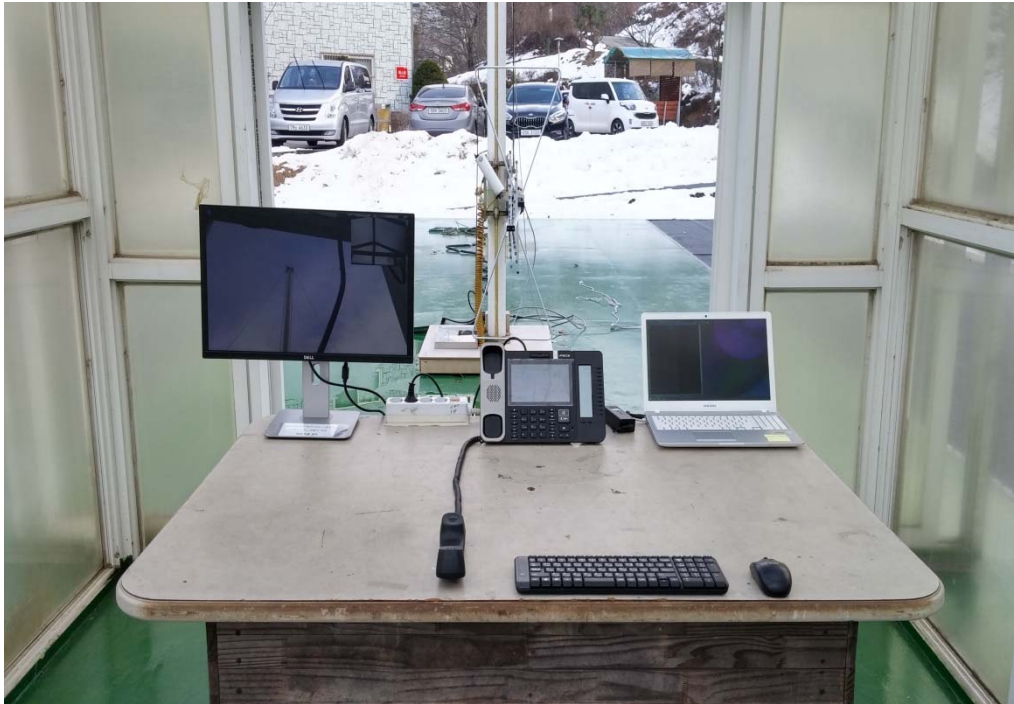
<Rear>





<Front>

Mode 2



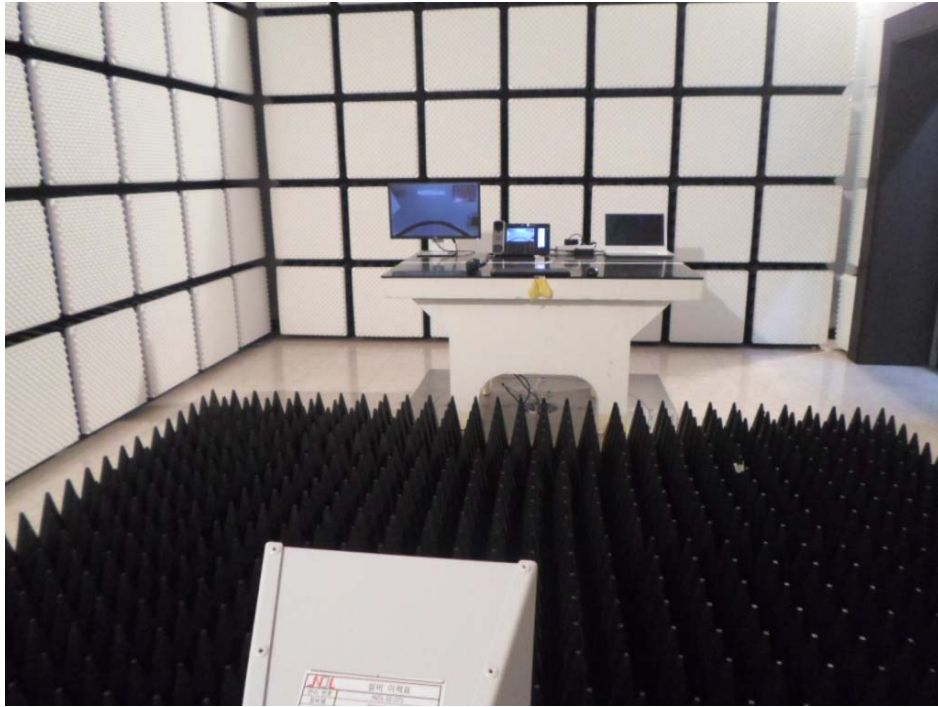
<Rear>



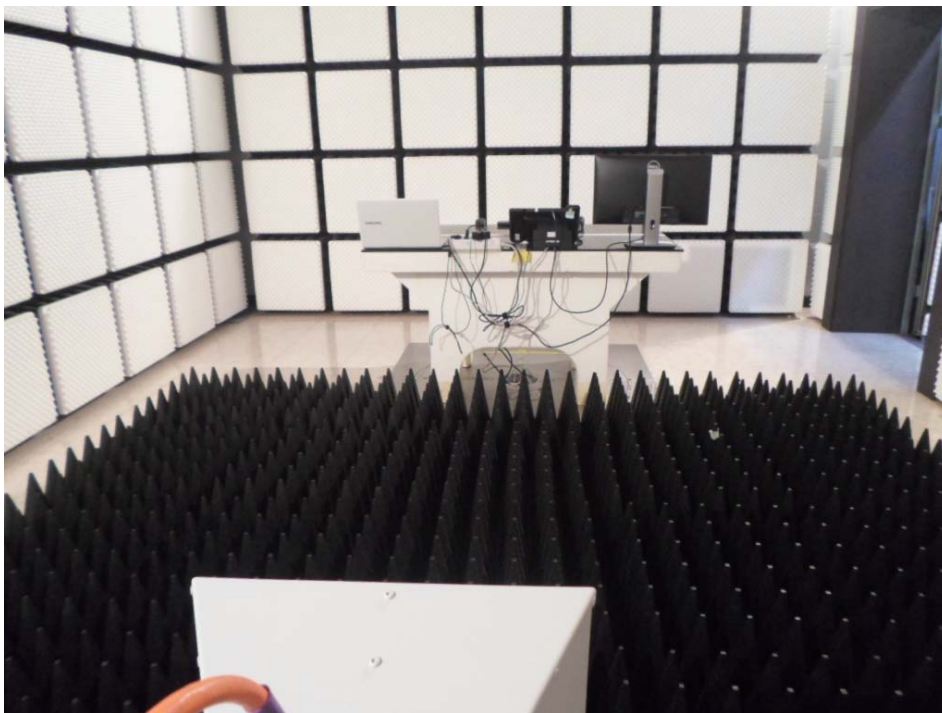
### 7.3 RADIATED EMISSIONS (ABOVE 1 GHz)

<Front>

Mode 1



<Rear>



<Front>

Mode 1



<Rear>





## 8.0 PHOTHOGRAPHS OF EUT

<Front of EUT>



<Bottom of EUT>



< Right of EUT >



< Left of EUT >



< Top of Main Board>

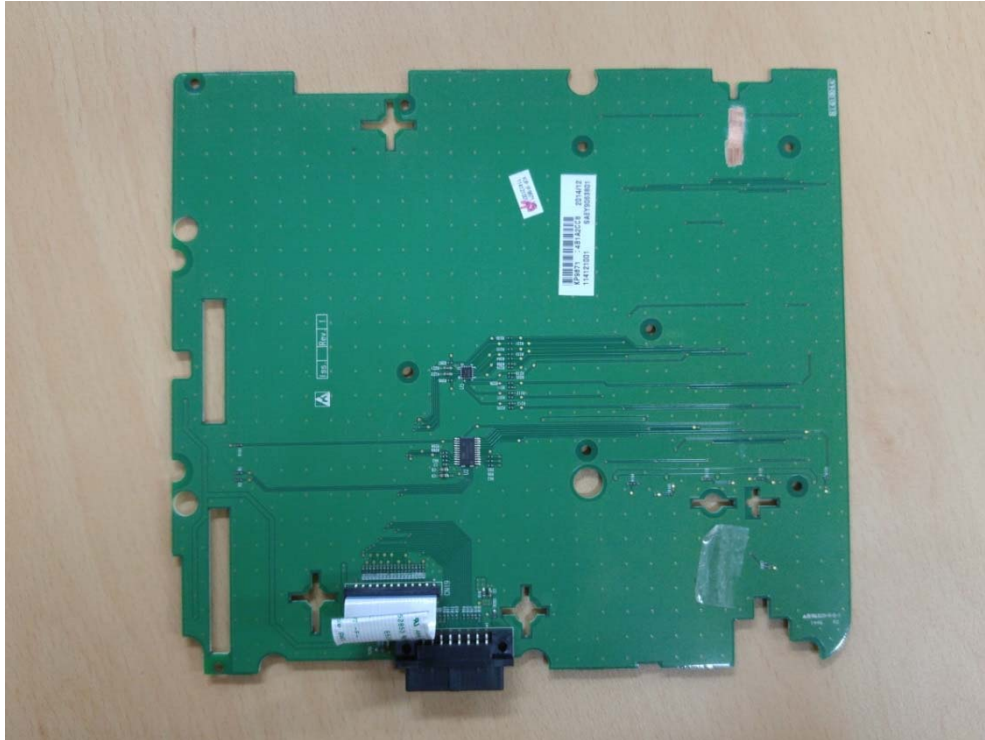


< Bottom of Main Board>

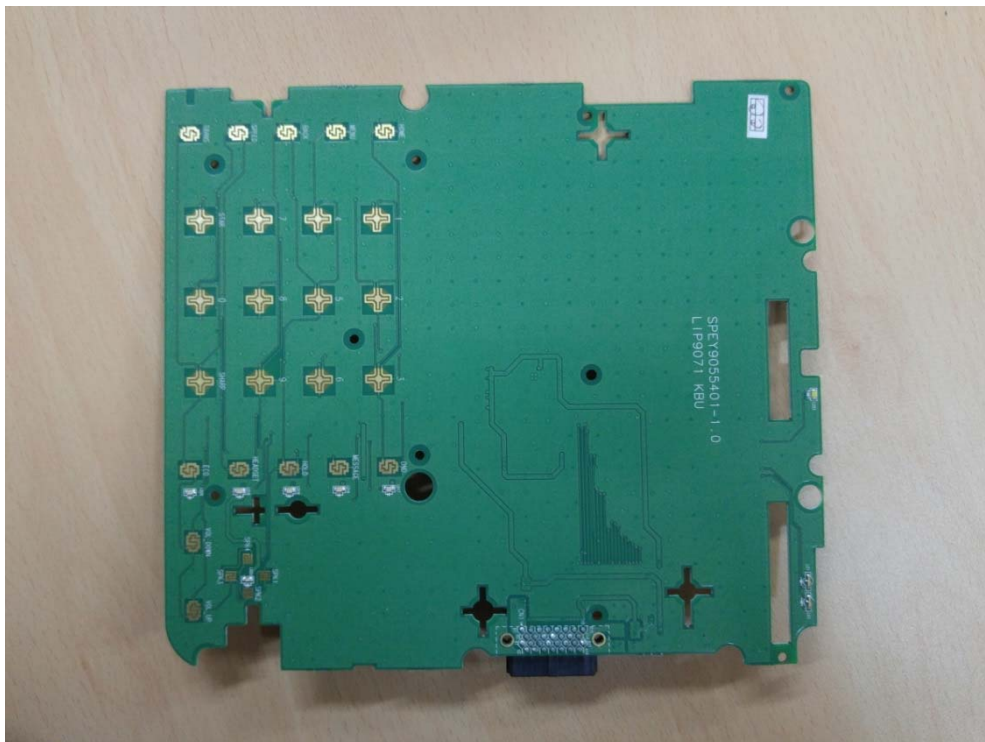




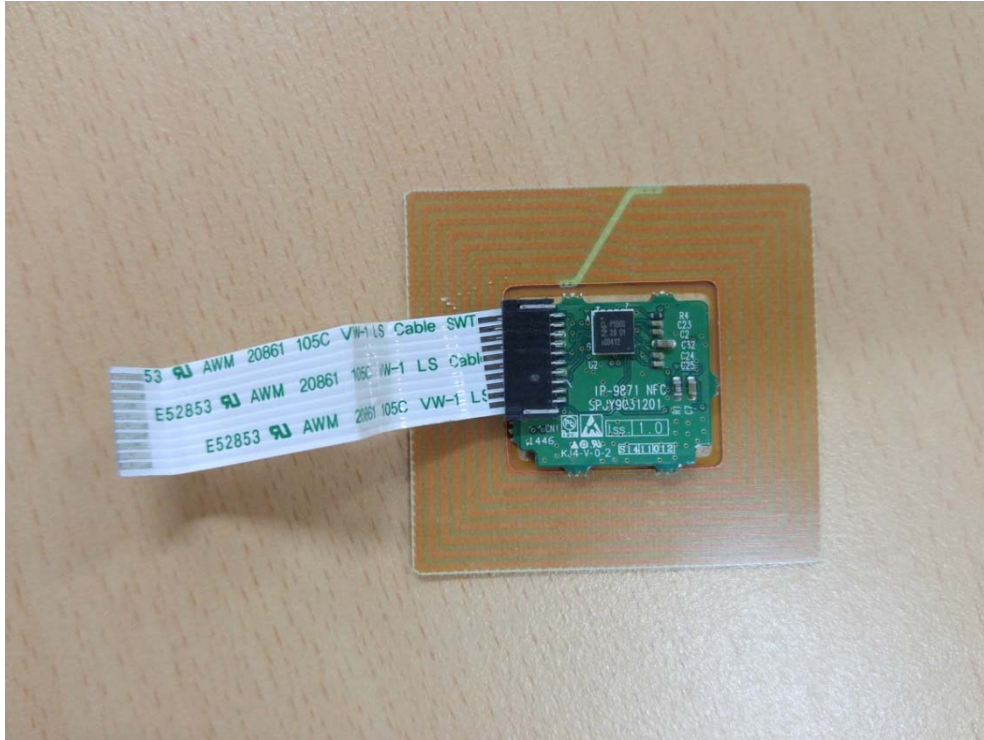
< Top of Power Board>



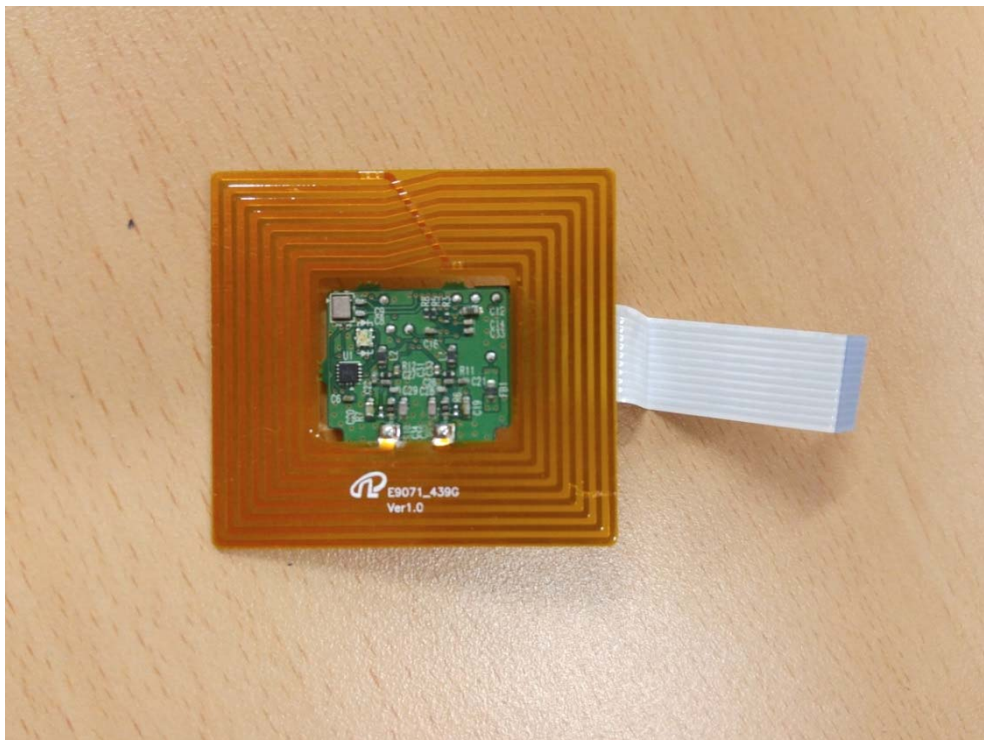
< Bottom of Power Board>



< Top of NFC module >



< Bottom of NFC module >



< Top of Panel >



< Bottom of Panel >





< Inside of EUT >



<Label>

<p><b>iPECS</b> <b>LIP-9071</b> IP Gigabit Video Phone For applicable power supplies see user manual. DC 48V , 0.3A  44~57VDC, PD Classification 4. IC: 11597A-LIP9071, FCC ID: 2ABGALIP9071 US: EKRIIPNANLIP9071 Made in Thailand</p>	<p>"This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation." CAN ICES-3 (B)/NMB-3(B)</p> <p> US I.T.E. LISTED E366459 ERICSSON </p>
<p><b>iPECS</b> <b>IP9871</b> IP Gigabit Video Phone For applicable power supplies see user manual. DC 48V , 0.3A  44~57VDC, PD Classification 4. IC: 11597A-LIP9071, FCC ID: 2ABGALIP9071 US: EKRIIPNANLIP9071 Made in Thailand</p>	<p>"This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:(1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation." CAN ICES-3 (B)/NMB-3(B)</p> <p> US I.T.E. LISTED E366459 ERICSSON </p>