Accredited Testing Laboratory under the terms of ISO/IEC 17025

CE CONFORMANCE REPORT

R&TTE DIRECTIVE 1995/5/EC

for

PRODUCT: USB TOUCHSCREEN MONITOR

"MODEL NAME: UM-760C-SMK"

MULTIPLE MODEL NAME: UM-760-SMK

AUTHORIZED

MultimediaLink Inc.

#812, DaehyeonTechnoWorld, 174, Ojeon-dong, Uiwang-si, Gyeonggi-do, 437-753, Korea

June 08, 2016

SUMMARY

The equipment complies with the standards;

- EN 55032: 2012
- EN 55024: 2010

(signature)

Sung-Ik, Han/ Managing Director

This is only valid in connection with Test Report: W166R-D010

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HEAD OFFICE : 301-14 Daessangnyeong-ri, Chowol-eup, Gwangju-si, Gyeonggi-do 464-862 Korea (TEL: 82-31-799-9500, FAX: 82-31-799-9599)

ELECTROMAGNETIC COMPATIBILITY TEST REPORT

Test Report No.	**: W166R-D010**
AGR No.	**: A165A-149**
Applicant	**: MultimediaLink Inc.**
Address	**: #812, DaehyeonTechnoWorld, 174, Ojeon-dong, Uiwang-si, Gyeonggi-do, 437-753, Korea**
Manufacturer	**: MultimediaLink Inc.**
Address	**: #812, DaehyeonTechnoWorld, 174, Ojeon-dong, Uiwang-si, Gyeonggi-do, 437-753, Korea**
Type of Equipment	**: USB Touchscreen Monitor**
Model Name	**: UM-760C-SMK**
Multiple Model Name	**: UM-760-SMK**
Serial number	**: N/A**
Total page of Report	**: 38 pages (including this page)**
Date of Incoming	**: May 17, 2016**
Date of Issuing	**: June 08, 2016**

SUMMARY

The equipment complies with the standard; EN 55032: 2012 and EN 55024: 2010.

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.

Reviewed by: Ki-Hong, Nam / Asst, Chief Engineer
ONETECH Corp.

Approved by: Sung-Ik, Han/ Managing Director
ONETECH Corp.

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Revision History

Issue Report No.	Issued Date	Revisions	Effect Section
W166R-D010	June 08, 2016	Initial Release	All

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1. APPLICANT AND MANUFACTURER INFORMATION

-. Applicant : MultimediaLink Inc.

-. Address : #812, DaehyeonTechnoWorld, 174, Ojeon-dong, Uiwang-si, Gyeonggi-do, 437-753, Korea

-. Manufacturer : MultimediaLink Inc.

-. Address : #812, DaehyeonTechnoWorld, 174, Ojeon-dong, Uiwang-si, Gyeonggi-do, 437-753, Korea

2. TEST SUMMARY

2.1 Test standards and results

STANDARDS		RESULTS
EN 55032: 2012	Radiated Emission	PASS
	Conducted Emission on DC Power Input/Output Port	N/A (See Note1)
	Conducted Emission on AC mains Input/Output Port	PASS
	Conducted Emission on Telecommunication Port	N/A (See Note 2)
	Harmonic Current Emission on AC Mains Input Port	N/A (See Note 3)
	Voltage Fluctuations and Flicker on AC Mains Input Port	N/A (See Note 3)
EN 55024: 2010	Electrostatic Discharge Immunity	Met criterion B
	RF Electromagnetic Filed Immunity	Met criterion A
	Electrical Fast Transient/Burst Immunity	Met criterion A
	Surge Immunity	Met criterion A
	RF Common mode 0.15 MHz to 80 MHz Immunity	Met criterion A
	Transients and surges, vehicular environment	N/A (See Note 4)
	Power Frequency Magnetic Field Immunity	N/A (See Note 5)
	Voltage Dips, Short Interruptions and Voltage Variations	Met criterion A & C

Note 1: The test is not applicable because the EUT is operated by AC 230 V~.

Note 2: This test is not applicable because the EUT does not have any telecommunication ports.

Note 3: This test is not performed because the EUT is operated by DC battery.

Note 4: The test is not applicable because the EUT is not operated in a vehicular environment.

Note 5: The equipment under test does not contain devices susceptible to magnetic fields So the test was not performed.

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2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Purpose of the test

To determine whether the equipment under test fulfills the EMC requirements of the standards stated in section 2.1.

2.4 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-4112/ C-4617/ G-666/ T-1842

IC (Industry Canada) – Registration No. Site# 3736-3

-. Site Accreditation:

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

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3. EUT (Equipment Under Test)

3.1 Identification of the EUT

-. Equipment : USB Touchscreen Monitor

-. Model Name : UM-760C-SMK

-. Brand Name : N/A

-. Serial number : N/A

-. Manufacturer : MultimediaLink Inc.

3.2 Additional information about the EUT

The MultimediaLink Inc., Model UM-760C-SMK (referred to as the EUT in this report) is a USB Touchscreen Monitor. Product specification information described herein was obtained from product data sheet or user's manual.

Monitor	1 024 x 600
Display processor	DisplayLink DL-125
Memory	DDR-400
Power Consumption	5 W (USB Power 5 V, Max 1.0 A)
Input Connector	USB Port

3.3 Peripheral equipment

Defined as equipment needed for correct operation of the EUT, but not considered as tested:

Model	Manufacturer	Description	Connected to
UM-760C-SMK	MultimediaLink Inc.	USB Touchscreen Monitor (EUT)	-
Pavilion dv3	HP	Notebook PC	EUT
LA65NS2-01	LITE-ON TECHNOLOGY CORPORATION	AC ADAPTER	-

3.4 Cable Description

Port name	Shielded	Ferrite Bead	Metal Shell	Length (m)	Connected to
USB	N	N	N	1.5	Notebook PC

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3.5 Mode of operation during the test

-. The EUT was operated with USB cable connected to the Notebook PC and then the EUT was operated Video output mode and Touch screen mode.

-. Input power condition during the measurements was AC 230 V~, 50 Hz.

3.6 Criterion description - EN 55032 / EN 55024

Criterion	Description
A	During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.
B	After the test, the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the EUT if used as intended.
C	During and after testing, a temporary loss of function is allowed, provided the function is self recoverable, or can be restored by the operation of the controls or cycling of the power to the EUT by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

3.9 Alternative type(s)/model(s); also covered by this test report

-. The following lists consist of the added model and their differences.

Model Name	Differences	Tested
UM-760C-SMK	Basic Model	☑
UM-760-SMK	The model is touch function delete.	☐

Note: 1. Applicant consigns only basic model to test. Therefore this test report just guarantees the units, which have been tested.

2. The Applicant/manufacturer is responsible for the compliance of all variants.

4. EUT MODIFICATIONS

-. None.

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5. EMISSION TESTS

5.1 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE

5.1.1 Operating environment

Temperature : (23 ~ 24) °C

Relative humidity : (46 ~ 47) % R.H.

5.1.2 Test set-up

The EUT and all local support equipment were placed on a non-conductive table, 0.8 m height above the reference ground plane. Power was fed to the EUT through a 50 Ω / 50 μH + 5 Ω Artificial Mains Network (AMN). The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient.

The test set-up photos are included in appendix I.

5.1.3 Measurement uncertainty

Mains terminal continuous disturbance voltage, quasi-peak detection : ± 2.93 dB

Mains terminal continuous disturbance voltage, average detection : ± 2.93 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, k = 2.

5.1.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESPI	Rohde & Schwarz	Test Receiver	101278	Nov. 02, 2015 (1Y)
☐ -	ESHS10	Rohde & Schwarz	Test Receiver	834467/007	Apr. 05, 2016 (1Y)
☐ -	NSLK8128	Schwarzbeck	AMN	8128-216	Apr. 06, 2016 (1Y)
■ -	NSLK8126	Schwarzbeck	AMN	8126-404	Apr. 05, 2016 (1Y)
☐ -	LT 32C	AFJ INSTRUMENT	AMN	32031306157	Apr. 05, 2016 (1Y)
☐ -	3825/2	EMCO	AMN	9109-1869	Apr. 06, 2016 (1Y)
☐ -	3825/2	EMCO	AMN	9109-1867	Apr. 06, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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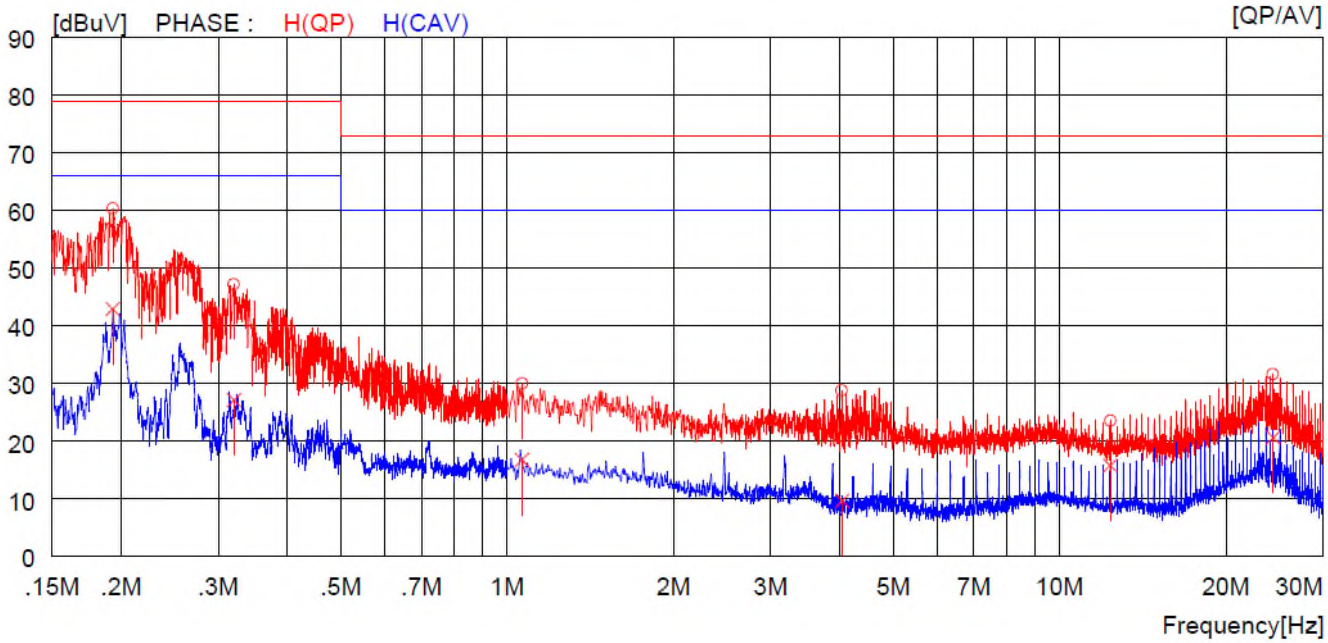
5.1.5 Test data

-. Test Date : May 24, 2016

-. Resolution bandwidth : 9 kHz

-. Frequency range : 0.15 MHz ~ 30 MHz

-. Tested Line : HOT LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.19300	60.3	----	0.1	60.4	----	79.0	----	18.6	----	H(QP)
2	0.32000	47.1	----	0.1	47.2	----	79.0	----	31.8	----	H(QP)
3	1.06400	29.9	----	0.1	30.0	----	73.0	----	43.0	----	H(QP)
4	4.04000	28.5	----	0.2	28.7	----	73.0	----	44.3	----	H(QP)
5	12.35000	23.0	----	0.5	23.5	----	73.0	----	49.5	----	H(QP)
6	24.35000	30.9	----	0.7	31.6	----	73.0	----	41.4	----	H(QP)
7	0.19300	----	42.8	0.1	----	42.9	----	66.0	----	23.1	H(CAV)
8	0.32000	----	27.0	0.1	----	27.1	----	66.0	----	38.9	H(CAV)
9	1.06400	----	16.7	0.1	----	16.8	----	60.0	----	43.2	H(CAV)
10	4.04000	----	9.5	0.2	----	9.7	----	60.0	----	50.3	H(CAV)
11	12.35000	----	15.3	0.5	----	15.8	----	60.0	----	44.2	H(CAV)
12	24.35000	----	19.9	0.7	----	20.6	----	60.0	----	39.4	H(CAV)

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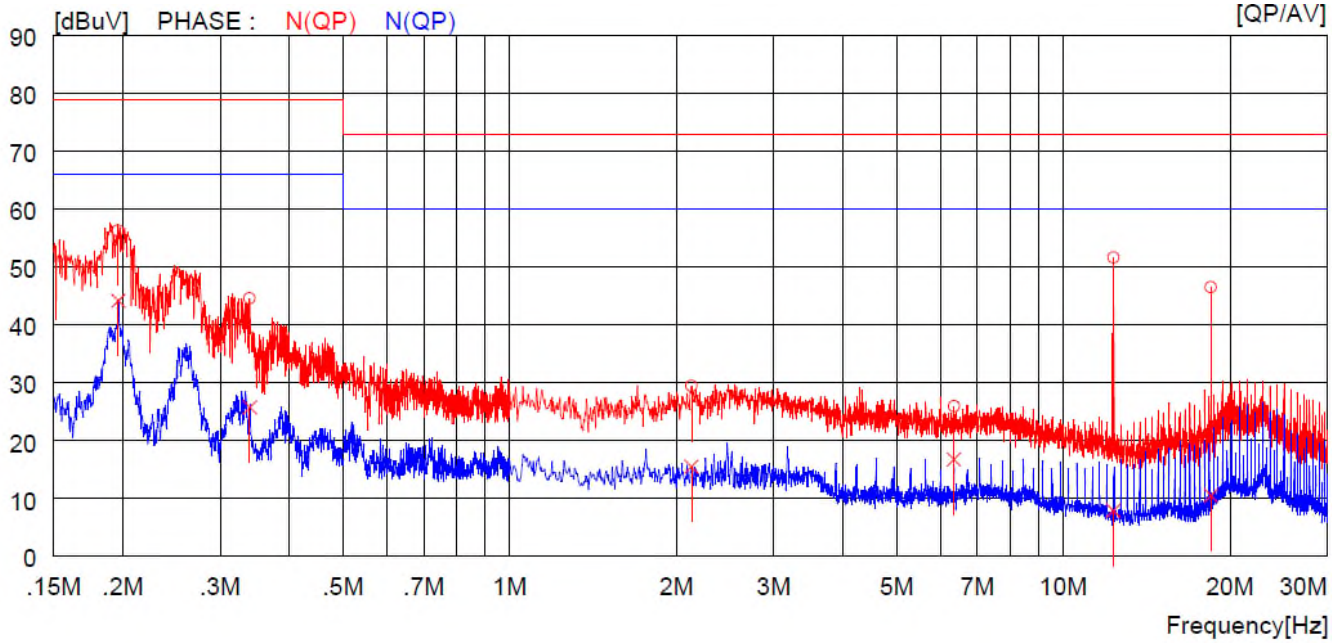
-. Tested Line : NEUTRAL LINE



NO	FREQ [MHz]	READING QP [dBuV]	READING AV [dBuV]	C.FACTOR [dB]	RESULT QP [dBuV]	RESULT AV [dBuV]	LIMIT QP [dBuV]	LIMIT AV [dBuV]	MARGIN QP [dBuV]	MARGIN AV [dBuV]	PHASE
1	0.19600	56.2	----	0.1	56.3	----	79.0	----	22.7	----	N(QP)
2	0.33900	44.5	----	0.1	44.6	----	79.0	----	34.4	----	N(QP)
3	2.12800	29.2	----	0.2	29.4	----	73.0	----	43.6	----	N(QP)
4	6.35000	25.6	----	0.3	25.9	----	73.0	----	47.1	----	N(QP)
5	12.33000	51.1	----	0.5	51.6	----	73.0	----	21.4	----	N(QP)
6	18.48000	45.8	----	0.7	46.5	----	73.0	----	26.5	----	N(QP)
7	0.19600	----	44.1	0.1	----	44.2	----	66.0	----	21.8	N(CAV)
8	0.33900	----	25.6	0.1	----	25.7	----	66.0	----	40.3	N(CAV)
9	2.12800	----	15.3	0.2	----	15.5	----	60.0	----	44.5	N(CAV)
10	6.35000	----	16.5	0.3	----	16.8	----	60.0	----	43.2	N(CAV)
11	12.33000	----	7.4	0.5	----	7.9	----	60.0	----	52.1	N(CAV)
12	18.48000	----	9.8	0.7	----	10.5	----	60.0	----	49.5	N(CAV)

Remark: Margin (dB) = Limit – Level (Result)

The emission level in above table is included the transducer factor that means insertion loss (LISN), cable loss and attenuator.

Tested by: Seok-Jun, Lee / Engineer

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5.2 RADIATED ELECTROMAGNETIC FIELD

5.2.1 Operating environment

Temperature : 22.4 °C

Relative humidity : 45.3 % R.H.

5.2.2 Test set-up

The radiated emissions measurements were on the 10 m, semi anechoic chamber. The EUT was placed on a non-conductive table, 0.8 m height above the ground plane.

The frequency spectrum from 30 MHz to 1 000 MHz was scanned and emission levels maximized at each frequency recorded. The system 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.

The test set-up photos are included in appendix II.

5.2.3 Measurement uncertainty

Radiated emission electric field intensity, 30 MHz ~ 300 MHz : ± 4.43 dB

Radiated emission electric field intensity, 300 MHz ~ 1 000 MHz : ± 3.80 dB

Measurement uncertainty is calculated in accordance with CISPR 16-4-2. The measurement uncertainty is given with a confidence of 95 % with the coverage factor, k = 2.

5.2.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	ESCI	Rohde & Schwarz	EMI Test Receiver	101013	Apr. 05, 2016 (1Y)
■ -	ESU	Rohde & Schwarz	EMI Test Receiver	100261	Apr. 06, 2016 (1Y)
■ -	310N	Sonoma Instrument	Amplifier	312544	Apr. 05, 2016 (1Y)
■ -	310N	Sonoma Instrument	Amplifier	312545	Apr. 05, 2016 (1Y)
□ -	SCU 18	Rohde & Schwarz	Signal Conditioning Unit	102209	May. 31, 2016 (1Y)
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-421	Apr. 15, 2016 (2Y)
■ -	VULB9163	Schwarzbeck	TRILOG Broadband Antenna	9163-255	May 20, 2016 (2Y)
□ -	BBHA9120D	Schwarzbeck	Horn Antenna	BBHA9120D295	Aug. 31, 2015 (2Y)
■ -	CO3000	Innco System	Controller	CO3000/904/ 37211215/L	N/A
■ -	DT3000	Innco System	Turn Table	930611	N/A
■ -	MA4000-EP	Innco System	Antenna Master	MA4000/332/ 27030611/L	N/A
■ -	MA-4000XPET	Innco System	Antenna Master	MA4000/509/ 37211215/L	N/A
□ -	N/A	EMCO	Tripod	N/A	N/A

All test equipment used is calibrated on a regular basis.

5.2.5 Test data

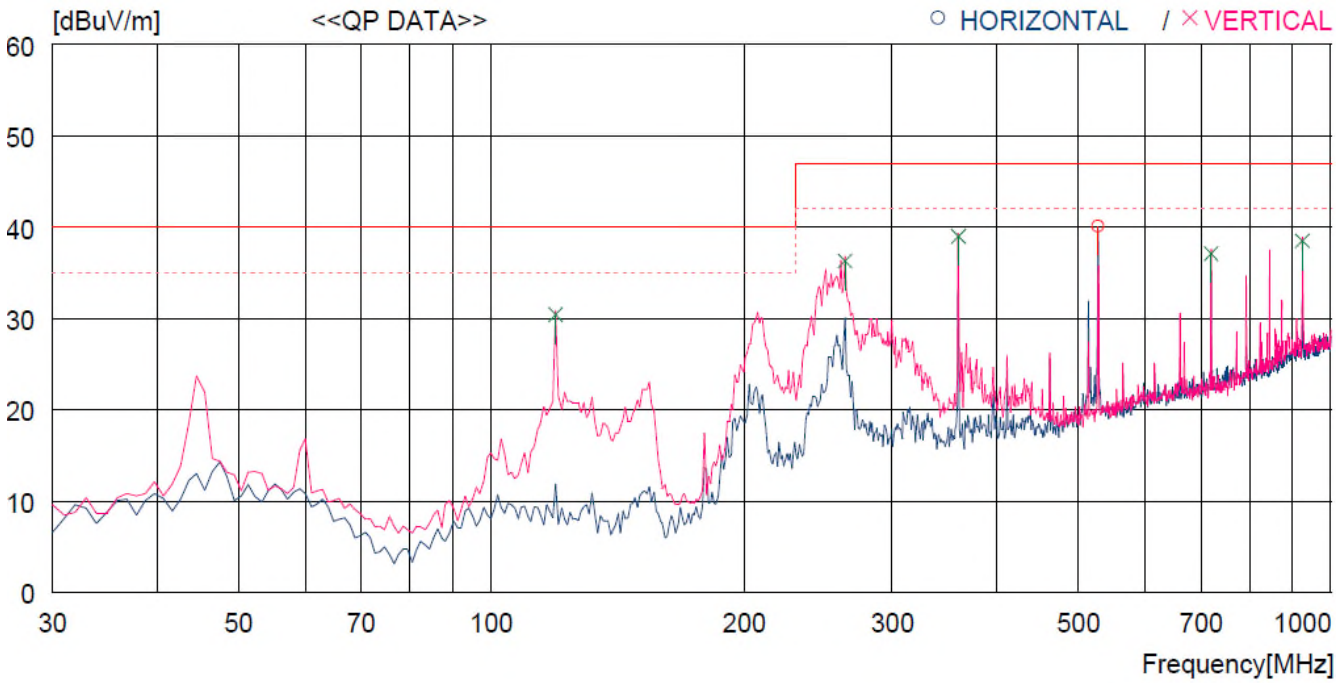
-. Test Date : May 23, 2016

-. Resolution bandwidth : 120 kHz

-. Frequency range : 30 MHz ~ 1 000 MHz

-. Measurement distance : 10 m

-. Detector Mode : Q.P



No.	FREQ [MHz]	READING QP [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	527.610	48.6	17.6	6.9	33.0	40.1	47.0	6.9	200	354
----- Vertical ------										
2	119.240	49.5	10.3	3.2	32.6	30.4	40.0	9.6	200	359
3	263.770	51.3	12.6	4.7	32.3	36.3	47.0	10.7	100	0
4	359.800	50.9	14.8	5.5	32.2	39.0	47.0	8.0	100	0
5	719.664	42.3	19.8	8.0	33.0	37.1	47.0	9.9	300	0
6	924.328	39.1	22.4	8.9	31.9	38.5	47.0	8.5	200	2

Remark: Margin (dB) = Limit – Result and Result = Reading Q.P + Antenna Factor + Loss – Gain

Loss and Gain in above table means Cable Loss and Pre-amplifier gain.

Tested by: Seok-Jun, Lee / Engineer

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6. IMMUNITY TESTS

6.1 ELECTROSTATIC DISCHARGE IMMUNITY

The **measurement of the Immunity Against Electrostatic Discharge** was performed in a shield room.

Date: May 25, 2016

6.1.1 Operating environment

Ambient temperature	23.4 [°C]
Relative humidity	45.8 [% R.H.]
Atmospheric pressure	101.2 [kPa]

6.1.2 Test set-up

The EUT and all local support equipment were placed on non-conductive support 0.8 m above a reference ground plane (RGP) and were put into operation according to the specified operating mode.

The test set-up photo is included in appendix III.

6.1.3 Measurement uncertainty

It has been demonstrated that the ESD generator meets the specified requirements in the standard with at least a 95 % confidence.

6.1.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	ESS-2002EX	NOISEKEN	Electrostatic Discharge Simulator	ESS0898812	Apr. 07, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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6.1.5 Test data

Test levels	: Contact discharge 2 / 4 kV, Air discharge 2 / 4 / 8 kV
Number of contact/air discharges	: 25 each pol. at each point for contact discharge 10 each pol. at each point for air discharge
Polarity	: Positive / Negative
EUT-position	: Table top
Required performance criterion	: B
Test result	: Met criterion B
Monitoring of the EUT	: Observed the state of Video output mode and Touch screen mode.

The test points of the EUT are each location on the surface touchable by hand (see test point in next page) and HCP / VCP - 0.1 m from the four sides of the EUT.

The results of selected test points of the EUT are listed in below table.

Point	Test level [± kV]	Pass / Fail	Description
Enclosure	2 / 4 (Contact)	Pass	There was no deviation from normal operating condition during and after test. Enclosure, screw contact with sound stuttering but ensure normal operation after test.
Screw	2 / 4 (Contact)	Pass	
Display	2 / 4 / 8 (Air)	Pass	
Port	2 / 4 / 8 (Air)	Pass	
HCP / VCP	2 / 4 (Indirect)	Pass	

Tested by: Seok-Jun, Lee / Engineer

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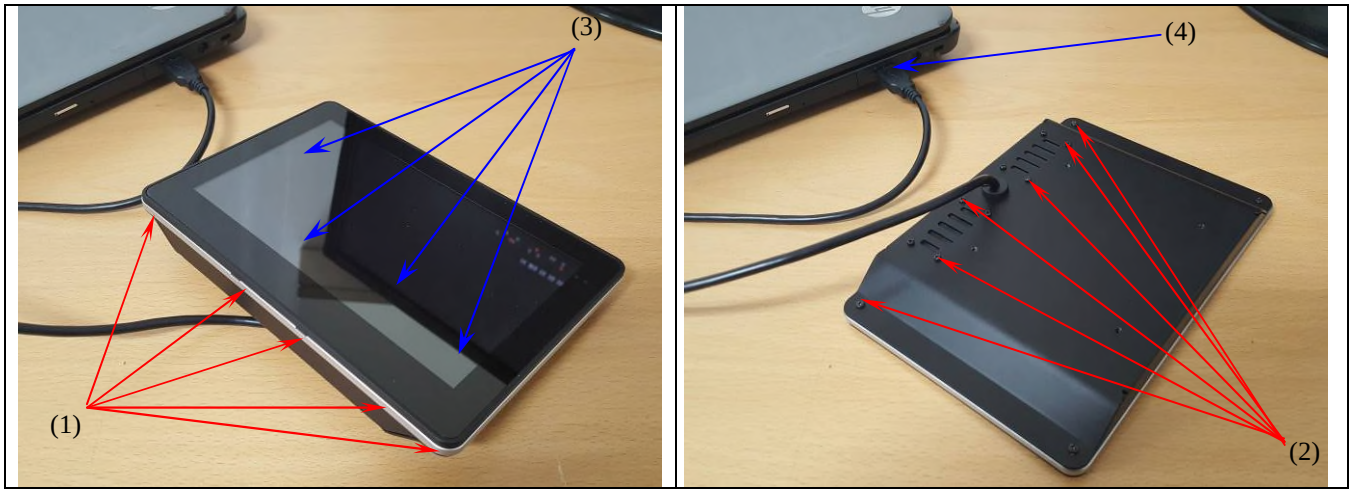
6.1.6 ESD Test Point Table

ESD Point	Discharge voltage [± kV]	Test Result
(1)Enclosure	2 / 4 (Contact)	Met Criterion B
(2)Screw	2 / 4 (Contact)	Met Criterion B
(3)Display	2 / 4 / 8 (Air)	Met Criterion A
(4)Port	2 / 4 / 8 (Air)	Met Criterion A
HCP / VCP	2 / 4 (Indirect)	Met Criterion A



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6.2 RADIATED RF-ELECTROMAGNETIC FIELD IMMUNITY

The **measurement of the Immunity Against Radiated RF-Electromagnetic Field** was performed in an anechoic chamber.

Date: May 23, 2016

6.2.1 Operating environment

Ambient temperature	23.1 [°C]
Relative humidity	44.8 [% R.H.]
Atmospheric pressure	100.9 [kPa]

6.2.2 Test set-up

The EUT and all local support equipment were placed on a non-conductive support 0.8 m above a reference ground plane (RGP) and were put into operation according to the specified operating mode.

The test set-up photo is included in appendix IV.

6.2.3 Measurement uncertainty

The measurement uncertainty is ± 0.23 V/m for 1 V/m, ± 0.70 V/m for 3 V/m and ± 2.30 V/m for 10 V/m.

Measurement uncertainty is calculated in accordance with UKAS Lab34. The measurement uncertainty is given with a confidence of 95 %. The measurement uncertainty is calculated as the uncertainty of the electric field intensity detected by the probe(s). The uncertainty calculations exclude influence of phenomena like in homogeneity of the electric field intensity.

6.2.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	SMT 06	Rohde & Schwarz	Signal Generator	100267	Dec. 03, 2015 (1Y)
■ -	NRVD	Rohde & Schwarz	Power Meter	101448	Apr. 05, 2016 (1Y)
□ -	AT4002A	Amplifier Research	Microwave Horn Antenna	N/A	Jan. 28, 2016 (1Y)
■ -	HL046	Rohde & Schwarz	Log Periodic Antenna	100053	Jan. 27, 2016 (1Y)
□ -	60S1G3	Amplifier Research	Amplifier	320441	Jan. 28, 2016 (1Y)
■ -	500W1000A	Amplifier Research	Amplifier	332911	Jan. 27, 2016 (1Y)
■ -	DC6180A	Amplifier Research	Directional Coupler	332598	Apr. 05, 2016 (1Y)
□ -	DC7144M1	Amplifier Research	Directional Coupler	313662	Apr. 05, 2016 (1Y)

All test equipment used is calibrated on a regular basis.

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6.2.5 Test data

Test level	: 3 V/m (AM 80 %, 1 kHz, sine wave)
Frequency range	: 80 MHz ~ 1 000 MHz,1 800 MHz, 2 600 MHz, 3 500 MHz and 5 000 MHz
Frequency step	: 1 %
Dwell time at each frequency	: 3 s
Exposed side	: Front / Back / Left / Right
Polarization of antenna	: Horizontal / Vertical
Distance of antenna – EUT	: 3 m
EUT-position	: Table top
Required performance criterion	: A
Test result	: Met criterion A
Monitoring of the EUT	: Observed the state of Video output mode and Touch screen mode.

The results of test are listed in below table.

Freq. Range [MHz]	Pol. V/H	Exposed side	Pass/ Fail	Description
80 ~ 1 000	H/V	Front / Back / Left / Right	Pass	There was no deviation from normal operating condition during and after test.
1 800	H/V	Front / Back / Left / Right	Pass	
2 600	H/V	Front / Back / Left / Right	Pass	
3 500	H/V	Front / Back / Left / Right	Pass	
5 000	H/V	Front / Back / Left / Right	Pass	

Remark: -“H”: Horizontal, “V”: Vertical

Tested by: Seok-Jun, Lee / Engineer

6.3 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

The **measurement of the Immunity Fast Transient/Burst** was performed in a shield room.

Date: May 26, 2016

6.3.1 Operating environment

Ambient temperature	24.2 [°C]
Relative humidity	47.2 [% R.H.]
Atmospheric pressure	100.8 [kPa]

6.3.2 Test set-up

The EUT and all local support equipment were placed on non-conductive support 0.1 m above a reference ground plane (RGP) and were put into operation according to the specified operating mode. If the manufacturer provides a non-detachable supply cable more than 0.5 m long with the equipment, the excess length of this cable shall be folded to avoid a flat coil and situated at a distance of 0.1 m above the ground reference plane.

The test set-up photo is included in appendix V.

6.3.3 Measurement uncertainty

It has been demonstrated that the burst generator meets the specified requirements in the standard with at least a 95 % confidence.

6.3.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	UCS 500 M4 S1	EM Test	Ultra Compact Generator	0304-20	Apr. 05, 2016 (1Y)
☐ -	HFK	EM Test	Capacitive Coupling Clamp	N/A	Apr. 06, 2016 (1Y)
☐ -	AC2716	EM Test	Power Source	93.30.1037	N/A

All test equipment used is calibrated on a regular basis.

6.3.5 Test data

Test level	: 1 kV (AC-mains supply)
Burst frequency	: 5 kHz
Rise time/Hold time	: 5/50 ns
Polarity	: Positive / Negative
Coupling time	: 60 s
Coupling methods	: AC mains - Coupling/decoupling network (CDN)
Lines for test	: AC Mains of the adapter
Type of line & length	: Unshielded, 0.5 m (AC mains)
EUT-position	: Table top
Required performance criterion	: B
Test result	: Met criterion A
Monitoring of the EUT	: Observed the state of Video output mode and Touch screen mode.

The results of test are listed in below table.

Line for test	Coupling Method	Test level [± kV]	Pass/ Fail	Description
AC-mains (L/N/PE)	CDN	1	Pass	There was no deviation from normal operating condition during and after test.
AC-mains (L+N)	CDN	1	Pass	
AC-mains (L+PE/N+PE)	CDN	1	Pass	
AC-mains (L+N+PE)	CDN	1	Pass	

Tested by: Seok-Jun, Lee / Engineer

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6.4 SURGE IMMUNITY TEST

The **measurements of the Immunity Surge Transients were** performed in a shield room.

Date: May 26, 2016

6.4.1 Operating environment

Ambient temperature	24.2 [°C]
Relative humidity	47.2 [% R.H.]
Atmospheric pressure	100.8 [kPa]

6.4.2 Test set-up

The EUT and all local support equipment were placed on a non-conductive support 0.8 m above a reference ground plane (RGP) and were put into operation according to the specified operating mode.

The test set-up photo is included in appendix VI.

6.4.3 Measurement uncertainty

It has been demonstrated that the surge generator meets the specified requirements in the standard with at least a 95 % confidence.

6.4.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	UCS 500 M4 S1	EM Test	Ultra Compact Generator	0304-20	Apr. 05, 2016 (1Y)
☐ -	KT-7030IG	KAST	Impulse Generator	81918	Nov. 03, 2015 (1Y)
☐ -	CNV 508	EM Test	Coupling Network	N/A	N/A
☐ -	AC2716	EM Test	Power Source	96. 30. 1037	N/A

All test equipments used is calibrated on a regular basis.

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6.4.5 Test data

Test level	: 0.5, 1 kV (Line-Line), 0.5, 1, 2 kV (Line-Ground)
Number of surge	: 5 surges / polarity
Polarity	: Positive / Negative
Angle	: 0° / 90° / 180° / 270°
Repetition rate	: 60 s
Coupling methods	: AC mains - Coupling/Decoupling Network (CDN)
Lines for test	: AC Mains of adapter
Type of line & length	: Unshielded, 1.0 m (AC mains)
EUT-position	: Table top
Required performance criterion	: B
Test result	: Met criterion A
Monitoring of the EUT	: Observed the state of Video output mode and Touch screen mode.

The results of test are listed in below table.

Line for test	Coupling Method	Test level [± kV]	Pass/ Fail	Description
AC-mains (L+N)	CDN	0.5, 1	Pass	There was no deviation from normal operating condition during and after test.
AC-mains (L+PE)	CDN	0.5, 1, 2	Pass	
AC-mains (N+PE)	CDN	0.5, 1, 2	Pass	

Remark: The EUT does not have the signal ports that may connect directly to outdoor cables.

Tested by: Seok-Jun, Lee / Engineer

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6.5 CONDUCTED RF FIELDS IMMUNITY TEST

The **measurement of the Immunity Against Conducted RF Field** was performed in a shield room.

Date: May 25, 2015

6.5.1 Operating environment

Ambient temperature	23.8 [°C]
Relative humidity	46.7 [% R.H.]
Atmospheric pressure	100.8 [kPa]

6.5.2 Test set-up

The EUT and all local support equipment were placed on a non-conductive support 0.1 m above a reference ground plane (RGP) and were put into operation according to the specified operating mode.

The test set-up photo is included in appendix VII.

6.5.3 Measurement uncertainty

The measurement uncertainty is ± 0.17 V for 1 V ± 0.50 V for 3 V and ± 1.70 V for 10 V.

Measurement uncertainty is calculated in accordance with EN 61000-4-6 Annex G. The measurement uncertainty is given with a confidence of 95 %.

6.5.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)
■ -	CWS 500N1	EM TEST	Continuous Wave Generator	P1409132217	Nov. 03, 2015 (1Y)
□ -	EM 101	Fisher Custom	Injection Clamp	35364	Oct. 07, 2015 (1Y)
■ -	CDN-M2/M3	EM TEST	CDN	P1312115835	Apr. 05, 2016 (1Y)
■ -	100-A-FFN-06	Bird Technologies Group	Attenuator	0751	Apr. 05, 2016 (1Y)

All test equipments used is calibrated on a regular basis.

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6.5.5 Test data

Test level	: 3 V (AM 80 %, 1 kHz, sine wave)
Frequency range	: 0.15 MHz ~ 80 MHz
Frequency step	: 1 %
Dwell time at each frequency	: 3 s
Coupling methods	: AC mains - Coupling/decoupling network (CDN)
Lines for test	: AC Mains of adapter
Type of line & length	: Unshielded, 0.2 m (AC Mains)
EUT-position	: Table top
Required performance criterion	: A
Test result	: Met criterion A
Monitoring of the EUT	: Observed the state of Video output mode and Touch screen mode.

The results of test are listed in below table.

Freq. Range [MHz]	Coupling Method	Lines for test	Test level [V]	Pass/ Fail	Description
0.15 ~ 80	CDN	AC mains	3	Pass	There was no deviation from normal operating condition during and after test.

Tested by: Seok-Jun, Lee / Engineer

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6.6 VOLTAGE DIPS AND INTERRUPT IMMUNITY TEST

The **measurement of the Immunity Voltage Dips And Interrupt** were performed in a shield room.

Date: May 26, 2016

6.6.1 Operating environment

Ambient temperature	24.2 [°C]
Relative humidity	47.2 [% R.H.]
Atmospheric pressure	100.8 [kPa]

6.6.2 Test set-up

The EUT and all local support equipment were placed on a non-conductive support 0.8 m above a reference ground plane (RGP) and were put into operation according to the specified operating mode.

Change to the voltage level shall occur at a zero crossing point in the a.c. voltage waveform.

The test set-up photo is included in appendix VIII.

6.6.3 Measurement uncertainty

It has been demonstrated that the voltage dips and interruptions generator meets the specified requirements in the standard with at least a 95 % confidence.

6.6.4 Test equipment used

	Model Number	Manufacturer	Description	Serial Number	Last Cal. (Interval)
■ -	UCS 500 M4 S1	EM Test	Ultra Compact Generator	0304-20	Apr. 05, 2016 (1Y)
□ -	UCS 500 M4	EM Test	Ultra Compact Generator	0804-01	Nov. 03, 2015 (1Y)
■ -	AC2716	EM Test	Power Source	93.30.1037	N/A

All test equipments used is calibrated on a regular basis.

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6.6.5 Test data

Nominal Mains Voltage (V_{NOM}) : 230 V~, 50 Hz

Level of Reduction (dip) : 10 ms at > 95 % of V_{NOM}, 500 ms at 30 % of V_{NOM}

Level of Interruptions : 5 000 ms at > 95 % of V_{NOM}

No. of dips/interruption : 3

Interval : 10 s

Type of line & length : Unshielded, 1.0 m (AC mains)

EUT-position : Table top

Required performance criterion : B (voltage dip), C (voltage interruption)

Test result : Met Criterion A and C

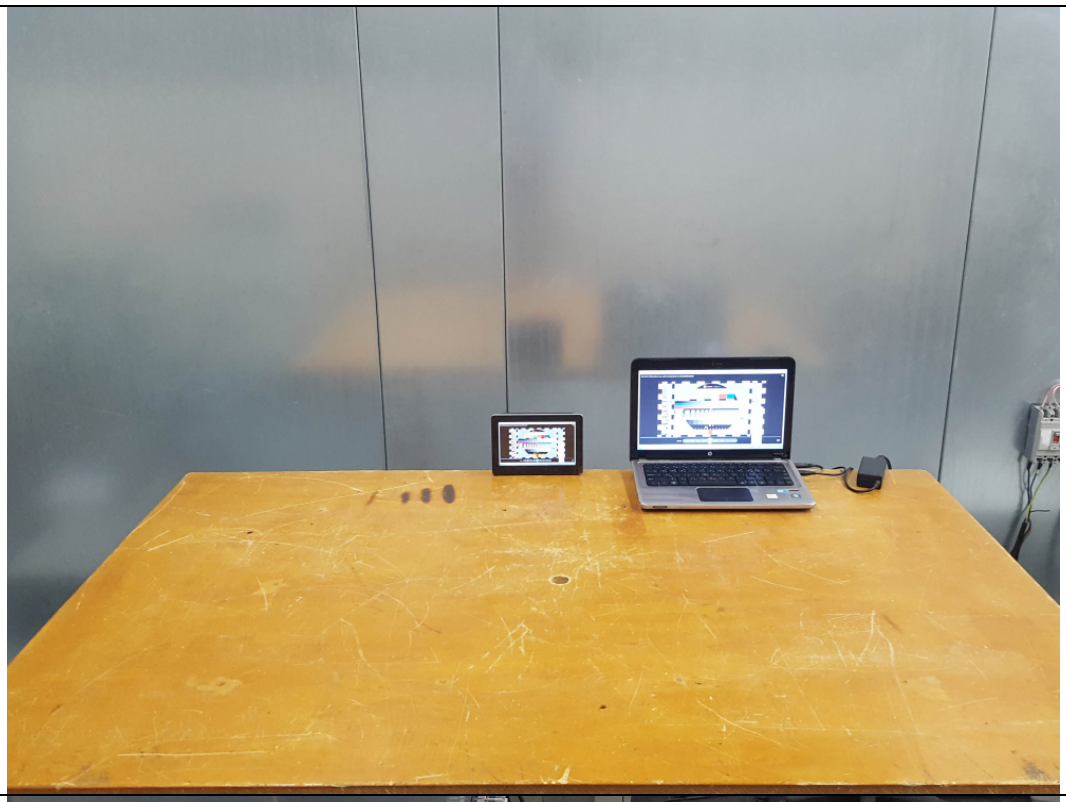
Monitoring of the EUT : Observed the state of Video output mode and Touch screen mode.

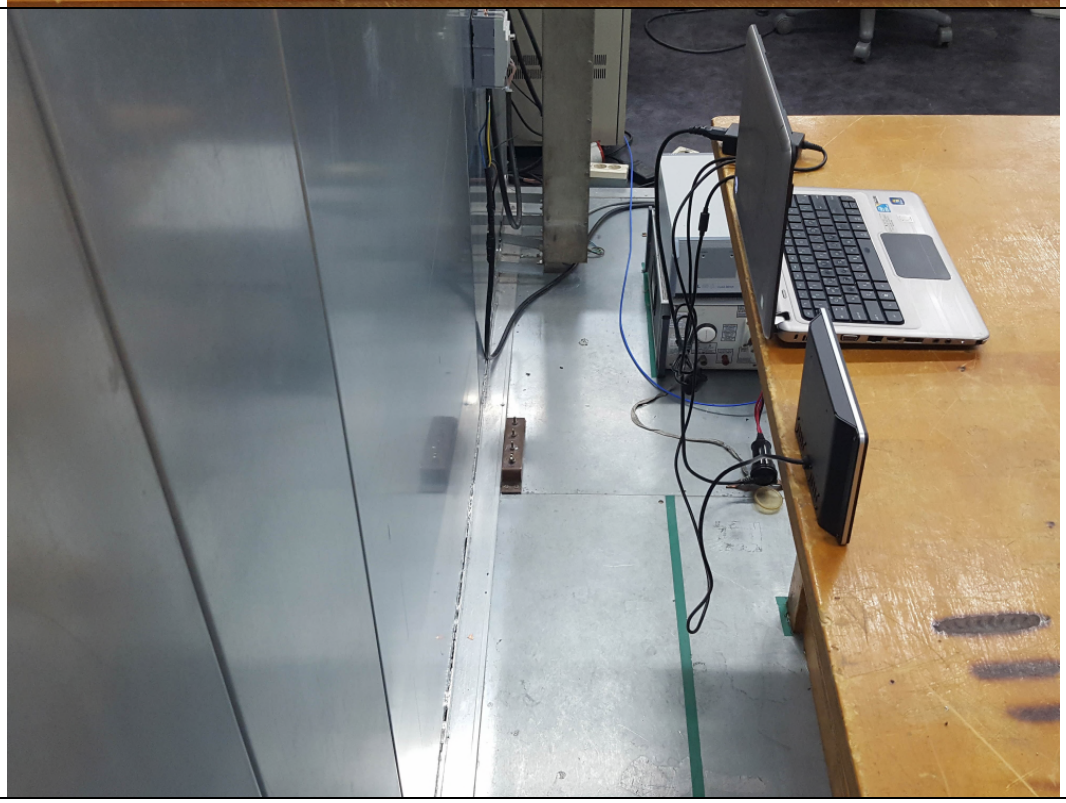
The results of test are listed in below table.

Test	Reduction (% of V_{NOM})	Duration in time (ms)	Pass / Fail	Description
Voltage dips	>95	10	Pass	There was no deviation from normal operation condition during and after test.
	30	500		
Voltage Interruptions	>95	5 000	Pass	

Tested by: Seok-Jun, Lee / Engineer

APPENDIX I - TEST SET-UP PHOTOS: (Mains Terminal Continuous Disturbance Voltage)





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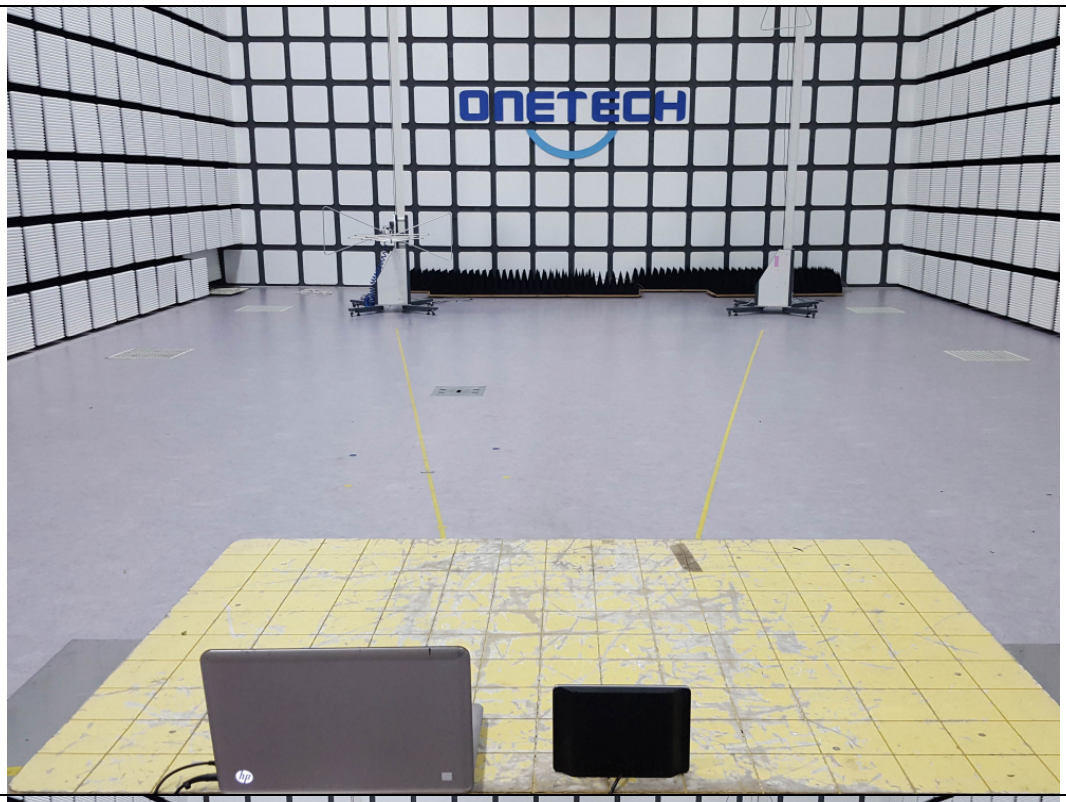
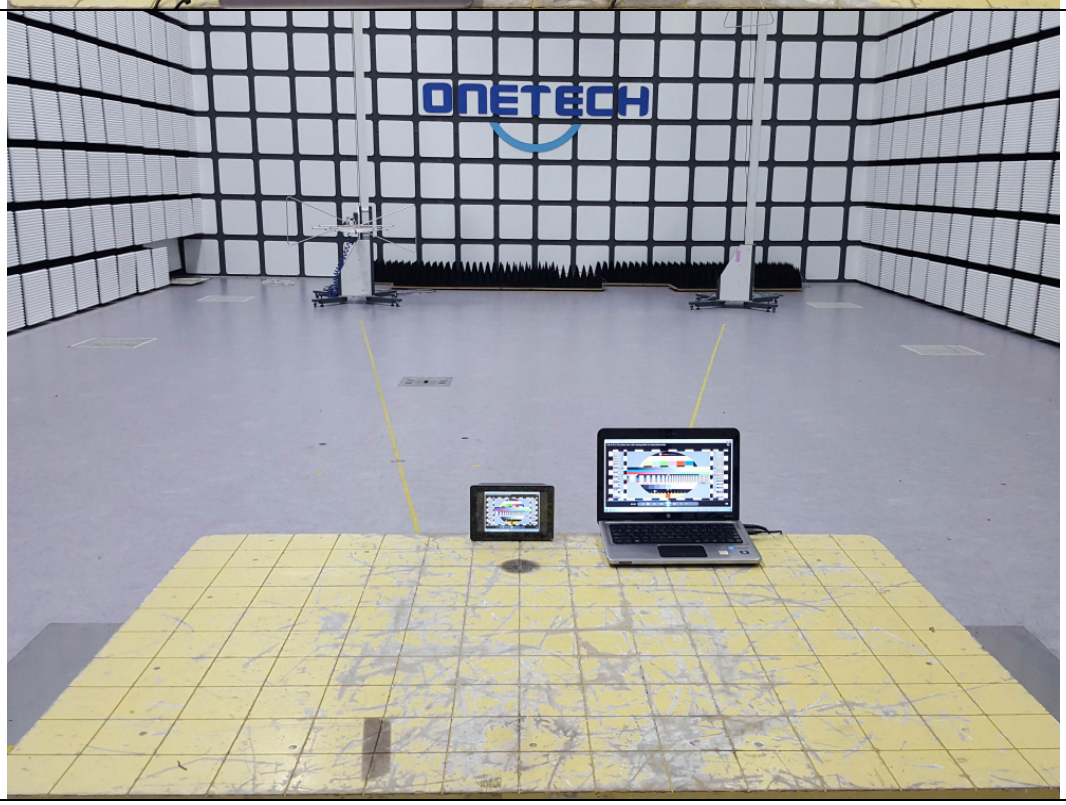
APPENDIX II - TEST SET-UP PHOTOS: (Radiated Emission)





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APPENDIX III - TEST SET-UP PHOTO: (ESD)

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APPENDIX IV - TEST SET-UP PHOTO: (RF E - FIELD)

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APPENDIX V - TEST SET-UP PHOTO: (EFT/Burst)

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APPENDIX VI - TEST SET-UP PHOTO: (Surge)

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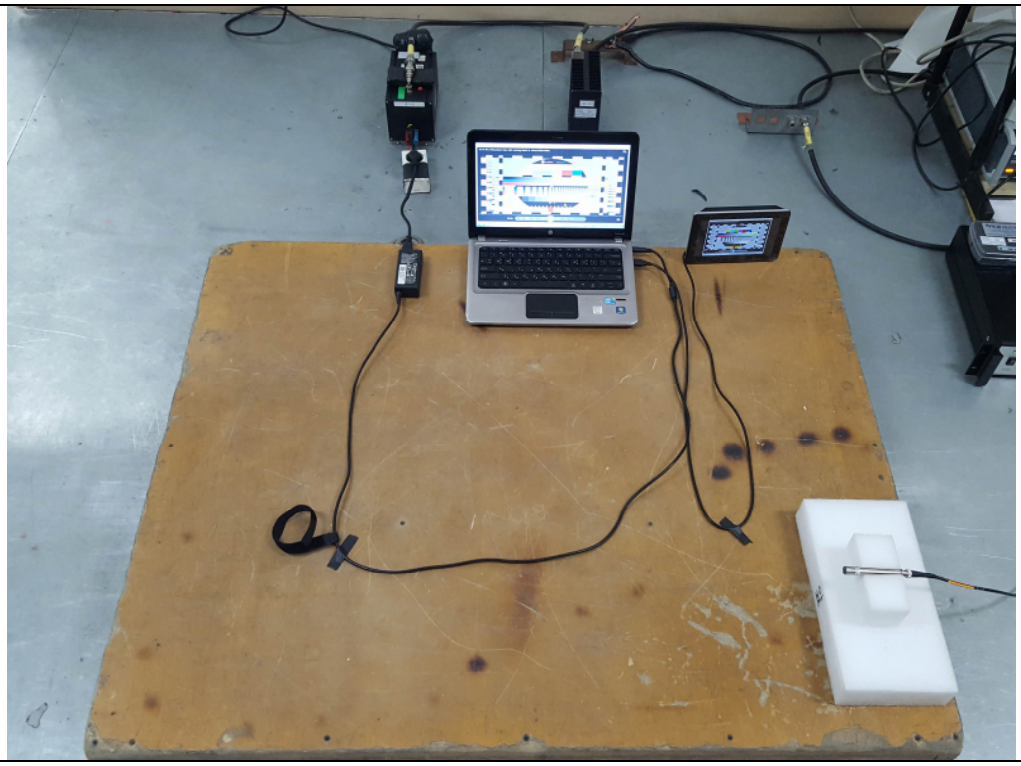
APPENDIX VII - TEST SET-UP PHOTO: (C.S)



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APPENDIX VIII - TEST SET-UP PHOTO: (Voltage Dips and Short Interruptions)

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APPENDIX IX - PHOTOGRAPHS OF THE PRODUCT

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