FCC/ISED Canada

TECHNICAL COMPLIANCE STATEMENT

For the

Product	**: KeyWe WiFi Bridge**
Model	**: GTDL-KBRD10**
Multiple Model	**: N/A**
Applicant	**: Guardtec**
FCC Rule	**: CFR 47 Part 15 Subpart B**
ISED Canada Standard	**: ICES-003**

We hereby certify that the above product has been tested by us with the listed rules and found in compliance with the regulation. The test data and results are issued on the test report no. **TR-W1809-002**

Signature

Choi, Young-min / Technical Manager

Date: 2018-09-05

Test Laboratory: ENG Co., Ltd.

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FCC/ISED Canada TEST REPORT

Project Number	**: EA1809C-026**
Test Report Number	**: TR-W1809-002**
Type of Equipment	**: KeyWe WiFi Bridge**
FCC ID	**: 2APR8-GTDLKBRD10**
Model Name	**: GTDL-KBRD10**
Multiple Model Name	**: N/A**
Applicant	**: Guardtec**
Address	**: #1203-1204, Hansin IT Tower, 272 Digital-ro, Guro-gu, Seoul, Korea 08389**
Manufacturer	**: Guardtec**
Address	**: #1203-1204, Hansin IT Tower, 272 Digital-ro, Guro-gu, Seoul, Korea 08389**
FCC Rule	**: CFR 47 Part 15 Subpart B Class B**
ISED Canada Standard	**: ICES-003 Issue 6 Class B**
Total page of Report	**: 25 pages**
Date of Receipt	**: 2018-08-22**
Date of Issue	**: 2018-09-05**
Test Result	**: PASS**

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

Prepared by Chu, Woo-Sik / Senior Engineer _____ Signature 2018-09-05 Date

Reviewed by Choi, Young-min / Technical Manager _____ Signature 2018-09-05 Date

ENG Co., Ltd. 135-60 Gyeongchung-daero, Gonjiam-eup, Gwangju-si, Gyeonggi-do, Korea 12813

TEL: +82-31-727-8300 FAX: +82-31-746-0800 http://www.the-eng.co.kr

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ENG Co., Ltd. 135-60 Gyeongchung-daero, Gonjiam-eup, Gwangju-si, Gyeonggi-do, Korea 12813

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Release Control Record

Issue Report No.	Issued Date	Details/Revisions
TR-W1809-002	2018-09-05	Initial Release

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1. TEST SUMMARY

1.1 Test standards and results

The EUT (Equipment Under Test) has been tested according to the following specifications:

APPLICABLE SECTION	TEST DESCRIPTION	RESULTS
FCC Part 15 Subpart B Section 15.107 (a)	AC Power Line Conducted Emission	PASS
FCC Part 15 Subpart B Section 15.109 (a)	Radiated Emission	PASS
ICES-003 Issue 6 Section 6.1, Class B	AC Power Line Conducted Emission	PASS
ICES-003 Issue 6 Section 6.2, Class B	Radiated Emission	PASS

1.2. Test Methodology

FCC: ANSI C 63.4: 2014, FCC CFR 47 Part 2, and Part 15

ISED Canada: ICES-003 Issue 6

1.3 Additions, deviations, exclusions from standards

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

1.4 Purpose of the test

To determine whether the equipment under test fulfills the FCC Rules, Regulation and standards stated in section 1.1 and 1.2

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1.5 Test Facility

The measurement facilities are located at 135-60 Gyeongchung-daero, Gonjiam-eup, Gwangju-si, Gyeonggi-do 12813, Korea. Description details of test facilities were submitted to the ISED, Canada, accredited as a Conformity Assessment Body (CAB) by the FCC, designated by the RRA (Radio Research Agency), and accredited by KOLAS (Korea Laboratory Accreditation Scheme) in Korea and approved by TUV Rheinland and TUV SÜD according to the requirement of ISO 17025.

Laboratory Qualification	Registration No.	Mark
FCC	KR0160	
ISED (Canada)	IC 12721A-1	
RRA	KR0160	
TUV Rheinland	UA 50314109-0002	
TUV SÜD	CARAT 18 03 94465 003	
Korean Agency for Technology and Standards	KT733	

2. EUT (Equipment Under Test) Description

The Guardtec, Model GTDL-KBRD10 (referred to as the EUT in this report) is a KeyWe WiFi Bridge, device that extends the range of KeyWe door locks so that they can be controlled not only from a short distance but also from a remote place. With the KeyWe App, you can check, lock, and unlock door lock from anywhere in the world when your are connected to the internet. The EUT contains FCC and ISED approved Wi-Fi & Bluetooth Internet of Thins Module in the EUT.

The product specification described herein was obtained from product data sheet or user's manual.

Equipment Class	JBP - Part 15 Class B Computing Device Peripheral
Operating Frequency	Bluetooth: (2 402 ~ 2 480) MHz WiFi: (2 412 ~ 2 462) MHz
Contained Wi-Fi & Bluetooth Internet of Things Module in the EUT	Model: ESP-WROOM-32D Modular Type: Single Modular Manufacturer: ESPRESSIF SYSTEMS (SHANGHAI) PTE LTD FCC ID: 2AC7Z-ESPWROOM32D IC: 21098-ESPWROOM32D
WiFi Security	WPA2, WEP
Power consumption	5V, Below 0.5A
Operating temperature	0 ~ 40 °C
Operating humidity	10 ~ 85 %

2.1 Additional Model

- None.

2.2 Description of supported units

The following peripheral devices and/or interface cables were connected during the measurement:

Description	Model No.	Serial No.	Manufacturer.
KeyWe WiFi Bridge (EUT)	GTDL-KBRD10	N/A	Guardtec
Adapter for EUT	JYT12-05010006	N/A	Shenzhen jieyingtong Electronic Co.,Ltd
Access Point	N704BCM	N704BCM3AA04757	ipTIME
Adapter for Access Point	M090080E811	N/A	MOST Optoelectronics International Limited
DoorLock Device	GKW-1000A	000833	Unico Hightech Co., Ltd.
Notebook PC	P62G	5432J72	DELL
Adapter for Notebook PC	HA65NM130	N/A	DELL

2.3 Cable Description

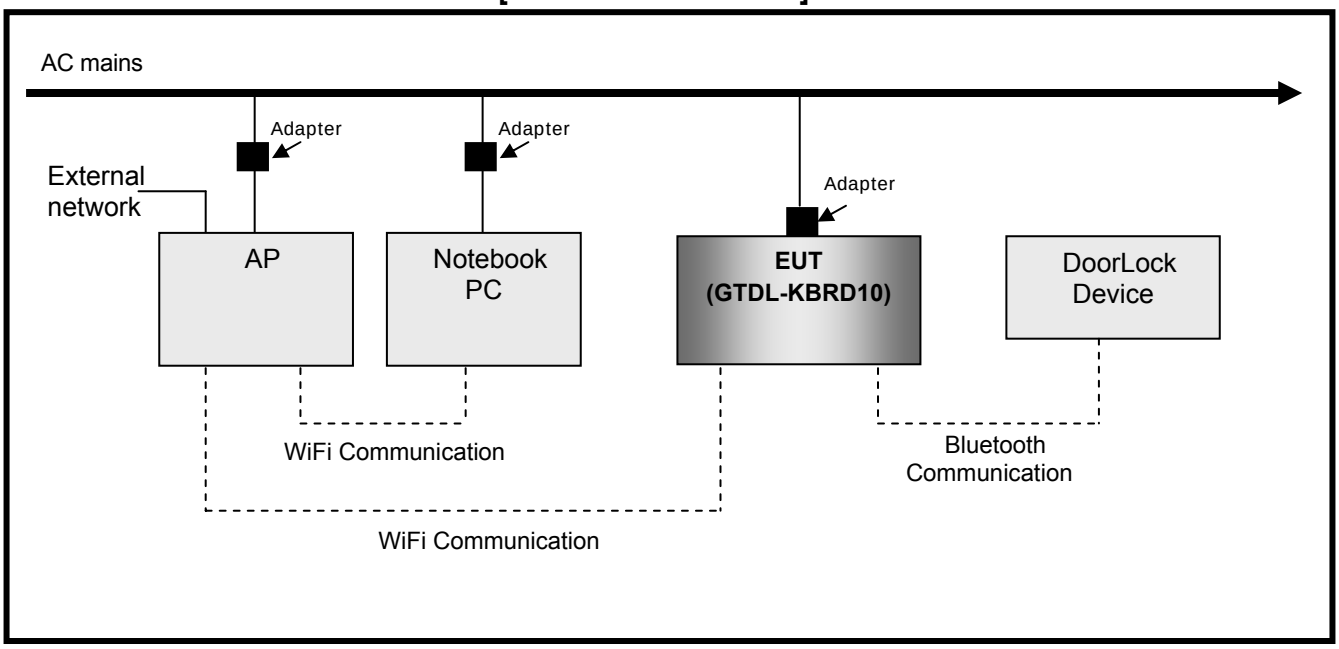
Description	Ports Name	Shielded (Y/N)	Ferrite Bead (Y/N)	Length (m)	Connected to
EUT	USB	-	N	-	Adapter
Access Point	DC IN	N	N	1.5	Adapter
	LAN	N	N	10.0	External network
Notebook PC	DC IN	N	N	1.5	Adapter

2.4 Mode of operation during the test

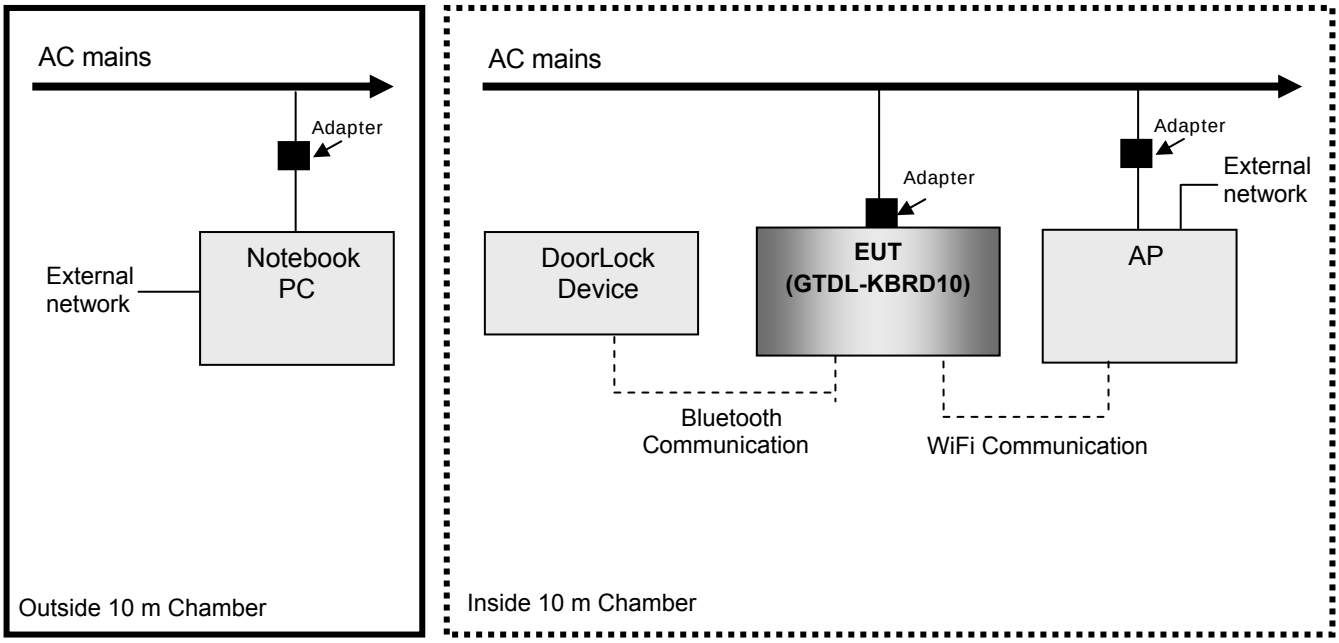
Test Mode	Description
#1	The EUT was connected to an AC/DC Adapter and operated as following. The notebook PC periodically transferred door Open/Close command to an Access Point using WiFi technology and the Access Point transferred the command to an EUT by Wi-Fi technology and then the EUT transferred this command to a digital door lock using Bluetooth technology. The digital door lock was periodically operated Open/Close during the test.

2.5 Test Setup Drawing

[Conducted Emission]



[Radiated Emission]



3. EUT Modifications

- No EMC Relevant Modifications were performed by this test laboratory.

4. EMISSION TESTS

4.1 AC Power Line Conducted Emission

4.1.1 Test setup

The EUT and all supporting equipments were placed on a non-metallic table approximately 0.8 m above the ground plane.

Power was fed to the EUT through a 50 Ω/50 μH + 5 Ω Line Impedance Stabilization Network (LISN) and all supporting equipments were connected to another LISN. The ground plane was electrically bonded to the reference ground system and all power lines were filtered from ambient noise. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4: 2014 7.3.3 to determine the worse operating conditions.

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

Used Software for measurement is EMC 32 supplied by Rohde&Schwarz.

4.1.2 Measurement uncertainty

Frequency range	Uncertainty
150 kHz ~ 30 MHz	2.00 dB

The measurement uncertainties are given with 95 % confidence.

4.1.3 Test Result

Date of Test	2018-08-27		
Temperature	24.8 °C	Relative humidity	55.3 % R.H.
Operating Input Voltage	120 Vac	Input Frequency	60 Hz
Frequency range	Resolution Bandwidth	Video Bandwidth	Detector Mode
0.15 MHz ~ 30 MHz	9 kHz	30 kHz	Peak , Q.P and/or Average
Test Mode	Mode #1		
Test Result	***Pass***	Tested By	Shin, Jae-young

4.1.4 Sample Calculated Example

At 5.31 MHz QP Limit = 73.0 dBμV

Correction Factor (C. Factor) of LISN, Pulse Limiter and cable loss at 5.31 MHz = 9.7 dB

Q.P Reading from the Test receiver = 20.8 dBμV

(Calculated value for system losses by software EMC32 manufactured by Rohde & Schwarz)

Therefore Q.P Margin = 73 - 20.8 = 52.2 so the EUT has 52.2 dB margin at 5.31 MHz

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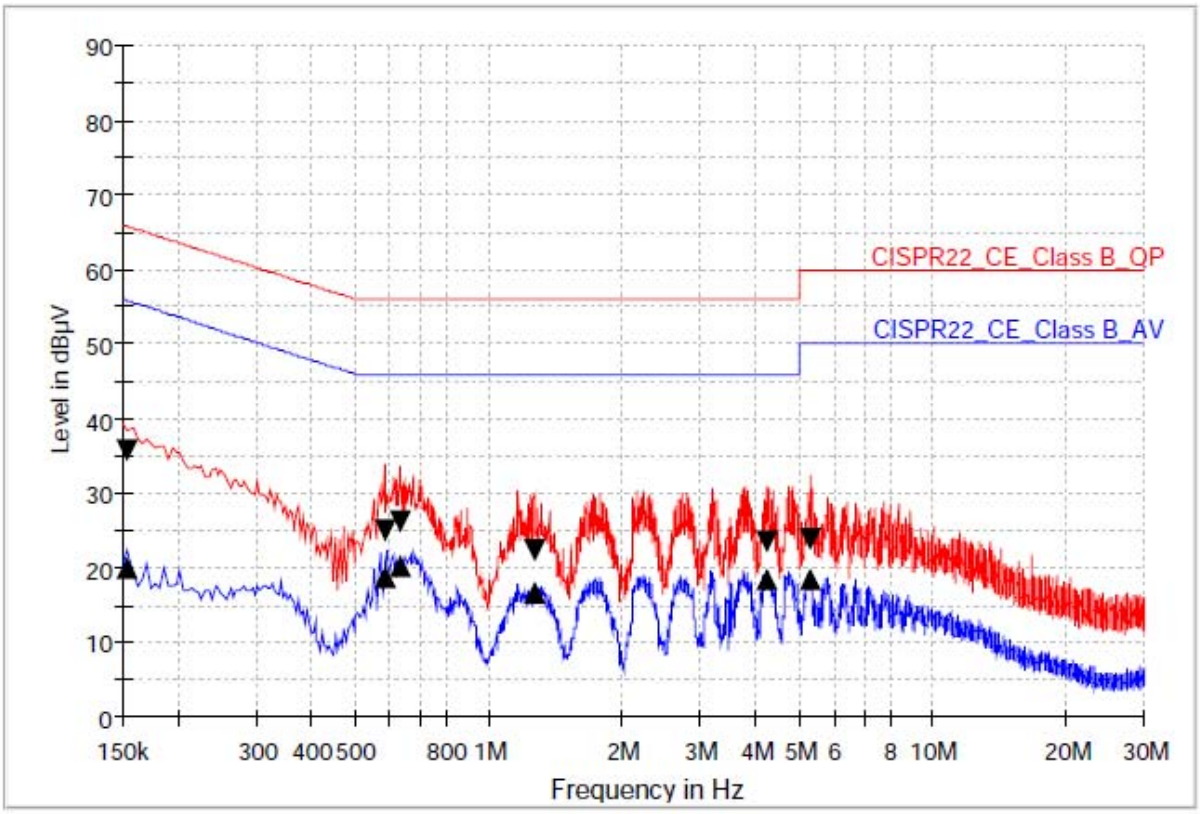
4.1.5 Test Data

HOT LINE



Limit and Margin1

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)	Margin - CAV (dB)	Limit - CAV (dBµV)
0.154000	35.9	19.8	9.000	L1	9.6	29.9	65.8	35.9	55.8
0.582000	25.1	18.7	9.000	L1	9.6	30.9	56.0	27.3	46.0
0.630000	26.3	20.1	9.000	L1	9.7	29.7	56.0	25.9	46.0
1.274000	22.3	16.7	9.000	L1	9.7	33.7	56.0	29.3	46.0
4.258000	23.6	18.4	9.000	L1	9.8	32.4	56.0	27.6	46.0
5.302000	23.8	18.5	9.000	L1	9.8	36.2	60.0	31.5	50.0

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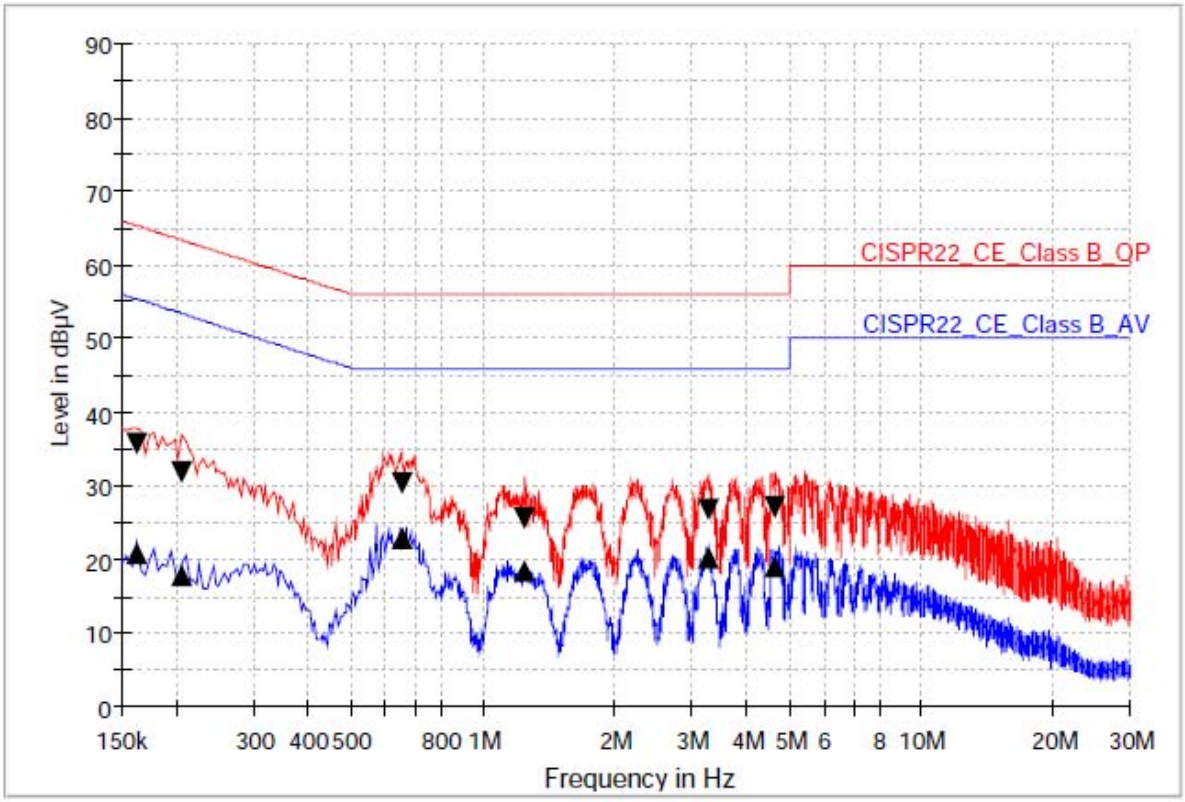
NEUTRAL LINE



Limit and Margin1

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)	Margin - CAV (dB)	Limit - CAV (dBµV)
0.162000	35.9	20.8	9.000	N	9.6	29.5	65.4	34.6	55.4
0.206000	31.8	17.9	9.000	N	9.6	31.5	63.4	35.4	53.4
0.654000	30.3	22.8	9.000	N	9.7	25.7	56.0	23.2	46.0
1.250000	25.8	18.4	9.000	N	9.7	30.2	56.0	27.6	46.0
3.266000	26.9	20.2	9.000	N	9.7	29.1	56.0	25.8	46.0
4.622000	27.0	18.9	9.000	N	9.8	29.0	56.0	27.1	46.0

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4.2 Radiated Emission

4.2.1 Test setup

The radiated emissions measurements were in the 3/10 m, Semi Anechoic Chamber. The EUT and all local supporting equipments were placed on a non-conductive table approximately 0.8 m above the ground plane.
The frequency spectrum from 30 MHz to the maximum frequency as specified in CFR 47 Part 15 section 15.33 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.
Preliminary radiated emission test was conducted using the procedure in ANSI C63.4: 2014 8.3.1.1 below 1 000 MHz, 8.3.1.2 above 1 GHz to determine the worse operating conditions
Measurement distance between the EUT and an antenna was 3 m.

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

Used Software for measurement is manufactured by TSJ.

4.2.2 Measurement frequency range

Highest frequency generated or used in the device or on which the device operates or tunes	Upper Frequency of Measurement range (MHz)
Below 1.705 MHz	30
(1.705 ~ 108) MHz	1 000
(108 ~ 500) MHz	2 000
(500 ~ 1 000) MHz	5 000
Above 1 000 MHz	5th harmonic of the highest freq. or 40 GHz, whichever is lower

The measurement uncertainties are given with 95 % confidence.

4.2.3 Measurement uncertainty

Frequency range	Uncertainty
Below 1 000 MHz	4.66 dB
Above 1 000 MHz	4.79 dB

The measurement uncertainties are given with 95 % confidence.

4.2.4 Test result

Date of Test	2018-08-23			
Temperature	23.1 °C		Relative humidity	52.2 % R.H.
Operating Input Voltage	120 Vac		Input Frequency	60 Hz
Frequency range	Resolution Bandwidth	Video Bandwidth	Detector Mode	Measurement distance
Below 1 000 MHz	100 kHz or 120 kHz	300 kHz	Peak or Q.P.	3 m
Date of Test	2018-08-23			
Temperature	22.0 °C		Relative humidity	51.5 % R.H.
Frequency range	Resolution Bandwidth	Video Bandwidth	Detector Mode	Measurement distance
Above 1 000 MHz	1 MHz	1 MHz or 10 Hz	Peak or Average	3 m
Test Mode	Mode #1			
Test Result	***Pass***	Tested By	Shin, Jae-young	

4.2.5 Sample Calculated Example

At 80 MHz Limit = 39.1 dBμV/m

Result =Receiver reading value + Antenna Factor + Cable Loss - Pre-amplifier gain = 30 dBμV/m

Margin = Limit - Result = 39.1 - 30 = 9.1 so the EUT has 9.1 dB margin at 80 MHz

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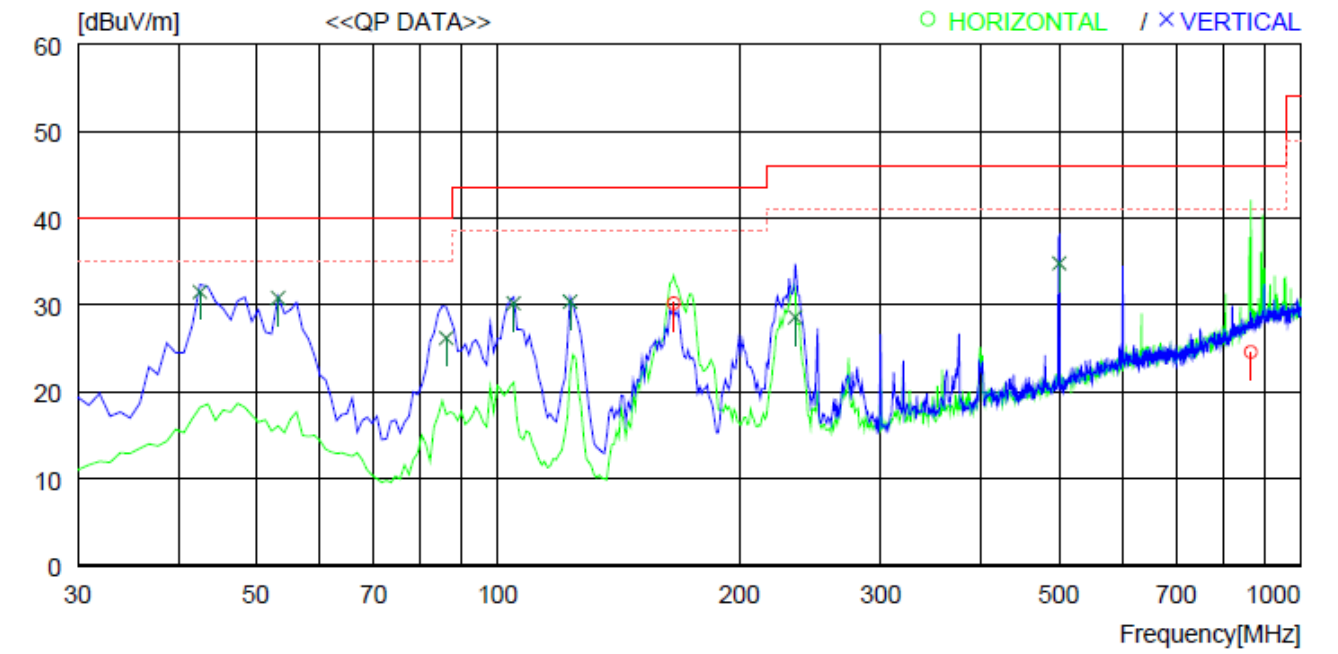
4.2.6 Test Data

30 MHz – 1 GHz



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	165.800	45.7	**8.6**	8.6	32.7	30.2	43.5	13.3	200	0
2	867.100	22.4	**22.3**	12.5	32.6	24.6	46.0	21.4	100	6
----- Vertical ------										
3	42.610	43.8	**13.2**	7.2	32.7	31.5	40.0	8.5	100	359
4	53.280	42.7	**13.5**	7.3	32.7	30.8	40.0	9.2	100	359
5	86.260	42.1	**9.0**	7.8	32.7	26.2	40.0	13.8	100	359
6	104.690	43.7	**11.2**	8.0	32.7	30.2	43.5	13.3	100	2
7	123.120	46.2	**8.7**	8.2	32.7	30.4	43.5	13.1	100	2
8	234.670	39.7	**12.4**	9.1	32.6	28.6	46.0	17.4	100	359
9	500.451	39.3	**17.6**	10.8	32.9	34.8	46.0	11.2	100	359

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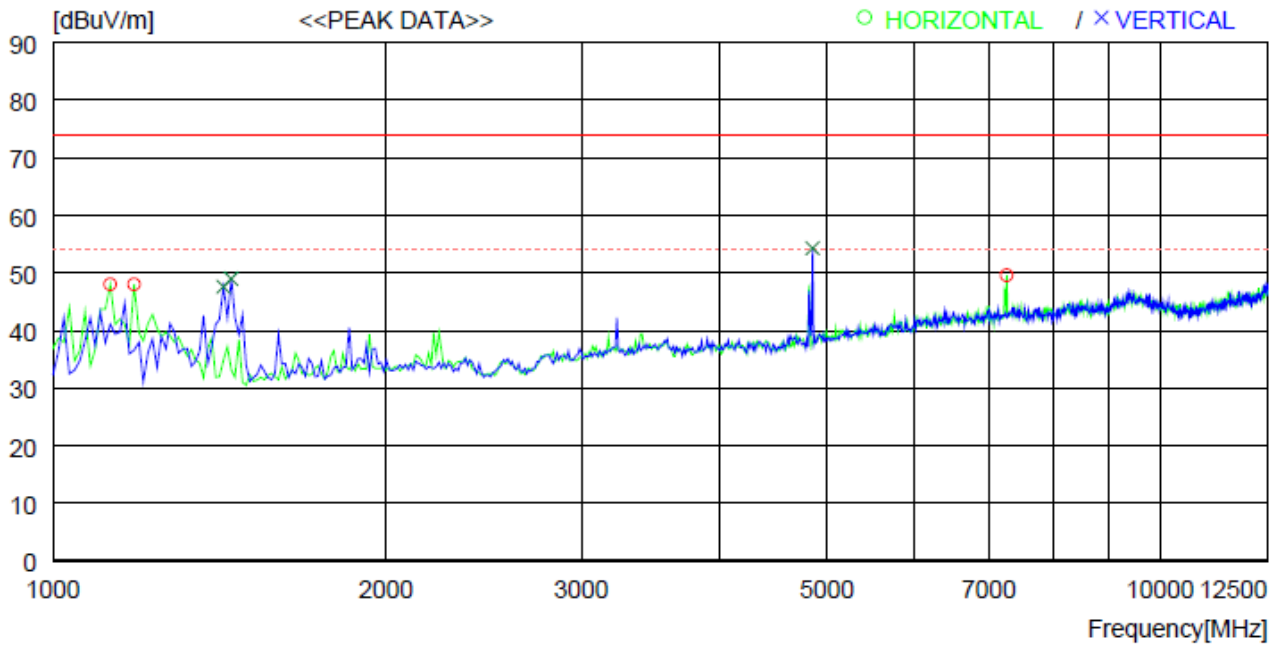
Above 1 000 MHz (Peak)



No.	FREQ [MHz]	READING PEAK [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	1126.500	59.0	24.4	5.0	40.4	48.0	74.0	26	200	359
2	1184.000	58.7	24.7	5.0	40.4	48.0	74.0	26	200	359
3	7267.500	41.2	35.7	12.9	40.2	49.6	74.0	24.4	200	26
----- Vertical ------										
4	1425.500	56.9	25.6	5.7	40.6	47.6	74.0	26.4	200	356
5	1448.500	58.3	25.7	5.7	40.7	49.0	74.0	25	200	203
6	4852.500	52.1	32.4	10.5	40.7	54.3	74.0	19.7	200	144

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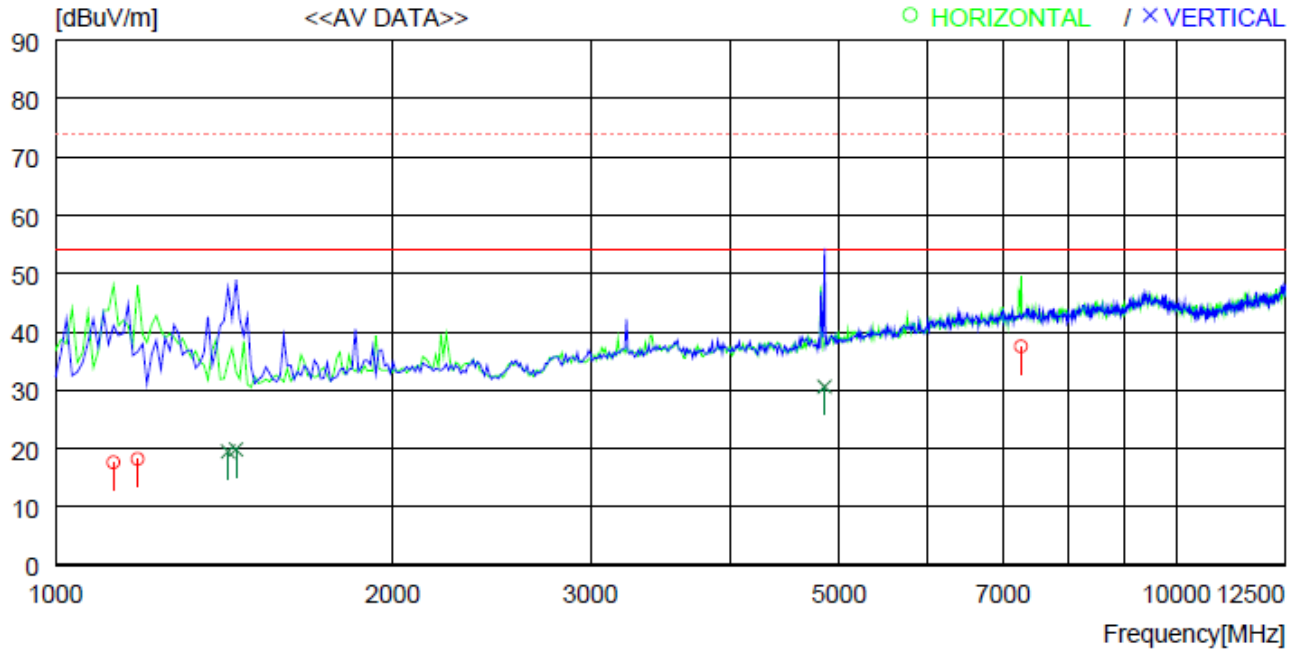
Above 1 000 MHz (Average)



No.	FREQ [MHz]	READING AV [dBuV]	ANT FACTOR [dB]	LOSS [dB]	GAIN [dB]	RESULT [dBuV/m]	LIMIT [dBuV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	1126.500	28.6	**24.4**	5.0	40.4	17.6	54.0	36.4	200	359
2	1184.000	28.9	**24.7**	5.0	40.4	18.2	54.0	35.8	200	359
3	7267.500	29.1	**35.7**	12.9	40.2	37.5	54.0	16.5	200	26
----- Vertical ------										
4	1425.500	28.8	**25.6**	5.7	40.6	19.5	54.0	34.5	200	356
5	1448.500	29.1	**25.7**	5.7	40.7	19.8	54.0	34.2	200	203
6	4852.500	28.4	**32.4**	10.5	40.7	30.6	54.0	23.4	200	144

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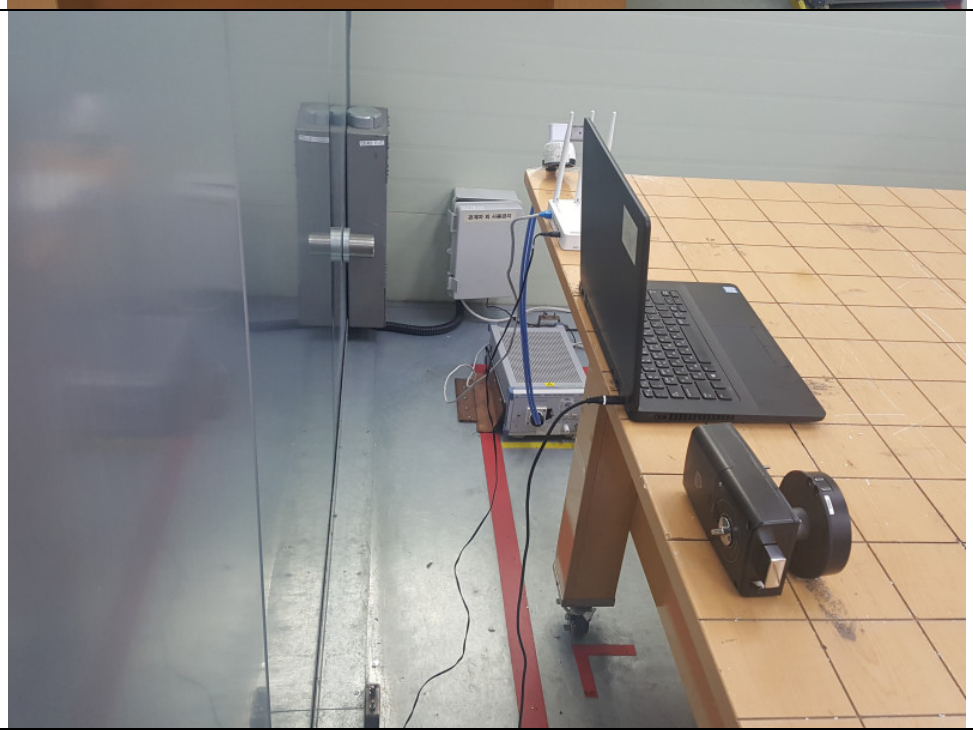
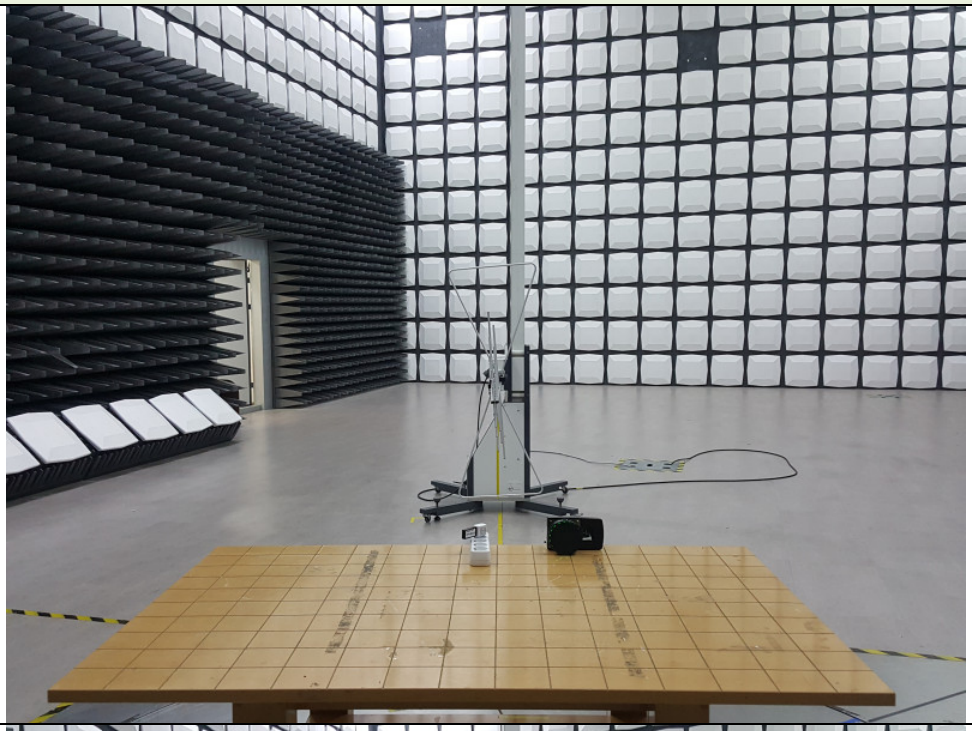
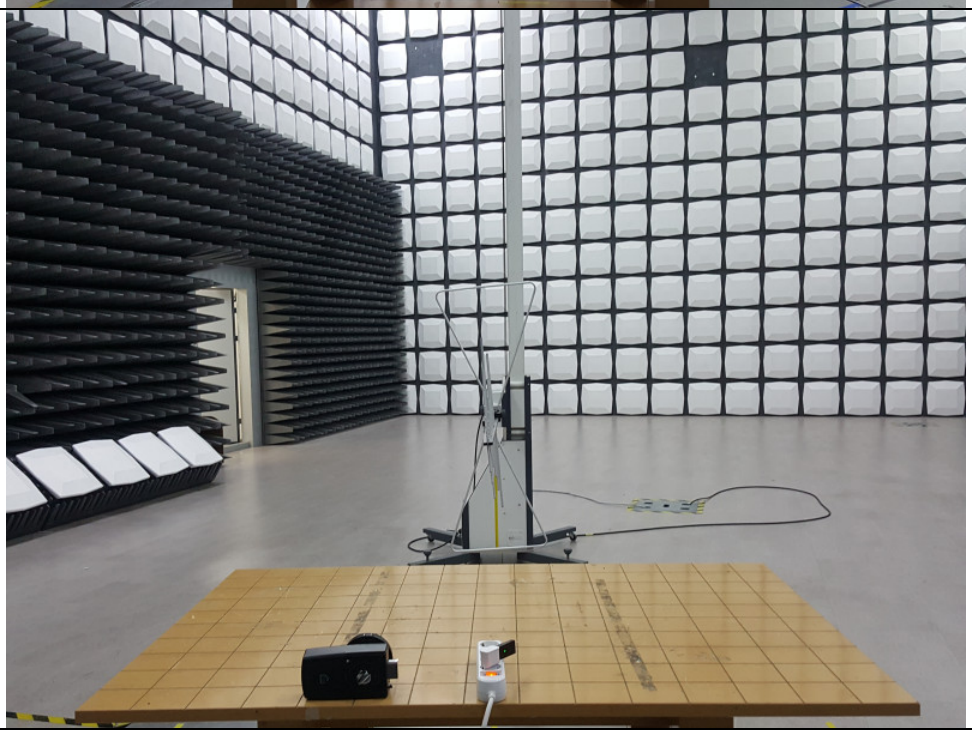
Appendix I - Test Setup Photos: AC Power Line Conducted Emission Test



Appendix II - Test Setup Photos: Radiated Emission Test

Test Setup for 30 MHz – 1 GHz



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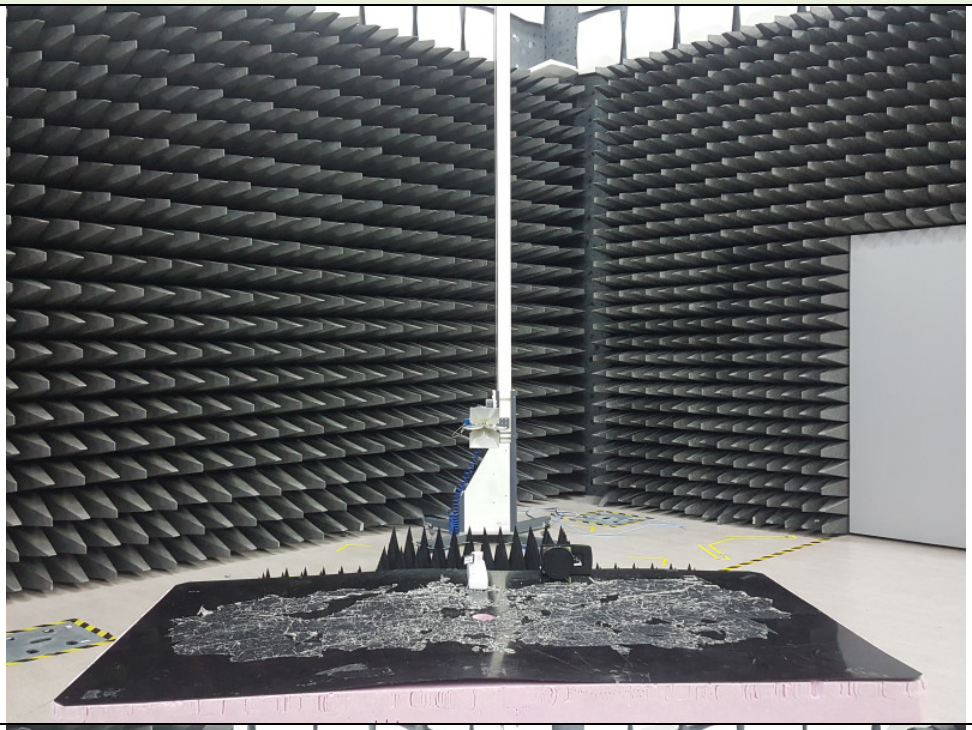
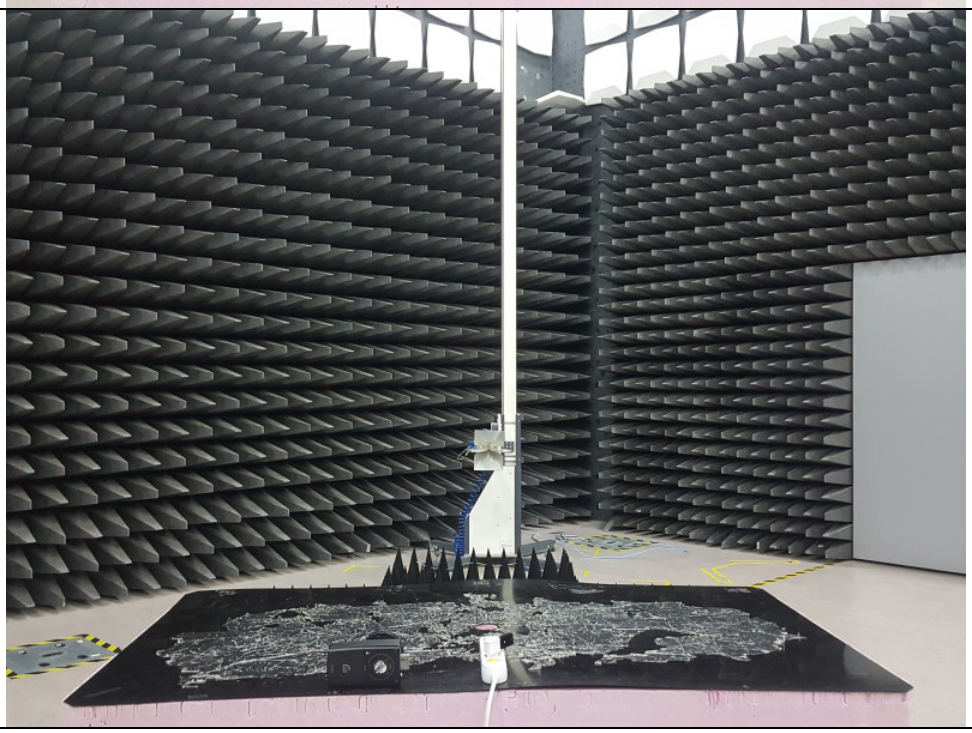
Test Setup for Above 1 GHz



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Appendix III - Test Instrumentation

Name of Equipment	Model Number	Manufacturer	Serial Number	Last Cal. (Interval)	USE
For EMISSION					
EMI Test Receiver	ESCI 7	Rohde & Schwarz	100722	2018-02-12(1Y)	■
Test Receiver	ESIB 26	Rohde & Schwarz	100298	2018-01-18(1Y)	□
LISN	ENV4200	Rohde & Schwarz	100203	2018-01-18(1Y)	□
LISN	ENV216	Rohde & Schwarz	100110	2018-07-27(1Y)	■
LISN	LS16C	AFJ	16011403310	2018-07-27(1Y)	■
LISN	NNLK8121	SchwarzBeck	8121-163	2018-07-27(1Y)	□
Voltage Probe	TK9420	Schwarzbeck	9420-165	2018-01-18(1Y)	□
Loop Antenna	HFH2-Z2	Rohde & Schwarz	100341	2017-06-15(2Y)	□
8-Wire ISN CAT 3	CAT3 8158	Schwarzbeck	CAT3 8158 #70	2018-01-22(1Y)	□
8-Wire ISN CAT 5	CAT5 8158	Schwarzbeck	CAT5 8158 #126	2018-01-22(1Y)	□
8-Wire ISN CAT 6	NTFM 8158	Schwarzbeck	NTFM 8158 #95	2018-01-22(1Y)	□
Test Receiver	ESU	Rohde & Schwarz	100303	2018-01-18(1Y)	■
TRILog Broadband Antenna	VULB9163	Schwarzbeck	9163-799	2017-10-23(2Y)	■
DOPPEL STEG HORN Antenna	HF 907	Rohde & Schwarz	102426	2017-01-06(2Y)	□
Preamp (1-18) GHz	SCU 18D	Rohde & Schwarz	19006450	2018-04-23(1Y)	■
Preamp 9 kHz-1 GHz	310N	Sonoma Instrument	344015	2018-01-18(1Y)	■
Attenuators	6 dB	Rohde & Schwarz	272.4110.50	2018-01-18(1Y)	■
Notch Filter	BRM50702	MICRO-TRONICS	G318	2017-11-08(1Y)	■
Antenna Master	MA4000-EP	INNCO SYSTEM	4600814	N/A	■
Turn Table	DT3000-3t	INNCO SYSTEM	1310814	N/A	■
CO3000 Controller	CO3000-4PORT	INNCO SYSTEM	CO3000/806/34130814/L	N/A	■
Digital Power Analyzer For Harmonic & Flicker	DPA 500	EM Test	V0713102356	2018-01-25(1Y)	□
AC Power Source	ACS 500	EM Test	V0713102357	2018-07-27(1Y)	□

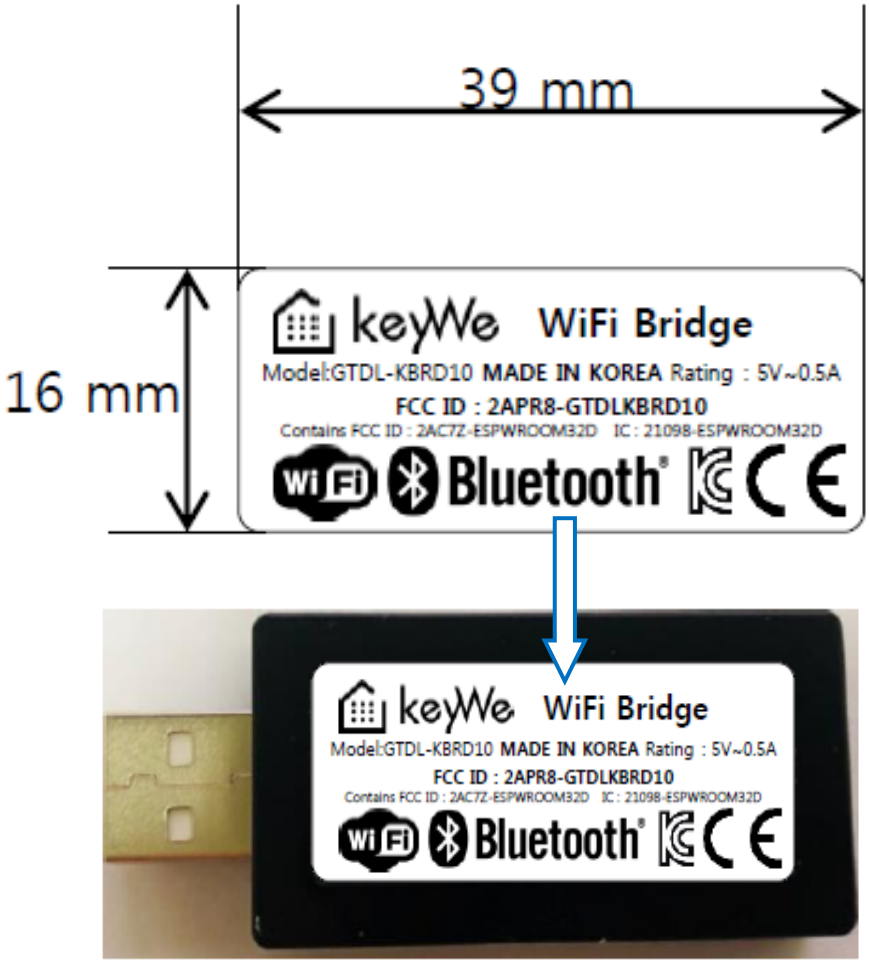
The above measuring equipments have been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipments, which is traceable to recognized national standards.

ENG Co., Ltd. 135-60 Gyeongchung-daero, Gonjiam-eup, Gwangju-si, Gyeonggi-do, Korea 12813

TEL: +82-31-727-8300 FAX: +82-31-746-0800 http://www.the-eng.co.kr

APPENDIX IV - IDENTIFICATION LABEL

PROPOSED FCC LABEL



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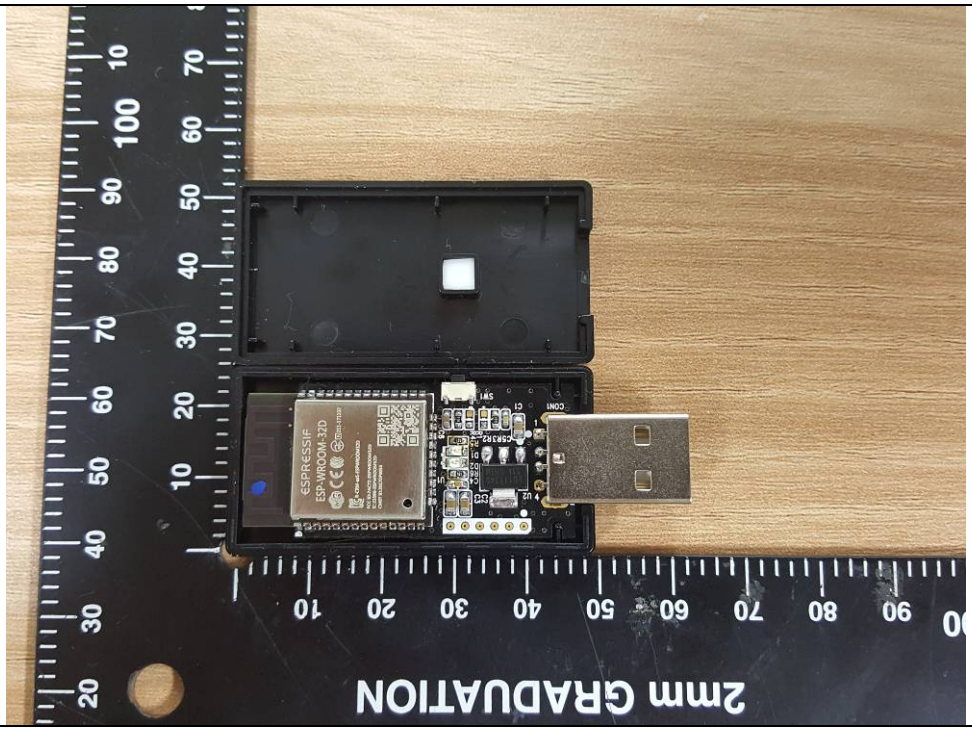
APPENDIX V - PHOTOGRAPHS REPORT



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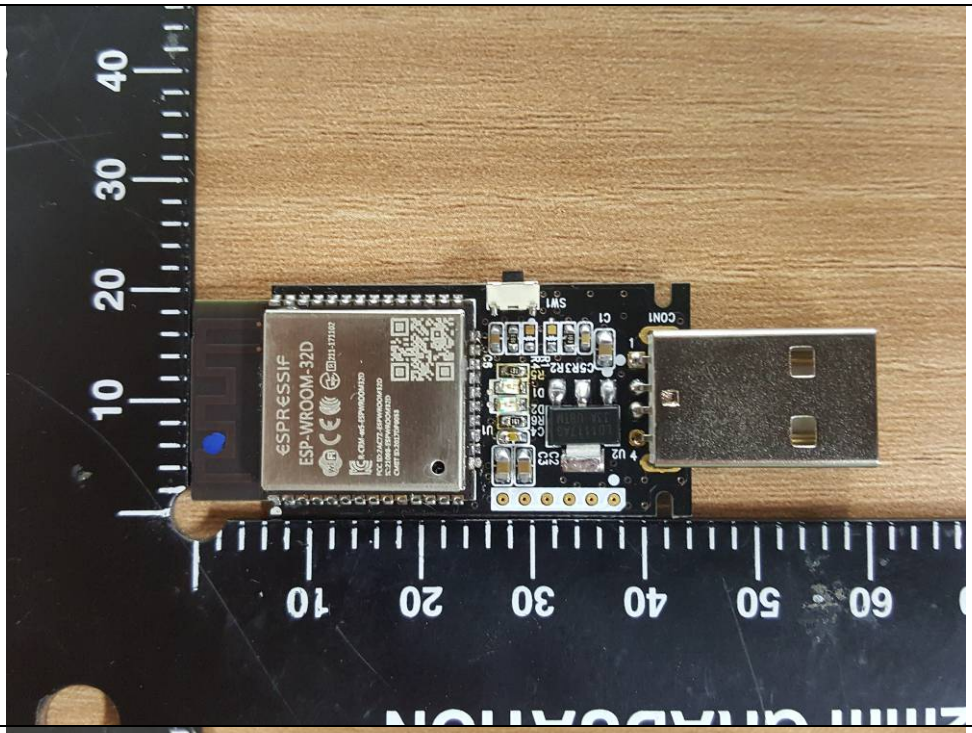

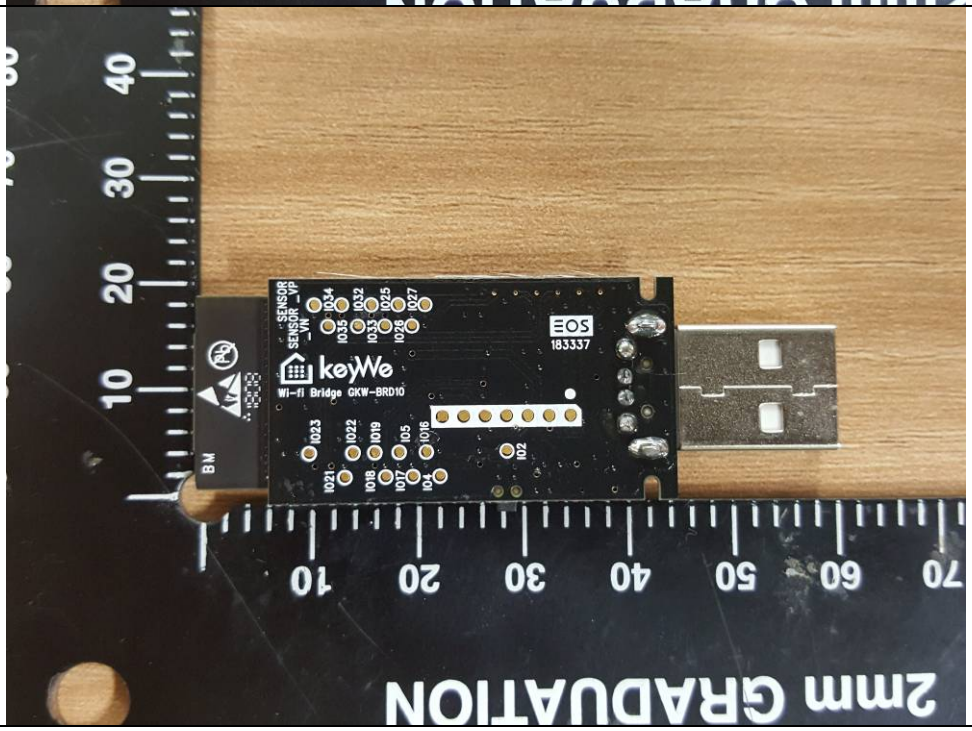

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