RF TEST REPORT

Report No.: 16070984-FCC-R3

Supersede Report No.: N/A

Applicant	Freevision Technologies Co., Ltd
Product Name	Magikit Box BLE
Model No.	MAGIKIT ADV V1.1
Serial No.	MAGIKIT ADV V1.1, MAGIKIT ADV V1.2, MAGIKIT ADV V1.3, MAGIKIT ADV V1.4 , MAGIKIT ADV V1.5 , MAGIKIT ADV V1.6, MAGIKIT ADV V1.7, MAGIKIT ADV V1.8 , MAGIKIT ADV V1.9
Test Standard	FCC Part 15.247: 2015, ANSI C63.10: 2013
Test Date	June 12 to June 22 2016
Issue Date	August 23, 2016
Test Result	☑ Pass ☐ Fail
Equipment complied with the specification	☑
Equipment did not comply with the specification	☐

Loren Luo	David Huang	
Loren Luo Test Engineer	David Huang Checked By	

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Test result presented in this test report is applicable to the tested sample only

Issued by:

SIEMIC (SHENZHEN-CHINA) LABORATORIES

Zone A, Floor 1, Building 2 Wan Ye Long Technology Park

South Side of Zhoushi Road, Bao' an District, Shenzhen, Guangdong China 518108

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Laboratories Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.

In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

Accreditations for Conformity Assessment

Country/Region	Scope
USA	EMC, RF/Wireless, SAR, Telecom
Canada	EMC, RF/Wireless, SAR, Telecom
Taiwan	EMC, RF, Telecom, SAR, Safety
Hong Kong	RF/Wireless, SAR, Telecom
Australia	EMC, RF, Telecom, SAR, Safety
Korea	EMI, EMS, RF, SAR, Telecom, Safety
Japan	EMI, RF/Wireless, SAR, Telecom
Singapore	EMC, RF, SAR, Telecom
Europe	EMC, RF, SAR, Telecom, Safety

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1. Report Revision History

Report No.	Report Version	Description	Issue Date
16070984-FCC-R3	NONE	Original	August 23, 2016

2. Customer information

Applicant Name	Freevision Technologies Co., Ltd
Applicant Add	Floor 3，Building 8,No.999 Jiangyue Rd Minhang Dist, Shanghai, China
Manufacturer	Freevision Technologies Co., Ltd
Manufacturer Add	Floor 3，Building 8,No.999 Jiangyue Rd Minhang Dist, Shanghai, China

3. Test site information

Lab performing tests	SIEMIC (Shenzhen-China) LABORATORIES
Lab Address	Zone A, Floor 1, Building 2 Wan Ye Long Technology Park South Side of Zhoushi Road, Bao’ an District, Shenzhen, Guangdong China 518108
FCC Test Site No.	718246
IC Test Site No.	4842E-1
Test Software	Radiated Emission Program-To Shenzhen v2.0

4. Equipment under Test (EUT) Information

Description of EUT:	Magikit Box BLE
Main Model:	MAGIKIT ADV V1.1
Serial Model:	MAGIKIT ADV V1.1, MAGIKIT ADV V1.2, MAGIKIT ADV V1.3, MAGIKIT ADV V1.4 , MAGIKIT ADV V1.5 , MAGIKIT ADV V1.6, MAGIKIT ADV V1.7, MAGIKIT ADV V1.8 , MAGIKIT ADV V1.9
Date EUT received:	June 12, 2016
Test Date(s):	June 12 to June 22 2016
Equipment Category：	DTS
Antenna Gain:	RFID Low Frequency: 20dBi RFID High Frequency: 20dBi BLE: 0 dBi
Type of Modulation:	RFID Low Frequency: ASK RFID High Frequency: ASK BLE: GFSK
RF Operating Frequency (ies):	RFID Low Frequency: 125-150KHz RFID High Frequency: 13.56MHz BLE: 2402-2480MHZ
Max. Output Power:	-1.63dBm
Number of Channels:	RFID High Frequency: 1CH (ASK) BLE: 40CH
Port:	USB Port
Trade Name :	N/A

	Battery:
Input Power:	Spec: 3.7V，260mAh ，0.962Wh
	USB：5V
GPRS/EGPRS Multi-slot class:	8/10/12
FCC ID:	2AIM881810M

5. Test Summary

The product was tested in accordance with the following specifications.
All testing has been performed according to below product classification:

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.247(d)	Band-Edge & Unwanted Emissions into Restricted Frequency Bands	Compliance
§15.205, §15.209, §15.247(d)	Radiated Spurious Emissions & Unwanted Emissions into Restricted Frequency Bands	Compliance

Measurement Uncertainty

Emissions		
Test Item	**Description**	**Uncertainty**
Band Edge and Radiated Spurious Emissions	Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m)	+5.6dB/-4.5dB
-	-	-

Note: The BT module of Magikit Box BLE has been approved associated with this FCC ID: 2ABN2-RFBMS02. Because it is limited Single Modular, so the items(Band-Edge & Unwanted Emissions into Restricted Frequency Bands and Radiated Spurious Emissions & Unwanted Emissions into Restricted Frequency Bands) were investigated again.

6. Measurements, Examination And Derived Results

6.1 Antenna Requirement

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited.
The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has 3 antennas:
A permanently attached PCB antenna for BLE, the gain is 0 dBi
A permanently attached Loop antenna for RFID Low Frequency, the gain is 20 dBi.
A permanently attached Loop antenna for RFID High Frequecy, the gain is 20 dBi.

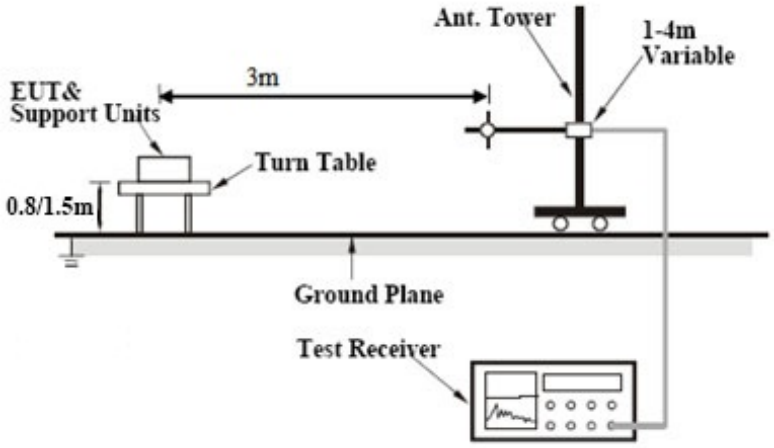
The antenna meets up with the ANTENNA REQUIREMENT.

Result: Compliance.

6.2Band-Edge & Unwanted Emissions into Restricted Frequency Bands

Temperature	22℃
Relative Humidity	53%
Atmospheric Pressure	1029mbar
Test date :	June 29, 2016
Tested By :	Loren Luo

Requirement(s):

Spec	Item	Requirement	Applicable
§15.247(d)	a)	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.	☑
Test Setup			
Test Procedure	Radiated Method Only - 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator. - 2. Position the EUT without connection to measurement instrument. Put it on the Rotated table and turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range. - 3. First, set both RBW and VBW of spectrum analyzer to 100 kHz with a		

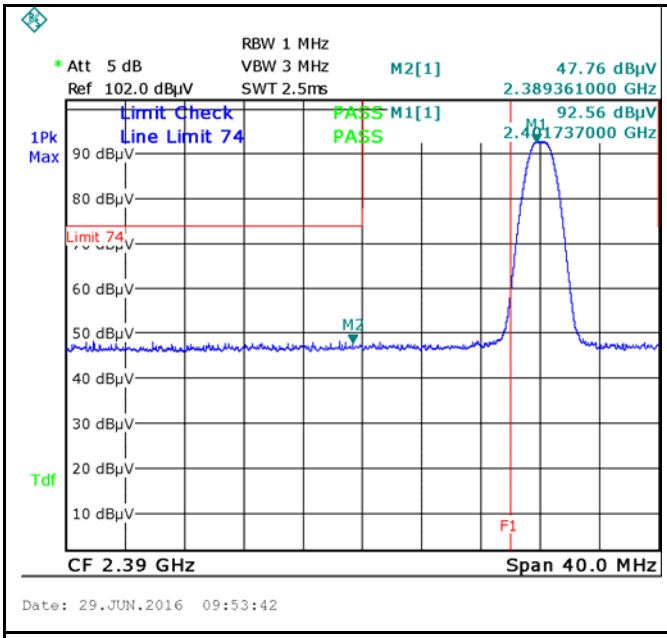
	convenient frequency span including 100kHz bandwidth from band edge, check the emission of EUT, if pass then set Spectrum Analyzer as below: a. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. b. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. c. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz. - 4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency. - 5. Repeat above procedures until all measured frequencies were complete.
Remark	
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

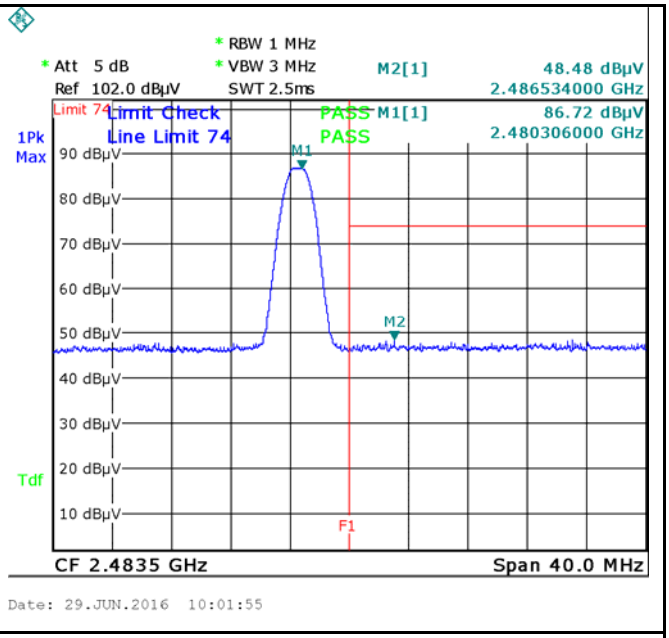
Test Plots

Band Edge measurement result



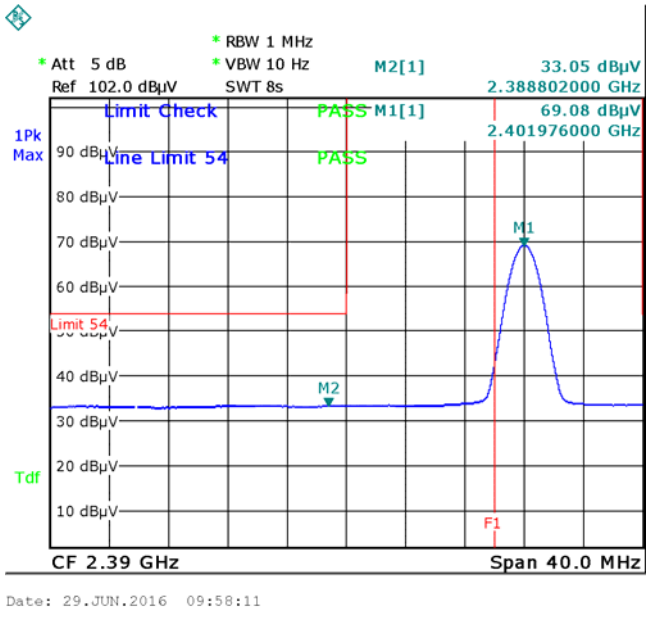
Band Edge, Left Side (Peak)

Note: F1 is frequency 2390MHz; F2 is frequency 2400MHz



Band Edge, Right Side (Peak)

Note: F1 is frequency 2483.5MHz



Band Edge, Left Side-AV

Note: (no need if PK value less than the AV limit)

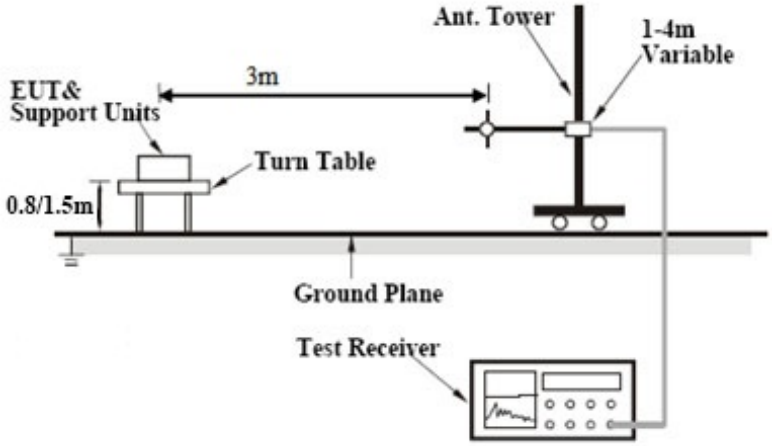
Band Edge, Right Side-AV

6.3 Radiated Spurious Emissions & Restricted Band

Temperature	22℃
Relative Humidity	53%
Atmospheric Pressure	1029mbar
Test date :	June 29, 2016
Tested By :	Loren Luo

Requirement(s):

<table>
<tr><th>Spec</th><th>Item</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td rowspan="3">47CFR§15.247(d), RSS210 (A8.5)</td><td>a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (μV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☑</td></tr>
<tr><td>b)</td><td>For non-restricted band, In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB or 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, determined by the measurement method on output power to be used. Attenuation below the general limits specified in § 15.209(a) is not required
☒ 20 dB down ☐ 30 dB down</td><td>☑</td></tr>
<tr><td>c)</td><td>or restricted band, emission must also comply with the radiated emission limits specified in 15.209</td><td>☑</td></tr>
</table>

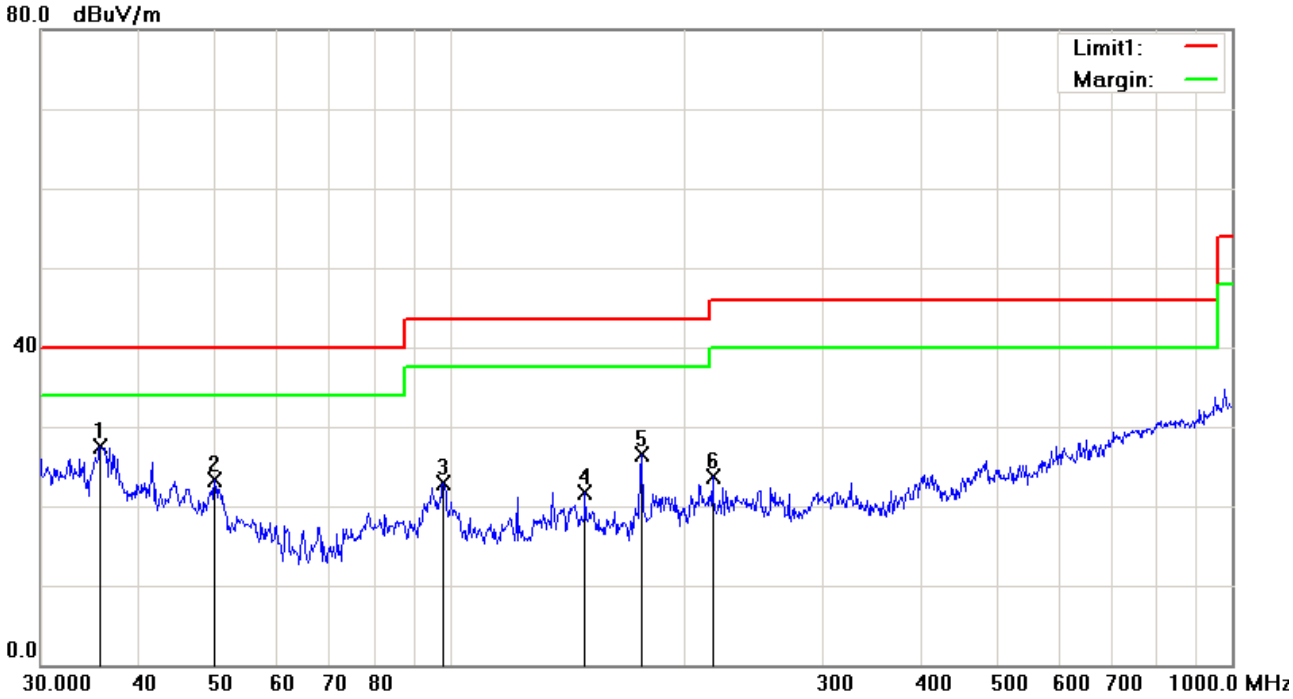
Test Setup	
Procedure	1. The EUT was switched on and allowed to warm up to its normal operating condition. 2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner: a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen. b. The EUT was then rotated to the direction that gave the maximum emission. c. Finally, the antenna height was adjusted to the height that gave the maximum emission. 3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasiy Peak detection at frequency below 1GHz. 4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak measurement at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz with Peak detection for Average Measurement as below at frequency above 1GHz. 5. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.
Remark	Different RF configuration has been evaluated but not much difference was found. The data presented here is the worst case data with EUT under 802.11n – HT20-2437MHz mode.
Result	☑ Pass ☐ Fail

Test Data ☑ Yes ☐ N/A

Test Plot ☑ Yes (See below) ☐ N/A

Test Mode:	Transmitting Mode

Below 1GHz

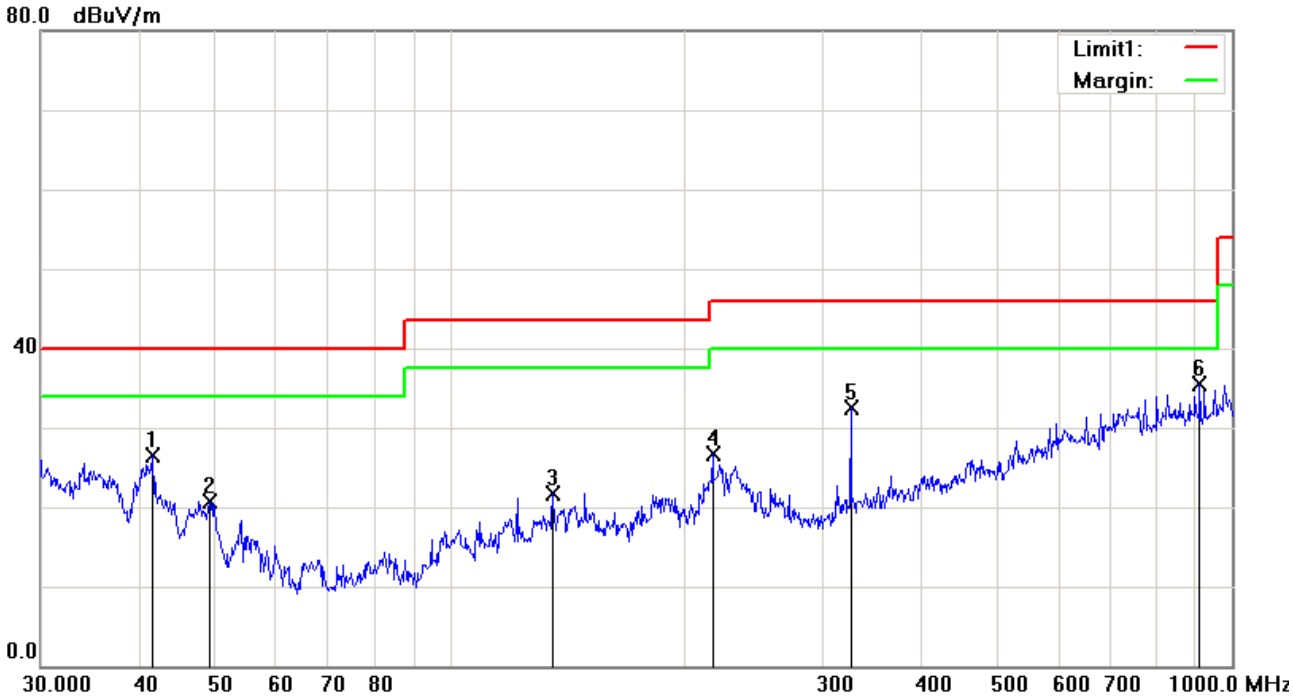


Test Data

Vertical Polarity Plot @3m

No	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Height	Degree
1	V	35.7491	32.06	peak	-4.49	27.57	40.00	-12.43	100	80
2	V	50.0566	36.51	peak	-13.19	23.32	40.00	-16.68	100	146
3	V	98.1419	34.19	peak	-11.30	22.89	43.50	-20.61	100	211
4	V	148.9625	30.19	peak	-8.42	21.77	43.50	-21.73	100	317
5	V	176.2686	36.17	peak	-9.59	26.58	43.50	-16.92	100	178
6	V	216.7828	32.56	peak	-8.89	23.67	46.00	-22.33	100	153

Below 1GHz



Test Data

Horizontal Polarity Plot @3m

No	P/L	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Height	Degree
1	H	41.7130	35.27	peak	-8.73	26.54	40.00	-13.46	100	129
2	H	49.3594	33.55	peak	-12.90	20.65	40.00	-19.35	100	351
3	H	135.5062	29.93	peak	-8.27	21.66	43.50	-21.84	100	224
4	H	216.7828	35.56	peak	-8.89	26.67	46.00	-19.33	100	180
5	H	325.5958	38.57	peak	-6.16	32.41	46.00	-13.59	100	71
6	H	909.6667	30.76	peak	4.78	35.54	46.00	-10.46	100	190

Above 1GHz

Test Mode:	Transmitting Mode

Low Channel (2402 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804	38.85	AV	V	33.83	6.86	31.72	47.82	54	-6.18
4804	38.41	AV	H	33.83	6.86	31.72	47.38	54	-6.62
4804	48.29	PK	V	33.83	6.86	31.72	57.26	74	-16.74
4804	47.83	PK	H	33.83	6.86	31.72	56.8	74	-17.2
17793	24.53	AV	V	44.98	11.24	32.08	48.67	54	-5.33
17793	24.29	AV	H	44.98	11.24	32.08	48.43	54	-5.57
17793	40.91	PK	V	44.98	11.24	32.08	65.05	74	-8.95
17793	40.65	PK	H	44.98	11.24	32.08	64.79	74	-9.21

Middle Channel (2440 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4880	38.93	AV	V	33.86	6.82	31.82	47.79	54	-6.21
4880	38.55	AV	H	33.86	6.82	31.82	47.41	54	-6.59
4880	48.36	PK	V	33.86	6.82	31.82	57.22	74	-16.78
4880	47.92	PK	H	33.86	6.82	31.82	56.78	74	-17.22
17807	24.16	AV	V	45.12	11.31	32.17	48.42	54	-5.58
17807	24.02	AV	H	45.12	11.31	32.17	48.28	54	-5.72
17807	41.25	PK	V	45.12	11.31	32.17	65.51	74	-8.49
17807	40.79	PK	H	45.12	11.31	32.17	65.05	74	-8.95

High Channel (2480 MHz)

Frequency (MHz)	S.A. Reading (dBμV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960	38.67	AV	V	33.9	6.76	31.92	47.41	54	-6.59
4960	38.52	AV	H	33.9	6.76	31.92	47.26	54	-6.74
4960	48.33	PK	V	33.9	6.76	31.92	57.07	74	-16.93
4960	47.98	PK	H	33.9	6.76	31.92	56.72	74	-17.28
17905	24.72	AV	V	45.27	11.27	32.25	49.01	54	-4.99
17905	24.48	AV	H	45.27	11.27	32.25	48.77	54	-5.23
17905	41.35	PK	V	45.27	11.27	32.25	65.64	74	-8.36
17905	41.09	PK	H	45.27	11.27	32.25	65.38	74	-8.62

Note:

*1, The testing has been conformed to 10*2480MHz=24,800MHz*
2, All other emissions more than 30 dB below the limit
3, X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

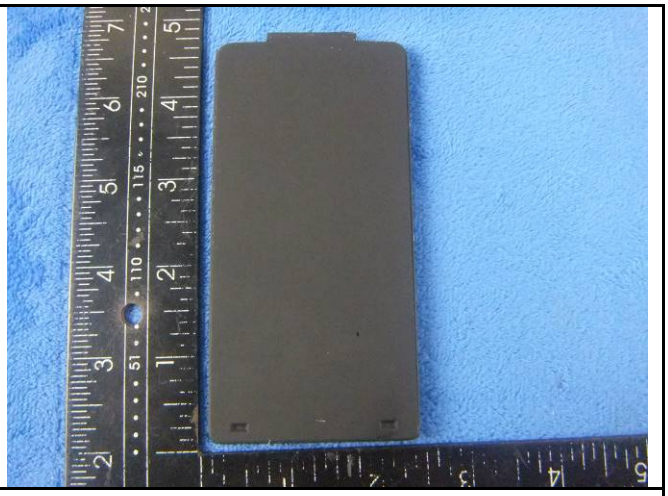
Annex A. TEST INSTRUMENT

Instrument	Model	Serial #	Cal Date	Cal Due	In use
AC Line Conducted					
EMI test receiver	ESCS30	8471241027	09/17/2015	09/16/2016	☑
Line Impedance	LI-125A	191106	09/25/2015	09/24/2016	☑
Line Impedance	LI-125A	191107	09/25/2015	09/24/2016	☑
LISN	ISN T800	34373	09/25/2015	09/24/2016	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	☑
Transient Limiter	LIT-153	531118	09/01/2015	08/31/2016	☑
RF conducted test					
Agilent ESA-E SERIES	E4407B	MY45108319	09/17/2015	09/16/2016	☑
Power Splitter	1#	1#	09/01/2015	08/31/2016	☑
DC Power Supply	E3640A	MY40004013	09/17/2015	09/16/2016	☑
Radiated Emissions					
EMI test receiver	ESL6	100262	09/17/2015	09/16/2016	☑
Positioning Controller	UC3000	MF780208282	11/19/2015	11/18/2016	☑
OPT 010 AMPLIFIER (0.1-1300MHz)	8447E	2727A02430	09/01/2015	08/31/2016	☑
Microwave Preamplifier (1 ~ 26.5GHz)	8449B	3008A02402	03/24/2016	03/23/2017	☑
Bilog Antenna (30MHz~6GHz)	JB6	A110712	09/21/2015	09/20/2016	☑
Double Ridge Horn Antenna (1 ~18GHz)	AH-118	71283	09/24/2015	09/23/2016	☑
Universal Radio Communication Tester	CMU200	121393	09/25/2015	09/24/2016	☑

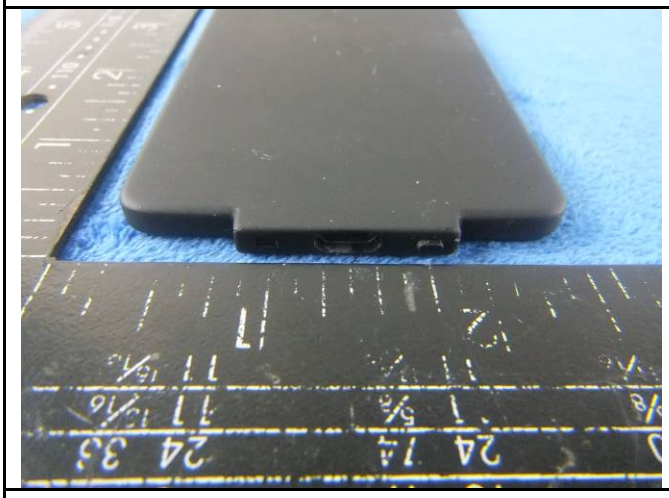
Annex B. EUT And Test Setup Photographs

Annex B.i. Photograph: EUT External Photo

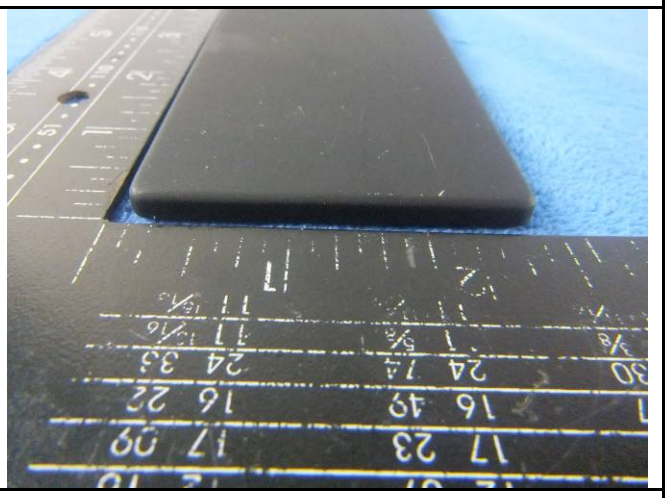
EUT - Front View



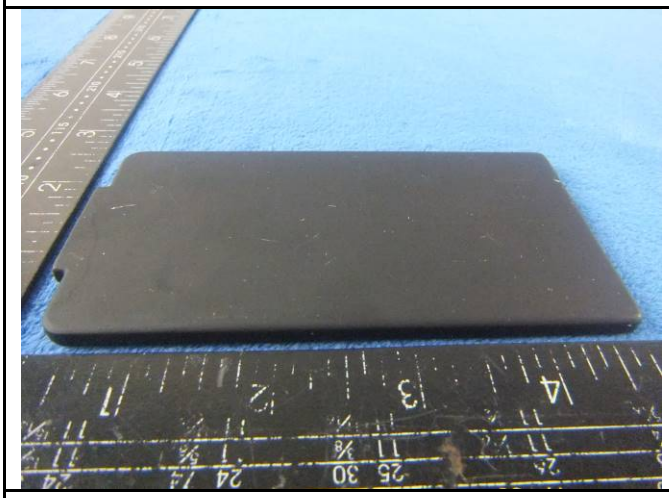
EUT - Rear View



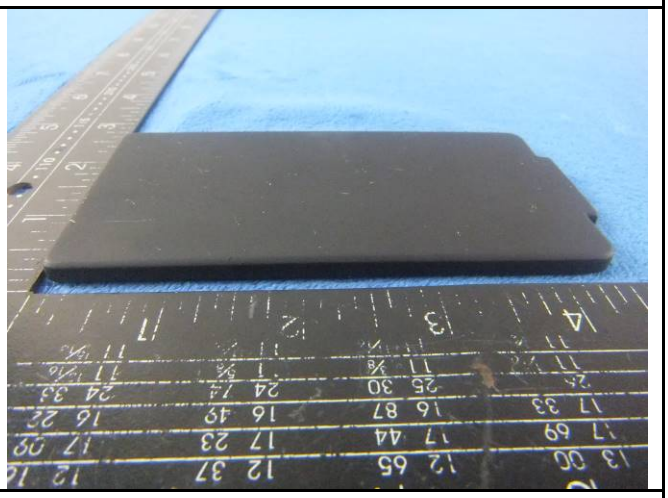
EUT - Top View



EUT - Bottom View



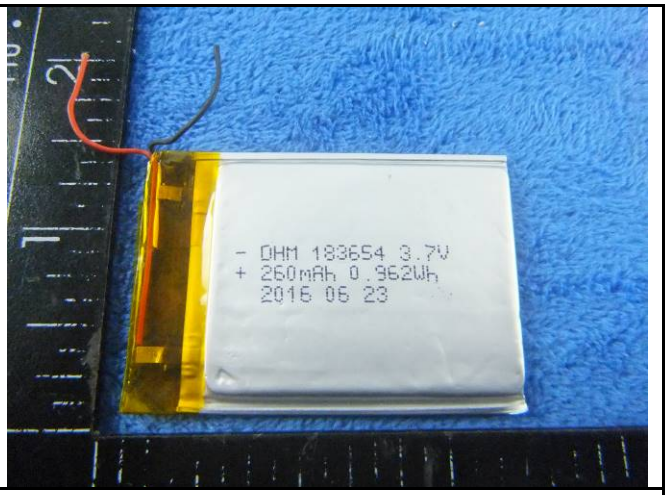
EUT - Left View



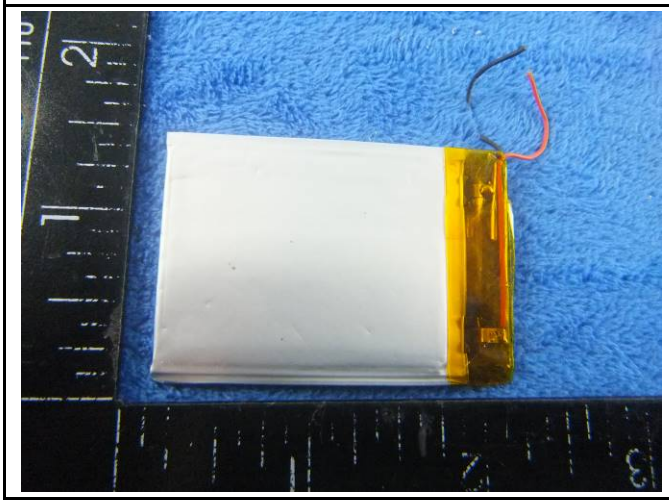
EUT - Right View

Annex B.ii. Photograph: EUT Internal Photo

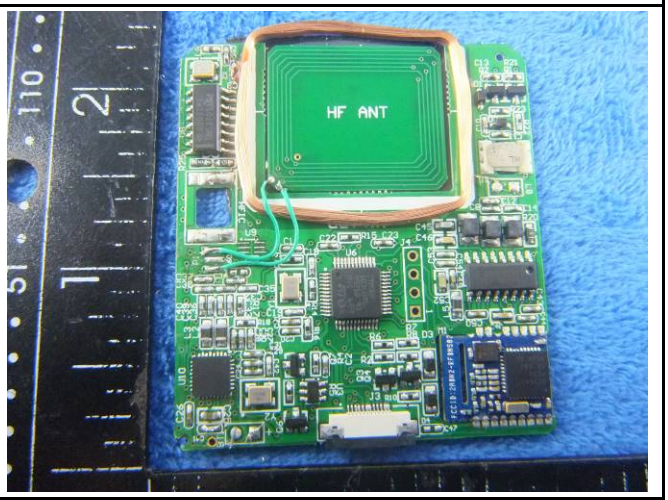
Cover Off - Top View 1



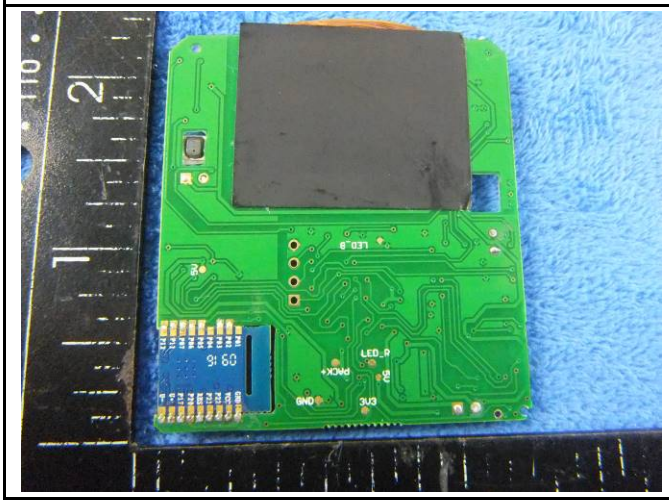
Battery - Front View



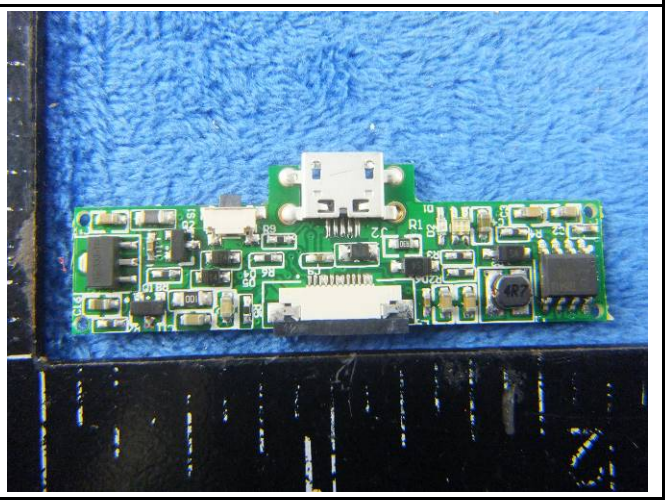
Battery - Rear View



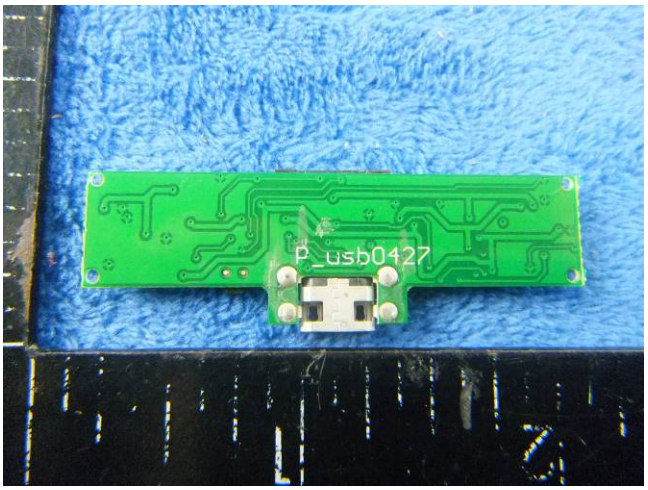
Mainborad - Front View



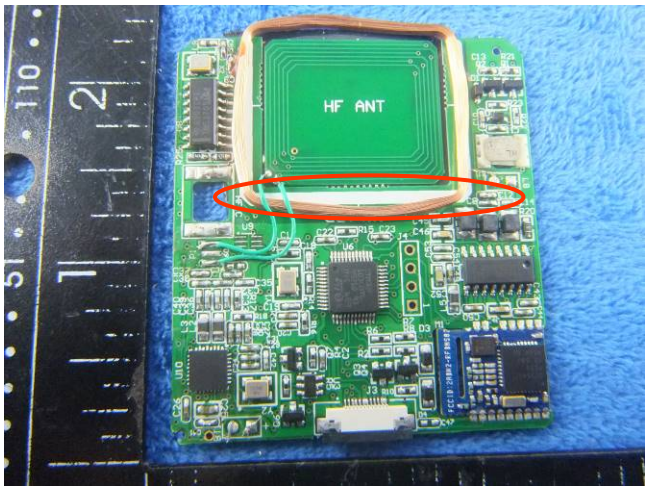
Mainborad - Rear View



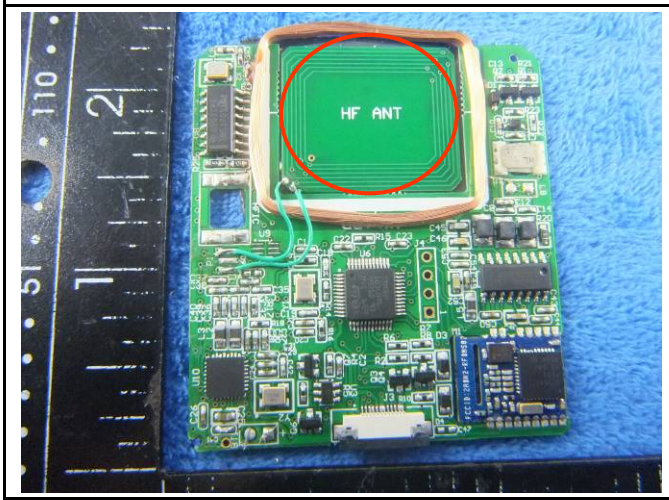
Mini Mainborad - Front View



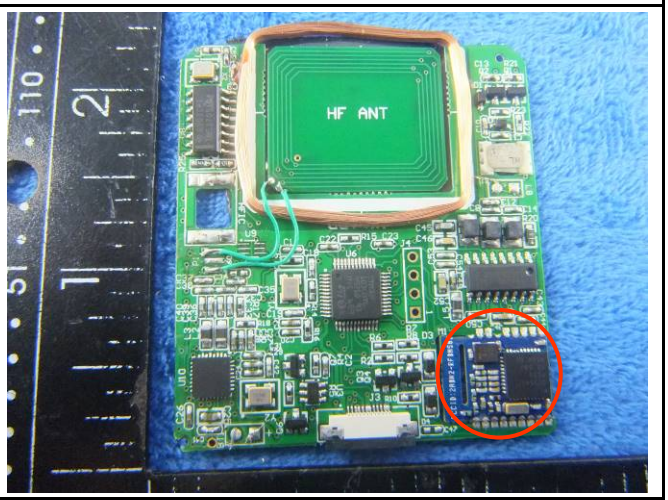
Mini Mainborad - Rear View



125-150KHz - Antenna View

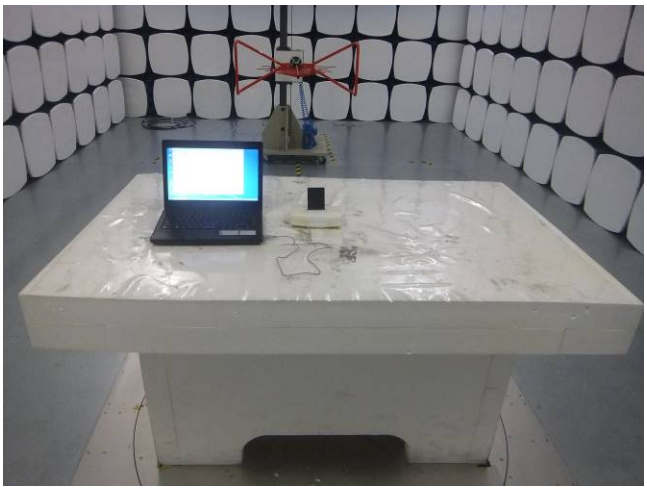
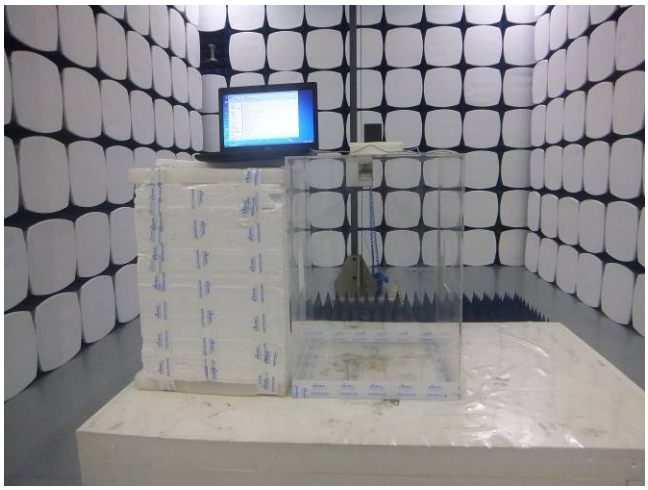


13.56MHz - Antenna View



BLE - Antenna View

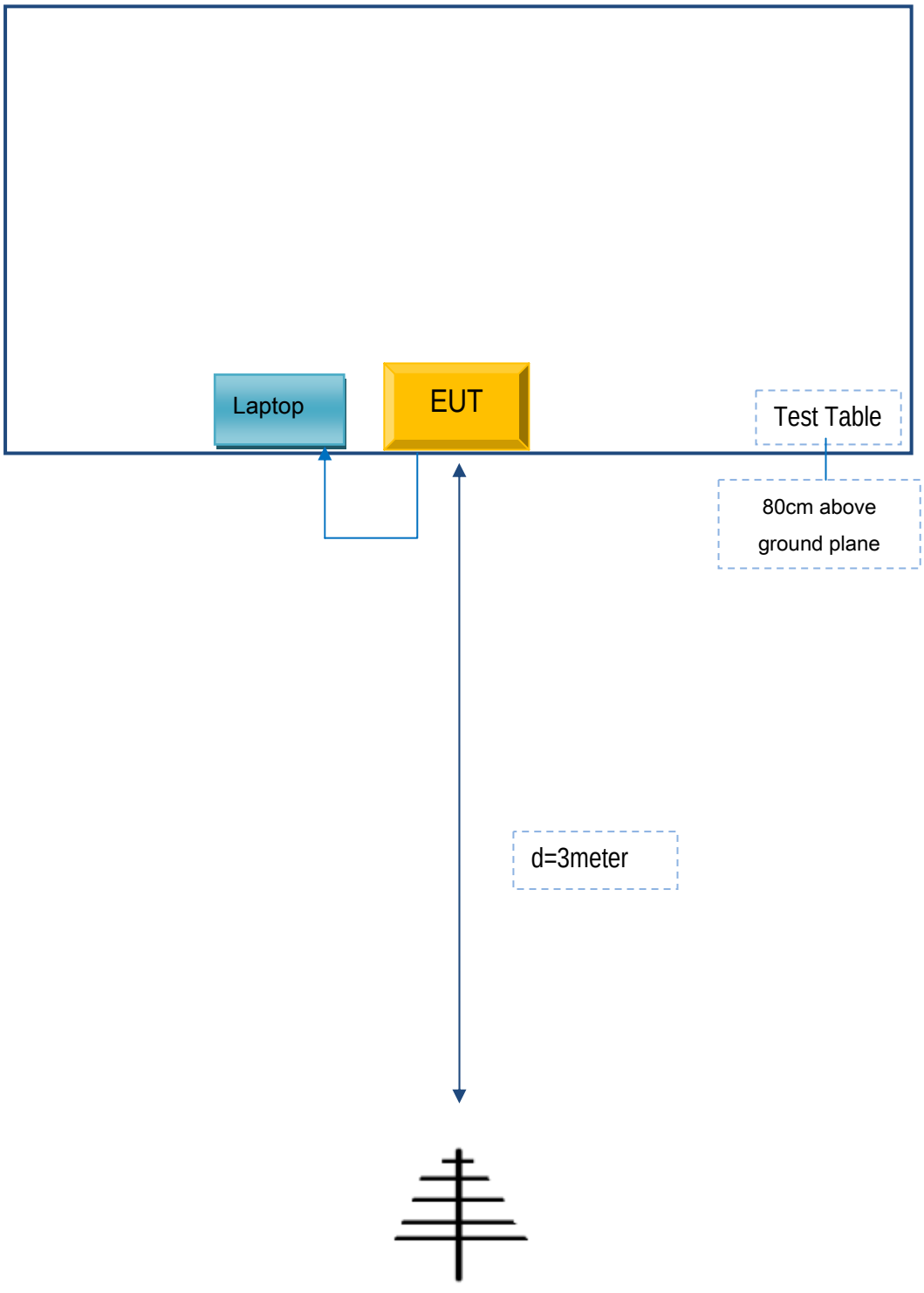
Annex B.iii. Photograph: Test Setup Photo

	
Radiated Spurious Emissions Test Setup 30MHz-1G	Radiated Spurious Emissions Test Setup above1G

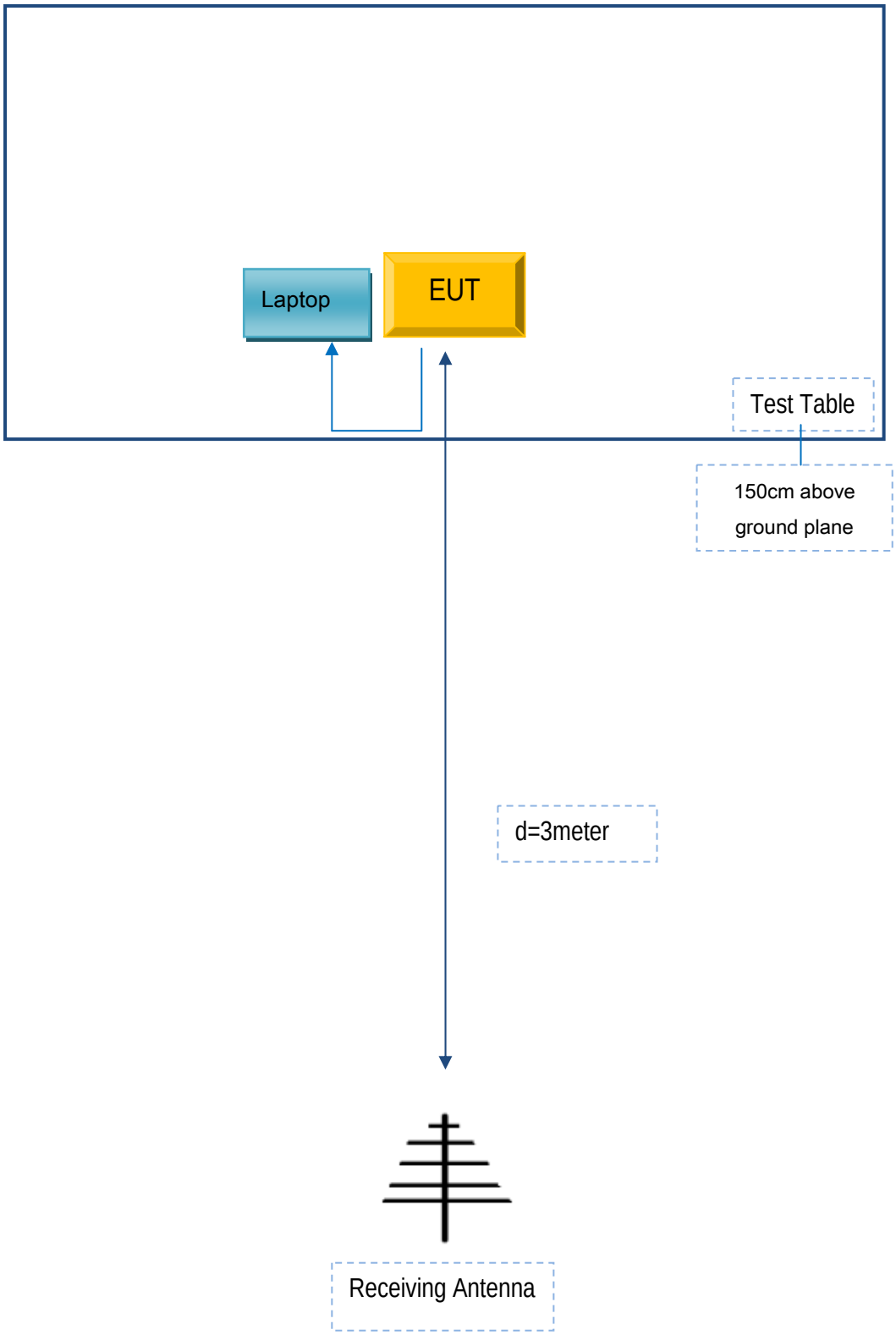
Annex C. TEST SETUP AND SUPPORTING EQUIPMENT

Annex C.ii. TEST SET UP BLOCK

Block Configuration Diagram for Radiated Emissions (Below 1GHz) .



Block Configuration Diagram for Radiated Emissions （Above 1GHz）.



Annex C. il. SUPPORTING EQUIPMENT DESCRIPTION

The following is a description of supporting equipment and details of cables used with the EUT.

Supporting Equipment:

Manufacturer	Equipment Description	Model	Serial No
Lenovo	Lenovo Laptop	E40& 0579A52	LR-1EHRX

Supporting Cable:

Cable type	Shield Type	Ferrite Core	Length	Serial No
N/A	N/A	N/A	N/A	N/A

Annex D. User Manual / Block Diagram / Schematics / Partlist

See attachment

Annex E. DECLARATION OF SIMILARITY

Freevision Technologies Co., Ltd

To ：775 Montague Expressway Mlpitas,CA 95035,USA

Declaration Letter

Dear Sir ’

For our business issue and marketing requirement, we would like to list Magikit Box BLE model numbers on
The FCC reports, as following:

Model No: MAGIKIT ADV V1.1
Trade: /

We declare that : MAGIKIT ADV V1.1, MAGIKIT ADV V1.2, MAGIKIT ADV V1.3, MAGIKIT ADV V1.4 , MAGIKIT ADV V1.5 ’MAGIKIT ADV V1.6, MAGIKIT ADV V1.7, MAGIKIT ADV V1.8 , MAGIKIT ADV V1.9, All models the same PCB and Appearance shape, accessories ,the difference of these is listed as below:

Main Model No	Serial Model No	Difference
MAGIKIT ADV V1.1	MAGIKIT ADV V1.1	Functionalities: Bluetooth, HF Reader & Writer,LF Reader & Writer ,HDX Reader, Tags
	MAGIKIT ADV V1.2,	Functionalities: Bluetooth, HF Reader & Writer,LF Reader & Writer,HDX Reader
	MAGIKIT ADV V1.3,	Functionalities: Bluetooth, HF Reader & Writer, LF Reader & Writer, Tags
	MAGIKIT ADV V1.4 ,	Functionalities: Bluetooth, HF Reader & Writer, Tags
	MAGIKIT ADV V1.5 ’	Functionalities: Bluetooth, HF Reader & Writer
	MAGIKIT ADV V1.6,	Functionalities: Bluetooth, LF Reader & Writer, HDX Reader, Tags
	MAGIKIT ADV V1.7,	Functionalities: Bluetooth, LF Reader & Writer, HDX Reader
	MAGIKIT ADV V1.8 ,	Functionalities: Bluetooth, LF Reader & Writer , Tags
	MAGIKIT ADV V1.9	Functionalities: Bluetooth, LF Reader & Writer

Thank you!
Sincerely,
Client's signature：Zoe Zheng
Client's name / title：Zoe Zheng / Manager
Contact information : 0086-021-24282670
Address : Floor 3 ’Building 8,No.999 Jiangyue Rd Minhang Dist, Shanghai, China