



Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

## FCC PART 15 SUBPART C TEST REPORT

### FCC PART 15.247

Report Reference No.....: GTS20231018011-1-85

FCC ID.....: 2AYD5-I23I01

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Date of issue.....: Jan. 29, 2024

Representative Laboratory Name.: Shenzhen Global Test Service Co.,Ltd.

Address .....: No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong, China

Applicant's name.....: Imin Technology Pte Ltd

Address .....: 11 Bishan Street 21, #03-05 Bosch Building, Singapore 573943

Test specification .....

Standard .....: FCC Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz

TRF Originator.....: Shenzhen Global Test Service Co.,Ltd.

Master TRF.....: Dated 2014-12

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Test item description .....: POS Device

Trade Mark .....



Manufacturer .....: Imin Technology Pte Ltd

Model/Type reference .....: I23I01

List Models .....: I23I02, I23I03, I23I01-01, I23I01-02, I23I01-03

Modulation Type.....: GFSK, π/4-DQPSK, 8DPSK

Operation Frequency.....: From 2402MHz to 2480MHz

Hardware Version .....: N/A

Software Version .....: N/A

Rating .....: DC 24V/2.5A by adapter

Result .....: PASS

## TEST REPORT

Test Report No. :	GTS20231018011-1-85	Jan. 29, 2024 Date of issue
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Equipment under Test : POS Device

Model /Type : I23I01

Listed model : I23I02, I23I03, I23I01-01, I23I01-02, I23I01-03

Applicant : **Imin Technology Pte Ltd**

Address : 11 Bishan Street 21, #03-05 Bosch Building, Singapore 573943

Manufacturer : **Imin Technology Pte Ltd**

Address : 11 Bishan Street 21, #03-05 Bosch Building, Singapore 573943

<b>Test Result:</b>	<b>PASS</b>
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

## Contents

<b>1. TEST STANDARDS .....</b>	<b>4</b>
<b>2. SUMMARY .....</b>	<b>5</b>
2.1. General Remarks .....	5
2.2. Product Description .....	5
2.3. Equipment Under Test .....	6
2.4. Short description of the Equipment under Test (EUT) .....	6
2.5. EUT operation mode .....	7
2.6. Block Diagram of Test Setup .....	7
2.7. Related Submittal(s) / Grant (s) .....	7
2.8. EUT Exercise Software .....	7
2.9. Special Accessories .....	8
2.10. External I/O Cable .....	8
2.11. Modifications .....	8
<b>3. TEST ENVIRONMENT .....</b>	<b>9</b>
3.1. Address of the test laboratory .....	9
3.2. Test Facility .....	9
3.3. Environmental conditions .....	9
3.4. Statement of the measurement uncertainty .....	9
3.5. Summary of measurement results .....	10
3.6. Equipments Used during the Test .....	11
<b>4. TEST CONDITIONS AND RESULTS .....</b>	<b>12</b>
4.1. AC Power Conducted Emission .....	12
4.2. Radiated Emission .....	22
4.3. Maximum Peak Output Power .....	35
4.4. 99% and 20dB Bandwidth .....	36
4.5. Frequency Separation .....	37
4.6. Conducted Spurious Emissions and Band Edge Compliance of RF Emission .....	38
4.7. Number of hopping frequency .....	40
4.8. Time Of Occupancy(Dwell Time) .....	41
4.9. Pseudorandom Frequency Hopping Sequence .....	42
4.10. Antenna Requirement .....	43
<b>5. TEST SETUP PHOTOS OF THE EUT .....</b>	<b>44</b>
<b>EXTERNAL AND INTERNAL PHOTOS OF THE EUT .....</b>	<b>46</b>
6.1. External photos of the EUT .....	46
6.2. Internal photos of the EUT .....	60

## **1. TEST STANDARDS**

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

[ANSI C63.10-2020](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB 558074 D01 15.247 Meas Guidance v05r02](#): Digital Transmission Systems (DTS) and Frequency Hopping measurement procedures

## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	Dec. 09, 2023
Testing commenced on	:	Dec. 09, 2023
Testing concluded on	:	Jan. 28, 2024

### 2.2. Product Description

Product Name:	POS Device
Trade Mark:	
Model/Type reference:	I23I01
List Model:	I23I02, I23I03, I23I01-01, I23I01-02, I23I01-03
Model Declaration	PCB board, structure and internal of these model(s) are the same, Only the model name different, So no additional models were tested. All modes are available in three versions, Different sizes of display and interface board are used. The transmitter part of the variants are identical and the Different sizes of display and interface board have no influence on the RF characteristics of the device which is proofed by performing EMC tests on the variants.
Power supply:	DC 24V/2.5A by adapter
Hardware Version	N/A
Software Version	N/A
Sample ID	GTS20231018011-1-S0001-5# & GTS20231018011-1-S0001-6#
Bluetooth	
Frequency Range	2402MHz ~ 2480MHz
Channel Number	79 channels for Bluetooth (DSS) 40 channels for Bluetooth (DTS)
Channel Spacing	1MHz for Bluetooth (DSS) 2MHz for Bluetooth (DTS)
Modulation Type	GFSK, π/4-DQPSK, 8DPSK for Bluetooth (DSS) GFSK for Bluetooth (DTS)
2.4G WLAN	
WLAN Operation frequency	IEEE 802.11b:2412-2462MHz IEEE 802.11g:2412-2462MHz IEEE 802.11n HT20:2412-2462MHz IEEE 802.11ax HE20:2412-2462MHz
WLAN Modulation Type	IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ax HE20: OFDMA (1024QAM,256QAM,64QAM,16QAM, QPSK,BPSK)
Channel number:	11 Channel for IEEE 802.11b/g/n/ax (HT20)
Channel separation:	5MHz
WIFI(5.2G/5.3G/5.7G/5.8G Band)	
WLAN Operation frequency	5180-5240MHz/ 5260MHz to 5320MHz/ 5500MHz to 5700MHz/ 5745MHz to 5825MHz
WLAN Modulation Type	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK)

	IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11ac VHT20: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac VHT40: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac VHT80: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax HE20: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax HE40: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax HE80: OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Channel number:	4 Channels for 20MHz bandwidth(5180-5240MHz) 4 Channels for 20MHz bandwidth(5260-5320MHz) 11 Channels for 20MHz bandwidth(5500-5700MHz) 5 channels for 20MHz bandwidth(5745-5825MHz) 2 channels for 40MHz bandwidth(5190~5230MHz) 2 channels for 40MHz bandwidth(5270~5310MHz) 5 Channels for 40MHz bandwidth(5510-5670MHz) 2 channels for 40MHz bandwidth(5755~5795MHz) 1 channels for 80MHz bandwidth(5210MHz) 1 channels for 80MHz bandwidth(5290MHz) 2 Channels for 80MHz bandwidth(5530-5610MHz) 1 channels for 80MHz bandwidth(5775MHz)
Antenna Description	Three Internal antenna respectively. WLAN support 2*2MIMO technology. ANT0 used for WIFI TX/RX, 2.00 dBi(Max.) for 2.4G Band and 2.00dBi(Max.) for 5G Band ANT1 used for WIFI TX/RX, 2.00 dBi(Max.) for 2.4G Band and 2.00dBi (Max.) for 5G Band ANT2 used for BT TX/RX, 2.00 dBi(Max.) for 2.4G Band
Remark:The EUT has 3 versions; Version A: 27 "display Version B: 21 "display Version C: 16 "display	

### 2.3. Equipment Under Test

#### Power supply system utilised

Power supply voltage	:	<input type="radio"/>	230V / 50 Hz	<input type="radio"/>	120V / 60Hz
		<input type="radio"/>	12 V DC	<input checked="" type="radio"/>	24 V DC
		<input type="radio"/>	Other (specified in blank below)		

DC 24.0V

### 2.4. Short description of the Equipment under Test (EUT)

This is a POS Device.

For more details, refer to the user's manual of the EUT.

## 2.5. EUT operation mode

The Applicant provides communication tools software to control the EUT for staying in continuous transmitting (Duty Cycle more than 98%) and receiving mode for testing .There are 79 channels provided to the EUT. Channel 00/39/78 was selected to test.

Mode of Operations	Frequency Range (MHz)	Data Rate (Mbps)
(BDR/EDR)	2402	1/2/3
	2441	1/2/3
	2480	1/2/3
For Conducted Emission		
Test Mode	TX Mode	
For Radiated Emission		
Test Mode	TX Mode	

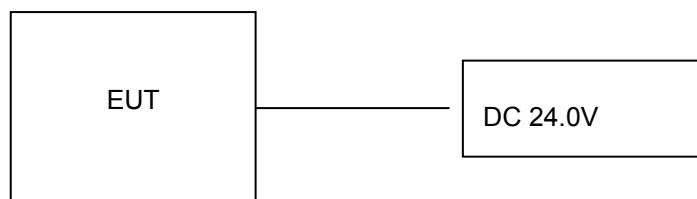
Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	<b>2402</b>	40	2442
01	2403	41	2443
02	2404	42	2444
--	--	--	--
--	--	--	--
<b>38</b>	2440	<b>78</b>	<b>2480</b>
39	2441		

AC conducted emission pre-test at both at AC 120V/60Hz and AC 240V/50Hz modes, recorded worst case(AC 120V/60Hz).

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was the mode and channel with the highest output power that was determined to be TX (1Mbps).

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be TX(1Mbps-MCH).

## 2.6. Block Diagram of Test Setup



## 2.7. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AYD5-I23I01** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

## 2.8. EUT Exercise Software

The system enters the engineering mode through the instructions provided by the application (adb model), tests under continuous transmission conditions, and changes the test channel.

## 2.9. Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
Jiangsu Chenyang Electron Co.,Ltd.	Adapter	CYSE65-240250	--	SDOC
Shenzhen SOY Technology Co.,Ltd.	Adapter	SOY-2400250-332-A	--	SDOC
SHENZHEN HONOR ELECTRONIC CO.,LTD.	Adapter	ADS-65HI-19A-1 24060F	--	SDOC
LENOVO	PC	DESKYOP-EUVCNR	--	SDOC
LENOVO	Keyboard	T460S	--	SDOC
LENOVO	Mouse	Howard	--	SDOC
SONY	Earphone	MDR-XB550AP	--	SDOC
aigo	USB flash disk	U330	--	SDOC
N/A	TF Card	N/A	--	SDOC
N/A	Electronic Scale	N/A	--	SDOC
N/A	Cashbox	N/A	--	SDOC

Note: The PC, Keyboard, Mouse, Earphone, USB flash disk, TF Card, Electronic Scale and Cashbox is only used for auxiliary testing.

## 2.10. External I/O Cable

I/O Port Description	Quantity	Cable
DC IN Port	1	Non-Shielded, 1.0m
USB Port	6	N/A
LAN Port	1	Non-Shielded, 1.0m
Type-C Port	2	Non-Shielded, 1.0m
TF Cart	1	N/A
RJ11 Port	1	Non-Shielded, 1.0m
RJ12 Port	1	Non-Shielded, 1.0m
Earphone	1	N/A

## 2.11. Modifications

No modifications were implemented to meet testing criteria.

### 3. TEST ENVIRONMENT

#### 3.1. Address of the test laboratory

##### Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong,China.

#### 3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

##### CNAS (No. CNAS L8169)

Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.

##### A2LA (Certificate No. 4758.01)

Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.

Industry Canada Registration Number. is 24189.

FCC Designation Number is CN1234.

FCC Registered Test Site Number is 165725.

#### 3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

#### 3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Global Test Service Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen GTS laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

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

### 3.5. Summary of measurement results

Applied Standard: FCC Part 15 Subpart C				
FCC Rules	Description of Test	Test Sample	Result	Remark
§15.247(b)(1)	Maximum Conducted Output Power	GTS20231018011-1-S0001-5#	Compliant	Appendix A
§15.247(c)	Frequency Separation	GTS20231018011-1-S0001-5#	Compliant	Appendix A
§15.247(c)	99% and 20 dB Bandwidth	GTS20231018011-1-S0001-5#	Compliant	Appendix A
§15.247(a)(1)(ii)	Number of Hopping Frequency	GTS20231018011-1-S0001-5#	Compliant	Appendix A
§15.247(a)(1)(iii)	Time Of Occupancy (Dwell Time)	GTS20231018011-1-S0001-5#	Compliant	Appendix A
§15.209, §15.205	Conducted Spurious Emissions and Band Edges Test	GTS20231018011-1-S0001-5#	Compliant	Appendix A
§15.209, §15.247(d)	Radiated Spurious Emissions	GTS20231018011-1-S0001-5# GTS20231018011-1-S0001-6#	Compliant	Note 1
§15.205	Emissions at Restricted Band	GTS20231018011-1-S0001-5#	Compliant	Note 1
§15.207(a)	AC Conducted Emissions	GTS20231018011-1-S0001-6#	Compliant	Note 1
§15.203 §15.247(c)	Antenna Requirements	GTS20231018011-1-S0001-5#	Compliant	Note 1
§15.247(i)§2.10 91	RF Exposure	/	Compliant	Note 2

Remark:

1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed
3. Note 1 – Test results inside test report;
4. Note 2 – Test results in other test report (MPE Report).
5. We tested all test mode and recorded worst case in report

### 3.6. Equipments Used during the Test

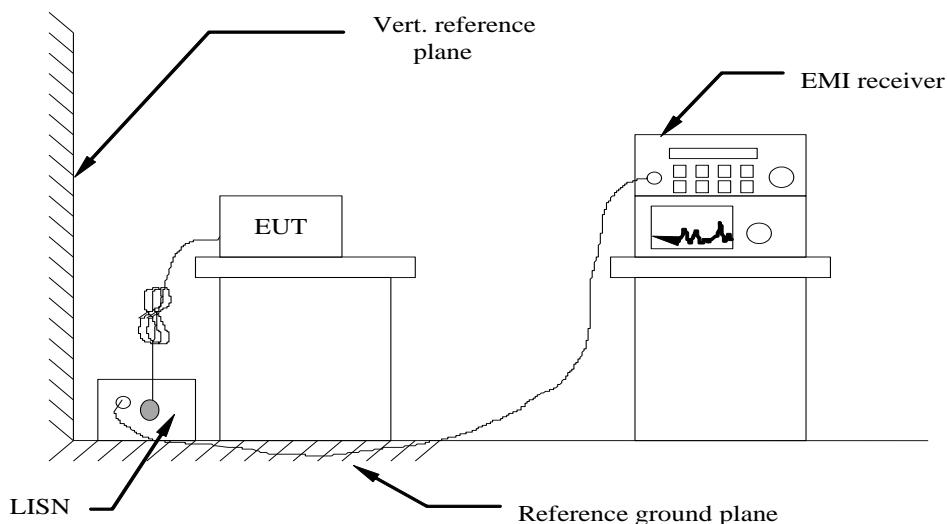
Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
LISN	CYBERTEK	EM5040A	E1850400105	2023/07/13	2024/07/12
LISN	R&S	ESH2-Z5	893606/008	2023/07/13	2024/07/12
EMI Test Receiver	R&S	ESPI3	101841-cd	2023/07/14	2024/07/13
EMI Test Receiver	R&S	ESCI7	101102	2023/07/13	2024/07/12
Spectrum Analyzer	Agilent	N9020A	MY48010425	2023/08/28	2024/08/27
Spectrum Analyzer	R&S	FSV40	100019	2023/07/13	2024/07/12
Vector Signal generator	Agilent	N5181A	MY49060502	2023/07/13	2024/07/12
Signal generator	Agilent	N5182A	3610AO1069	2023/07/13	2024/07/12
Climate Chamber	ESPEC	EL-10KA	A20120523	2023/07/13	2024/07/12
Controller	EM Electronics	Controller EM 1000	N/A	N/A	N/A
Horn Antenna	Schwarzbeck	BBHA 9120D	01622	2023/07/13	2024/07/12
Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2023/07/13	2024/07/12
Bilog Antenna	Schwarzbeck	VULB9163	000976	2023/07/13	2024/07/12
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2023/07/13	2024/07/12
Antenna Tower	Suzhou Keletuo electronic Technology Co., LTD	BK-*AT-BS	N/A	N/A	N/A
Amplifier	Schwarzbeck	BBV 9743	#202	2023/07/14	2024/07/13
Amplifier	Schwarzbeck	BBV9179	9719-025	2023/07/14	2024/07/13
Amplifier	EMCI	EMC051845B	980355	2023/07/14	2024/07/13
Temperature/Humidity Meter	Gangxing	CTH-608	02	2023/07/13	2024/07/12
High-Pass Filter	K&L	9SH10-2700/X12750-O/O	KL142031	2023/08/30	2024/08/29
High-Pass Filter	K&L	41H10-1375/U12750-O/O	KL142032	2023/08/30	2024/08/29
RF Cable(below 1GHz)	HUBER+SUHNER	RG214	RE01	2023/07/13	2024/07/12
RF Cable(above 1GHz)	HUBER+SUHNER	RG214	RE02	2023/07/13	2024/07/12
Data acquisition card	Agilent	U2531A	TW53323507	2023/07/13	2024/07/12
Power Sensor	Agilent	U2021XA	MY5365004	2023/07/13	2024/07/12
Test Control Unit	Tonscend	JS0806-1	178060067	2023/07/13	2024/07/12
Automated filter bank	Tonscend	JS0806-F	19F8060177	2023/07/13	2024/07/12
EMI Test Software	Tonscend	JS1120-1	Ver 2.6.8.0518	/	/
EMI Test Software	Tonscend	JS1120-3	Ver 2.5.77.0418	/	/
EMI Test Software	Tonscend	JS32-CE	Ver 2.5	/	/
EMI Test Software	Tonscend	JS32-RE	Ver 2.5.1.8	/	/

Note: The Cal.Interval was one year.

## 4. TEST CONDITIONS AND RESULTS

### 4.1. AC Power Conducted Emission

#### TEST CONFIGURATION



#### TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2020.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2020.
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2020.
- 4 The EUT received DC 24.0V power, the Adapter received AC120V/60Hz or AC 240V/50Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

#### AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

#### DISTURBANCE Calculation

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$CD \text{ (dBuV)} = RA \text{ (dBuV)} + PL \text{ (dB)} + CL \text{ (dB)}$$

Where	CD = Conducted Disturbance	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	PL = 10 dB Pulse Limiter Factor

## **TEST RESULTS**

Remark: We measured Conducted Emission at GFSK,  $\pi/4$ -DQPSK and 8DPSK mode in AC 120V/60Hz and AC 240V/50Hz, the worst case was recorded(GFSK 1Mbps-MCH).

Temperature	26°C	Humidity	47%
Test Engineer	Evan Ouyang	Configurations	BT

## Version A:

Adapter: CYSE65-240250

Power supply: AC 120V/60Hz

Polarization: L

Test Graph

Final Data List

NO.	Frequency	QP		Factor	QP		AVG.		QP		AVG.		Line	Remark
		Reading	Reading		Result	Result	Limit	Limit	Margin	Margin				
1	0.1856	38.34	19.88	9.88	46.20	29.74	64.23	54.23	18.03	24.49	L1	PASS		
2	0.7171	22.33	16.40	9.67	32.00	26.07	56.00	46.00	24.00	19.93	L1	PASS		
3	1.2798	16.96	8.08	9.68	26.64	17.77	56.00	46.00	29.36	28.23	L1	PASS		
4	2.0874	13.84	6.20	9.73	23.57	15.93	56.00	46.00	32.43	30.07	L1	PASS		
5	4.0195	18.92	8.99	9.80	28.72	18.79	56.00	46.00	27.28	27.21	L1	PASS		
6	13.3295	22.01	17.25	9.33	31.34	26.58	60.00	50.00	28.66	23.42	L1	PASS		

Note: 1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

Power supply:	AC 120V/60Hz	Polarization	N
---------------	--------------	--------------	---

**Test Graph**

**Final Data List**

NO.	Frequency	QP		AVG.		Factor		QP		AVG.		QP		AVG.		Line	Remark
		Reading	Reading	Result	Result	Factor	Factor	Limit	Limit	Margin	Margin	Margin	Margin				
1	0.1515	40.24	22.88	9.79	50.03	32.67	65.92	55.92	15.89	23.25	N	PASS					
2	0.1851	35.30	19.38	9.80	45.10	29.18	64.25	54.25	19.15	25.07	N	PASS					
3	0.7174	28.41	20.73	9.66	36.07	30.39	56.00	46.00	19.93	15.61	N	PASS					
4	2.3935	16.72	8.99	9.74	26.46	18.73	56.00	46.00	29.54	27.27	N	PASS					
5	3.6380	21.94	13.26	9.79	31.73	23.05	56.00	46.00	24.27	22.95	N	PASS					
6	14.8930	28.22	21.35	9.27	35.49	30.62	60.00	50.00	24.51	19.38	N	PASS					

Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

**Adapter: SOY-2400250-332-A**

Power supply:	AC 120V/60Hz	Polarization				L													
Test Graph																			
Final Data List																			
NO.	Frequency	QP Reading	AVG. Reading	Factor	QP Result	AVG. Result	QP Limit	AVG. Limit	QP Margin	AVG. Margin	Line	Remark							
1	0.1628	39.06	21.44	9.92	48.98	31.36	65.32	55.32	16.34	23.98	L1	PASS							
2	0.2320	30.48	16.14	9.77	40.25	25.91	62.38	52.38	22.13	26.47	L1	PASS							
3	0.6795	19.77	12.16	9.87	29.44	21.83	56.00	46.00	26.56	24.17	L1	PASS							
4	1.0152	17.63	8.77	9.87	27.30	18.44	56.00	46.00	28.70	27.58	L1	PASS							
5	3.4970	17.24	6.82	9.78	27.02	16.60	56.00	46.00	28.98	29.40	L1	PASS							
6	10.2016	23.04	19.71	9.81	32.65	29.32	60.00	50.00	27.35	20.68	L1	PASS							

**Adapter: ADS-65HI-19A-1 24060F**

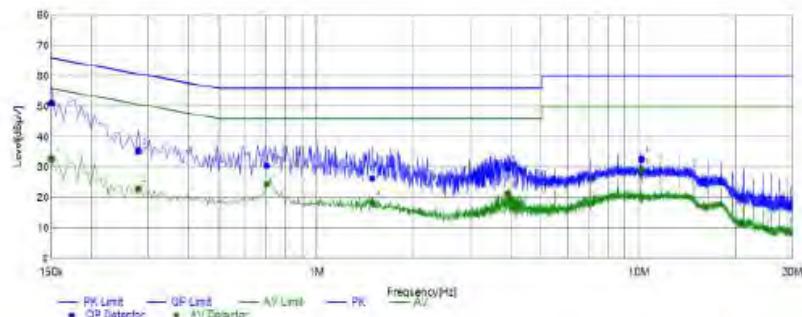
Power supply:	AC 120V/60Hz	Polarization	L									
<b>Test Graph</b>												
<b>Final Data List</b>												
NO.	Frequency	QP Reading	AVG. Reading	Factor	QP Result	AVG. Result	QP Limit	AVG. Limit	QP Margin	AVG. Margin	Line	Remark
1	0.1635	38.73	21.08	9.82	48.65	31.00	65.29	55.29	16.64	24.29	L1	PASS
2	0.2089	33.30	17.77	9.80	43.10	27.57	63.25	53.25	20.15	25.68	L1	PASS
3	0.7799	19.86	11.43	9.68	29.54	21.11	56.00	46.00	26.46	24.89	L1	PASS
4	1.2617	17.12	8.18	9.68	26.80	17.88	56.00	46.00	29.20	28.14	L1	PASS
5	3.6562	18.31	8.35	9.78	28.09	18.13	56.00	46.00	27.91	27.87	L1	PASS
6	11.7690	22.91	18.97	9.48	32.39	28.45	60.00	50.00	27.61	21.55	L1	PASS
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).												
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).												
Power supply:	AC 120V/60Hz	Polarization	N									
<b>Test Graph</b>												
<b>Final Data List</b>												
NO.	Frequency	QP Reading	AVG. Reading	Factor	QP Result	AVG. Result	QP Limit	AVG. Limit	QP Margin	AVG. Margin	Line	Remark
1	0.1590	38.73	21.71	9.79	48.52	31.50	65.52	55.52	17.00	24.02	N	PASS
2	0.2083	31.86	17.38	9.79	41.65	27.17	63.27	53.27	21.62	26.10	N	PASS
3	0.7269	26.21	20.22	9.67	35.88	28.89	56.00	46.00	20.12	16.11	N	PASS
4	1.4790	17.85	8.60	9.69	27.54	18.19	56.00	46.00	28.46	27.81	N	PASS
5	3.4453	21.16	11.75	9.77	30.93	21.52	56.00	46.00	25.07	24.48	N	PASS
6	13.3393	26.24	21.77	9.37	35.61	31.14	60.00	50.00	24.39	18.86	N	PASS
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).												
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).												

## Version B:

Adapter: CYSE65-240250

Power supply:	AC 120V/60Hz	Polarization	L
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Test Graph



Final Data List

NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark
		Reading	Reading		Result	Result	Limit	Limit	Margin	Margin		
1	0.1503	41.14	22.81	9.96	51.10	32.77	65.98	55.98	14.88	23.21	L1	PASS
2	0.2797	25.72	13.29	9.71	35.43	23.00	80.83	50.83	25.40	27.83	L1	PASS
3	0.6994	20.90	14.75	9.67	30.57	24.42	56.00	46.00	25.43	21.58	L1	PASS
4	1.4885	16.74	8.78	9.70	26.44	18.48	56.00	46.00	29.56	27.52	L1	PASS
5	3.9221	19.86	11.62	9.79	29.05	21.41	56.00	46.00	26.35	24.59	L1	PASS
6	10.2016	23.05	19.30	9.61	32.66	28.91	60.00	50.00	27.34	21.09	L1	PASS

Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

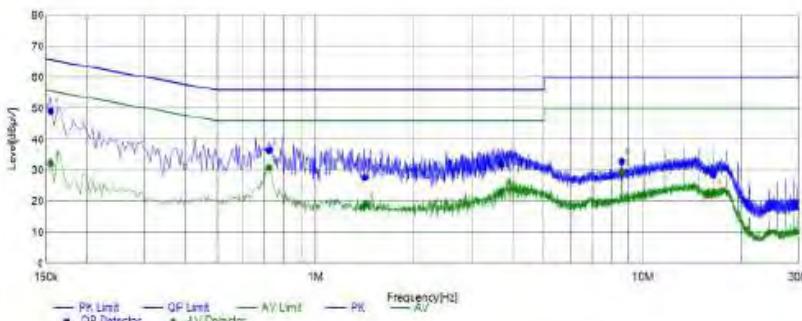
Power supply:

AC 120V/60Hz

Polarization

N

Test Graph



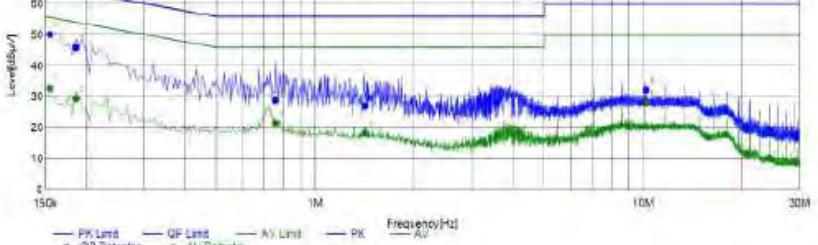
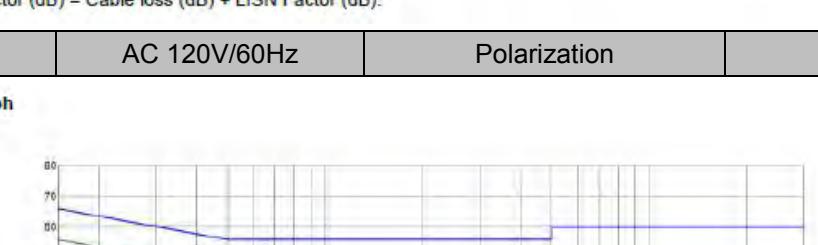
Final Data List

NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark
		Reading	Reading		Result	Result	Limit	Limit	Margin	Margin		
1	0.1552	39.36	22.44	9.79	49.15	32.23	65.72	55.72	16.57	23.49	N	PASS
2	0.7206	26.83	21.22	9.66	38.49	30.88	56.00	46.00	19.51	15.12	N	PASS
3	1.4122	18.00	9.01	9.68	27.68	18.69	56.00	46.00	28.32	27.31	N	PASS
4	3.7000	22.22	13.39	9.78	32.00	23.17	56.00	46.00	24.00	22.83	N	PASS
5	8.6306	23.15	19.88	9.69	32.84	29.57	60.00	50.00	27.16	20.43	N	PASS
6	16.4691	19.44	13.94	9.18	28.62	23.12	60.00	50.00	31.38	26.88	N	PASS

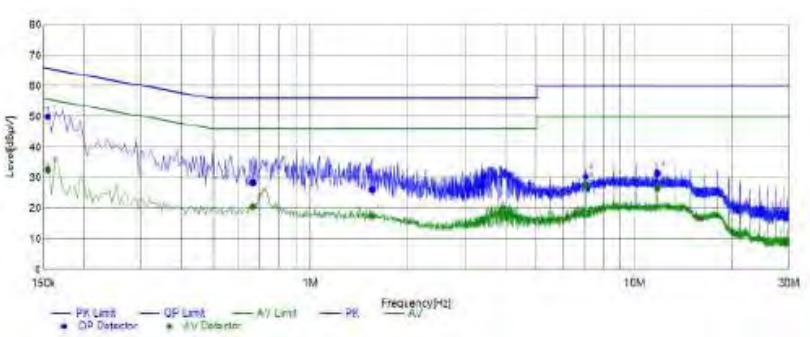
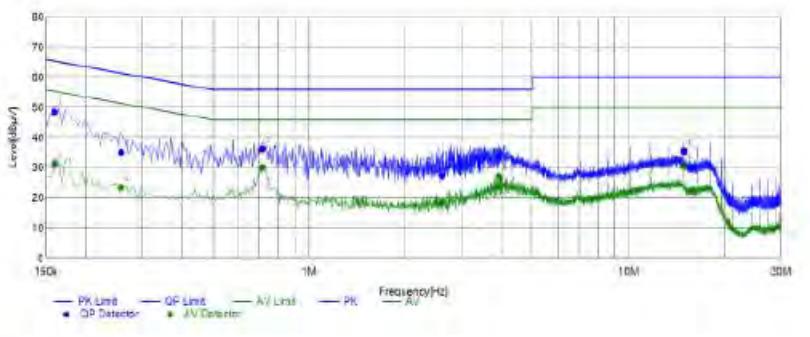
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).

2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).

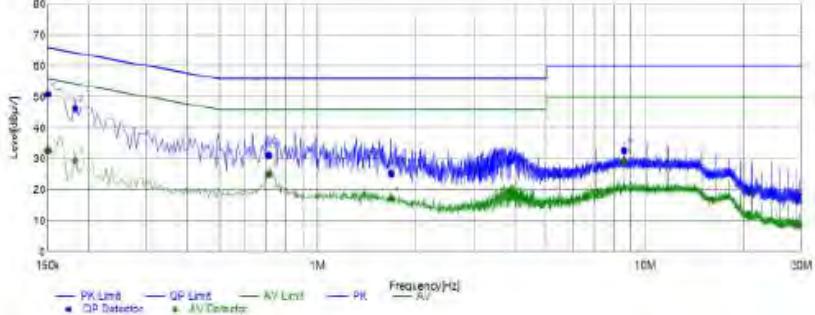
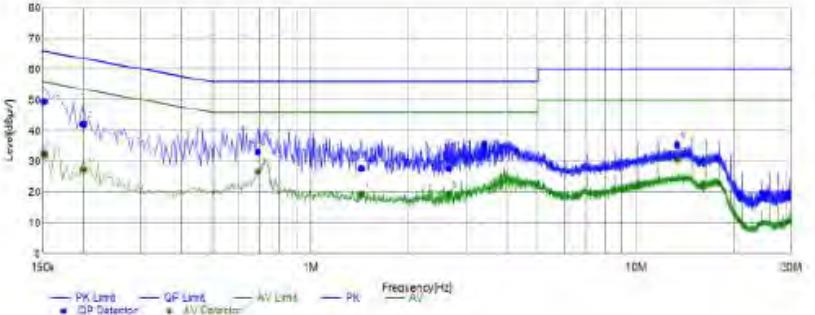
**Adapter: SOY-2400250-332-A**

Power supply:	AC 120V/60Hz	Polarization	L									
Test Graph												
												
Final Data List												
NO.	Frequency	QP Reading	Avg. Reading	Factor	QP Result	Avg. Result	QP Limit	Avg. Limit	QP Margin	Avg. Margin	Line	Remark
1	0.1550	40.28	22.77	9.04	50.22	32.71	65.73	55.73	15.51	23.02	L1	PASS
2	0.1881	36.09	19.83	9.85	45.94	29.48	64.21	54.21	18.27	24.73	L1	PASS
3	0.7552	19.27	11.72	9.68	28.95	21.40	56.00	46.00	27.05	24.80	L1	PASS
4	1.4178	17.32	8.62	9.89	27.01	18.31	56.00	46.00	28.99	27.69	L1	PASS
5	3.5824	18.46	8.07	9.80	28.26	17.87	56.00	46.00	27.74	28.13	L1	PASS
6	10.2089	22.57	18.43	9.81	32.18	28.04	60.00	50.00	27.82	21.96	L1	PASS
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).												
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).												
Power supply:	AC 120V/60Hz	Polarization	N									
Test Graph												
												
Final Data List												
NO.	Frequency	QP Reading	Avg. Reading	Factor	QP Result	Avg. Result	QP Limit	Avg. Limit	QP Margin	Avg. Margin	Line	Remark
1	0.1634	37.85	20.81	9.79	47.44	30.80	65.29	55.29	17.85	24.69	N	PASS
2	0.1912	33.81	17.84	9.80	43.41	27.64	63.98	53.98	20.57	26.34	N	PASS
3	0.7239	26.89	21.13	9.66	36.55	30.79	56.00	46.00	19.45	15.21	N	PASS
4	1.4934	18.26	9.41	9.69	27.95	19.10	56.00	46.00	28.05	26.90	N	PASS
5	3.0562	18.36	10.06	9.76	28.12	19.82	56.00	46.00	27.88	26.18	N	PASS
6	13.3485	26.21	21.85	9.37	35.58	31.02	60.00	50.00	24.42	18.98	N	PASS
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).												
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).												

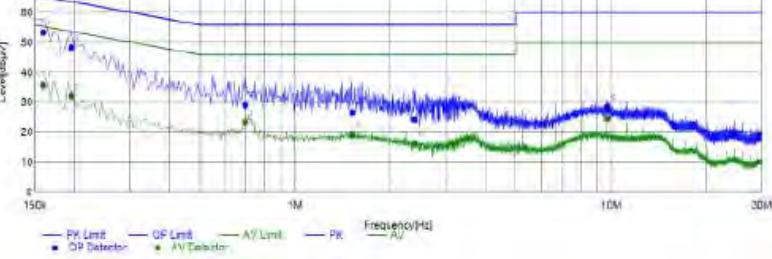
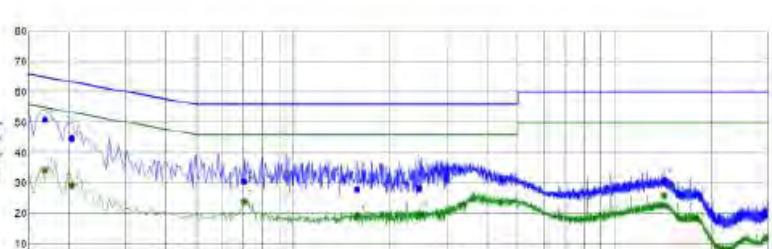
## Adapter: ADS-65HI-19A-1 24060F

Power supply:	AC 120V/60Hz	Polarization	L									
<b>Test Graph</b>												
												
<b>Final Data List</b>												
NO.	Frequency	QP Reading	Avg. Reading	Factor	QP Result	Avg. Result	QP Limit	Avg. Limit	QP Margin	Avg. Margin	Line	Remark
1	0.1547	40.15	22.71	9.95	50.10	32.66	65.75	55.75	15.85	23.09	L1	PASS
2	0.6645	18.80	10.89	9.67	28.47	20.56	56.00	46.00	27.53	25.44	L1	PASS
3	1.5509	18.51	7.89	9.70	28.21	17.59	56.00	46.00	29.79	28.41	L1	PASS
4	3.3855	17.58	6.83	9.77	27.35	16.60	56.00	46.00	28.65	29.40	L1	PASS
5	7.0688	20.87	17.83	9.75	30.42	27.58	60.00	50.00	29.58	22.42	L1	PASS
6	11.7789	22.02	17.09	9.48	31.50	26.57	60.00	50.00	28.50	23.43	L1	PASS
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).												
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).												
Power supply:	AC 120V/60Hz	Polarization	N									
<b>Test Graph</b>												
												
<b>Final Data List</b>												
NO.	Frequency	QP Reading	Avg. Reading	Factor	QP Result	Avg. Result	QP Limit	Avg. Limit	QP Margin	Avg. Margin	Line	Remark
1	0.1593	38.78	21.59	9.79	48.57	31.38	65.50	55.50	16.93	24.12	N	PASS
2	0.2578	25.40	13.85	9.73	35.13	23.58	61.50	51.50	26.37	27.92	N	PASS
3	0.7134	26.59	20.55	9.66	36.25	30.21	56.00	46.00	19.75	15.79	N	PASS
4	2.6132	17.50	8.86	9.75	27.25	18.61	56.00	46.00	28.75	27.39	N	PASS
5	3.9281	23.81	17.45	9.79	33.60	27.24	56.00	46.00	22.40	18.78	N	PASS
6	14.9163	26.24	21.30	9.27	35.51	30.57	60.00	50.00	24.49	19.43	N	PASS
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).												
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).												

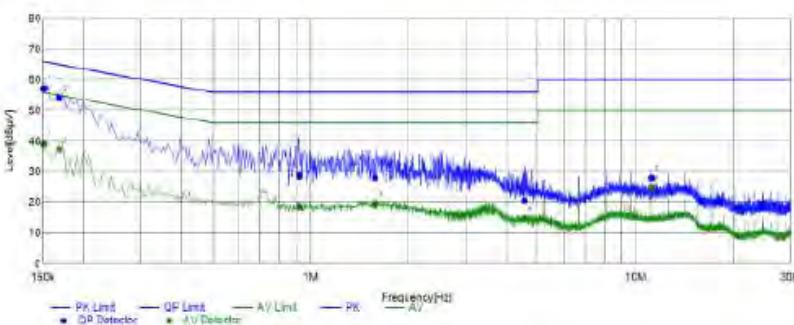
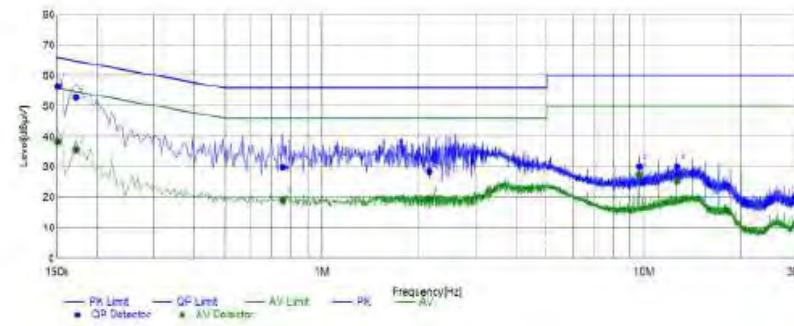
**Version C:**  
**Adapter: CYSE65-240250**

Power supply:	AC 120V/60Hz	Polarization	L																																																																																																								
<b>Test Graph</b> 																																																																																																											
<b>Final Data List</b> <table border="1"> <thead> <tr> <th>NO.</th> <th>Frequency</th> <th>QP</th> <th>AVG.</th> <th>Factor</th> <th>QP</th> <th>AVG.</th> <th>QP</th> <th>AVG.</th> <th>QP</th> <th>AVG.</th> <th>Line</th> <th>Remark</th> </tr> <tr> <th></th> <th></th> <th>Reading</th> <th>Reading</th> <th></th> <th>Result</th> <th>Result</th> <th>Limit</th> <th>Limit</th> <th>Margin</th> <th>Margin</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.1502</td> <td>40.98</td> <td>22.74</td> <td>9.96</td> <td>50.94</td> <td>32.70</td> <td>65.99</td> <td>55.99</td> <td>15.05</td> <td>23.29</td> <td>L1</td> <td>PASS</td> </tr> <tr> <td>2</td> <td>0.1818</td> <td>38.49</td> <td>19.71</td> <td>9.87</td> <td>46.38</td> <td>29.58</td> <td>64.41</td> <td>54.41</td> <td>18.05</td> <td>24.83</td> <td>L1</td> <td>PASS</td> </tr> <tr> <td>3</td> <td>0.7081</td> <td>21.60</td> <td>15.40</td> <td>9.67</td> <td>31.27</td> <td>25.07</td> <td>56.00</td> <td>46.00</td> <td>24.73</td> <td>20.93</td> <td>L1</td> <td>PASS</td> </tr> <tr> <td>4</td> <td>1.6795</td> <td>15.60</td> <td>7.55</td> <td>9.71</td> <td>25.31</td> <td>17.26</td> <td>56.00</td> <td>46.00</td> <td>30.69</td> <td>28.74</td> <td>L1</td> <td>PASS</td> </tr> <tr> <td>5</td> <td>3.8656</td> <td>19.53</td> <td>9.82</td> <td>9.79</td> <td>29.32</td> <td>19.61</td> <td>56.00</td> <td>46.00</td> <td>26.68</td> <td>26.39</td> <td>L1</td> <td>PASS</td> </tr> <tr> <td>6</td> <td>8.6365</td> <td>23.01</td> <td>19.88</td> <td>9.69</td> <td>32.70</td> <td>29.55</td> <td>60.00</td> <td>50.00</td> <td>27.30</td> <td>20.45</td> <td>L1</td> <td>PASS</td> </tr> </tbody> </table>				NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark			Reading	Reading		Result	Result	Limit	Limit	Margin	Margin			1	0.1502	40.98	22.74	9.96	50.94	32.70	65.99	55.99	15.05	23.29	L1	PASS	2	0.1818	38.49	19.71	9.87	46.38	29.58	64.41	54.41	18.05	24.83	L1	PASS	3	0.7081	21.60	15.40	9.67	31.27	25.07	56.00	46.00	24.73	20.93	L1	PASS	4	1.6795	15.60	7.55	9.71	25.31	17.26	56.00	46.00	30.69	28.74	L1	PASS	5	3.8656	19.53	9.82	9.79	29.32	19.61	56.00	46.00	26.68	26.39	L1	PASS	6	8.6365	23.01	19.88	9.69	32.70	29.55	60.00	50.00	27.30	20.45	L1	PASS
NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark																																																																																															
		Reading	Reading		Result	Result	Limit	Limit	Margin	Margin																																																																																																	
1	0.1502	40.98	22.74	9.96	50.94	32.70	65.99	55.99	15.05	23.29	L1	PASS																																																																																															
2	0.1818	38.49	19.71	9.87	46.38	29.58	64.41	54.41	18.05	24.83	L1	PASS																																																																																															
3	0.7081	21.60	15.40	9.67	31.27	25.07	56.00	46.00	24.73	20.93	L1	PASS																																																																																															
4	1.6795	15.60	7.55	9.71	25.31	17.26	56.00	46.00	30.69	28.74	L1	PASS																																																																																															
5	3.8656	19.53	9.82	9.79	29.32	19.61	56.00	46.00	26.68	26.39	L1	PASS																																																																																															
6	8.6365	23.01	19.88	9.69	32.70	29.55	60.00	50.00	27.30	20.45	L1	PASS																																																																																															
Note: 1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB). 2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).																																																																																																											
Power supply:	AC 120V/60Hz	Polarization	N																																																																																																								
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<b>Final Data List</b> <table border="1"> <thead> <tr> <th>NO.</th> <th>Frequency</th> <th>QP</th> <th>AVG.</th> <th>Factor</th> <th>QP</th> <th>AVG.</th> <th>QP</th> <th>AVG.</th> <th>QP</th> <th>AVG.</th> <th>Line</th> <th>Remark</th> </tr> <tr> <th></th> <th></th> <th>Reading</th> <th>Reading</th> <th></th> <th>Result</th> <th>Result</th> <th>Limit</th> <th>Limit</th> <th>Margin</th> <th>Margin</th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.1514</td> <td>39.83</td> <td>22.62</td> <td>9.79</td> <td>49.62</td> <td>32.41</td> <td>65.92</td> <td>55.92</td> <td>16.30</td> <td>23.51</td> <td>N</td> <td>PASS</td> </tr> <tr> <td>2</td> <td>0.1998</td> <td>32.40</td> <td>17.58</td> <td>9.80</td> <td>42.20</td> <td>27.38</td> <td>63.62</td> <td>53.62</td> <td>21.42</td> <td>26.24</td> <td>N</td> <td>PASS</td> </tr> <tr> <td>3</td> <td>0.6872</td> <td>23.49</td> <td>17.14</td> <td>9.68</td> <td>33.15</td> <td>26.80</td> <td>56.00</td> <td>46.00</td> <td>22.85</td> <td>19.20</td> <td>N</td> <td>PASS</td> </tr> <tr> <td>4</td> <td>1.4306</td> <td>18.07</td> <td>9.52</td> <td>9.68</td> <td>27.75</td> <td>19.20</td> <td>56.00</td> <td>46.00</td> <td>28.25</td> <td>26.80</td> <td>N</td> <td>PASS</td> </tr> <tr> <td>5</td> <td>2.6508</td> <td>17.96</td> <td>9.56</td> <td>9.75</td> <td>27.71</td> <td>19.31</td> <td>56.00</td> <td>46.00</td> <td>28.29</td> <td>26.69</td> <td>N</td> <td>PASS</td> </tr> <tr> <td>6</td> <td>13.3530</td> <td>26.11</td> <td>21.31</td> <td>9.37</td> <td>35.48</td> <td>30.68</td> <td>60.00</td> <td>50.00</td> <td>24.52</td> <td>19.32</td> <td>N</td> <td>PASS</td> </tr> </tbody> </table>				NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark			Reading	Reading		Result	Result	Limit	Limit	Margin	Margin			1	0.1514	39.83	22.62	9.79	49.62	32.41	65.92	55.92	16.30	23.51	N	PASS	2	0.1998	32.40	17.58	9.80	42.20	27.38	63.62	53.62	21.42	26.24	N	PASS	3	0.6872	23.49	17.14	9.68	33.15	26.80	56.00	46.00	22.85	19.20	N	PASS	4	1.4306	18.07	9.52	9.68	27.75	19.20	56.00	46.00	28.25	26.80	N	PASS	5	2.6508	17.96	9.56	9.75	27.71	19.31	56.00	46.00	28.29	26.69	N	PASS	6	13.3530	26.11	21.31	9.37	35.48	30.68	60.00	50.00	24.52	19.32	N	PASS
NO.	Frequency	QP	AVG.	Factor	QP	AVG.	QP	AVG.	QP	AVG.	Line	Remark																																																																																															
		Reading	Reading		Result	Result	Limit	Limit	Margin	Margin																																																																																																	
1	0.1514	39.83	22.62	9.79	49.62	32.41	65.92	55.92	16.30	23.51	N	PASS																																																																																															
2	0.1998	32.40	17.58	9.80	42.20	27.38	63.62	53.62	21.42	26.24	N	PASS																																																																																															
3	0.6872	23.49	17.14	9.68	33.15	26.80	56.00	46.00	22.85	19.20	N	PASS																																																																																															
4	1.4306	18.07	9.52	9.68	27.75	19.20	56.00	46.00	28.25	26.80	N	PASS																																																																																															
5	2.6508	17.96	9.56	9.75	27.71	19.31	56.00	46.00	28.29	26.69	N	PASS																																																																																															
6	13.3530	26.11	21.31	9.37	35.48	30.68	60.00	50.00	24.52	19.32	N	PASS																																																																																															
Note: 1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB). 2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).																																																																																																											

**Adapter: SOY-2400250-332-A**

Power supply:	AC 120V/60Hz	Polarization	L														
<b>Test Graph</b>																	
																	
<b>Final Data List</b>																	
NO.	Frequency	QP		AVG.		Factor		QP		AVG.		QP		AVG.		Line	Remark
		Reading	Result	Reading	Result	Result	Limit	Limit	Margin	Margin	Margin	Margin					
1	0.1592	43.53	25.92	9.93	53.46	35.85	65.50	55.50	12.04	19.65	L1	PASS					
2	0.1955	38.52	22.38	9.82	48.34	32.18	63.80	53.80	15.46	21.62	L1	PASS					
3	0.6943	19.61	13.74	9.67	29.28	23.41	56.00	46.00	26.72	22.59	L1	PASS					
4	1.5178	17.01	9.47	9.69	26.70	19.16	56.00	46.00	29.30	26.84	L1	PASS					
5	2.3825	14.48	6.58	9.74	24.22	16.32	56.00	46.00	31.78	29.68	L1	PASS					
6	9.7365	18.94	14.90	9.64	28.58	24.54	60.00	50.00	31.42	25.46	L1	PASS					
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).																	
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).																	
Power supply:	AC 120V/60Hz	Polarization	N														
<b>Test Graph</b>																	
																	
<b>Final Data List</b>																	
NO.	Frequency	QP		AVG.		Factor		QP		AVG.		QP		AVG.		Line	Remark
		Reading	Result	Reading	Result	Result	Limit	Limit	Margin	Margin	Margin	Margin					
1	0.1683	41.21	24.50	9.79	51.00	34.29	65.04	55.04	14.04	20.75	N	PASS					
2	0.2041	35.06	19.54	9.80	44.86	29.34	63.44	53.44	18.58	24.10	N	PASS					
3	0.7022	20.92	14.29	9.66	30.58	23.95	56.00	46.00	25.42	22.05	N	PASS					
4	1.5792	18.35	9.43	9.69	28.04	19.12	56.00	46.00	27.98	26.88	N	PASS					
5	2.4581	18.51	10.21	9.74	28.25	19.95	58.00	46.00	27.75	26.05	N	PASS					
6	14.2351	21.87	18.65	9.31	30.98	25.98	60.00	50.00	29.02	24.04	N	PASS					
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).																	
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).																	

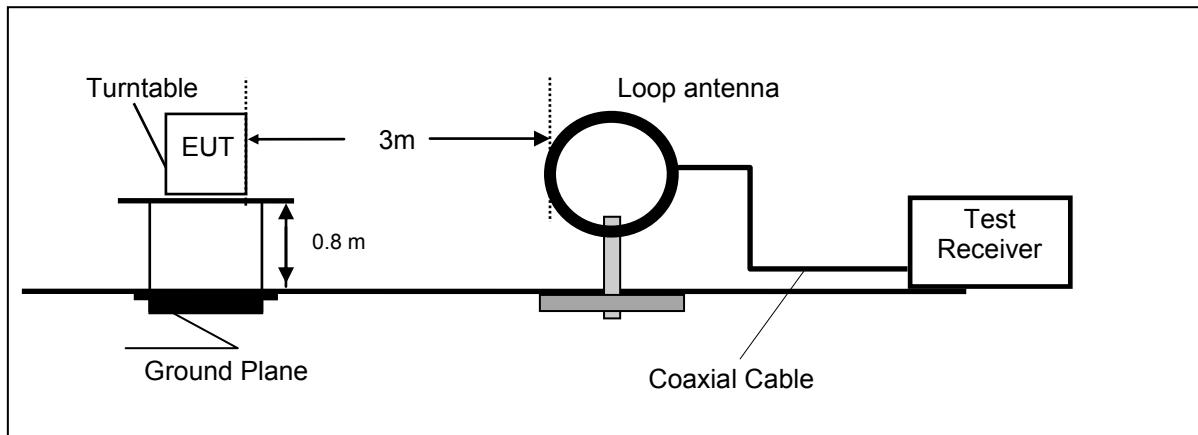
## Adapter: ADS-65HI-19A-1 24060F

Power supply:	AC 120V/60Hz	Polarization	L									
<b>Test Graph</b>												
												
<b>Final Data List</b>												
NO.	Frequency	QP Reading	Avg. Reading	Factor	QP Result	Avg. Result	QP Limit	Avg. Limit	QP Margin	Avg. Margin	Line	Remark
1	0.1510	47.21	29.21	9.96	57.17	39.17	65.95	55.95	8.78	16.78	L1	PASS
2	0.1684	44.19	27.43	9.90	54.09	37.33	65.04	55.04	10.95	17.71	L1	PASS
3	0.9240	19.06	9.05	9.66	28.72	18.71	56.00	46.00	27.28	27.29	L1	PASS
4	1.5804	18.25	9.89	9.70	27.95	19.59	56.00	46.00	28.05	26.41	L1	PASS
5	4.5515	10.77	4.90	9.80	20.57	14.70	56.00	46.00	35.43	31.30	L1	PASS
6	11.1974	18.44	15.33	9.52	27.98	24.85	60.00	50.00	32.04	25.15	L1	PASS
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).												
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).												
Power supply:	AC 120V/60Hz	Polarization	N									
<b>Test Graph</b>												
												
<b>Final Data List</b>												
NO.	Frequency	QP Reading	Avg. Reading	Factor	QP Result	Avg. Result	QP Limit	Avg. Limit	QP Margin	Avg. Margin	Line	Remark
1	0.1510	48.84	28.81	9.79	58.63	38.40	65.04	55.94	9.31	17.54	N	PASS
2	0.1718	43.23	25.95	9.79	53.02	35.74	64.87	54.87	11.85	19.13	N	PASS
3	0.7550	20.38	9.44	9.67	30.05	19.11	56.00	46.00	25.95	26.89	N	PASS
4	2.1496	18.87	9.00	9.72	28.69	19.62	56.00	46.00	27.31	26.38	N	PASS
5	9.6889	20.60	17.87	9.85	30.25	27.52	60.00	50.00	29.75	22.48	N	PASS
6	12.6891	20.77	16.06	9.43	30.20	25.49	60.00	50.00	29.80	24.51	N	PASS
Note:1. Result (dB $\mu$ V) = Reading (dB $\mu$ V) + Factor (dB).												
2. Factor (dB) = Cable loss (dB) + LISN Factor (dB).												

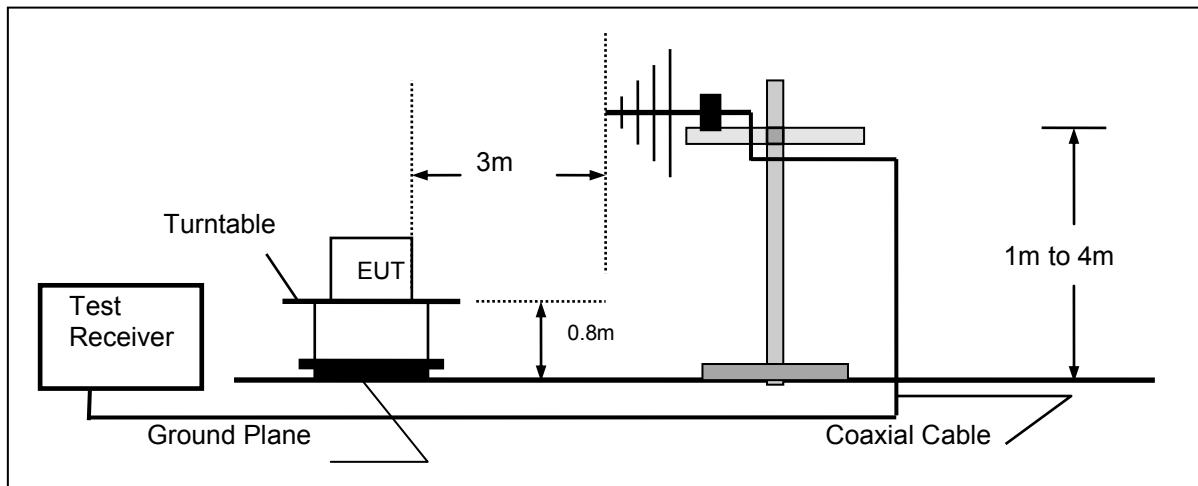
## 4.2. Radiated Emission

### TEST CONFIGURATION

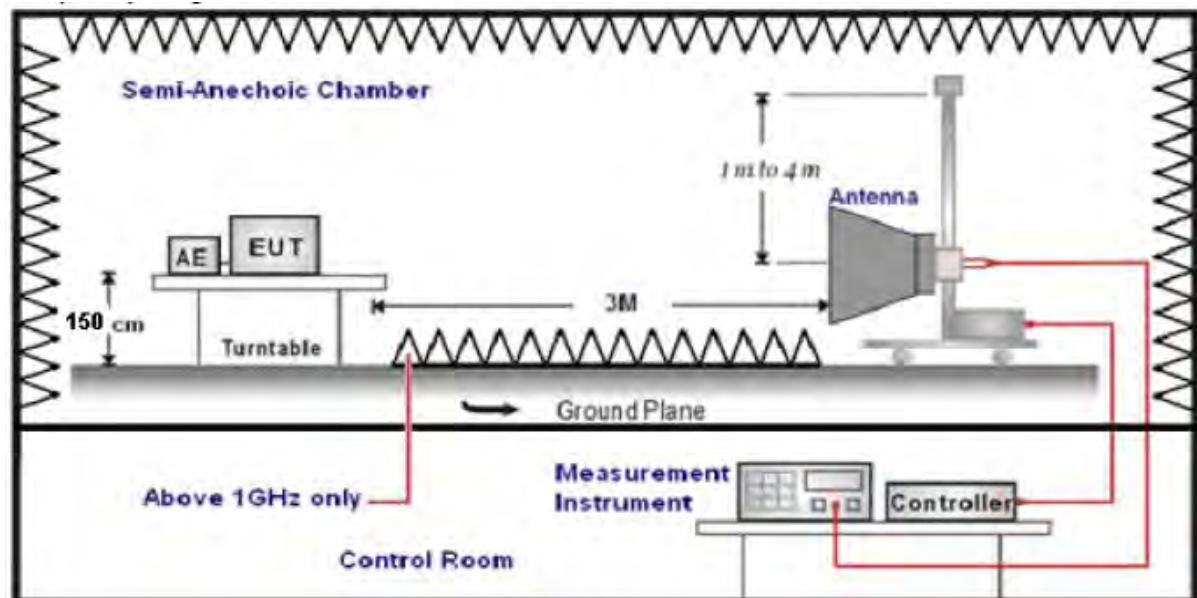
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



**TEST PROCEDURE**

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz; the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz. so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

**Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

$$Transd = AF + CL - AG$$

**RADIATION LIMIT**

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of desired power.

The pre-test have done for the EUT in three axes and found the worst emission at position shown in test setup photos.

Frequency (MHz)	Distance (Meters)	Radiated (dB $\mu$ V/m)	Radiated ( $\mu$ V/m)
0.009-0.49	3	$20\log(2400/F(\text{kHz}))+40\log(300/3)$	$2400/F(\text{kHz})$
0.49-1.705	3	$20\log(24000/F(\text{kHz}))+40\log(30/3)$	$24000/F(\text{kHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

**TEST RESULTS**

Remark: We measured Radiated Emission at GFSK,  $\pi/4$ -DQPSK and 8DPSK mode from 9KHz to 25GHz and recorded worst case at GFSK(1Mbps-MCH) mode.

Temperature	26°C	Humidity	47%
Test Engineer	Evan Ouyang	Configurations	BT

**For 9 KHz~30MHz**

Freq. (MHz)	Level (dB $\mu$ V)	Over Limit (dB)	Over Limit (dB $\mu$ V)	Remark
-	-	-	-	See Note

**Note:**

The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB);

Limit line = specific limits (dB $\mu$ V) + distance extrapolation factor.

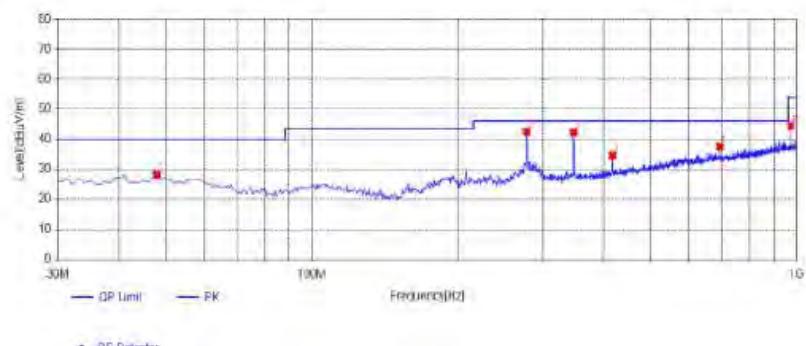
For 30MHz-1GHz

Version A:

Adapter: CYSE65-240250

## Horizontal

## Test Graph



## Suspected List

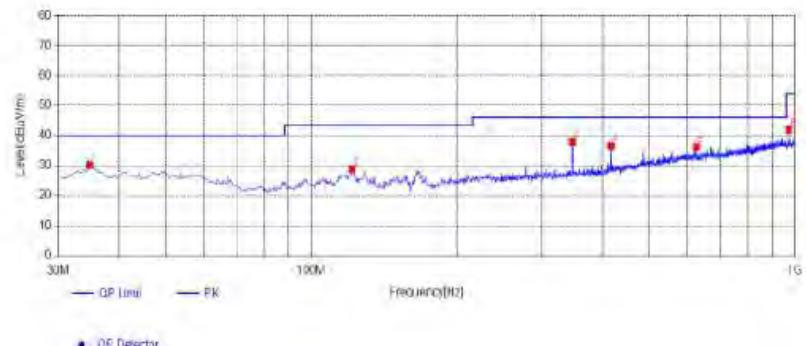
NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	47.945	32.84	-4.66	28.18	40.00	11.82	100	118	PK	Horizontal	PASS
2	277.835	43.88	-1.36	42.50	46.00	3.50	100	196	PK	Horizontal	PASS
3	347.19	41.78	0.60	42.38	46.00	3.62	100	199	PK	Horizontal	PASS
4	417.03	32.08	2.48	34.56	46.00	11.44	100	220	PK	Horizontal	PASS
5	694.935	29.25	8.25	37.50	46.00	8.50	100	13	PK	Horizontal	PASS
6	973.325	31.80	12.55	44.35	54.00	9.85	100	135	PK	Horizontal	PASS

Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

## Vertical

## Test Graph



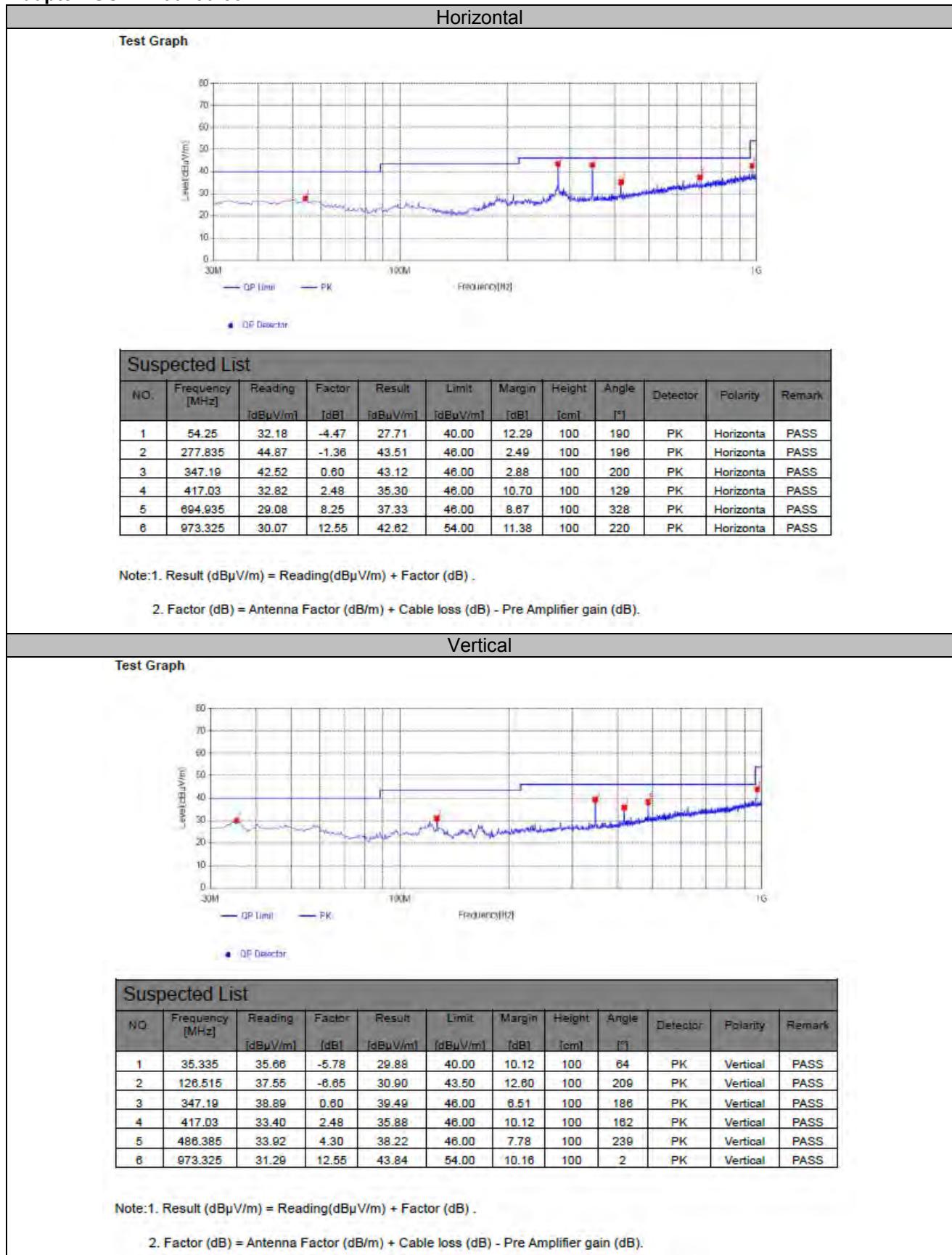
## Suspected List

NO.	Frequency [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Polarity	Remark
1	34.85	35.95	-5.79	30.16	40.00	9.84	100	254	PK	Vertical	PASS
2	121.665	34.88	-8.12	28.76	43.50	14.74	100	122	PK	Vertical	PASS
3	347.19	37.25	0.80	37.85	46.00	8.15	100	204	PK	Vertical	PASS
4	417.03	34.10	2.48	36.58	46.00	9.42	100	167	PK	Vertical	PASS
5	625.58	29.02	7.26	36.28	46.00	9.72	100	230	PK	Vertical	PASS
6	972.84	29.39	12.55	41.94	54.00	12.06	100	0	PK	Vertical	PASS

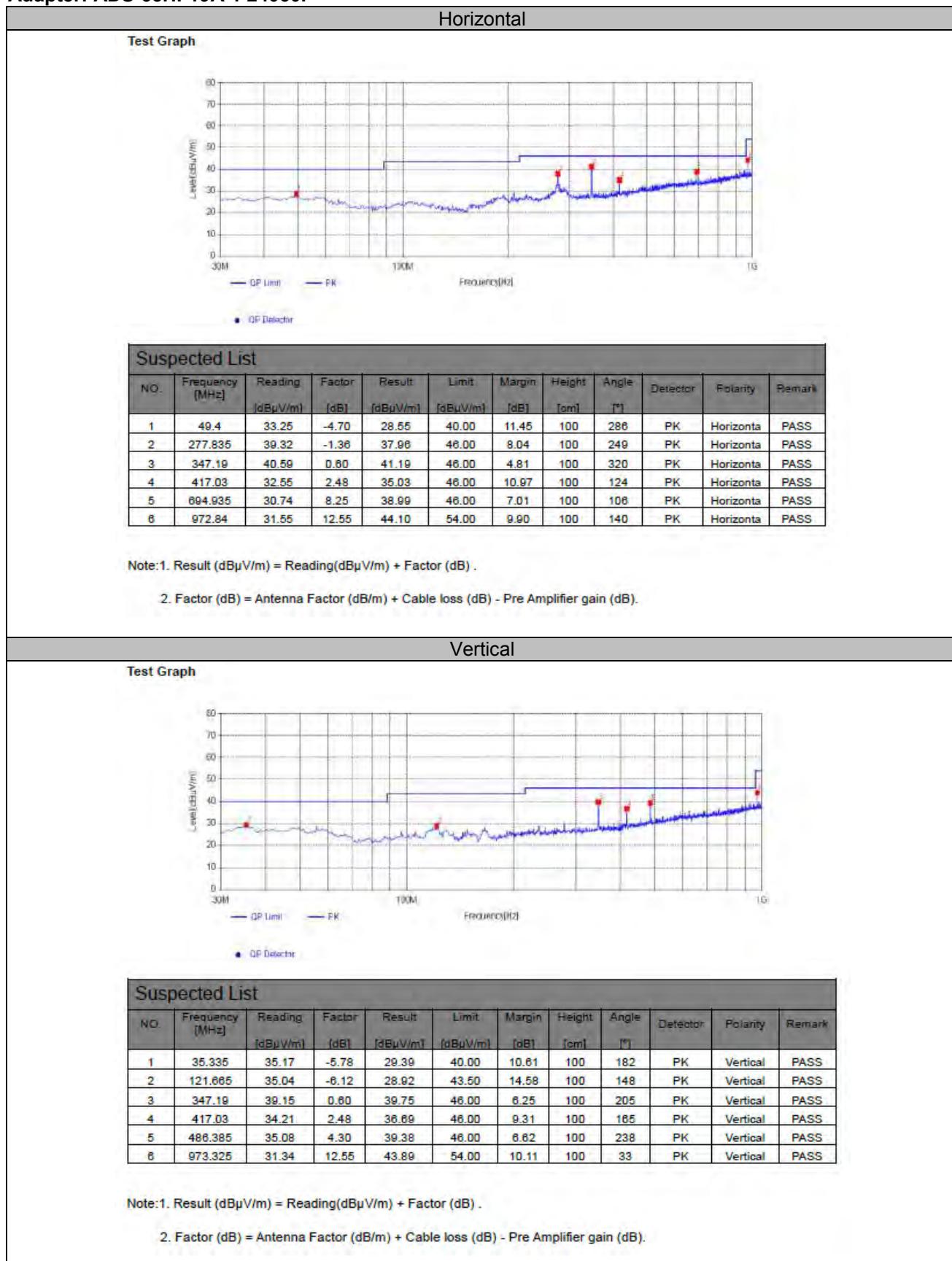
Note:1. Result (dBµV/m) = Reading(dBµV/m) + Factor (dB) .

2. Factor (dB) = Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB).

## Adapter: SOY-2400250-332-A

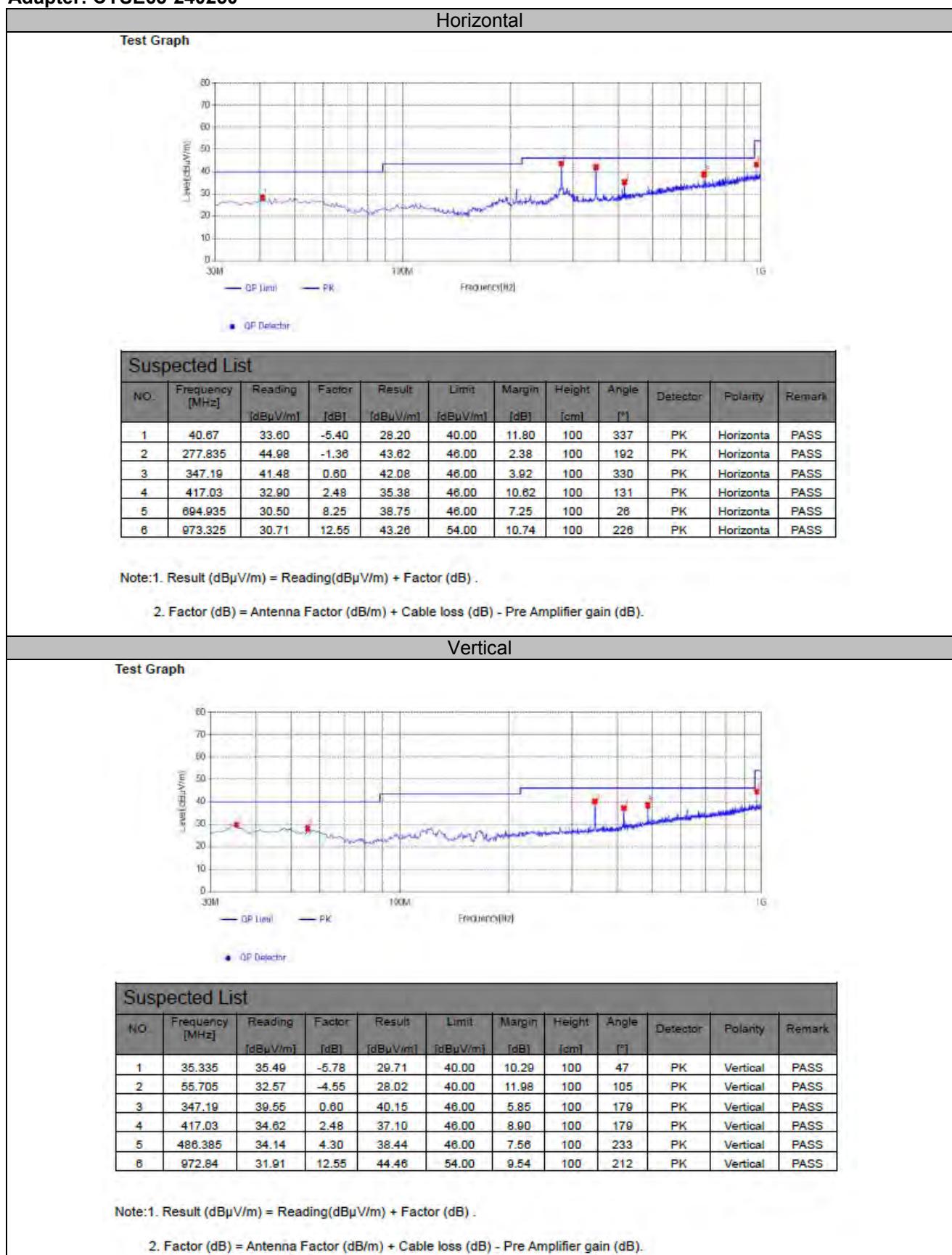


## Adapter: ADS-65HI-19A-1 24060F

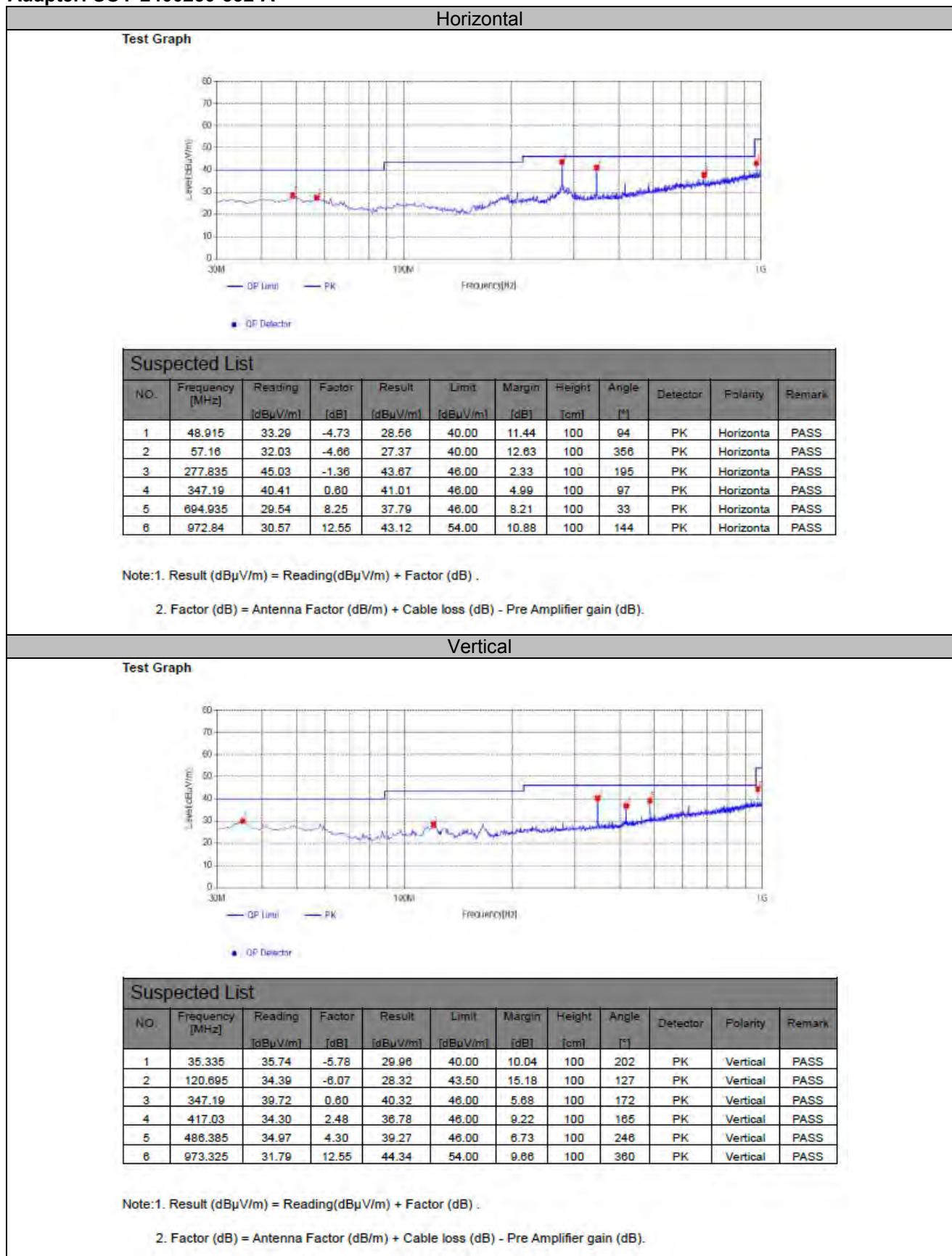


## Version B:

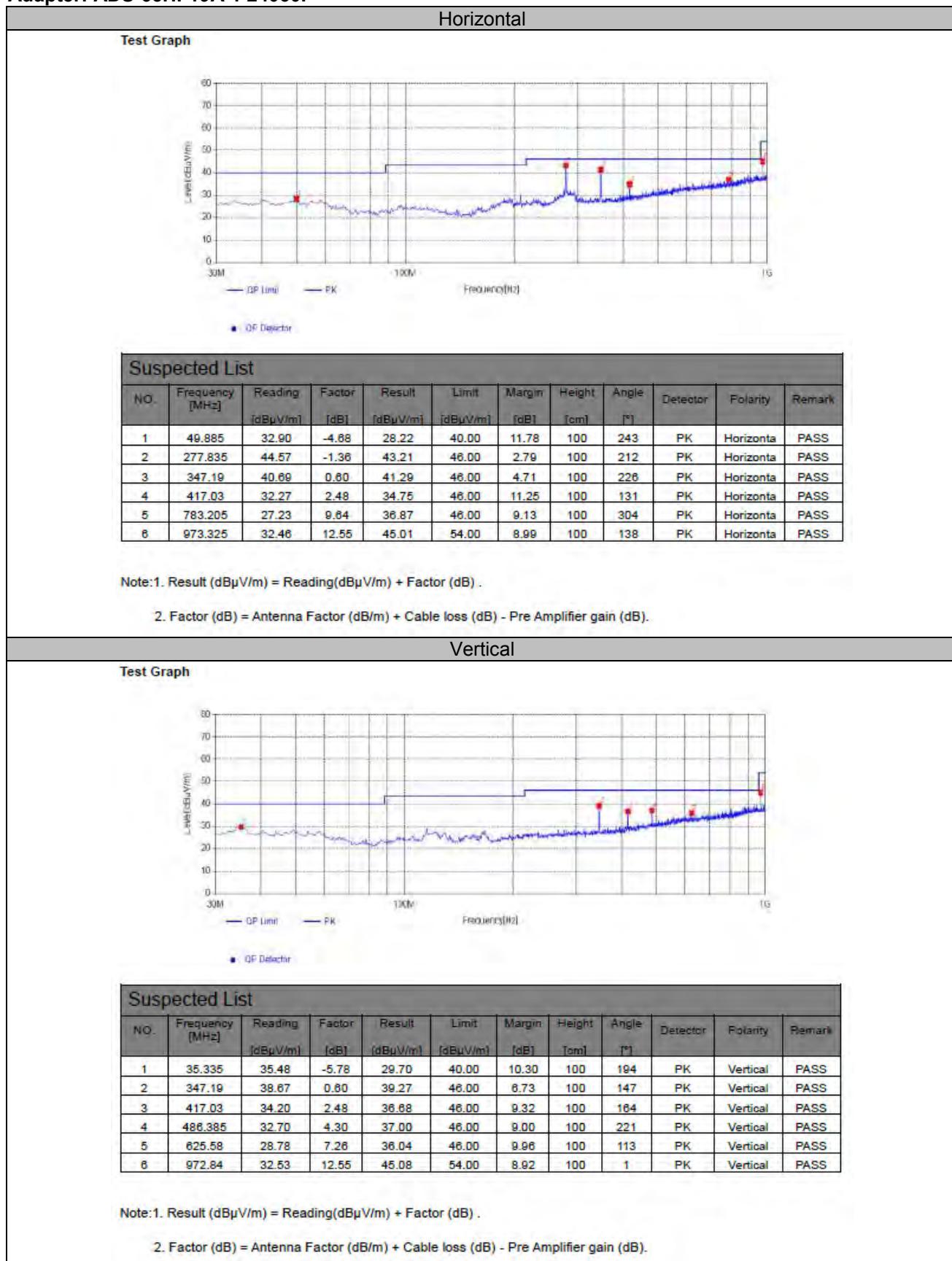
Adapter: CYSE65-240250



## Adapter: SOY-2400250-332-A

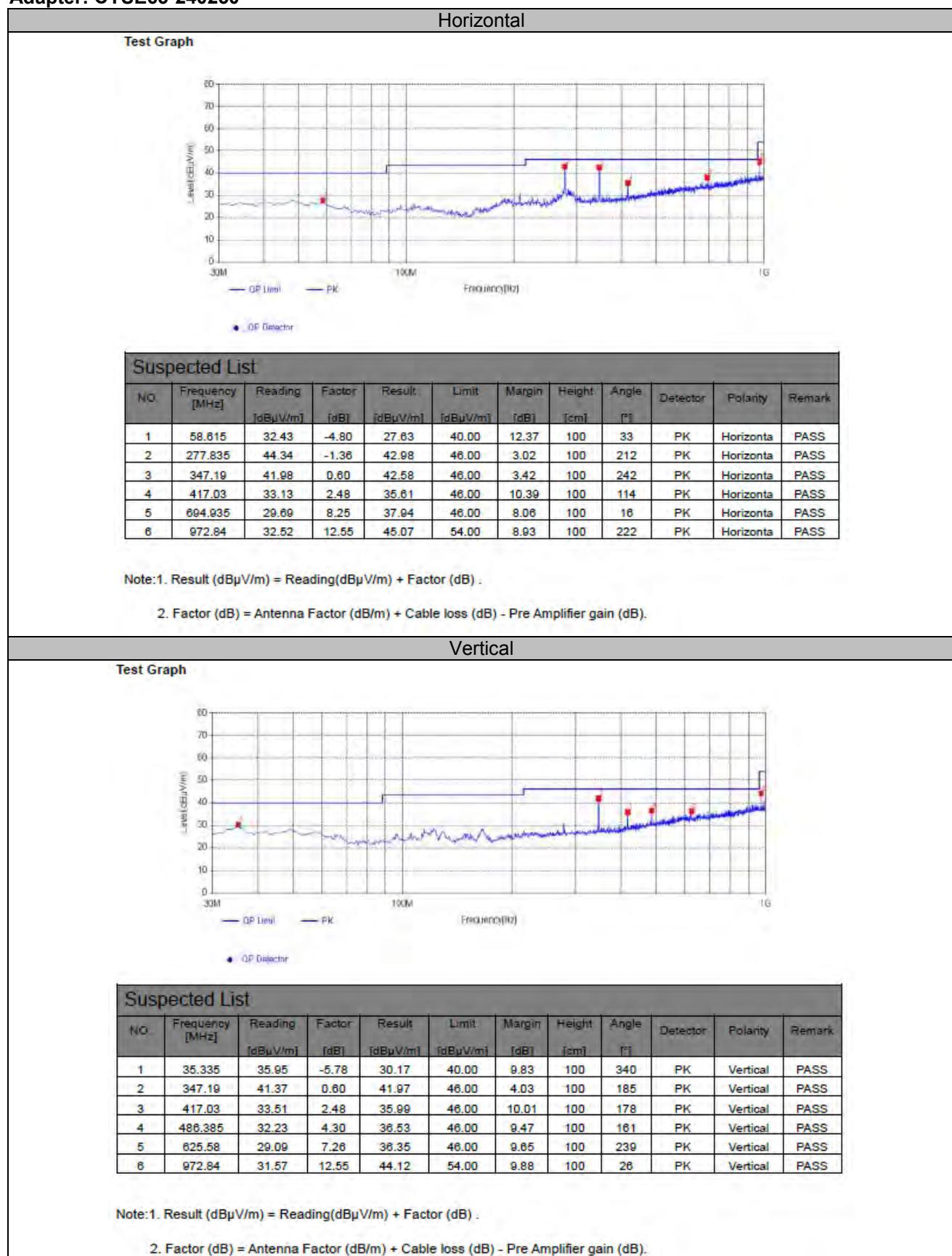


## Adapter: ADS-65HI-19A-1 24060F

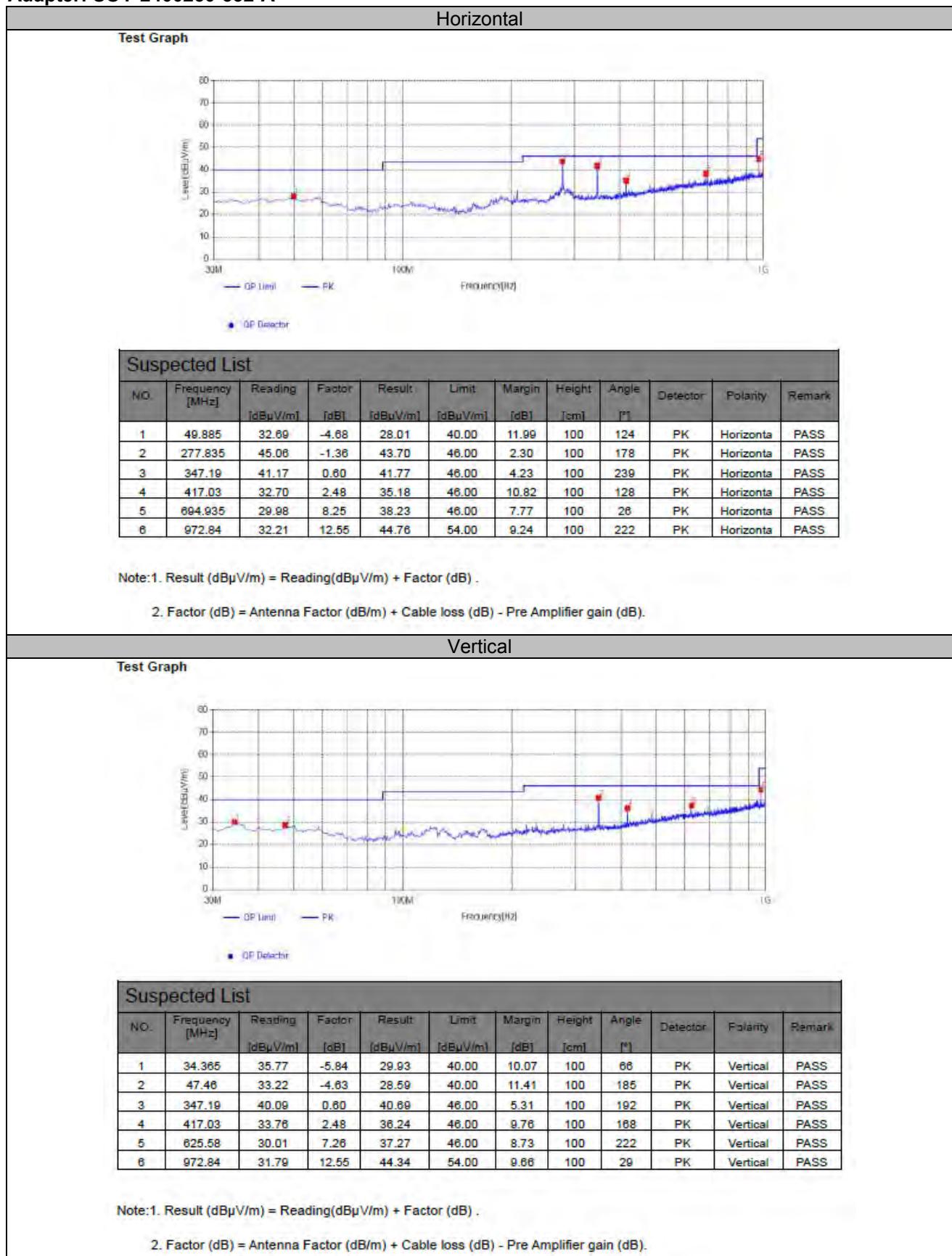


## Version C:

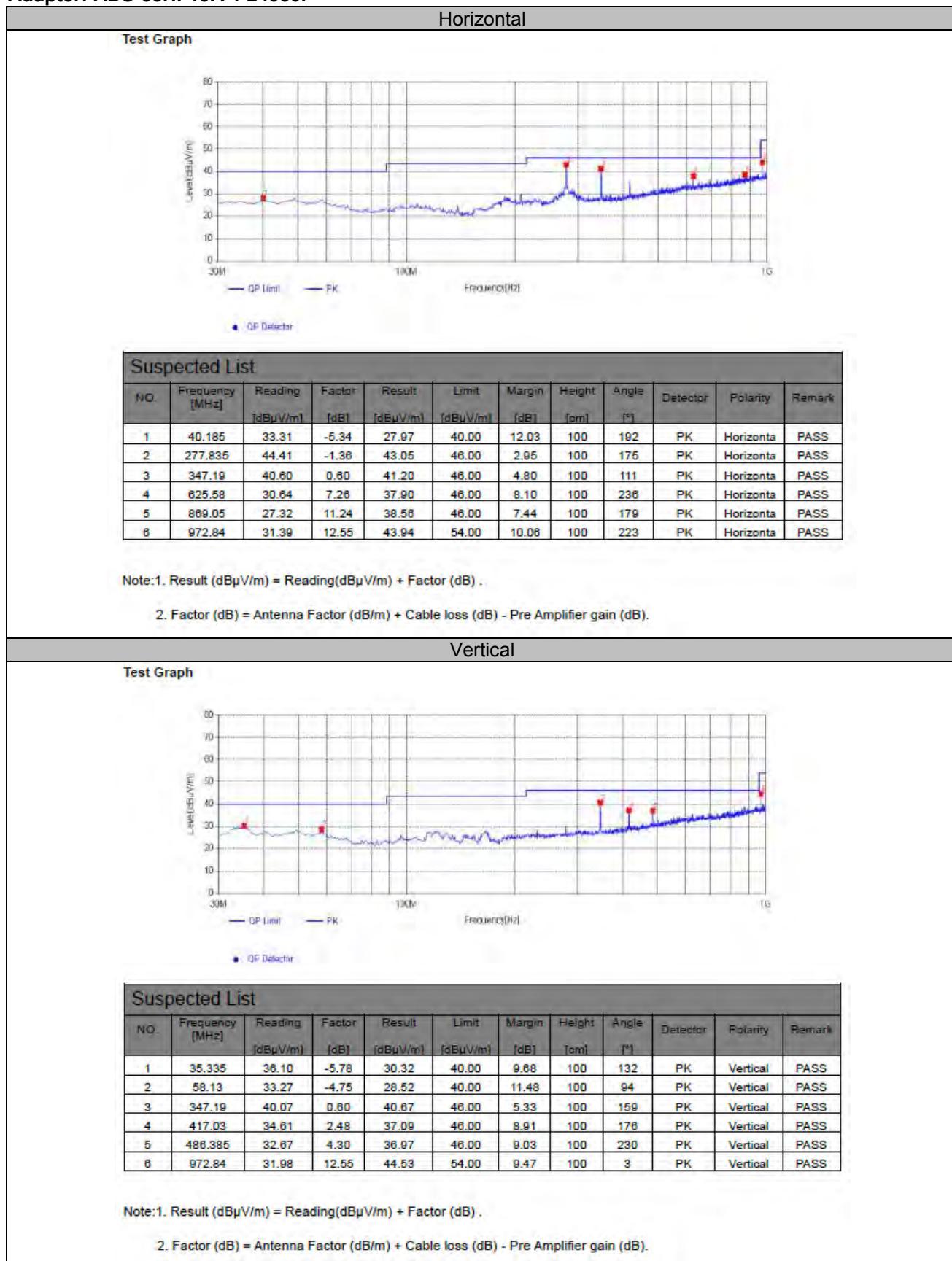
## Adapter: CYSE65-240250



## Adapter: SOY-2400250-332-A



## Adapter: ADS-65HI-19A-1 24060F



## For 1GHz to 25GHz

GFSK /Channel 0 / 2402 MHz(Worst Case)

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4804.00	50.35	32.44	30.25	7.95	60.49	74.00	-13.51	Peak	Horizontal
4804.00	36.37	32.44	30.25	7.95	46.51	54.00	-7.49	Average	Horizontal
4804.00	54.68	32.44	30.25	7.95	64.82	74.00	-9.18	Peak	Vertical
4804.00	36.19	32.44	30.25	7.95	46.33	54.00	-7.67	Average	Vertical

Channel 39 / 2441 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4882.00	49.02	32.52	30.31	8.12	59.35	74.00	-14.65	Peak	Horizontal
4882.00	36.14	32.52	30.31	8.12	46.47	54.00	-7.53	Average	Horizontal
4882.00	52.40	32.52	30.31	8.12	62.73	74.00	-11.27	Peak	Vertical
4882.00	36.61	32.52	30.31	8.12	46.94	54.00	-7.06	Average	Vertical

Channel 78 / 2480 MHz

Freq. MHz	Reading dBuV	Ant. Fac. dB/m	Pre. Fac. dB	Cab. Loss dB	Measured dBuV/m	Limit dBuV/m	Margin dB	Remark	Pol.
4960.00	51.98	32.68	30.27	7.88	62.27	74.00	-11.73	Peak	Horizontal
4960.00	36.82	32.68	30.27	7.88	47.11	54.00	-6.89	Average	Horizontal
4960.00	49.25	32.68	30.27	7.88	59.54	74.00	-14.46	Peak	Vertical
4960.00	31.05	32.68	30.27	7.88	41.34	54.00	-12.66	Average	Vertical

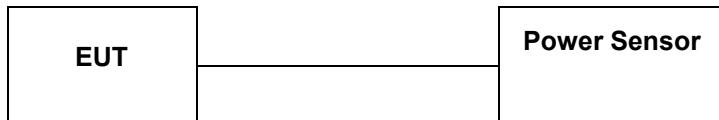
## Notes:

- 1). Measuring frequencies from 9 KHz~10<sup>th</sup> harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.
- 2). Radiated emissions measured in frequency range from 9 KHz~10<sup>th</sup> harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.
- 3). Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4). Measured= Reading- Pre. Fac.+ Ant. Fac.+ Cab. Loss
- 5). Margin = Measured- Limit

**NOTE: All the modes have been tested and recorded worst mode in the report(Version A\_Adapter: CYSE65-240250).**

### 4.3. Maximum Peak Output Power

#### TEST CONFIGURATION



#### TEST PROCEDURE

According to ANSI C63.10:2013 Maximum peak conducted output power for HFSS devices:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the HFSS bandwidth and shall utilize a fast-responding diode detector.

The maximum Average conducted output power may be measured using a wideband RF power meter with a thermocouple derector or equivalent. The power meter shall have a video bandwidth that is greater than or equal to the HFSS bandwidth and shall utilize a fast-responding diode detector.

#### LIMIT

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

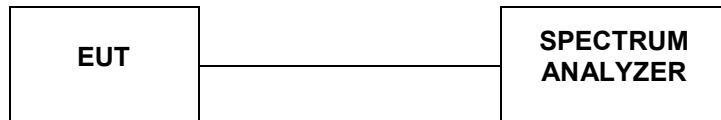
#### TEST RESULTS

For reporting purpose only.

Please refer to Appendix A.3.

#### 4.4. 99% and 20dB Bandwidth

##### TEST CONFIGURATION



##### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=30KHz and VBW=100KHz. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

##### LIMIT

For frequency hopping systems operating in the 2400MHz-2483.5MHz no limit for 20dB bandwidth.

##### TEST RESULTS

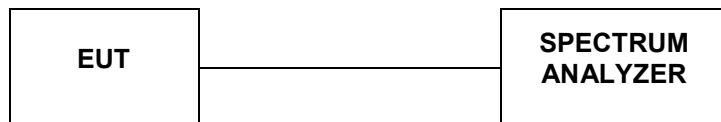
For reporting purpose only.

Please refer to Appendix A.1.

Please refer to Appendix A.2.

## 4.5. Frequency Separation

### TEST CONFIGURATION



### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=100KHz and VBW=300KHz.

### LIMIT

According to 15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the  $2/3 \times 20$ dB bandwidth of the hopping channel, whichever is greater.

### TEST RESULTS

For reporting purpose only.

Please refer to Appendix A.4.

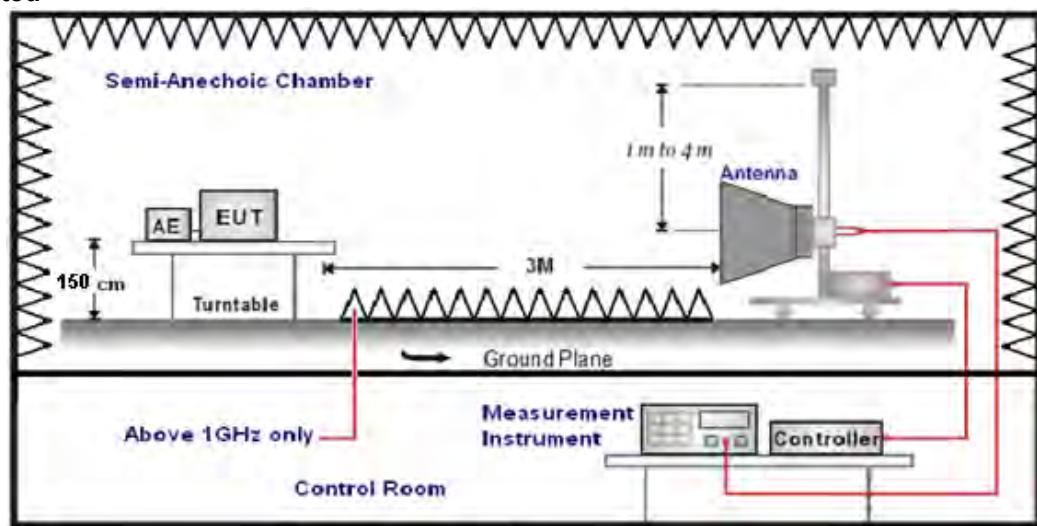
## 4.6. Conducted Spurious Emissions and Band Edge Compliance of RF Emission

### TEST REQUIREMENT

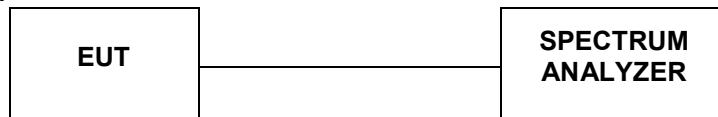
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### TEST CONFIGURATION

#### For Radiated



#### For Conducted



### TEST PROCEDURE

1. The EUT was placed on a turn table which is 1.5m above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed..
5. The distance between test antenna and EUT was 3 meter:
6. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

### LIMIT

Below -20dB of the highest emission level in operating band.

Radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)

**TEST RESULTS**

Remark: we measured all conditions(DH1,DH3,DH5) and recorded worst case at DH1.

**4.6.1 For Radiated Bandedge Measurement**

Remark: we tested radiated bandedge at both hopping and no-hopping modes, recorded worst case at no-hopping mode

Temperature	23.8°C			Humidity			53.7%		
Test Engineer	Evan Ouyang			Configurations			BT		

GFSK										
Frequency(MHz):		2402			Polarity:			HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2390.00	45.85 PK	74.00	-28.15	1.50	85	51.16	27.49	3.32	36.12	-5.31
2390.00	34.67 AV	54.00	-19.33	1.50	85	39.98	27.49	3.32	36.12	-5.31
Frequency(MHz):		2402			Polarity:			VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2390.00	49.00 PK	74.00	-25.00	1.50	294	54.31	27.49	3.32	36.12	-5.31
2390.00	29.81 AV	54.00	-24.19	1.50	294	35.12	27.49	3.32	36.12	-5.31
Frequency(MHz):		2480			Polarity:			HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2483.50	45.20 PK	74.00	-28.80	1.50	169	50.92	27.45	3.38	36.55	-5.72
2483.50	34.41 AV	54.00	-19.59	1.50	169	40.13	27.45	3.38	36.55	-5.72
Frequency(MHz):		2480			Polarity:			VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier	Correction Factor (dB/m)
2483.50	49.03 PK	74.00	-24.97	1.50	135	54.75	27.45	3.38	36.55	-5.72
2483.50	30.41 AV	54.00	-23.59	1.50	135	36.13	27.45	3.38	36.55	-5.72

**REMARKS:**

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier Factor
3. Margin value = Limit value - Emission level.
4. -- Mean the PK detector measured value is below average limit.
5. The other emission levels were very low against the limit.

**NOTE: All the modes have been tested and recorded worst mode in the report(Version A\_Adapter: CYSE65-240250).**

**4.6.2 For Conducted Bandedge Measurement**

For reporting purpose only.

Please refer to Appendix A.7.

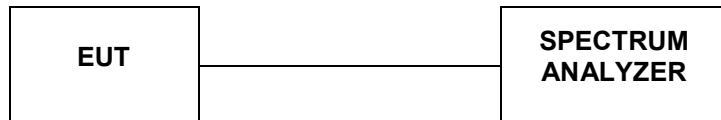
**4.6.3 For Conducted Spurious Emissions Measurement**

For reporting purpose only.

Please refer to Appendix A.8.

## 4.7. Number of hopping frequency

### TEST CONFIGURATION



### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. Set spectrum analyzer start 2400MHz to 2483.5MHz with RBW=100KHz and VBW=300KHz.

### LIMIT

Frequency hopping systems in the 2400–2483.5MHz band shall use at least 15 channels.

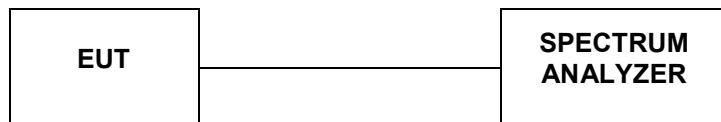
### TEST RESULTS

For reporting purpose only.

Please refer to Appendix A.6.

#### 4.8. Time Of Occupancy(Dwell Time)

##### TEST CONFIGURATION



##### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. Set center frequency of spectrum analyzer=operating frequency with RBW=1MHz and VBW=3MHz,Span=0Hz.

##### LIMIT

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

##### TEST RESULTS

For reporting purpose only.

Please refer to Appendix A.5.

## 4.9. Pseudorandom Frequency Hopping Sequence

### TEST APPLICABLE

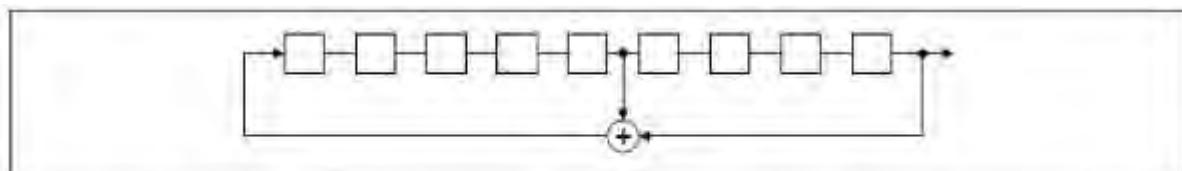
For 47 CFR Part 15C section 15.247 (a)(1) requirement:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

### EUT Pseudorandom Frequency Hopping Sequence Requirement

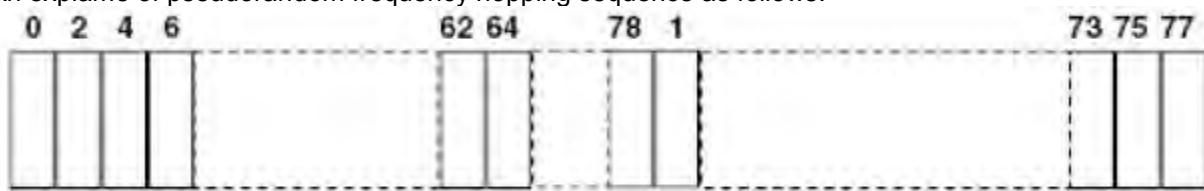
The pseudorandom frequency hopping sequence may be generated in a nine-stage shift register whose 5<sup>th</sup> and 9<sup>th</sup> stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones, for example: the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence:  $2^9 - 1 = 511$  bits
- Longest sequence of zeros: 8 (non-inverted signal)



*Linear Feedback Shift Register for Generation of the PRBS sequence*

An example of pseudorandom frequency hopping sequence as follows:



Each frequency used equally one the average by each transmitter.

The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitter and shift frequencies in synchronization with the transmitted signals.

## 4.10. Antenna Requirement

### Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

And according to FCC 47 CFR Section 15.247 (c), if 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 6dBi.

### Test Result

The antenna used for this product is Internal Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2.00dBi.

Reference to the **Internal photos**.

## 5. TEST SETUP PHOTOS OF THE EUT

Photo of Radiated Emissions Measurement



Fig. 1



Fig. 2

Photo of Conducted Emission Measurement



Fig. 3

## **EXTERNAL AND INTERNAL PHOTOS OF THE EUT**

### **6.1.External photos of the EUT**

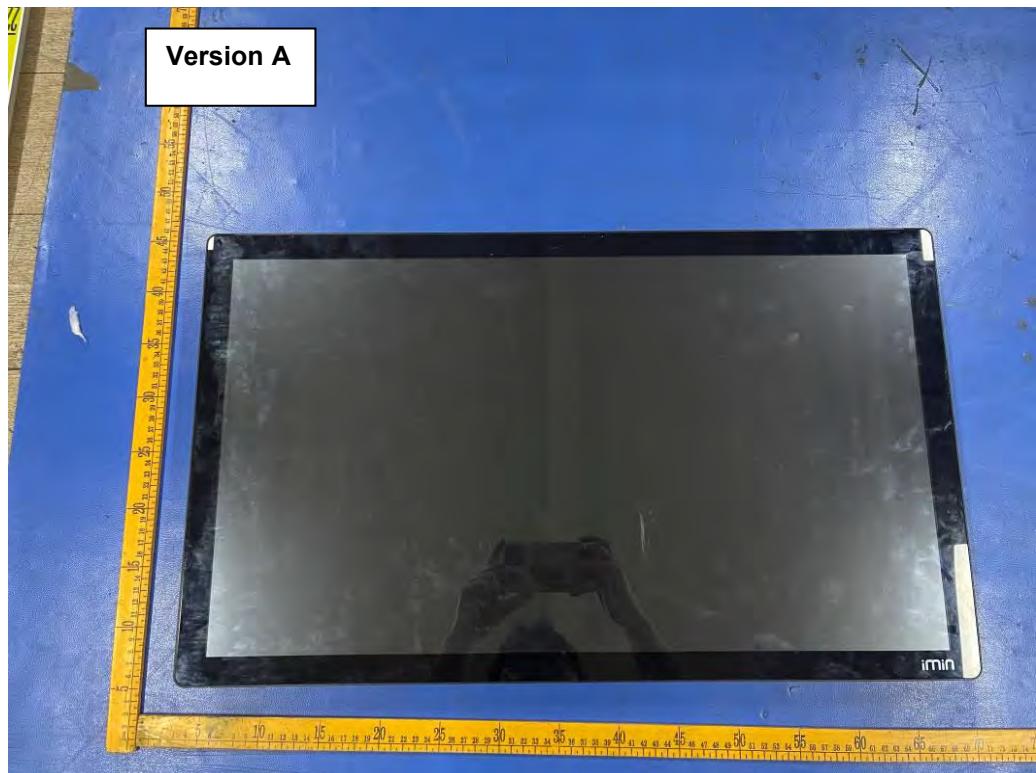


Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8

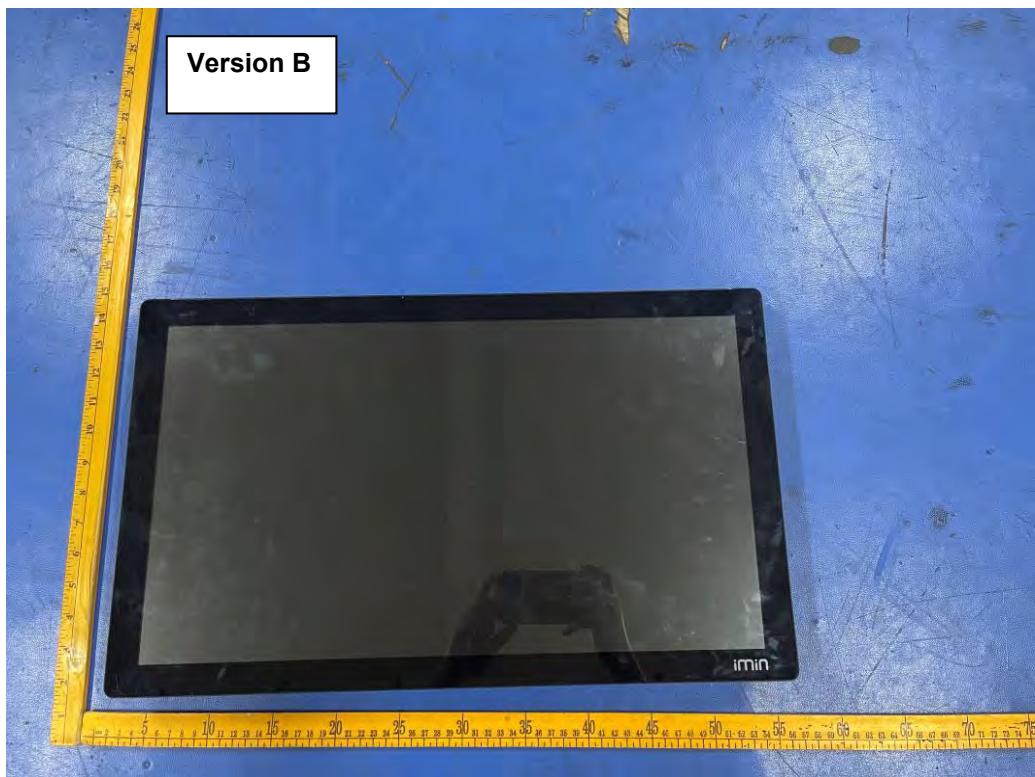


Fig. 9

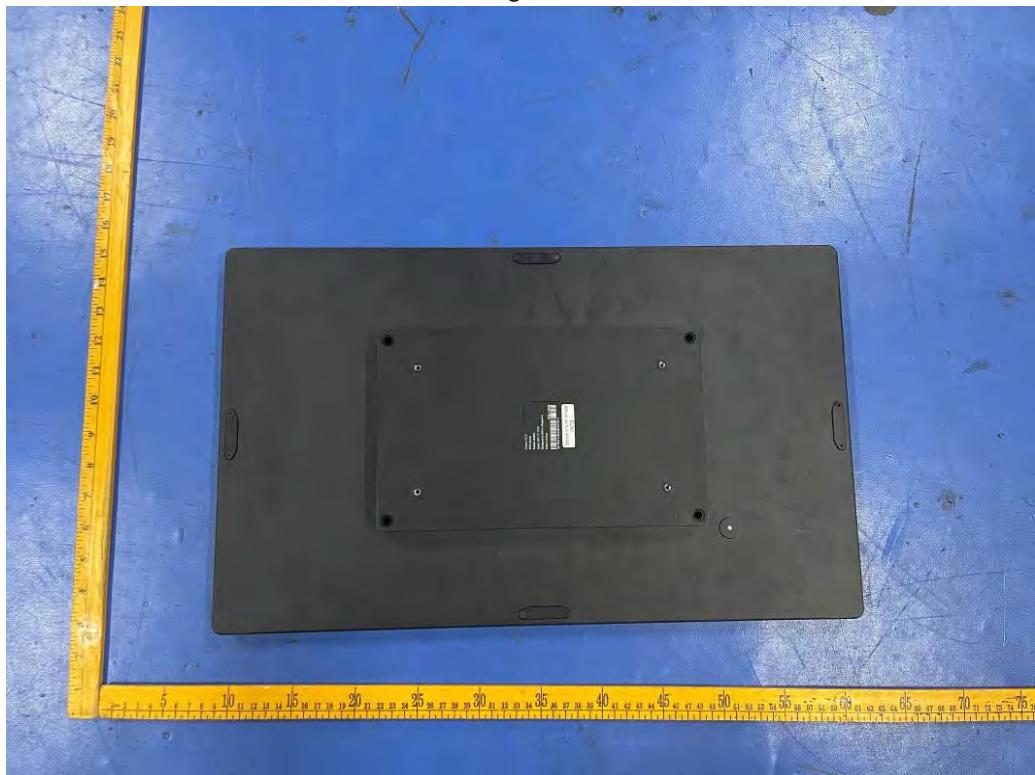


Fig. 10



Fig. 11



Fig. 12



Fig. 13



Fig. 14



Fig. 15



Fig. 16

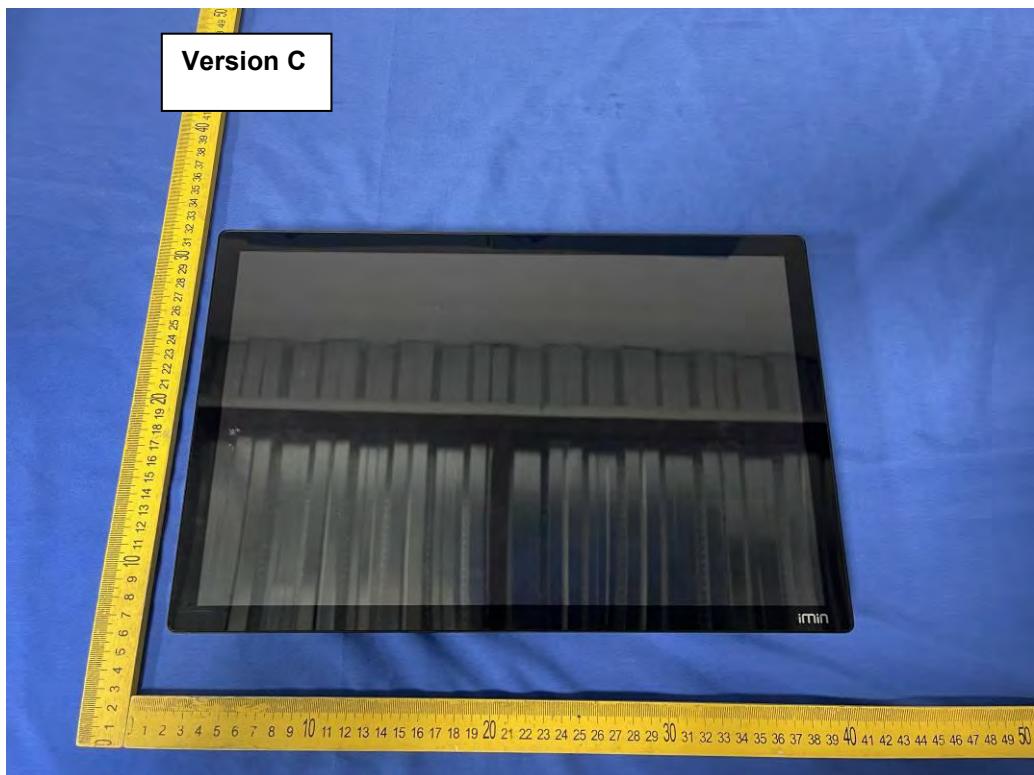


Fig. 17

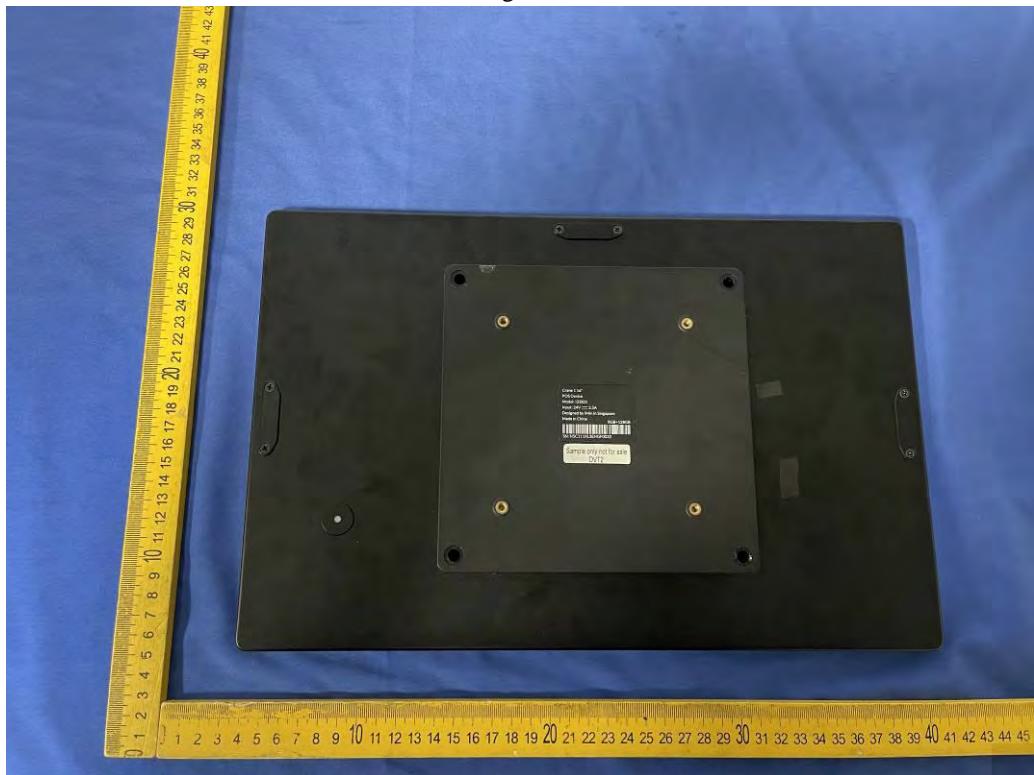


Fig. 18



Fig. 19



Fig. 20

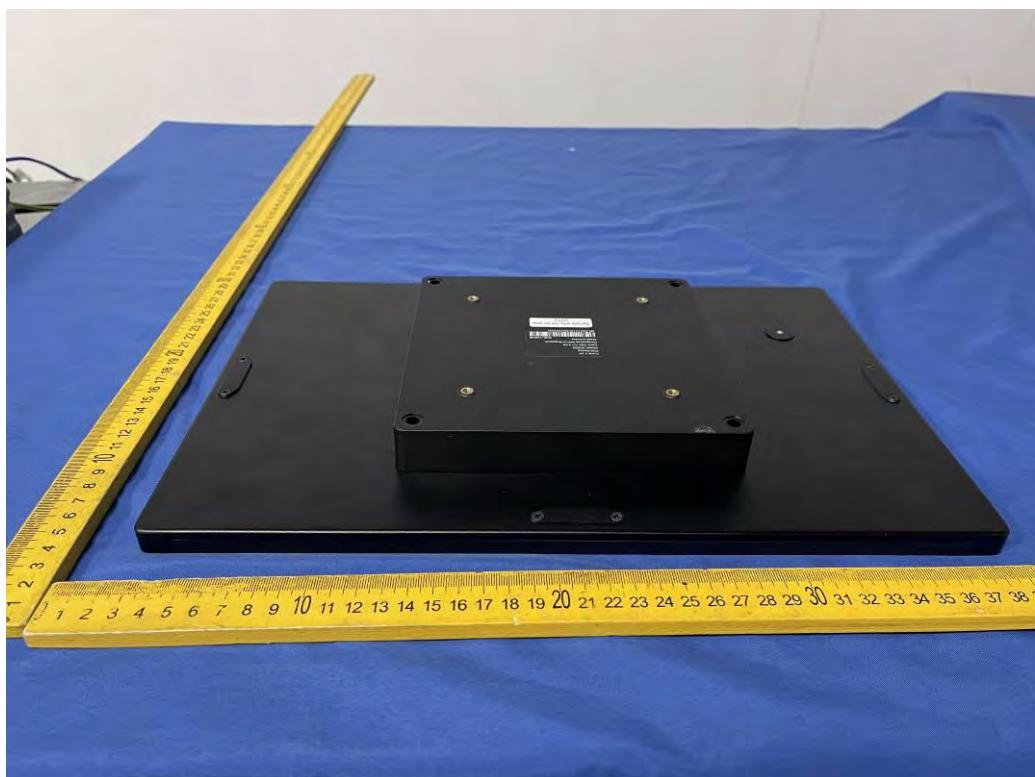


Fig. 21

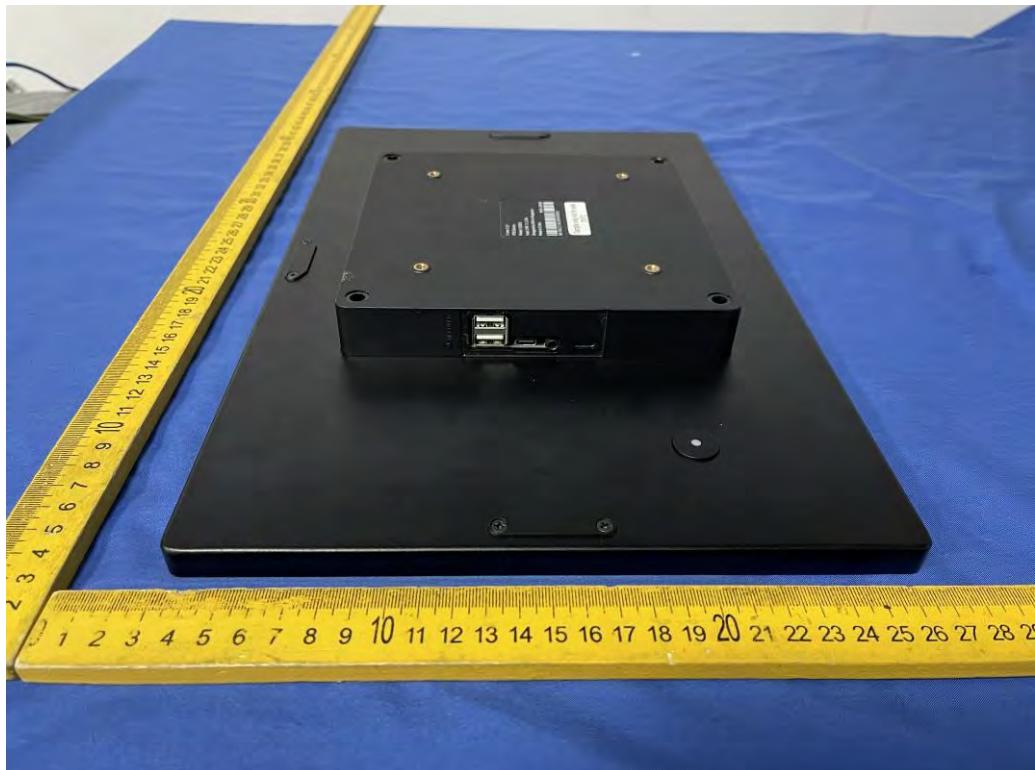


Fig. 22



Fig. 23



Fig. 24



Fig. 25



Fig. 26

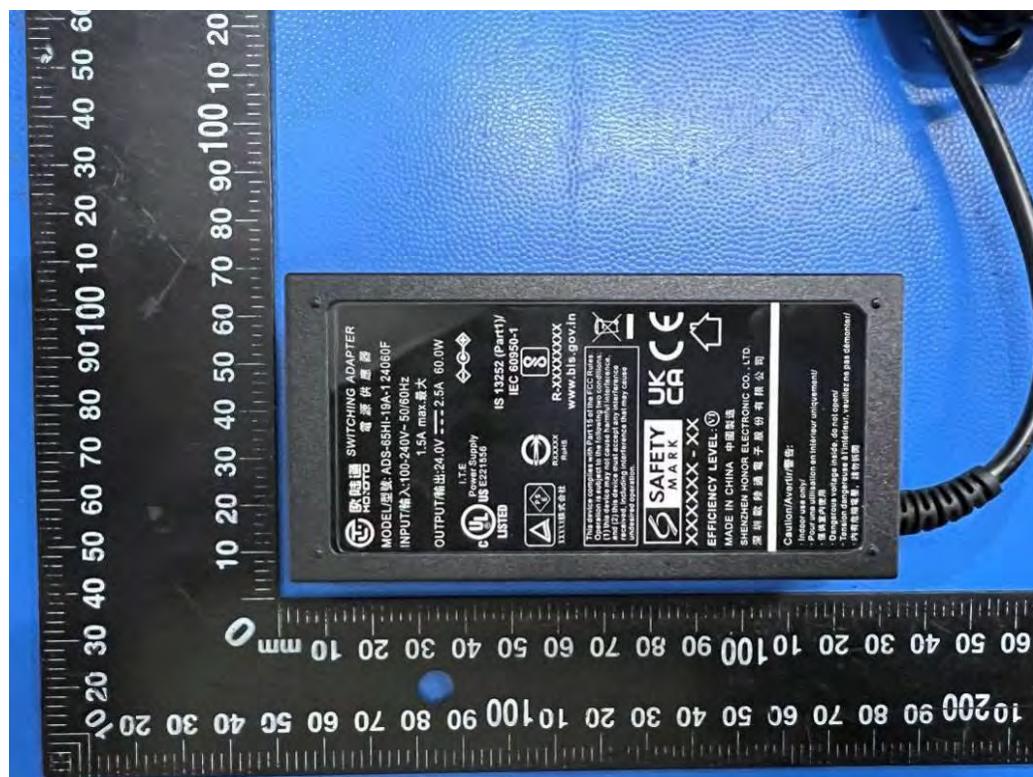


Fig. 27



Fig. 28