

## FCC Test Report

**Report No.:** RFBEAD-WTW-P21031019-4 R2

**FCC ID:** M82-AIM78S2

**Test Model:** AIM-78S-2

**Series Model:** AIM-78H-2, AIM-78H-2XXXXXXXXXXXXXXXXXX,  
AIM-78S-2XXXXXXXXXXXXXXXXXX (X: maybe 0-9, A-Z or blank) (refer to  
item 3.1 for more details)

**Received Date:** Apr. 01, 2021

**Test Date:** Mar. 21 ~ Apr. 11, 2022

**Issued Date:** May 05, 2022

**Applicant:** ADVANTECH CO., LTD

**Address:** No.1, Alley 20, Lane 26, Rueiguang Rd, Neihu District, Taipei, Taiwan 114

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, TAIWAN

**FCC Registration /  
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

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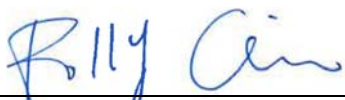
### Release Control Record

Issue No.	Description	Date Issued
RFBEAD-WTW-P21031019-4	Original release	Dec. 17, 2021
RFBEAD-WTW-P21031019-4 R1	Revised accessory devices of EUT.	Jan. 10, 2022
RFBEAD-WTW-P21031019-4 R2	Updated NFC module and all test data.	May 05, 2022

**1 Certificate of Conformity**

**Product:** 10.1" Tablet PC  
**Brand:** ADVANTECH  
**Test Model:** AIM-78S-2  
**Series Model:** AIM-78H-2, AIM-78H-2XXXXXXXXXXXXXXXXXX, AIM-78S-2XXXXXXXXXXXXXXXXXX  
(X: maybe 0-9, A-Z or blank) (refer to item 3.1 for more details)  
**Sample Status:** Engineering sample  
**Applicant:** ADVANTECH CO., LTD  
**Test Date:** Mar. 21 ~ Apr. 11, 2022  
**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.225)  
47 CFR FCC Part 15, Subpart C (Section 15.215)  
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :**  , **Date:** May 05, 2022  
Polly Chen / Specialist

**Approved by :**  , **Date:** May 05, 2022  
Jeremy Lin / Project Engineer

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.225, 15.215)			
FCC Clause	Test Item	Result	Remarks
15.207	Conducted emission test	Pass	Meet the requirement of limit. Minimum passing margin is -4.83dB at 0.15800MHz.
15.225 (a)	The field strength of any emissions within the band 13.553-13.567 MHz	Pass	Meet the requirement of limit. Minimum passing margin is -65.5dB at 13.56MHz.
15.225 (b)	The field strength of any emissions within the bands 13.410-13.553 MHz and 13.567-13.710 MHz	Pass	Meet the requirement of limit.
15.225 (c)	The field strength of any emissions within the bands 13.110-13.410 MHz and 13.710-14.010 MHz	Pass	Meet the requirement of limit.
15.225 (d)	The field strength of any emissions appearing outside of the 13.110-14.010 MHz band	Pass	Meet the requirement of limit. Minimum passing margin is -7.9dB at 249.24MHz.
15.225 (e)	The frequency tolerance	Pass	Meet the requirement of limit.
15.215 (c)	20dB Bandwidth	Pass	Meet the requirement of limit.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.44 dB
	30MHz ~ 200MHz	2.93 dB
	200MHz ~ 1000MHz	2.95 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	10.1" Tablet PC
Brand	ADVANTECH
Model	AIM-78S-2
Series Model	AIM-78H-2, AIM-78H-2XXXXXXXXXXXXXXXXXX, AIM-78S-2XXXXXXXXXXXXXXXXXX (X: maybe 0-9, A-Z or blank)
Model Difference	For marketing purpose
Sample Status	Engineering sample
Power Supply Rating	10.8Vdc (Battery) 19Vdc (from adapter)
Modulation Type	ASK
Operating Frequency	13.56MHz
Data Rate	Type A: 106 kbit/s Type B: 106 kbit/s Type F: 212/424 kbit/s Type V: 26.48 kbit/s
Field Strength	18.5dBuV/m (QP) (30m)
Antenna Type	Loop antenna
Antenna Connector	NA
Accessory Device	Refer to note
Cable Supplied	Refer to note

Note:

1. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	Tamura	XEW1934N	Input: 100-240Vac~1.5A , 50/60Hz Output: 19Vdc / 3.42A Power Line: AC: 1.5m cable without core DC: 1.2m cable without core
Adapter 2 (option)	FSP	FSP065-DBCM1	Input: 100-240Vac~ 2.0-1.0A, 50-60Hz Output: 19Vdc / 3.43A Power Line: AC: 1.5m cable without core DC: 1.5m cable with 1 core
Battery	ADVANTECH	AIM-BAT-10	Rating: 10.8Vdc, 24.84Wh, 2300mAh
Docking Station (option)	ADVANTECH	AIM-DOC-0001	Rating: 19Vdc, 3.42A (VESA Dock)
Docking Station (option)	ADVANTECH	AIM-VED0	Rating: 9 ~ 32Vdc (Vehicle Dock)
Docking Station (option)	ADVANTECH	AIM-OFD-0000	Rating: 19Vdc (Office Dock)
Extension Modules-Barcode scanner (20° ) (option)	ADVANTECH	AIM-EXT0-0040 (20 degree)	Sensor: 640 x 480 CMOS sensor
Extension Modules-Barcode scanner (70° ) (option)	ADVANTECH	AIM-EXT0-0041 (70 degree)	Sensor: 640 x 480 CMOS sensor
WLAN module	USI	MS-01	-

2. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

### 3.2 Description of Test Modes

1 channel is provided to this EUT

Channel	Freq. (MHz)
1	13.56

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE	PLC	FS	EB	
A	√	√	-	-	EUT + Adapter
B	√	√	-	-	EUT + VESA Dock
C	√	√	√	√	EUT + Vehicle Dock
D	√	√	-	-	EUT + Office Dock

Where RE: Radiated Emission  
 FS: Frequency Stability  
 PLC: Power Line Conducted Emission  
 EB: 20dB Bandwidth measurement

**Note:**

- The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Y-plane for mode A.
- The EUT had been pre-tested on Type A, Type B, Type F, Type V. The worst case was found when data rate was Type V and chosen for final test.
- “-”: Means no effect.

**Radiated Emission below 30MHz Test:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
C	1	1	ASK

**Radiated Emission above 30MHz Test:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A, B, C, D	1	1	ASK

**Power Line Conducted Emission Test:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A, B, C, D	1	1	ASK

**Frequency Stability:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
C	1	1	ASK

**20dB Bandwidth:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
C	1	1	ASK



Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE	22 deg. C, 69% RH	120Vac, 60Hz	Thomas Cheng, Vincent Chen
PLC	21 deg. C, 66% RH	120Vac, 60Hz	Thomas Cheng
FS	24 deg. C, 72% RH	10.8Vdc	Thomas Cheng
BW	24 deg. C, 72% RH	120Vac, 60Hz	Thomas Cheng

### 3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Flash	Transcend	16GB	03	NA	Type-A Provided by client
B.	Flash	Transcend	16GB	03	NA	Type-A Provided by client
C.	Flash	SanDisk	Cruzer Glide 3.0 16GB	NA	NA	Type-C
D.	Earphone	APPLE	NA	NA	NA	-
E.	NFC Card	NA	NA	NA	NA	-
F.	Load	NA	NA	NA	NA	-
G.	Power Supply	TOPWARD	33010D	NA	NA	-
H.	GPS Antenna	Connectec	SP070809-001	3-6004-031R000	NA	Provided by client
I.	Monitor	DELL	SE2416Hc	CN-OWJKMC-64180 -66D-013B-A00	NA	-
J.	Docking Station	ADVANTECH	AIM-DOC-0001	NA	NA	Provided by client
K.	Docking Station	ADVANTECH	AIM-VED0	NA	NA	Provided by client
L.	Docking Station	ADVANTECH	AIM-OFD-0000	NA	NA	Provided by client
M.	Adapter	FSP	FSP065-DBCMI	NA	NA	Provided by client

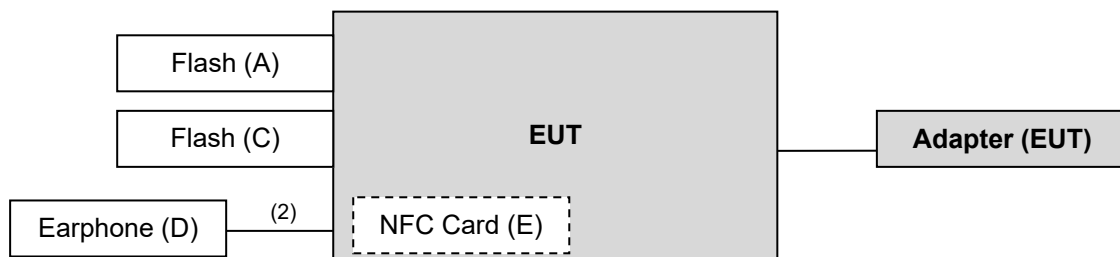
Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RS232 cable	1	1.5	N	0	-
2.	Audio cable	1	1.2	N	0	-
3.	LAN cable	1	7	N	0	RJ45, Cat.5e
4.	Antenna cable	1	5	N	0	Provided by client
5.	Power cable	1	1	N	0	Provided by client
6.	HDMI cable	1	2.0	Y	0	Provided by Lab. (Brand: Amber, Model: HDMI-AA120)
7.	DC Power cable	1	1.5	N	1	Provided by client
8.	AC Power cable	1	1.5	N	0	Provided by client

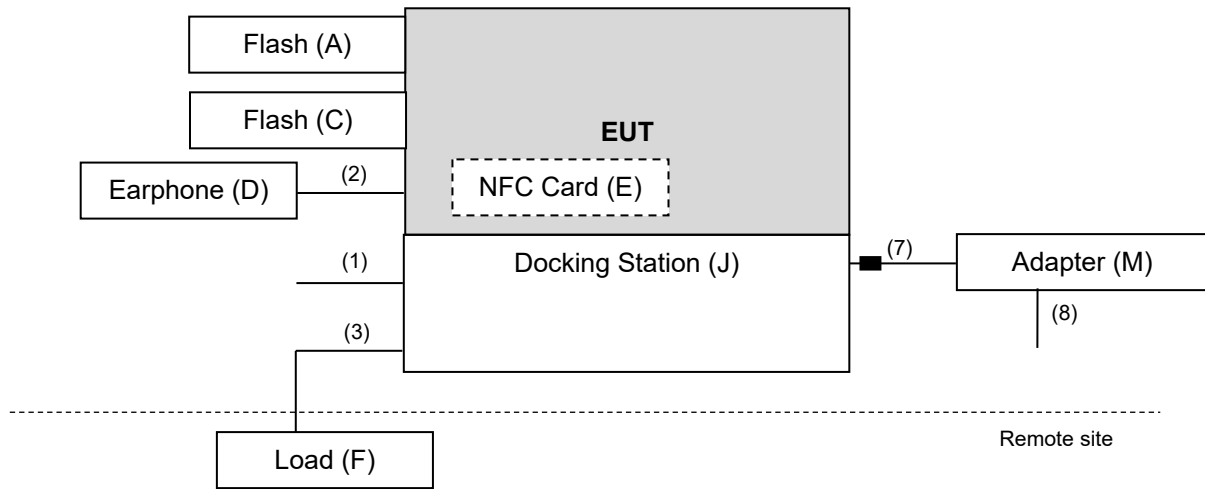
Note: The core(s) is(are) originally attached to the cable(s).

#### 3.3.1 Configuration of System under Test

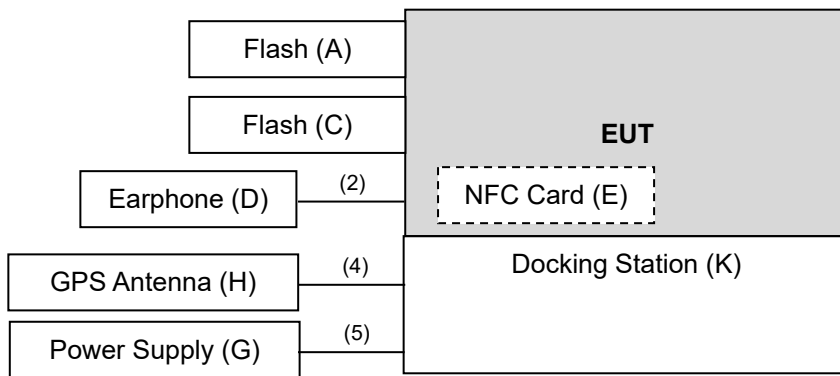
Mode A



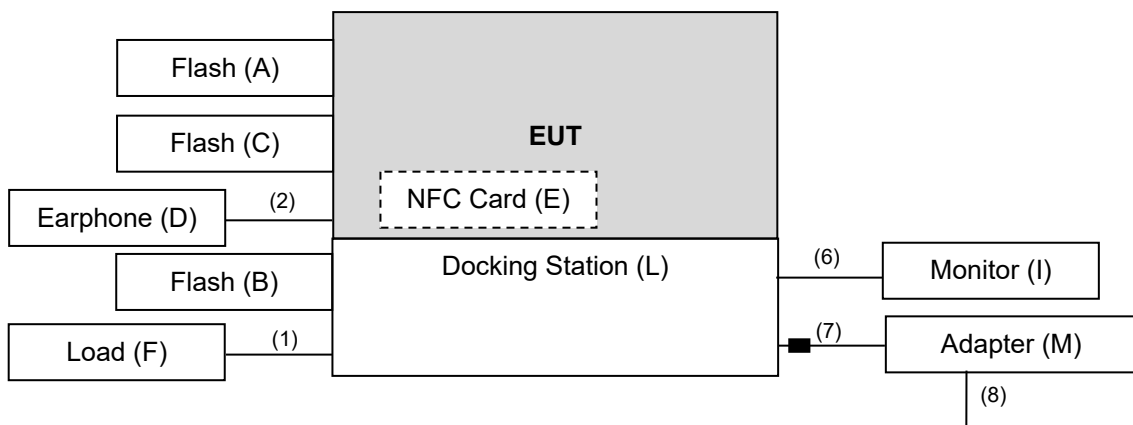
Mode B



Mode C



Mode D



### 3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C (15.225)**

**FCC Part 15, Subpart C (15.215)**

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

## 4 Test Types and Results

### 4.1 Radiated Emission Measurement

#### 4.1.1 Limits of Radiated Emission Measurement

The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**Note:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

#### 4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 03, 2021	Dec. 02, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 14, 2021	Nov. 13, 2022
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Oct. 28, 2021	Oct. 27, 2022
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC 012645	980115	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable EMCI	EMC104-SM-SM-8000	171005	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 05, 2021	Oct. 04, 2022
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 05, 2021	Oct. 04, 2022
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Chamber 10.

### 4.1.3 Test Procedures

#### For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode, except for the frequency band (9 kHz-90 kHz, 110 kHz-490 kHz) set to average detect function and peak detect function.

#### Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency band (9 kHz~150 kHz) and 9kHz at frequency below 30MHz (except 9 kHz~150 kHz).
2. There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

#### For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

#### Note:

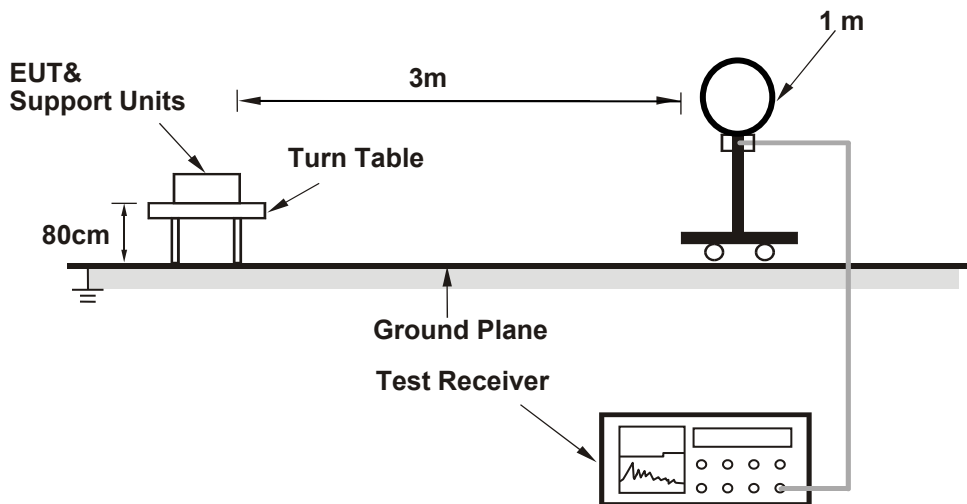
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

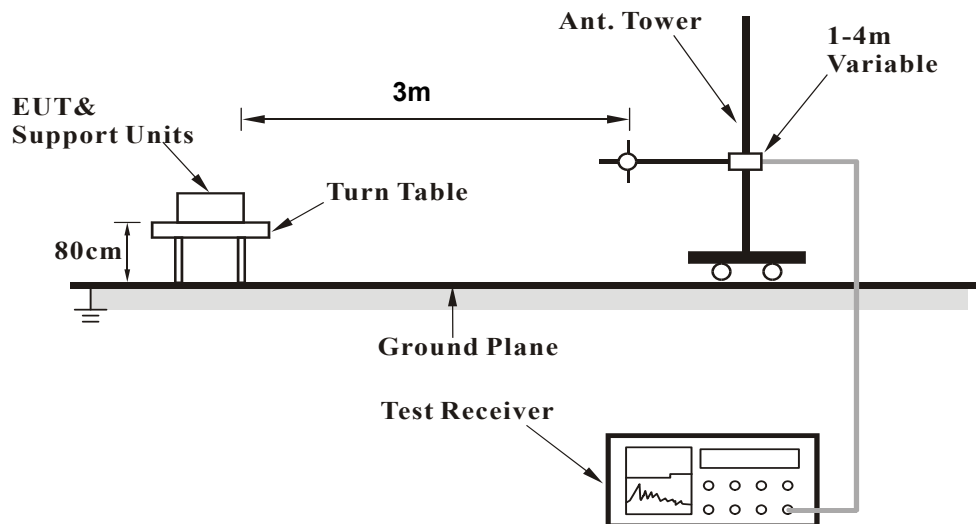
No deviation.

#### 4.1.5 Test Set Up

##### For Radiated emission below 30MHz



##### For Radiated emission 30MHz to 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).



#### 4.1.6 EUT Operating Conditions

##### Mode A

- a. The EUT powered by adapter.
- b. The EUT under transmission condition continuously at specific channel frequency.

##### Mode B

- a. The EUT powered by docking station.
- b. The EUT under transmission condition continuously at specific channel frequency.

##### Mode C

- a. The EUT powered by docking station.
- b. The EUT under transmission condition continuously at specific channel frequency.

##### Mode D

- a. The EUT powered by docking station.
- b. The EUT communicated with monitor via HDMI cables and transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

Mode C

Type V

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	13.553 ~ 13.567MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

#### Antenna Polarity & Test Distance: Loop Antenna Parallel At 3m

No.	Freq. (MHz)	Emission Level (dBuV/m) (30m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV) (3m)	Correction Factor (dB/m)
1	*13.56	18.5 QP	84.0	-65.5	1.00	356	36.5	-18.0

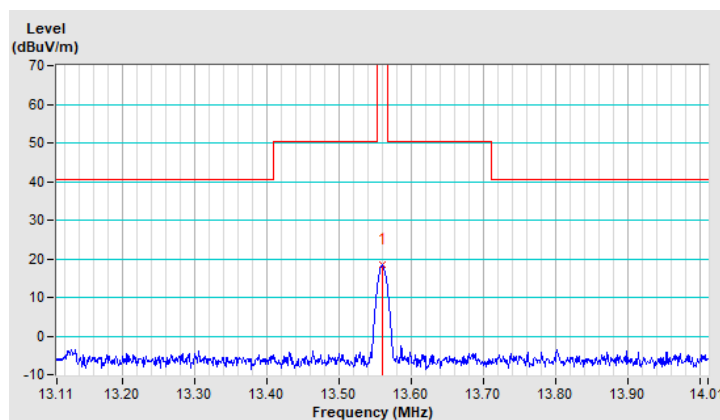
Remarks:

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(dB)+Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* ” : Fundamental frequency
6. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\text{uV/m} && 30\text{m} \\
 &= 84\text{dBuV/m} && 30\text{m}
 \end{aligned}$$



EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	13.553 ~ 13.567MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Loop Antenna Perpendicular At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m) (30m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV) (3m)	Correction Factor (dB/m)
1	*13.56	13.7 QP	84.0	-70.3	1.00	259	31.7	-18.0

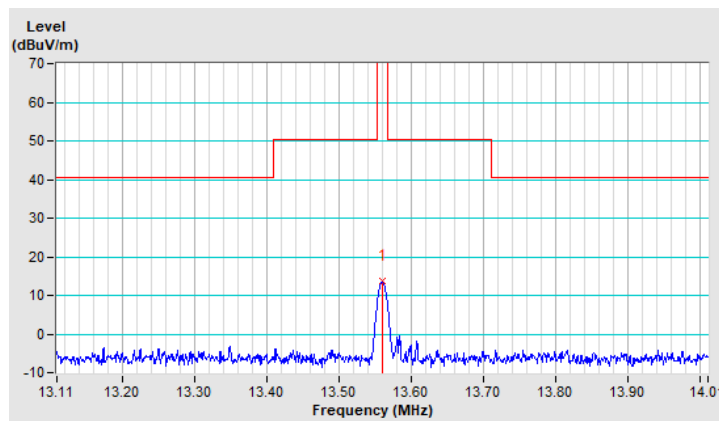
Remarks:

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(dB)+Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* “ : Fundamental frequency
6. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$\begin{aligned}
 13.56\text{MHz} &= 15848\mu\text{V/m} && 30\text{m} \\
 &= 84\text{dBuV/m} && 30\text{m}
 \end{aligned}$$



EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	13.553 ~ 13.567MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Loop Antenna Ground Parallel At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m) (30m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV) (3m)	Correction Factor (dB/m)
1	*13.56	10.9 QP	84.0	-73.1	1.00	23	28.9	-18.0

Remarks:

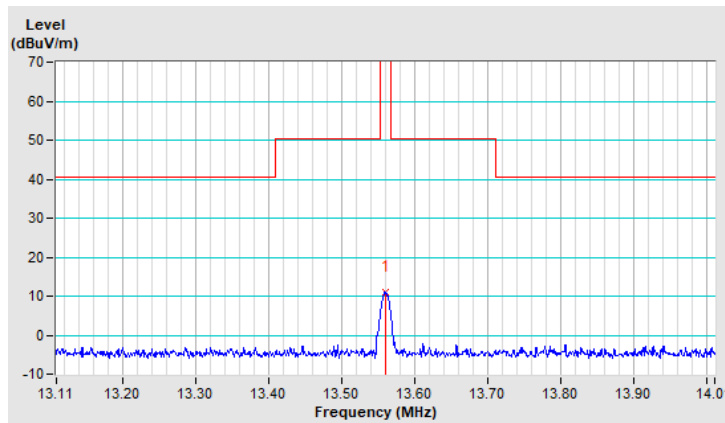
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)+Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ \* ” : Fundamental frequency
6. Above limits have been translated by the formula

The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

Example:

$$13.56\text{MHz} = 15848\mu\text{V/m} \quad 30\text{m}$$

$$= 84\text{dBuV/m} \quad 30\text{m}$$

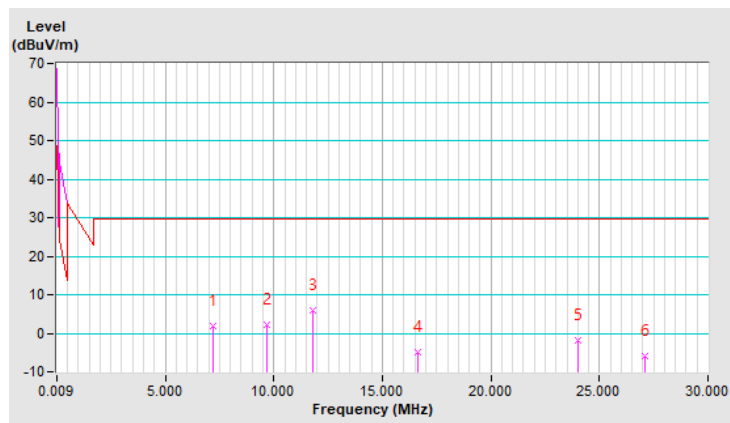


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 30MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Loop Antenna Parallel At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m) (30m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV) (3m)	Correction Factor (dB/m)
1	7.18	1.7 QP	29.5	-27.8	1.00	302	20.8	-19.1
2	9.70	2.2 QP	29.5	-27.3	1.00	138	20.4	-18.2
3	11.83	6.1 QP	29.5	-23.4	1.00	328	24.1	-18.0
4	16.65	-4.9 QP	29.5	-34.4	1.00	265	13.0	-17.9
5	24.03	-1.9 QP	29.5	-31.4	1.00	229	16.0	-17.9
6	27.12	-6.0 QP	29.5	-35.5	1.00	206	11.9	-17.9

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(dB) +Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

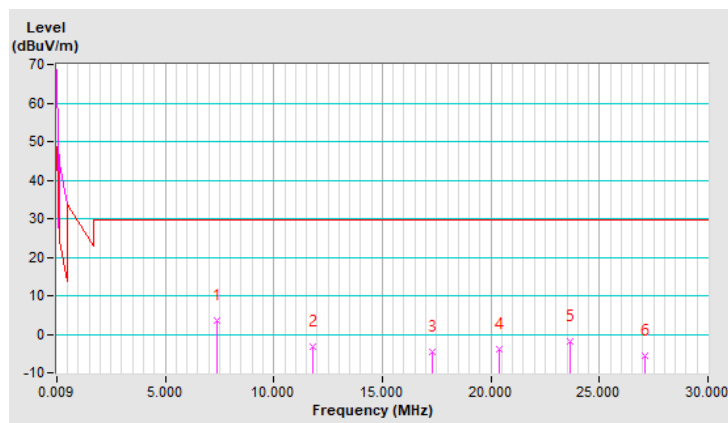


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 30MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Loop Antenna Perpendicular At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m) (30m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV) (3m)	Correction Factor (dB/m)
1	7.36	3.5 QP	29.5	-26.0	1.00	210	22.5	-19.0
2	11.83	-3.2 QP	29.5	-32.7	1.00	27	14.8	-18.0
3	17.31	-4.6 QP	29.5	-34.1	1.00	145	13.3	-17.9
4	20.40	-3.8 QP	29.5	-33.3	1.00	96	14.0	-17.8
5	23.67	-1.9 QP	29.5	-31.4	1.00	178	16.0	-17.9
6	27.12	-5.7 QP	29.5	-35.2	1.00	305	12.2	-17.9

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(dB) +Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

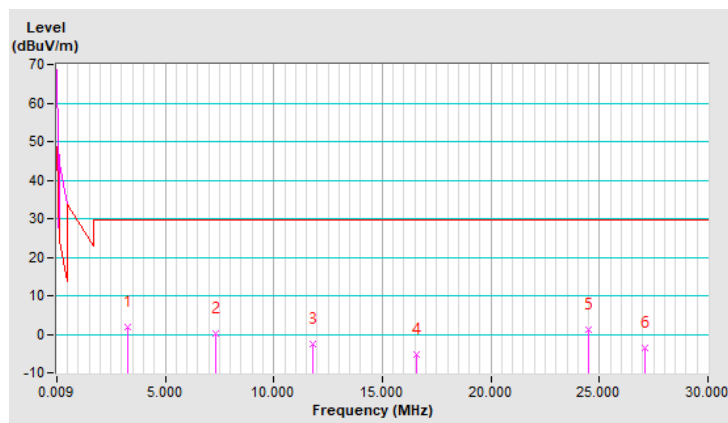


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 30MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Loop Antenna Ground Paralle At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m) (30m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV) (3m)	Correction Factor (dB/m)
1	3.28	1.9 QP	29.5	-27.6	1.00	214	21.9	-20.0
2	7.30	0.3 QP	29.5	-29.2	1.00	195	19.3	-19.0
3	11.83	-2.6 QP	29.5	-32.1	1.00	81	15.4	-18.0
4	16.59	-5.4 QP	29.5	-34.9	1.00	302	12.5	-17.9
5	24.48	1.2 QP	29.5	-28.3	1.00	124	19.1	-17.9
6	27.12	-3.4 QP	29.5	-32.9	1.00	35	14.5	-17.9

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(dB) +Distance Factor
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)



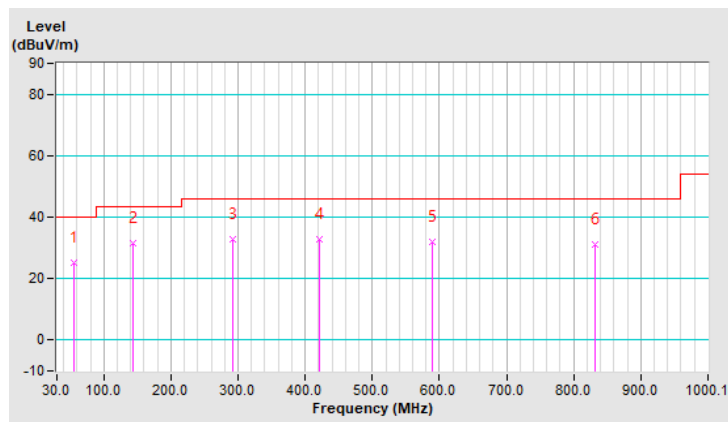
**Mode A**  
Type V

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Horizontal At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	56.19	25.3 QP	40.0	-14.7	2.35 H	356	38.1	-12.8
2	143.50	31.6 QP	43.5	-11.9	1.51 H	233	43.9	-12.3
3	291.93	32.8 QP	46.0	-13.2	2.94 H	343	45.3	-12.5
4	421.92	32.9 QP	46.0	-13.1	1.13 H	56	41.4	-8.5
5	588.78	31.9 QP	46.0	-14.1	1.48 H	168	35.8	-3.9
6	832.27	31.0 QP	46.0	-15.0	3.15 H	354	30.0	1.0

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(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



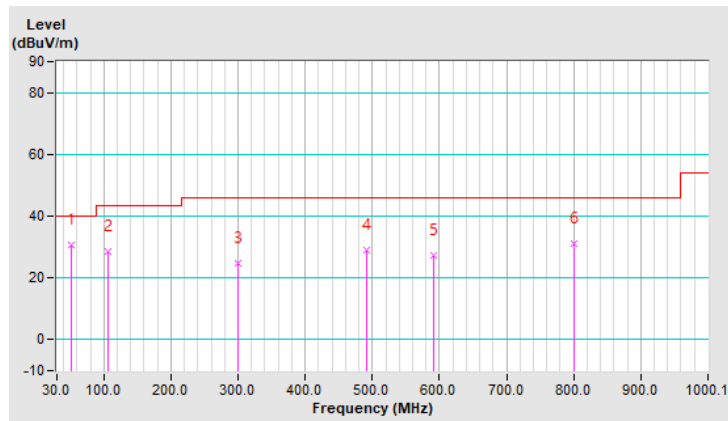


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	52.31	30.8 QP	40.0	-9.2	2.00 V	320	43.5	-12.7
2	105.67	28.4 QP	43.5	-15.1	2.54 V	296	44.1	-15.7
3	299.69	24.9 QP	46.0	-21.1	3.34 V	336	37.0	-12.1
4	491.77	29.1 QP	46.0	-16.9	1.56 V	152	35.4	-6.3
5	591.69	27.1 QP	46.0	-18.9	1.68 V	298	30.9	-3.8
6	801.23	31.1 QP	46.0	-14.9	2.52 V	67	30.7	0.4

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(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



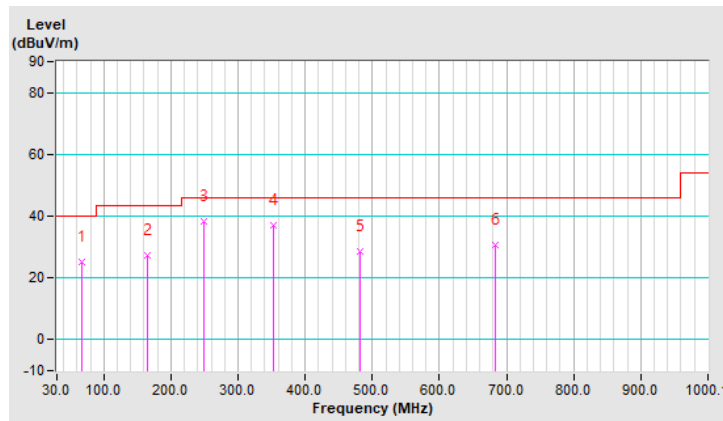
**Mode B**  
Type V

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Horizontal At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	66.86	25.1 QP	40.0	-14.9	2.32 H	18	39.3	-14.2
2	165.81	27.2 QP	43.5	-16.3	2.78 H	108	40.0	-12.8
<b>3</b>	<b>249.24</b>	<b>38.1 QP</b>	<b>46.0</b>	<b>-7.9</b>	<b>1.56 H</b>	<b>321</b>	<b>52.6</b>	<b>-14.5</b>
4	352.07	37.0 QP	46.0	-9.0	2.23 H	124	47.3	-10.3
5	481.10	28.5 QP	46.0	-17.5	1.42 H	309	35.3	-6.8
6	683.85	30.7 QP	46.0	-15.3	1.06 H	335	32.7	-2.0

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(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

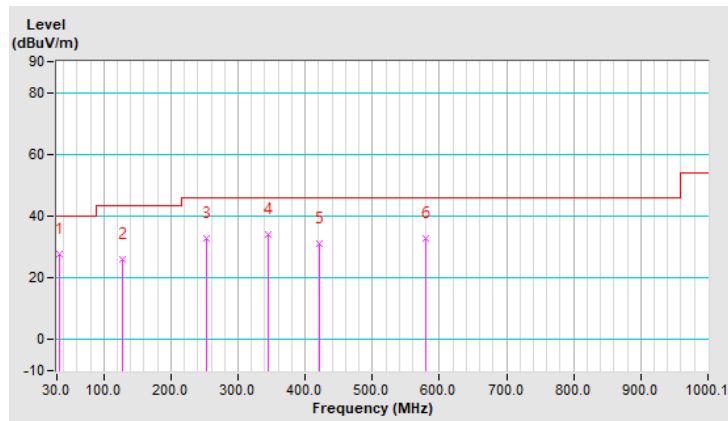


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.88	27.6 QP	40.0	-12.4	1.23 V	324	41.4	-13.8
2	127.01	26.2 QP	43.5	-17.3	2.42 V	4	40.0	-13.8
3	252.15	33.0 QP	46.0	-13.0	1.68 V	353	47.4	-14.4
4	344.31	34.1 QP	46.0	-11.9	3.33 V	2	44.6	-10.5
5	420.95	30.9 QP	46.0	-15.1	1.05 V	343	39.5	-8.6
6	580.05	32.8 QP	46.0	-13.2	2.31 V	265	37.0	-4.2

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(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



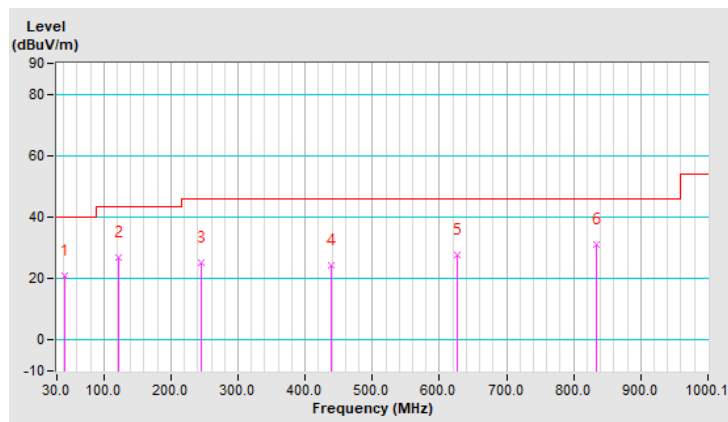
**Mode C**  
Type V

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Horizontal At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	42.61	21.1 QP	40.0	-18.9	1.35 H	347	34.0	-12.9
2	122.16	27.0 QP	43.5	-16.5	2.51 H	148	41.1	-14.1
3	245.36	25.2 QP	46.0	-20.8	2.80 H	308	39.7	-14.5
4	439.38	24.5 QP	46.0	-21.5	2.31 H	344	32.0	-7.5
5	625.64	27.9 QP	46.0	-18.1	3.50 H	359	30.7	-2.8
6	834.21	31.3 QP	46.0	-14.7	1.36 H	186	30.2	1.1

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(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

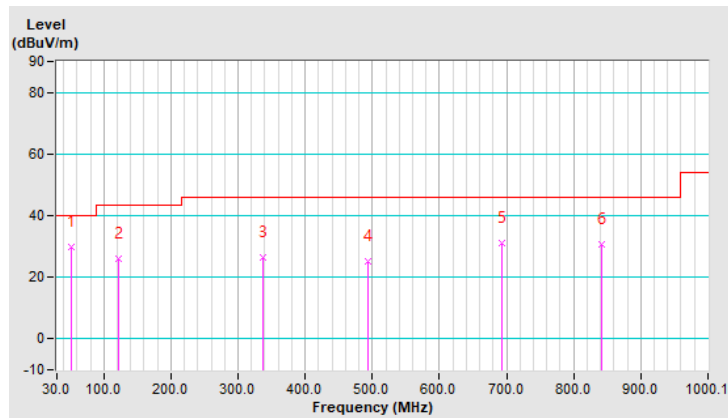


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	52.31	29.8 QP	40.0	-10.2	1.09 V	242	42.5	-12.7
2	122.16	26.0 QP	43.5	-17.5	3.31 V	310	40.1	-14.1
3	336.55	26.5 QP	46.0	-19.5	2.91 V	278	37.2	-10.7
4	492.74	25.2 QP	46.0	-20.8	2.66 V	145	31.5	-6.3
5	692.58	31.3 QP	46.0	-14.7	2.30 V	194	33.2	-1.9
6	841.00	30.7 QP	46.0	-15.3	1.61 V	314	29.6	1.1

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(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



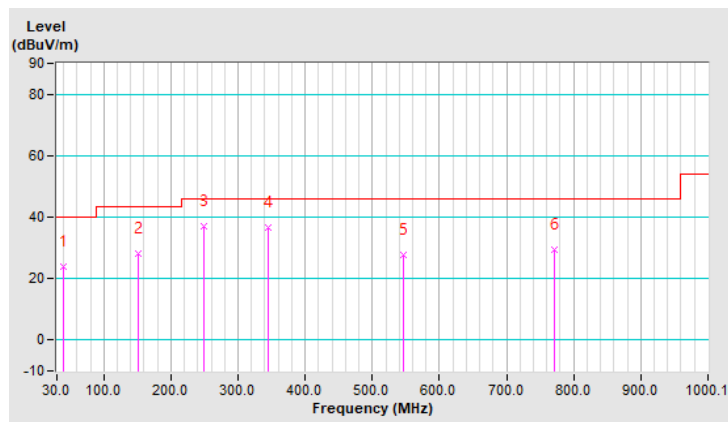
**Mode D**  
Type V

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Horizontal At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	40.67	23.8 QP	40.0	-16.2	1.52 H	260	36.9	-13.1
2	150.29	28.0 QP	43.5	-15.5	2.42 H	327	40.1	-12.1
3	248.27	37.1 QP	46.0	-8.9	3.42 H	304	51.6	-14.5
4	344.31	36.4 QP	46.0	-9.6	1.57 H	259	46.9	-10.5
5	547.06	27.6 QP	46.0	-18.4	3.33 H	337	32.8	-5.2
6	771.16	29.6 QP	46.0	-16.4	1.78 H	20	29.6	0.0

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(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

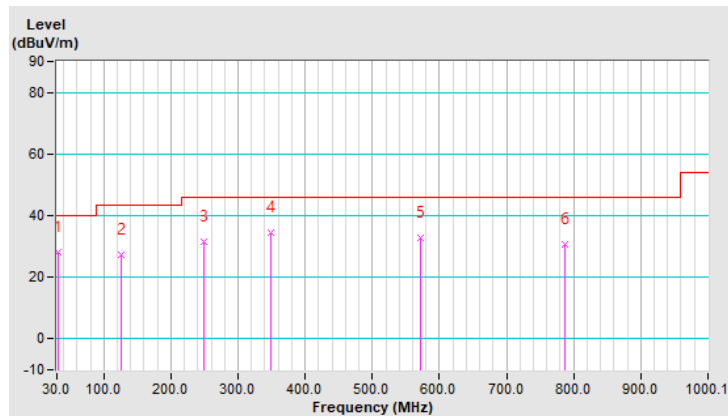


EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	Below 1000MHz
Input Power	120Vac, 60Hz	Detector Function	Quasi-Peak
Environmental Conditions	22 deg. C, 69% RH	Tested By	Thomas Cheng

Antenna Polarity & Test Distance: Vertical At 3m								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	32.91	28.0 QP	40.0	-12.0	1.53 V	25	42.0	-14.0
2	126.04	27.1 QP	43.5	-16.4	2.26 V	150	40.8	-13.7
3	249.24	31.5 QP	46.0	-14.5	3.45 V	150	46.0	-14.5
4	349.16	34.5 QP	46.0	-11.5	1.52 V	348	44.8	-10.3
5	572.29	32.6 QP	46.0	-13.4	1.09 V	84	37.2	-4.6
6	787.65	30.5 QP	46.0	-15.5	3.34 V	2	30.4	0.1

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(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.  
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Jan. 22, 2022	Jan. 21, 2023
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2021	Sep. 03, 2022
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	Apr. 26, 2021	Apr. 25, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The test was performed in HwaYa Shielded Room 2 (Conduction 2).  
 3. The VCCI Site Registration No. is C-12047.  
 4. Tested date: Mar. 25, 2022



#### 4.2.3 Test Procedures

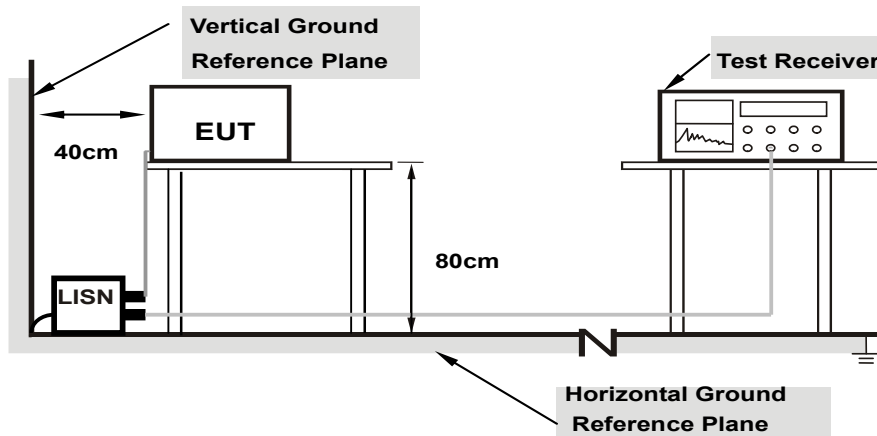
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

### 4.2.7 Test Results

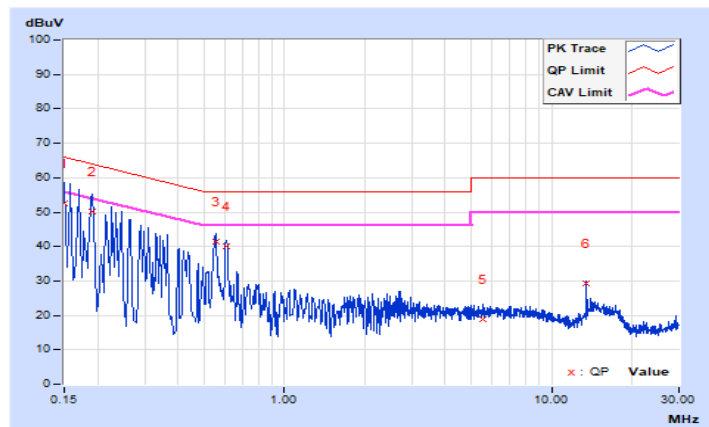
#### Type V

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.13	42.36	18.29	52.49	28.42	66.00	56.00	-13.51	-27.58
2	0.19000	10.14	40.12	15.27	50.26	25.41	64.04	54.04	-13.78	-28.63
3	0.55400	10.17	31.34	20.64	41.51	30.81	56.00	46.00	-14.49	-15.19
4	0.60600	10.17	29.99	26.24	40.16	36.41	56.00	46.00	-15.84	-9.59
5	5.51400	10.26	8.60	4.70	18.86	14.96	60.00	50.00	-41.14	-35.04
6	13.55800	10.32	19.04	13.60	29.36	23.92	60.00	50.00	-30.64	-26.08

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

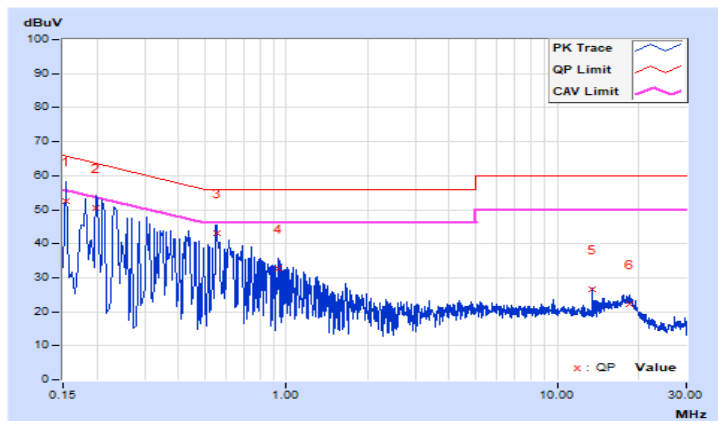


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15400	10.14	42.27	18.33	52.41	28.47	65.78
2	0.19800	10.15	40.20	11.75	50.35	21.90	63.69	53.69	-13.34	-31.79
3	0.55265	10.18	32.81	26.74	42.99	36.92	56.00	46.00	-13.01	-9.08
4	0.93400	10.20	22.44	7.91	32.64	18.11	56.00	46.00	-23.36	-27.89
5	13.55800	10.41	16.07	12.75	26.48	23.16	60.00	50.00	-33.52	-26.84
6	18.45800	10.51	11.61	6.88	22.12	17.39	60.00	50.00	-37.88	-32.61

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

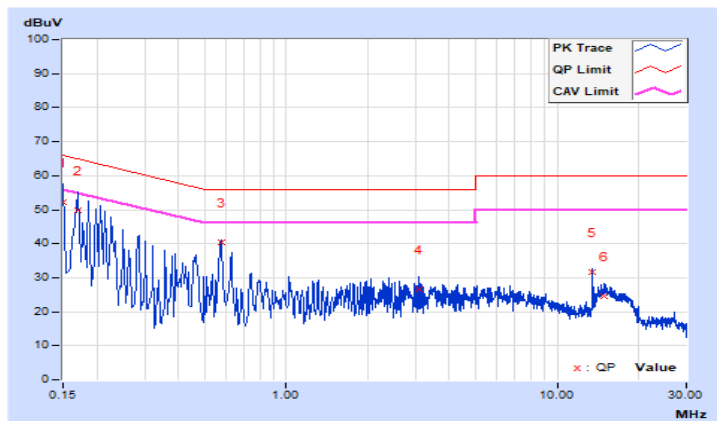


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15000	10.13	42.12	20.50	52.25	30.63	66.00
2	0.17000	10.13	39.86	22.17	49.99	32.30	64.96	54.96	-14.97	-22.66
3	0.57400	10.17	30.18	29.73	40.35	39.90	56.00	46.00	-15.65	-6.10
4	3.08200	10.24	16.21	10.47	26.45	20.71	56.00	46.00	-29.55	-25.29
5	13.55800	10.32	21.31	18.94	31.63	29.26	60.00	50.00	-28.37	-20.74
6	14.89800	10.33	14.30	6.27	24.63	16.60	60.00	50.00	-35.37	-33.40

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

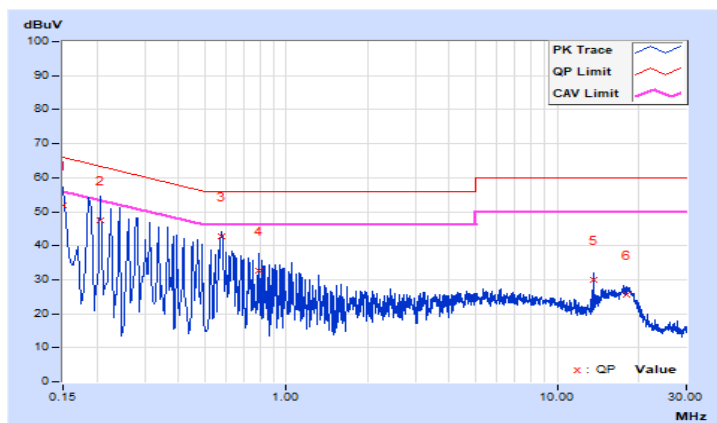


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15000	10.14	41.58	19.94	51.72	30.08	66.00
2	0.20600	10.15	37.37	19.88	47.52	30.03	63.37	53.37	-15.85	-23.34
3	0.57493	10.18	32.51	29.91	42.69	40.09	56.00	46.00	-13.31	-5.91
4	0.79000	10.19	22.35	12.20	32.54	22.39	56.00	46.00	-23.46	-23.61
5	13.56200	10.41	19.69	17.27	30.10	27.68	60.00	50.00	-29.90	-22.32
6	18.13400	10.51	15.24	6.70	25.75	17.21	60.00	50.00	-34.25	-32.79

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

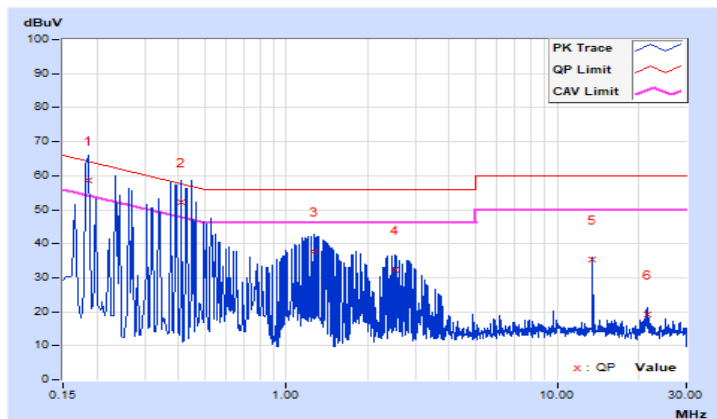


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	C		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.18600	10.14	48.32	17.29	58.46	27.43	64.21
2	0.41000	10.16	41.94	11.06	52.10	21.22	57.65	47.65	-5.55	-26.43
3	1.26200	10.20	27.57	2.75	37.77	12.95	56.00	46.00	-18.23	-33.05
4	2.52600	10.23	22.07	-5.51	32.30	4.72	56.00	46.00	-23.70	-41.28
5	13.55800	10.32	25.19	24.20	35.51	34.52	60.00	50.00	-24.49	-15.48
6	21.49400	10.35	8.76	4.10	19.11	14.45	60.00	50.00	-40.89	-35.55

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

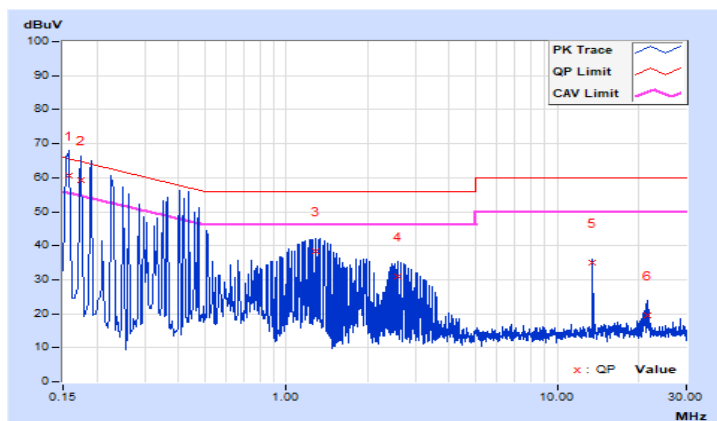


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	C		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			<b>1</b>	<b>0.15800</b>	<b>10.14</b>	<b>50.60</b>	<b>21.41</b>	<b>60.74</b>	<b>31.55</b>	<b>65.57</b>
2	0.17400	10.14	49.24	18.81	59.38	28.95	64.77	54.77	-5.39	-25.82
3	1.29000	10.21	28.23	12.55	38.44	22.76	56.00	46.00	-17.56	-23.24
4	2.59800	10.24	20.71	6.58	30.95	16.82	56.00	46.00	-25.05	-29.18
5	13.55800	10.41	24.62	22.61	35.03	33.02	60.00	50.00	-24.97	-16.98
6	21.45000	10.50	9.17	4.82	19.67	15.32	60.00	50.00	-40.33	-34.68

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

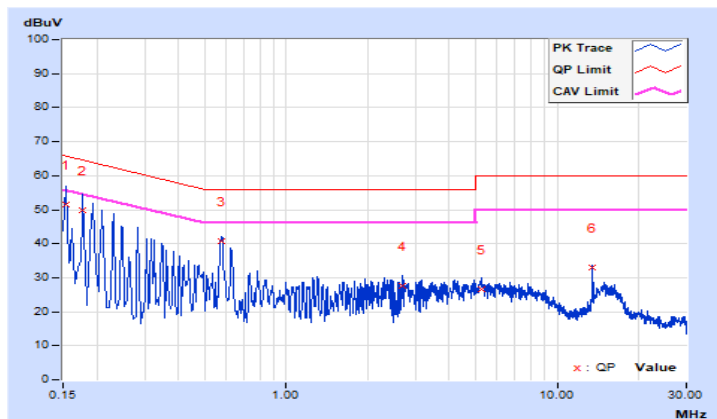


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	D		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15400	10.13	41.37	26.13	51.50	36.26	65.78
2	0.17800	10.14	39.85	12.65	49.99	22.79	64.58	54.58	-14.59	-31.79
3	0.57796	10.17	30.68	28.99	40.85	39.16	56.00	46.00	-15.15	-6.84
4	2.68200	10.23	17.24	10.29	27.47	20.52	56.00	46.00	-28.53	-25.48
5	5.24200	10.26	16.32	9.33	26.58	19.59	60.00	50.00	-33.42	-30.41
6	13.55800	10.32	22.54	17.90	32.86	28.22	60.00	50.00	-27.14	-21.78

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



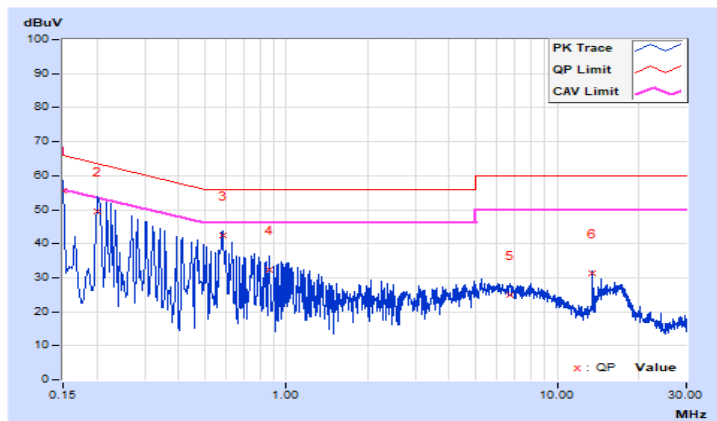


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	D		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15000	10.14	45.48	25.14	55.62	35.28	66.00
2	0.20200	10.15	39.24	17.18	49.39	27.33	63.53	53.53	-14.14	-26.20
3	0.58102	10.18	32.10	30.43	42.28	40.61	56.00	46.00	-13.72	-5.39
4	0.86600	10.19	22.17	11.49	32.36	21.68	56.00	46.00	-23.64	-24.32
5	6.67800	10.31	14.56	6.74	24.87	17.05	60.00	50.00	-35.13	-32.95
6	13.55800	10.41	20.74	17.26	31.15	27.67	60.00	50.00	-28.85	-22.33

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

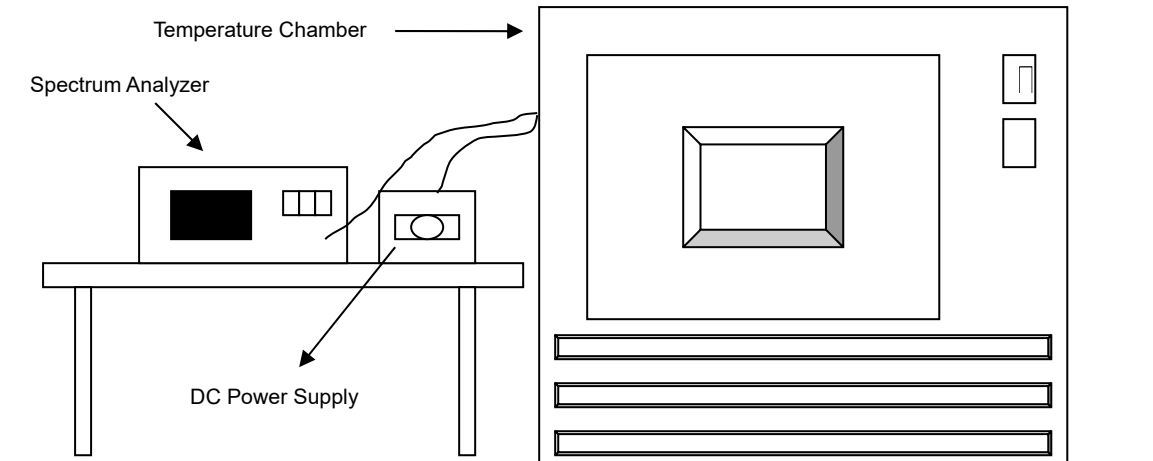


### 4.3 Frequency Stability

#### 4.3.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Jun. 07, 2021	Jun. 06, 2022
Standard Temperature And Humidity Chamber TERCHY	MHU-225AU	920842	Jun. 15, 2021	Jun. 14, 2022
Three-phase coupling / decoupling network TESEQ	CDN 3063	4006	Mar. 08, 2022	Mar. 07, 2023
DC Power Supply Topward	6306A	727263	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. Tested date: Apr. 11, 2022

#### 4.3.4 Test Procedure

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

Same as Item 4.1.6.

#### 4.3.7 Test Result

##### Type V

Frequency Stability Versus Temp.									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	10.8	13.56006	0.00044	13.56005	0.00037	13.56007	0.00052	13.56006	0.00044
40	10.8	13.56004	0.00029	13.56004	0.00029	13.56005	0.00037	13.56004	0.00029
30	10.8	13.56004	0.00029	13.56003	0.00022	13.56003	0.00022	13.56002	0.00015
20	10.8	13.55997	-0.00022	13.55997	-0.00022	13.55997	-0.00022	13.55998	-0.00015
10	10.8	13.55998	-0.00015	13.55998	-0.00015	13.55997	-0.00022	13.55998	-0.00015
0	10.8	13.56004	0.00029	13.56005	0.00037	13.56005	0.00037	13.56005	0.00037
-10	10.8	13.56007	0.00052	13.56007	0.00052	13.56007	0.00052	13.56006	0.00044
-20	10.8	13.55995	-0.00037	13.55994	-0.00044	13.55995	-0.00037	13.55995	-0.00037

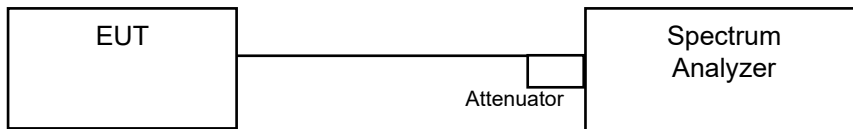
Frequency Stability Versus Voltage									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
20	12.42	13.55997	-0.00022	13.55997	-0.00022	13.55997	-0.00022	13.55998	-0.00015
	10.80	13.55997	-0.00022	13.55997	-0.00022	13.55997	-0.00022	13.55998	-0.00015
	9.18	13.55997	-0.00022	13.55997	-0.00022	13.55997	-0.00022	13.55998	-0.00015

#### 4.4 20dB Bandwidth

##### 4.4.1 Limits of 20dB Bandwidth Measurement

The 20dB bandwidth shall be specified in operating frequency band.

##### 4.4.2 Test Setup



##### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

##### 4.4.4 Test Procedures

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1kHz RBW and 3kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

##### 4.4.5 Deviation from Test Standard

No deviation.

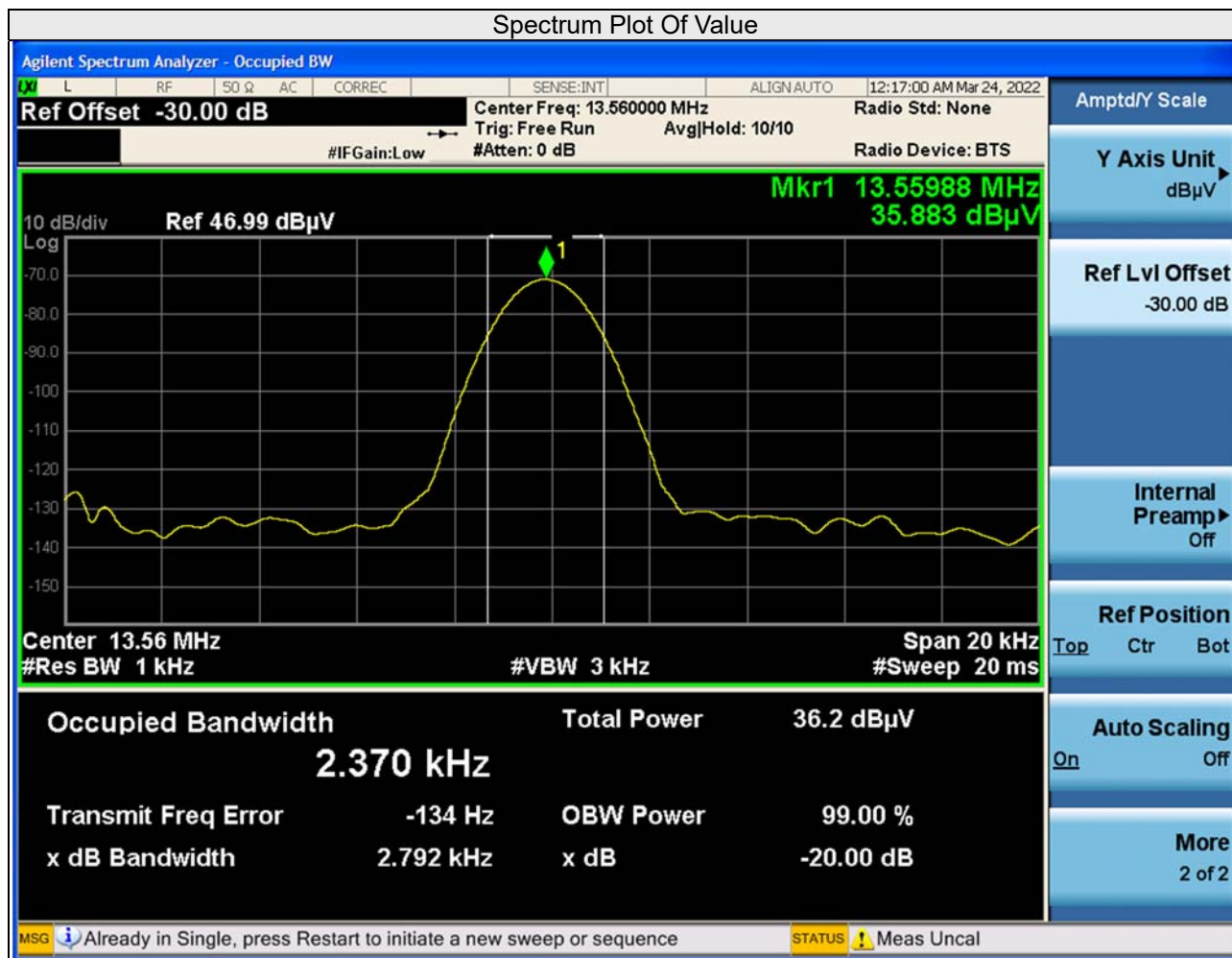
##### 4.4.6 EUT Operating Conditions

Same as Item 4.1.6.

#### 4.4.7 Test Results

##### Type V

20dBc point (Low)	20dBc point (High)	Operating frequency band (MHz)	Pass / Fail
13.55988	13.562672	13.553~13.567	Pass



Note: The signal look like CW signal, so RBW can't be match 1~5 % OBW.

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

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