

## FCC Test Report

**Report No.:** RFBEAD-WTW-P21060534-4

**FCC ID:** M82-AIM78S6

**Model:** AIM-78S-6

**Series Model:** AIM-78H-6, AIM-78H-6XXXXXXXXXXXXXXXXXX,  
AIM-78S-6XXXXXXXXXXXXXXXXXX (X: maybe 1-9, A-Z, or blank)  
(refer to item 3.1 for more details)

**Received Date:** Jun. 16, 2021

**Test Date:** Jul. 26 ~ Aug. 25, 2021

**Issued Date:** Dec. 27, 2021

**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(1):** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /  
Designation Number(1):** 788550 / TW0003

**Test Location(2):** B2F., No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan

**FCC Registration /  
Designation Number(2):** 427177 / TW0011



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### Release Control Record

Issue No.	Description	Date Issued
RFBEAD-WTW-P21060534-4	Original release	Dec. 27, 2021

## 1 Certificate of Conformity

**Product:** 10.1" Tablet PC

**Brand:** ADVANTECH

**Model:** AIM-78S-6

**Series Model:** AIM-78H-6, AIM-78H-6XXXXXXXXXXXXXXXXXX,  
AIM-78S-6XXXXXXXXXXXXXXXXXX (X: maybe 1-9, A-Z, or blank)  
(refer to item 3.1 for more details)

**Sample Status:** Engineering sample

**Applicant:** ADVANTECH CO., LTD

**Test Date:** Jul. 26 ~ Aug. 25, 2021

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
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 :** Pettie Chen , **Date:** Dec. 27, 2021  
Pettie Chen / Senior Specialist

**Approved by :** Jeremy Lin , **Date:** Dec. 27, 2021  
Jeremy Lin / Project Engineer

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -5.00dB at 0.54398MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -7.55dB at 65.42MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX_IV not a standard connector.

### Note:

- For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
- 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	2.0153 dB
	200MHz ~ 1000MHz	2.0224 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.0121 dB
	18GHz ~ 40GHz	1.1508 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-6
Series Model	AIM-78H-6, AIM-78H-6XXXXXXXXXXXXXXXXXX, AIM-78S-6XXXXXXXXXXXXXXXXXX (X: maybe 1-9, A-Z, or blank)
Model Difference	Refer to note
Sample Status	Engineering sample
Power Supply Rating	10.8Vdc (Battery) 19Vdc (Adapter)
Modulation Type	GFSK
Transfer Rate	Bluetooth LE 4.0: 1Mbps Bluetooth LE 5.0: 2Mbps
Operating Frequency	2402 ~ 2480MHz
Number of Channel	40
Channel Spacing	2MHz
Output Power	Bluetooth LE 4.0: 3.475mW Bluetooth LE 5.0: 3.499mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Refer to note
Cable Supplied	Refer to note

Note:

1. The following models are provided to this EUT. The model of the AIM-78S-6 was chosen for final test.

Model	Description
AIM-78S-6, AIM-78H-6, AIM-78H-6XXXXXXXXXXXXXXXXXX, AIM-78S-6XXXXXXXXXXXXXXXXXX (X: maybe 1-9, A-Z, or blank)	For marketing purpose

2. 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
WWAN+WLAN module	USI	MS-01 Pro	-

Product	Brand	Model	Description
Docking Stations (option)	ADVANTECH	AIM-DOC-0001	Rating: 19Vdc, 3.42A (VESA Dock)
Docking Stations (option)	ADVANTECH	AIM-VED0	Rating: 9 ~ 32Vdc (Vehicle Dock)
Docking Stations (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

3. The EUT uses the following antennas.

Ant. Type	PIFA															
Ant. Connector	I-PEX_IV															
WiFi/BT_Main / BT																
Frequency (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500					
Peak Gain (dBi)	3.36	3.36	3.15	3.16	3.06	3.25	3.22	3.23	3.32	3.01	3.12					
Frequency (MHz)	5150		5250		5350		5450		5550		5650		5750		5850	
Peak Gain (dBi)	4.31		3.23		2.63		1.97		2.33		2.76		2.61		2.71	
WiFi_Aux																
Frequency (MHz)	2400	2410	2420	2430	2440	2450	2460	2470	2480	2490	2500					
Peak Gain (dBi)	4.19	4.09	4.25	4.12	4.07	3.95	3.86	3.86	3.71	3.46	3.43					
Frequency (MHz)	5150		5250		5350		5450		5550		5650		5750		5850	
Peak Gain (dBi)	0.97		1.81		2.02		1.08		1.63		1.95		0.30		0.41	

\* The max. gain was chosen for final tests.

\* 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.

4. The device WLAN 2.4GHz, BT and NFC can transmit simultaneously.

The device WLAN 5GHz, BT and NFC can transmit simultaneously.

5. Spurious emission of the simultaneous operation (WLAN 2.4GHz, BT and NFC or WLAN 5GHz, BT and NFC) has been evaluated and no non-compliance was found.



### 3.2 Description of Test Modes

40 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT + Adapter
B	-	√	√	-	EUT + VESA Dock
C	-	√	√	-	EUT + Vehicle Dock
D	-	√	√	-	EUT + Office Dock

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement  
 RE<1G: Radiated Emission below 1GHz  
 PLC: Power Line Conducted Emission  
 APCM: Antenna Port Conducted Measurement

Note:

- The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z plane.
- For radiated emission (below 1GHz) and power line conducted emission test items chosen the worst maximum fundamental emission level channel.
- "-": Means no effect.

#### **Radiated Emission Test (Above 1GHz):**

- 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	Data Rate (Mbps)
A	0 to 39	0, 19, 39	GFSK	1, 2

#### **Radiated Emission Test (Below 1GHz):**

- 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	Data Rate (Mbps)
A, B, C, D	0 to 39	19	GFSK	1

#### **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	Data Rate (Mbps)
A, B, C, D	0 to 39	19	GFSK	1

#### **Antenna Port Conducted Measurement:**

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- 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	Data Rate (Mbps)
A	0 to 39	0, 19, 39	GFSK	1, 2

**Test Condition:**

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 75% RH	120Vac, 60Hz	Karl Lee
RE<1G	25 deg. C, 75% RH	120Vac, 60Hz	Karl Lee
PLC	25 deg. C, 75% RH 23 deg. C, 66% RH	120Vac, 60Hz	Edison Lee Cookie Ku
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Jisyong Wang

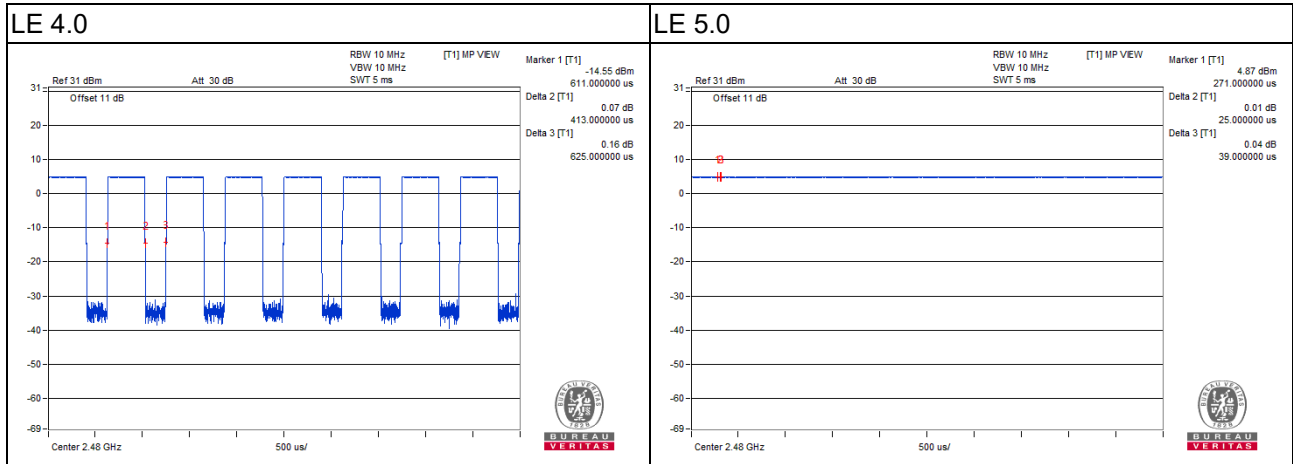
**3.3 Duty Cycle of Test Signal**

BT LE 4.0: Duty cycle of test signal is < 98%.

BT LE 5.0: Duty cycle = 100%

BT LE 4.0: Duty cycle = 0.413/0.625 = 0.661, Duty factor = 10 \* log (1/0.661) = 1.80

BT LE 5.0: Duty cycle = 100%



### 3.4 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	HP	v250W	05	NA	Type-A
B.	Flash	HP	v250W	03	NA	Type-A
C.	Earphone	APPLE	NA	NA	NA	-
D.	Load	NA	NA	NA	NA	-
E.	Power Supply	TOPWARD	6306D	809760	NA	-
F.	GPS Antenna	CONNECTEC	SP070809-001	3-6004-031R000	NA	Provided by client
G.	Monitor	DELL	SE2416Hc	CN-OWJKMC-641 80-66D-013B-A00	NA	-
H.	Docking Station	ADVANTECH	AIM-DOC-0001	NA	NA	Provided by client
I.	Docking Station	ADVANTECH	AIM-VED0	NA	NA	Provided by client
J.	Docking Station	ADVANTECH	AIM-OFD-0000	NA	NA	Provided by client
K.	Adapter	FSP	FSP065-DBCMI	NA	NA	Provided by client

Note:

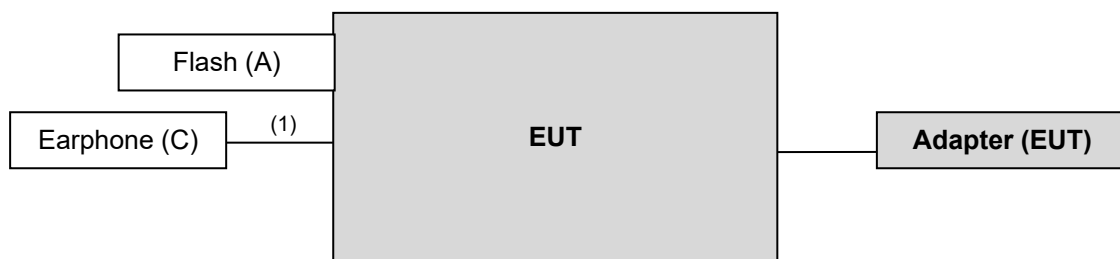
1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Audio cable	1	1.2	N	0	-
2.	RS232 cable	1	1.5	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

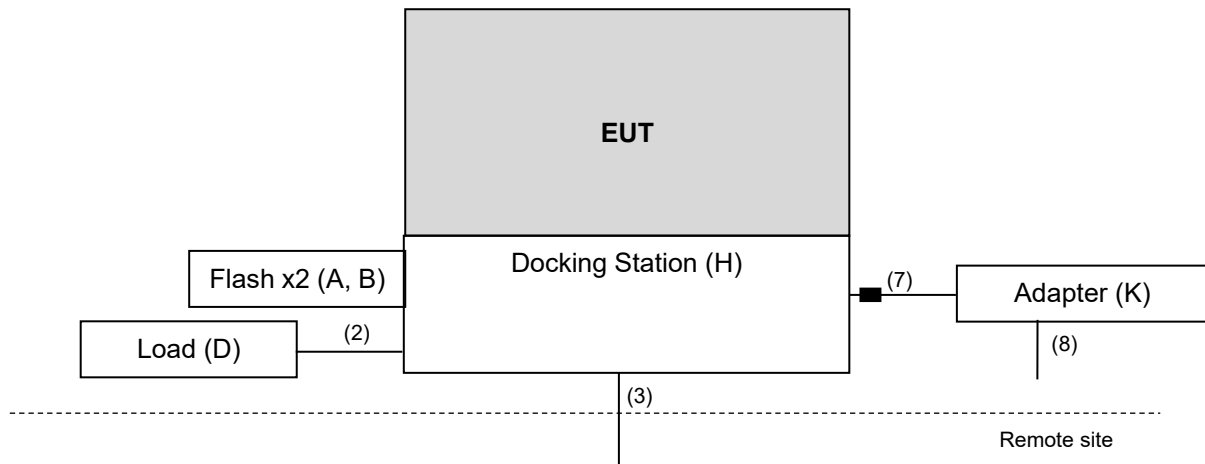
Note: The core(s) is(are) originally attached to the cable(s).

#### 3.4.1 Configuration of System under Test

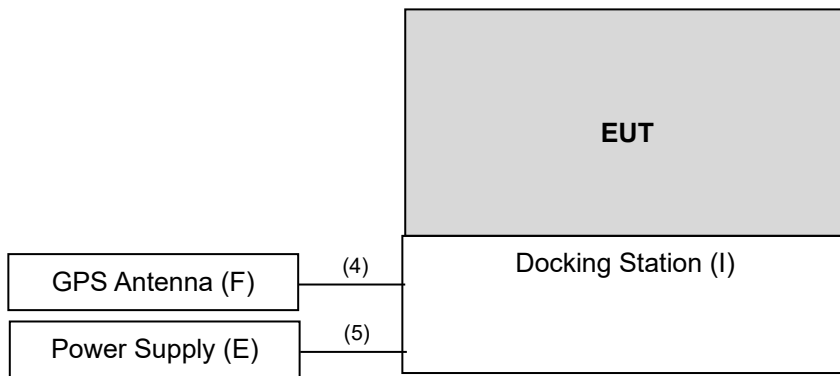
Mode A



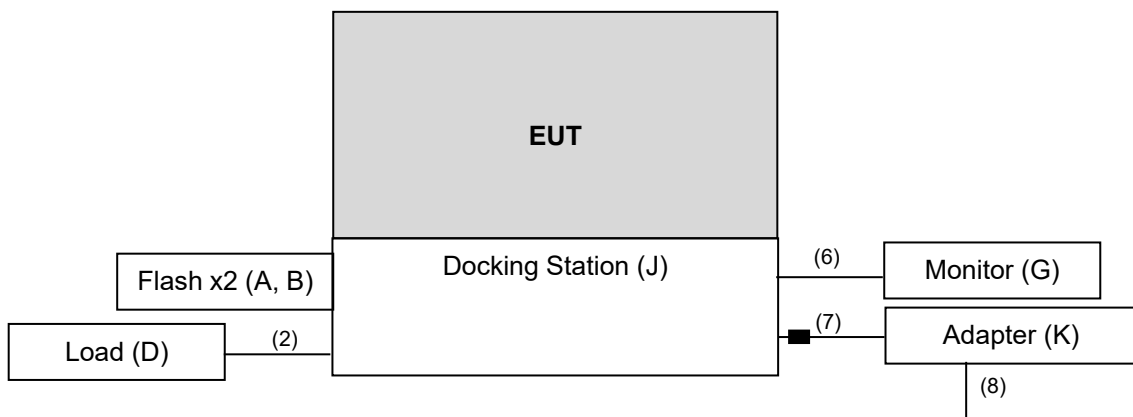
Mode B



Mode C



Mode D



### **3.5 General Description of Applied Standards and References**

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

**Test standard:**

**FCC Part 15, Subpart C (15.247)**

ANSI C63.10:2013

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

**References Test Guidance:**

**KDB 558074 D01 15.247 Meas Guidance v05r02**

All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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
Test Receiver Agilent Technologies	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 12, 2021	Apr. 11, 2022
HORN Antenna ETS-Lindgren	3117	00143293	Nov. 22, 2020	Nov. 21, 2021
BILOG Antenna SCHWARZBECK	VULB 9168	9168-616	Nov. 09, 2020	Nov. 08, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Nov. 22, 2020	Nov. 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
MXG Vector signal generator Agilent	N5182B	MY53050430	Nov. 25, 2020	Nov. 24, 2021
Preamplifier Agilent	310N	187226	Jun. 17, 2021	Jun. 16, 2022
Preamplifier Agilent	83017A	MY39501357	Jun. 17, 2021	Jun. 16, 2022
Preamplifier EMCI	EMC 184045	980116	Oct. 07, 2020	Oct. 06, 2021
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-400)	Jun. 17, 2021	Jun. 16, 2022
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(RFC-SMS-100-SMS-24)	Jun. 17, 2021	Jun. 16, 2022
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 19, 2021	Jan. 18, 2022
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 11, 2021	Jan. 10, 2022

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 Xindian Chamber 6.



### 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.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

#### For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 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.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

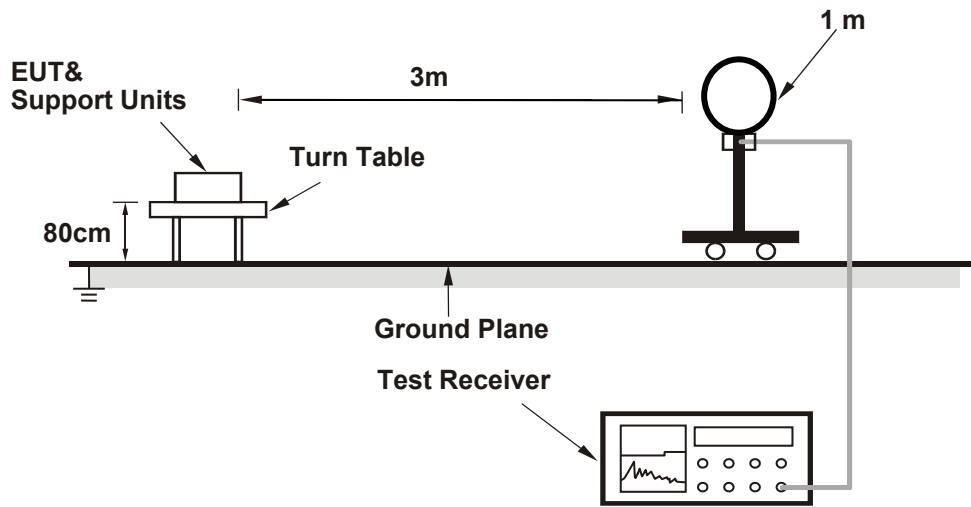
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz. (BT LE 4.0: RBW = 1MHz, VBW = 3kHz, BT LE 5.0: RBW = 1MHz, VBW = 10kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

### 4.1.4 Deviation from Test Standard

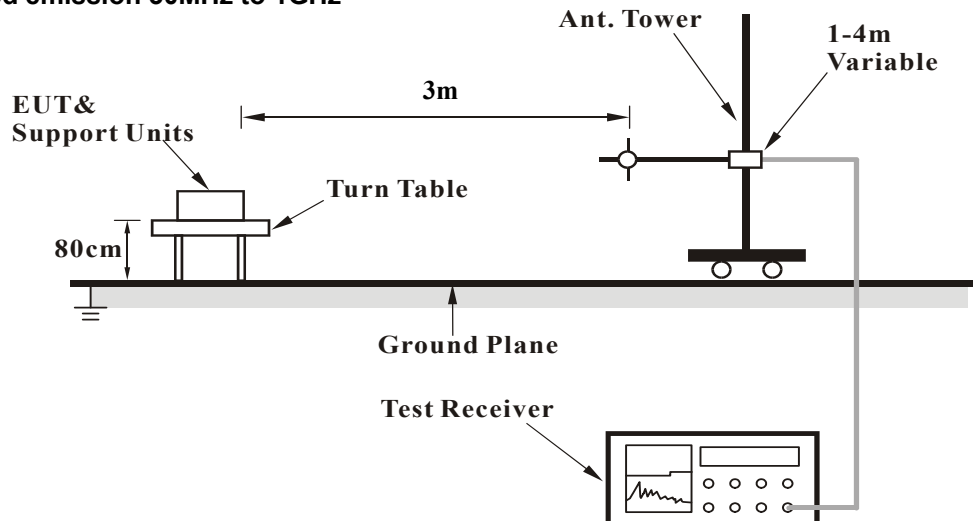
No deviation.

#### 4.1.5 Test Setup

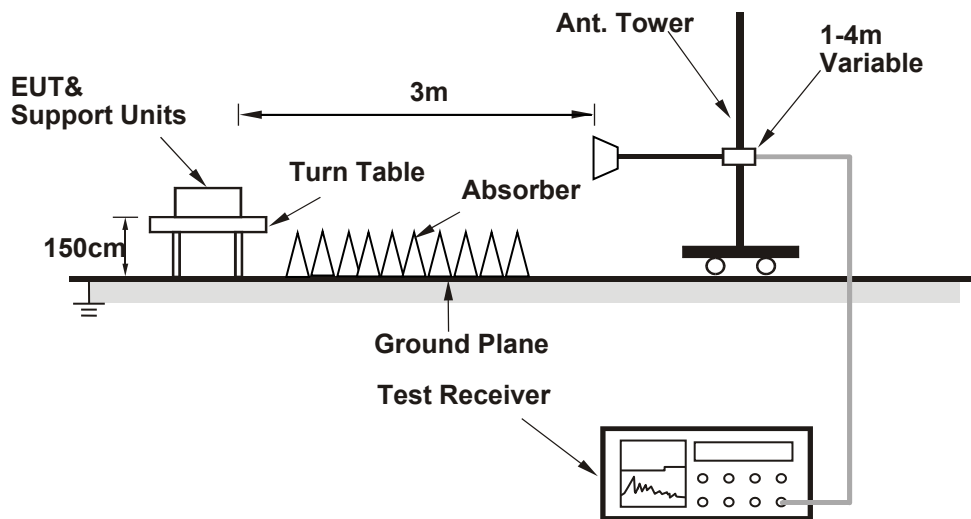
##### For Radiated emission below 30MHz



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



### For Radiated emission above 1GHz



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

#### 4.1.6 EUT Operating Conditions

##### Mode A

- The EUT powered by adapter.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via USB cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

##### Mode B

- The EUT powered by cradle.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via LAN cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

##### Mode C

- The EUT powered by cradle.
- The EUT under transmission condition continuously at specific channel frequency.

##### Mode D

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

#### 4.1.7 Test Results

Above 1 GHz Data:

LE 4.0

EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.44	36.94	5.15	54	-12.56	256	115	Average
2390	51.67	47.17	5.15	74	-22.33	256	115	Peak
2402	100.19	95.67	5.17			256	115	Average
2402	100.95	96.43	5.17			256	115	Peak
4804	42.84	32.49	8.08	54	-11.16	249	102	Average
4804	48.97	38.62	8.08	74	-25.03	249	102	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.72	37.22	5.15	54	-12.28	224	0	Average
2390	52.15	47.65	5.15	74	-21.85	224	0	Peak
2402	98.97	94.45	5.17			224	0	Average
2402	99.73	95.21	5.17			224	0	Peak
4804	42.16	31.81	8.08	54	-11.84	233	327	Average
4804	48.44	38.09	8.08	74	-25.56	233	327	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 2402 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.58	37.08	31.8	54	-12.42	256	115	Average
2390	51.96	47.46	31.8	74	-22.04	256	115	Peak
2440	101.2	96.61	31.85			256	115	Average
2440	101.94	97.35	31.85			256	115	Peak
2483.5	41.97	37.31	31.88	54	-12.03	256	115	Average
2483.5	52.11	47.45	31.88	74	-21.89	256	115	Peak
4880	42.37	32.16	33.98	54	-11.63	161	28	Average
4880	48.59	38.38	33.98	74	-25.41	161	28	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.61	37.11	31.8	54	-12.39	224	0	Average
2390	52.7	48.2	31.8	74	-21.3	224	0	Peak
2440	99.35	94.76	31.85			224	0	Average
2440	100	95.41	31.85			224	0	Peak
2483.5	40.97	36.31	31.88	54	-13.03	224	0	Average
2483.5	51.49	46.83	31.88	74	-22.51	224	0	Peak
4880	42.09	31.88	33.98	54	-11.91	186	22	Average
4880	48.36	38.15	33.98	74	-25.64	186	22	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 2440 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	99.85	95.21	31.88			256	115	Average
2480	100.68	96.04	31.88			256	115	Peak
2483.5	42.01	37.35	31.88	54	-11.99	256	115	Average
2483.5	52.38	47.72	31.88	74	-21.62	256	115	Peak
4960	41.68	31.32	33.99	54	-12.32	213	191	Average
4960	47.85	37.49	33.99	74	-26.15	213	191	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	98.71	94.07	31.88			224	0	Average
2480	99.55	94.91	31.88			224	0	Peak
2483.5	42.09	37.43	31.88	54	-11.91	224	0	Average
2483.5	52.07	47.41	31.88	74	-21.93	224	0	Peak
4960	42.52	32.16	33.99	54	-11.48	232	107	Average
4960	48.61	38.25	33.99	74	-25.39	232	107	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 2480 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

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EUT Test Condition		Measurement Detail	
Channel	Channel 0	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.6	37.1	31.8	54	-12.4	256	115	Average
2390	51.89	47.39	31.8	74	-22.11	256	115	Peak
2402	98.08	93.56	31.8			256	115	Average
2402	100.18	95.66	31.8			256	115	Peak
4804	45.91	35.56	33.96	54	-8.09	118	294	Average
4804	48.21	37.86	33.96	74	-25.79	118	294	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.52	37.02	31.8	54	-12.48	224	0	Average
2390	51.49	46.99	31.8	74	-22.51	224	0	Peak
2402	97.04	92.52	31.8			224	0	Average
2402	99.02	94.5	31.8			224	0	Peak
4804	42.37	32.02	33.96	54	-11.63	186	23	Average
4804	48.66	38.31	33.96	74	-25.34	186	23	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 2402 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.48	36.98	31.8	54	-12.52	256	115	Average
2390	52.25	47.75	31.8	74	-21.75	256	115	Peak
2440	99.22	94.63	31.85			256	115	Average
2440	101.09	96.5	31.85			256	115	Peak
2483.5	41.96	37.3	31.88	54	-12.04	256	115	Average
2483.5	52.48	47.82	31.88	74	-21.52	256	115	Peak
4880	41.82	31.61	33.98	54	-12.18	243	184	Average
4880	48.11	37.9	33.98	74	-25.89	243	184	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2390	41.71	37.21	31.8	54	-12.29	224	0	Average
2390	51.28	46.78	31.8	74	-22.72	224	0	Peak
2440	98.14	93.55	31.85			224	0	Average
2440	100.11	95.52	31.85			224	0	Peak
2483.5	42.04	37.38	31.88	54	-11.96	224	0	Average
2483.5	52.25	47.59	31.88	74	-21.75	224	0	Peak
4880	41.69	31.48	33.98	54	-12.31	138	122	Average
4880	47.95	37.74	33.98	74	-26.05	138	122	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 2440 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.



EUT Test Condition		Measurement Detail	
Channel	Channel 39	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	97.88	93.24	31.88			256	115	Average
2480	99.97	95.33	31.88			256	115	Peak
2483.5	44.56	39.9	31.88	54	-9.44	256	115	Average
2483.5	53.84	49.18	31.88	74	-20.16	256	115	Peak
4960	42.74	32.38	33.99	54	-11.26	150	97	Average
4960	49.09	38.73	33.99	74	-24.91	150	97	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2480	96.61	91.97	31.88			224	0	Average
2480	98.7	94.06	31.88			224	0	Peak
2483.5	43.4	38.74	31.88	54	-10.6	224	0	Average
2483.5	52.19	47.53	31.88	74	-21.81	224	0	Peak
4960	41.47	31.11	33.99	54	-12.53	231	267	Average
4960	47.69	37.33	33.99	74	-26.31	231	267	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 2480 MHz: Fundamental frequency.
- The emission levels of other frequencies were very low against the limit.

Below 1GHz worst-case data:

**9 kHz ~ 30 MHz Data:**

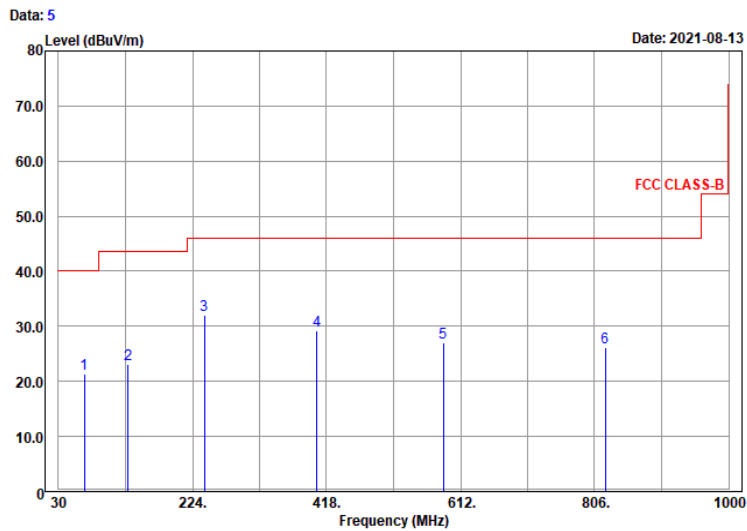
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

**30 MHz ~ 1 GHz Worst-Case Data:**

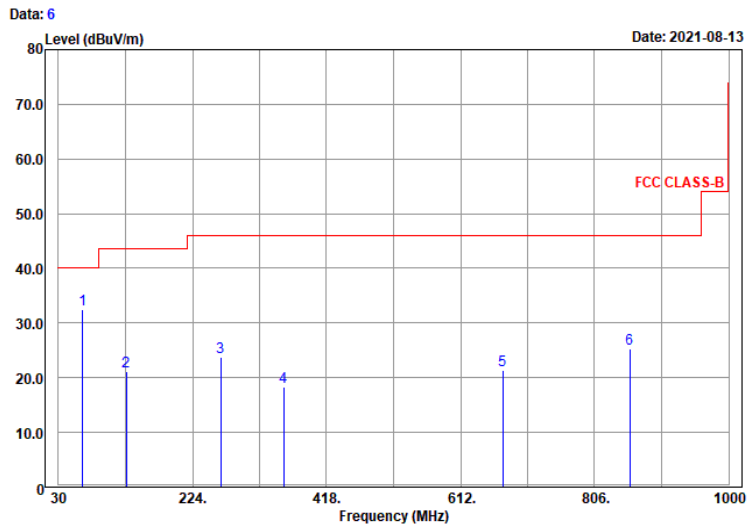
<LE 4.0>

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee
Test Mode	A		

**Horizontal**



**Vertical**



**Antenna Polarity & Test Distance: Horizontal at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
67.36	21.45	40.18	-18.73	40	-18.55	136	282	QP
131.02	23.15	43.65	-20.5	43.5	-20.35	195	177	QP
241.62	32.06	49.07	-17.01	46	-13.94	226	351	QP
403.85	29.14	43.01	-13.87	46	-16.86	236	181	QP
587.12	27.04	37.94	-10.9	46	-18.96	207	196	QP
821.64	26.23	33.57	-7.34	46	-19.77	128	143	QP

**Antenna Polarity & Test Distance: Vertical at 3 m**

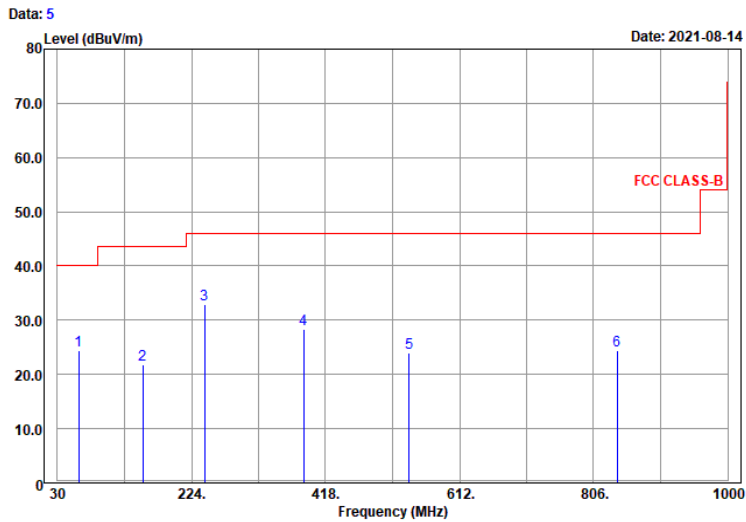
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
<b>65.42</b>	<b>32.45</b>	<b>50.37</b>	<b>-17.92</b>	<b>40</b>	<b>-7.55</b>	<b>168</b>	<b>142</b>	<b>QP</b>
128.36	21.17	41.45	-20.28	43.5	-22.33	205	49	QP
265.33	23.72	40.31	-16.59	46	-22.28	169	108	QP
356.14	18.33	32.97	-14.64	46	-27.67	142	87	QP
673.25	21.33	30.92	-9.59	46	-24.67	251	172	QP
857.23	25.27	31.9	-6.63	46	-20.73	246	121	QP

Remarks:

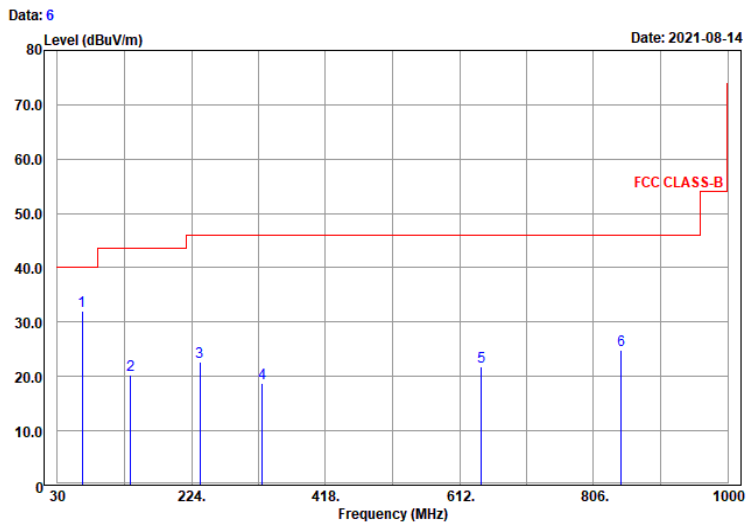
- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value.
- The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee
Test Mode	B		

### Horizontal



### Vertical



**Antenna Polarity & Test Distance: Horizontal at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
60.52	24.37	40.51	-16.14	40	-15.63	154	218	QP
153.62	21.82	42.69	-20.87	43.5	-21.68	129	169	QP
243.127	32.82	49.79	-16.97	46	-13.18	163	228	QP
386.26	28.44	42.59	-14.15	46	-17.56	136	20	QP
539.26	23.99	35.75	-11.76	46	-22.01	201	317	QP
840.16	24.39	31.36	-6.97	46	-21.61	174	116	QP

**Antenna Polarity & Test Distance: Vertical at 3 m**

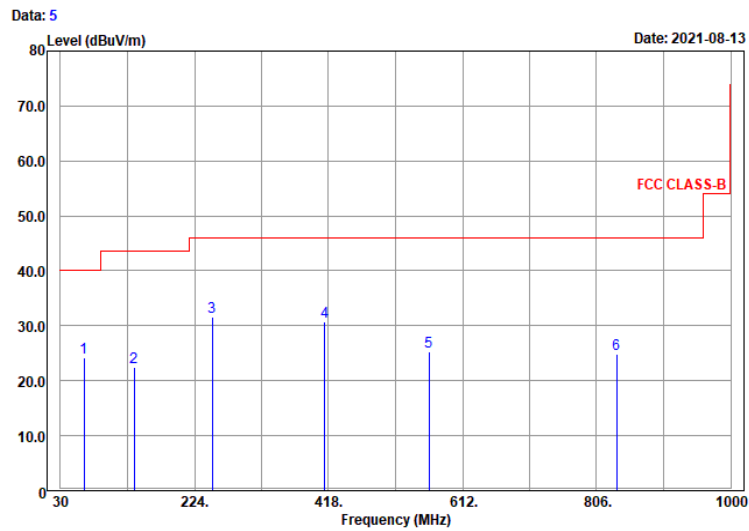
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
65.57	32.04	49.96	-17.92	40	-7.96	124	149	QP
136.27	20.34	41.17	-20.83	43.5	-23.16	159	102	QP
236.53	22.74	39.95	-17.21	46	-23.26	182	124	QP
326.27	18.74	34.16	-15.42	46	-27.26	159	204	QP
643.28	21.73	31.95	-10.22	46	-24.27	152	247	QP
846.35	24.82	31.67	-6.85	46	-21.18	211	162	QP

**Remarks:**

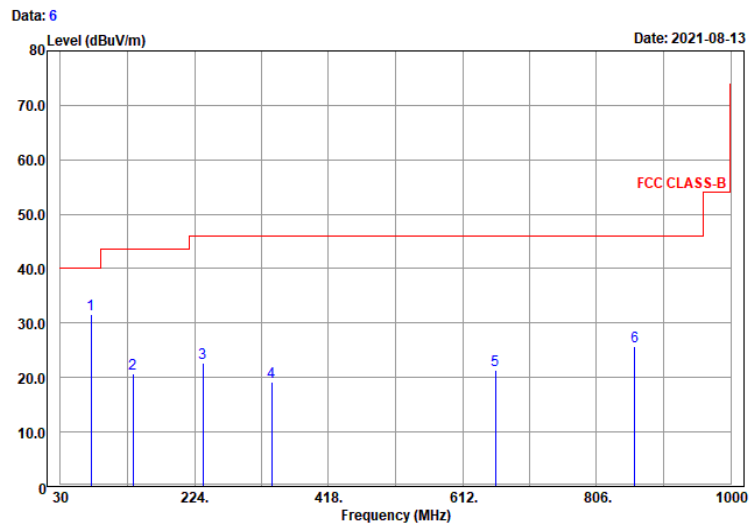
- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value.
- The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee
Test Mode	C		

### Horizontal



### Vertical



**Antenna Polarity & Test Distance: Horizontal at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
63.82	24.16	41.4	-17.24	40	-15.84	163	172	QP
136.28	22.47	43.3	-20.83	43.5	-21.03	169	281	QP
250.14	31.69	48.52	-16.83	46	-14.31	203	36	QP
412.52	30.83	44.55	-13.72	46	-15.17	129	27	QP
563.26	25.35	36.65	-11.3	46	-20.65	199	78	QP
835.26	24.78	31.79	-7.01	46	-21.22	191	67	QP

**Antenna Polarity & Test Distance: Vertical at 3 m**

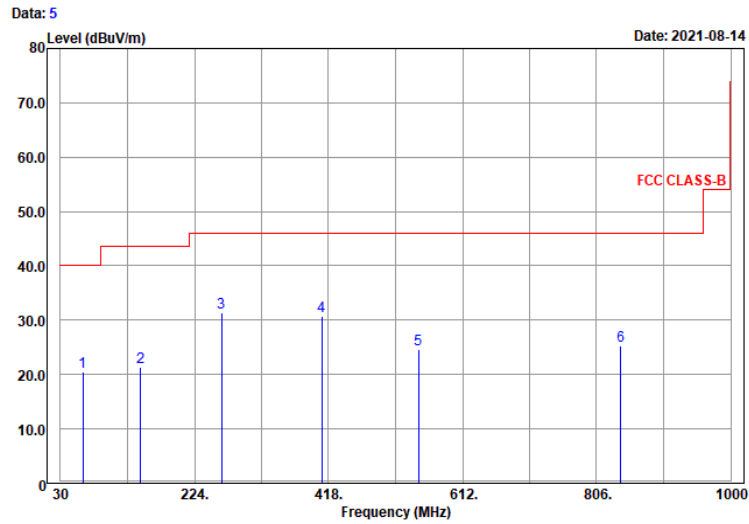
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
74.24	31.69	52.9	-21.21	40	-8.31	152	190	QP
135.28	20.66	41.43	-20.77	43.5	-22.84	102	89	QP
236.53	22.74	39.95	-17.21	46	-23.26	182	124	QP
335.81	19.12	34.23	-15.11	46	-26.88	238	141	QP
659.35	21.45	31.34	-9.89	46	-24.55	206	279	QP
861.17	25.66	32.2	-6.54	46	-20.34	241	180	QP

**Remarks:**

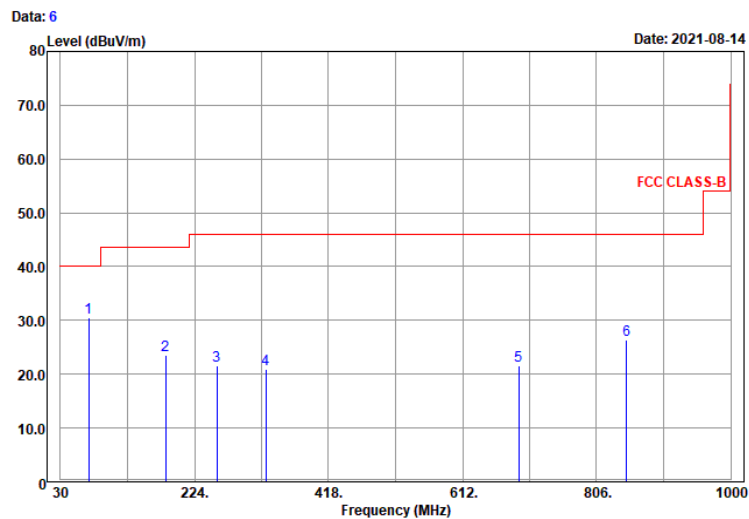
- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value.
- The emission levels of other frequencies were very low against the limit.

EUT Test Condition		Measurement Detail	
Channel	Channel 19	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Karl Lee
Test Mode	D		

### Horizontal



### Vertical





**Antenna Polarity & Test Distance: Horizontal at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
62.43	20.49	37.18	-16.69	40	-19.51	126	208	QP
145.84	21.47	42.51	-21.04	43.5	-22.03	162	193	QP
263.25	31.47	48.11	-16.64	46	-14.53	192	27	QP
408.56	30.67	44.46	-13.79	46	-15.33	126	89	QP
548.47	24.68	36.27	-11.59	46	-21.32	164	199	QP
840.63	25.32	32.28	-6.96	46	-20.68	177	131	QP

**Antenna Polarity & Test Distance: Vertical at 3 m**

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
70.58	30.41	50.29	-19.88	40	-9.59	213	18	QP
182.63	23.61	43.06	-19.45	43.5	-19.89	127	122	QP
256.83	21.48	38.19	-16.71	46	-24.52	156	289	QP
327.24	20.96	36.31	-15.35	46	-25.04	245	112	QP
693.63	21.48	30.76	-9.28	46	-24.52	187	115	QP
849.62	26.32	33.14	-6.82	46	-19.68	265	131	QP

**Remarks:**

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value.
- The emission levels of other frequencies were very low against the limit.

## 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	ESCI	100613	Dec. 04, 2020	Dec. 03, 2021
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 16, 2021	Jan. 15, 2022
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 25, 2021	Feb. 24, 2022
V-LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 28, 2020	Aug. 27, 2021
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 1 (Conduction 1).  
 3. The VCCI Site Registration No. is C-12040.

#### 4.2.3 Test Procedures

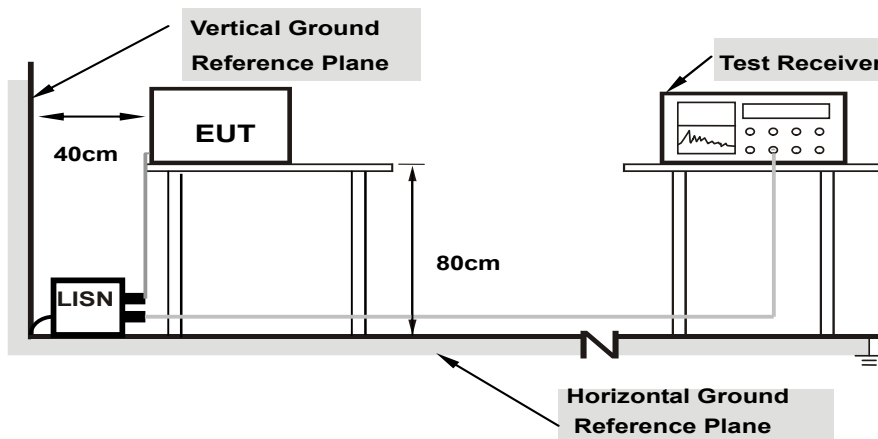
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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

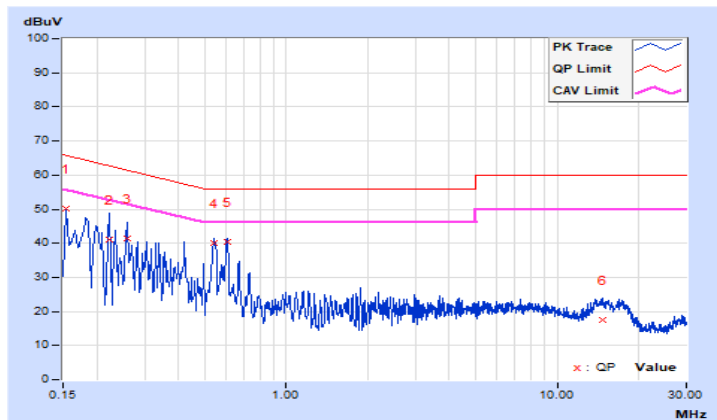
### LE 4.0

Phase	Line (L)	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	9.71	40.58	13.52	50.29	23.23	65.78	55.78	-15.49	-32.55
2	0.22200	9.71	31.41	8.14	41.12	17.85	62.74	52.74	-21.62	-34.89
3	0.25800	9.72	31.55	12.07	41.27	21.79	61.50	51.50	-20.23	-29.71
4	0.54200	9.74	30.31	27.99	40.05	37.73	56.00	46.00	-15.95	-8.27
5	0.60600	9.74	30.53	29.36	40.27	39.10	56.00	46.00	-15.73	-6.90
6	14.71000	9.83	7.67	1.89	17.50	11.72	60.00	50.00	-42.50	-38.28

#### 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.

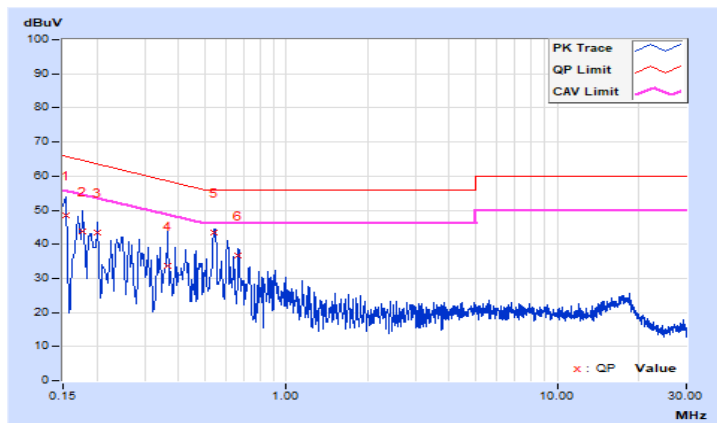


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	9.77	38.79	13.12	48.56	22.89	65.78
2	0.17800	9.77	34.12	20.86	43.89	30.63	64.58	54.58	-20.69	-23.95
3	0.20200	9.77	33.81	14.07	43.58	23.84	63.53	53.53	-19.95	-29.69
4	0.36600	9.79	23.75	16.00	33.54	25.79	58.59	48.59	-25.05	-22.80
<b>5</b>	<b>0.54398</b>	<b>9.80</b>	<b>33.53</b>	<b>31.20</b>	<b>43.33</b>	<b>41.00</b>	<b>56.00</b>	<b>46.00</b>	<b>-12.67</b>	<b>-5.00</b>
6	0.66600	9.80	27.00	24.62	36.80	34.42	56.00	46.00	-19.20	-11.58

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.

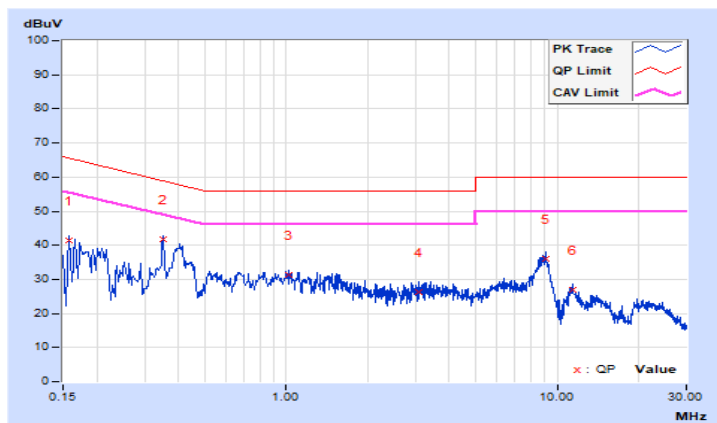


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.15782	9.71	31.63	18.43	41.34	28.14	65.58
2	0.34941	9.72	32.02	16.90	41.74	26.62	58.98	48.98	-17.24	-22.36
3	1.02193	9.76	21.59	13.11	31.35	22.87	56.00	46.00	-24.65	-23.13
4	3.07053	9.78	16.38	9.62	26.16	19.40	56.00	46.00	-29.84	-26.60
5	9.04525	9.85	26.30	18.26	36.15	28.11	60.00	50.00	-23.85	-21.89
6	11.38734	9.85	17.23	7.95	27.08	17.80	60.00	50.00	-32.92	-32.20

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.

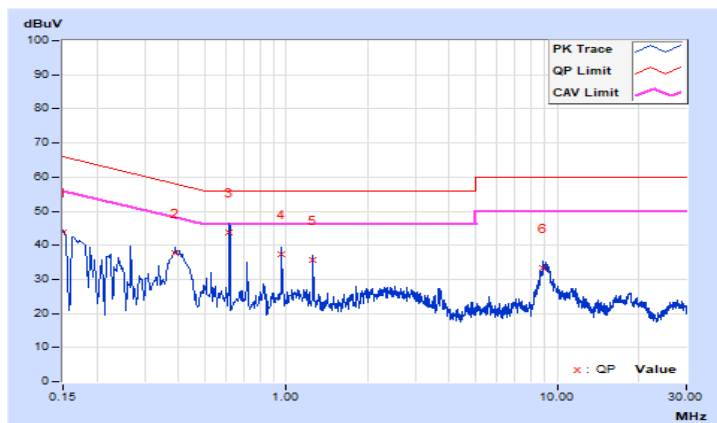


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	9.76	33.96	14.96	43.72	24.72	66.00
2	0.38851	9.79	27.77	20.88	37.56	30.67	58.10	48.10	-20.54	-17.43
3	0.61529	9.80	34.13	5.77	43.93	15.57	56.00	46.00	-12.07	-30.43
4	0.96328	9.82	27.49	6.35	37.31	16.17	56.00	46.00	-18.69	-29.83
5	1.25653	9.82	25.90	6.45	35.72	16.27	56.00	46.00	-20.28	-29.73
6	8.88494	9.92	23.37	16.45	33.29	26.37	60.00	50.00	-26.71	-23.63

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.

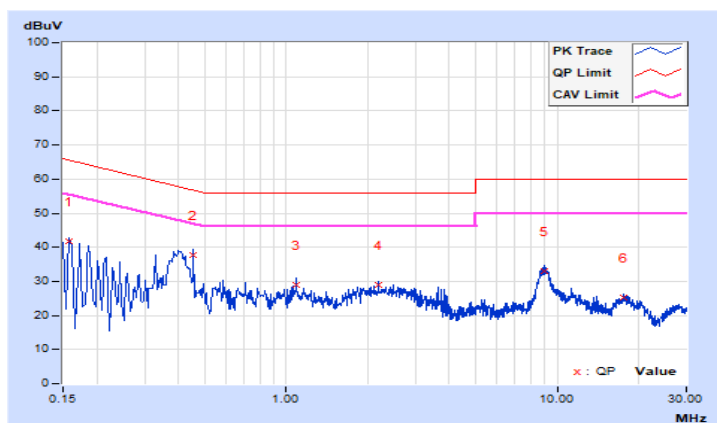


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	C		

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	0.15782	9.71	32.11	17.20	41.82	26.91	65.58
2	0.45498	9.73	27.82	9.00	37.55	18.73	56.78	46.78	-19.23	-28.05
3	1.08840	9.76	19.09	7.91	28.85	17.67	56.00	46.00	-27.15	-28.33
4	2.19884	9.77	19.14	9.11	28.91	18.88	56.00	46.00	-27.09	-27.12
5	8.96314	9.85	23.20	16.22	33.05	26.07	60.00	50.00	-26.95	-23.93
6	17.58469	9.82	15.44	7.02	25.26	16.84	60.00	50.00	-34.74	-33.16

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.



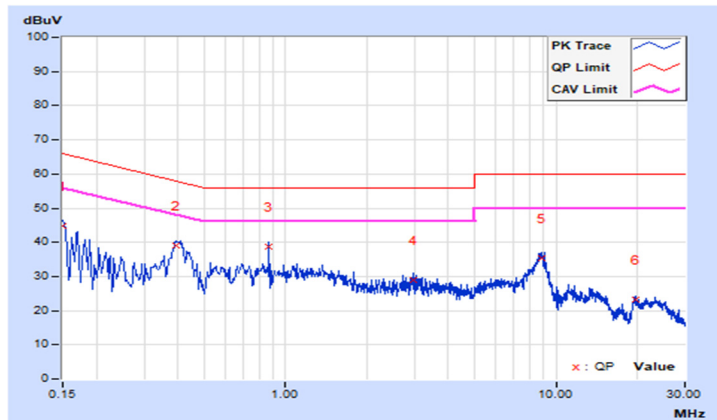


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	C		

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.
			1	0.15000	9.76	35.05	15.54	44.81	25.30	66.00
2	0.39242	9.79	29.42	21.70	39.21	31.49	58.01	48.01	-18.80	-16.52
3	0.86944	9.81	28.85	11.16	38.66	20.97	56.00	46.00	-17.34	-25.03
4	2.95347	9.84	19.02	8.78	28.86	18.62	56.00	46.00	-27.14	-27.38
5	8.85366	9.91	25.55	18.41	35.46	28.32	60.00	50.00	-24.54	-21.68
6	19.67263	9.99	13.33	5.85	23.32	15.84	60.00	50.00	-36.68	-34.16

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.

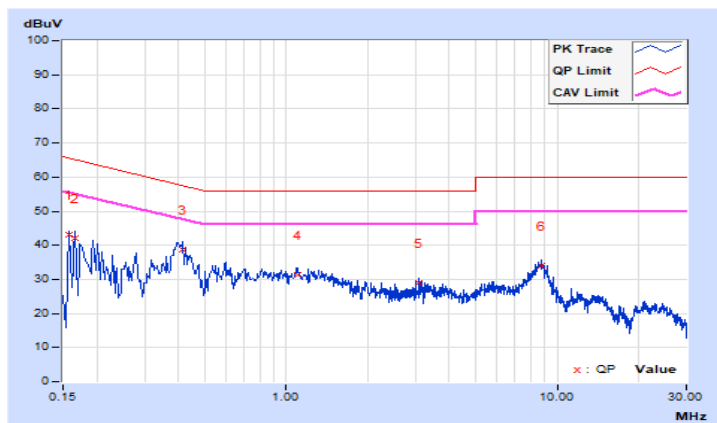


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	D		

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	0.15782	9.71	33.47	19.02	43.18	28.73	65.58
2	0.16564	9.71	32.54	16.94	42.25	26.65	65.18	55.18	-22.93	-28.53
3	0.41588	9.73	28.94	20.28	38.67	30.01	57.53	47.53	-18.86	-17.52
4	1.10404	9.76	21.48	12.74	31.24	22.50	56.00	46.00	-24.76	-23.50
5	3.08250	9.78	19.14	10.98	28.92	20.76	56.00	46.00	-27.08	-25.24
6	8.75591	9.85	24.01	17.03	33.86	26.88	60.00	50.00	-26.14	-23.12

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.

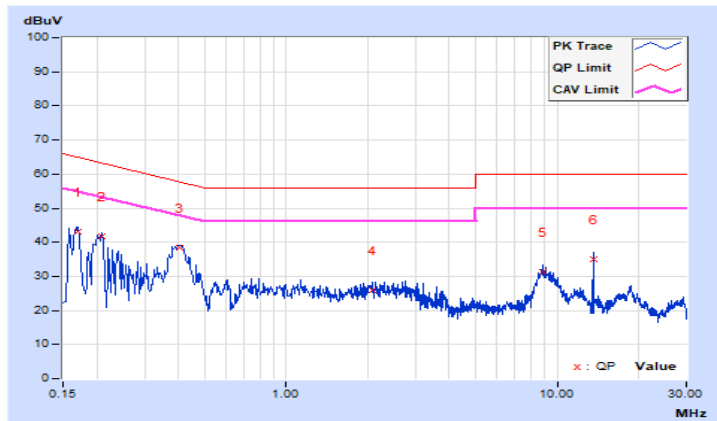


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	D		

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	0.16955	9.77	33.24	14.40	43.01	24.17	64.98
2	0.20838	9.77	31.89	11.32	41.66	21.09	63.27	53.27	-21.61	-32.18
3	0.40415	9.79	28.68	20.81	38.47	30.60	57.77	47.77	-19.30	-17.17
4	2.07763	9.83	16.22	8.07	26.05	17.90	56.00	46.00	-29.95	-28.10
5	8.82629	9.91	21.52	13.39	31.43	23.30	60.00	50.00	-28.57	-26.70
6	13.56130	9.94	24.99	15.23	34.93	25.17	60.00	50.00	-25.07	-24.83

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.

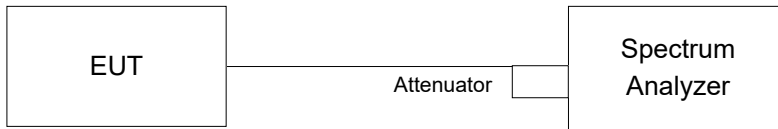


### 4.3 6dB Bandwidth Measurement

#### 4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

- Set resolution bandwidth (RBW) = 100kHz.
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### 4.3.5 Deviation from Test Standard

No deviation.

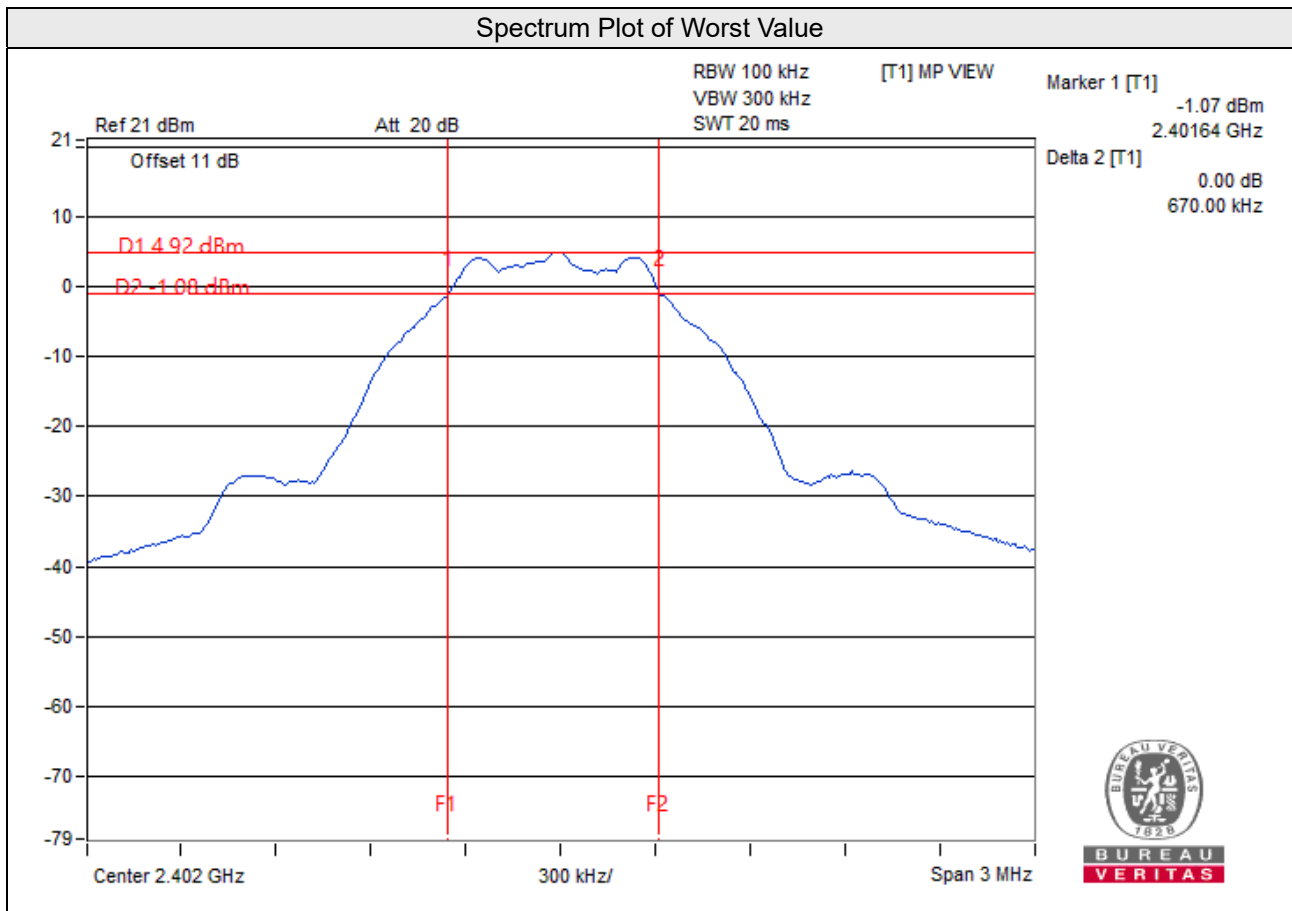
#### 4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 4.3.7 Test Result

#### LE 4.0

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	2402	0.67	0.5	Pass
19	2440	0.67	0.5	Pass
39	2480	0.67	0.5	Pass



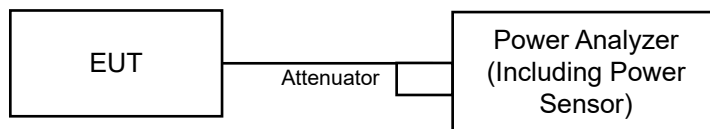


## 4.4 Conducted Output Power Measurement

### 4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

### 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

For Peak Power

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

For Average Power

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

### 4.4.5 Deviation from Test Standard

No deviation.

### 4.4.6 EUT Operating Conditions

Same as item 4.3.6.

#### 4.4.7 Test Results

##### Peak Power

###### LE 4.0

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	2402	3.062	4.86	30.00	Pass
19	2440	<b>3.475</b>	5.41	30.00	Pass
39	2480	3.048	4.84	30.00	Pass

###### LE 5.0

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
0	2402	3.097	4.91	30.00	Pass
19	2440	<b>3.499</b>	5.44	30.00	Pass
39	2480	3.041	4.83	30.00	Pass

##### Average Power

###### LE 4.0

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	2.972	4.73
19	2440	3.373	5.28
39	2480	2.965	4.72

###### LE 5.0

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
0	2402	2.985	4.75
19	2440	3.365	5.27
39	2480	2.931	4.67

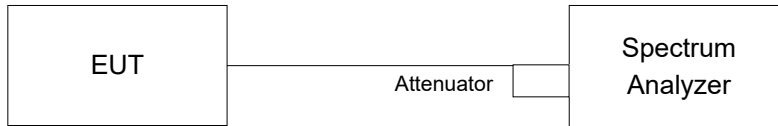


## 4.5 Power Spectral Density Measurement

### 4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm per 3kHz.

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d. Set the VBW  $\geq 3 \times \text{RBW}$ .
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

### 4.5.5 Deviation from Test Standard

No deviation.

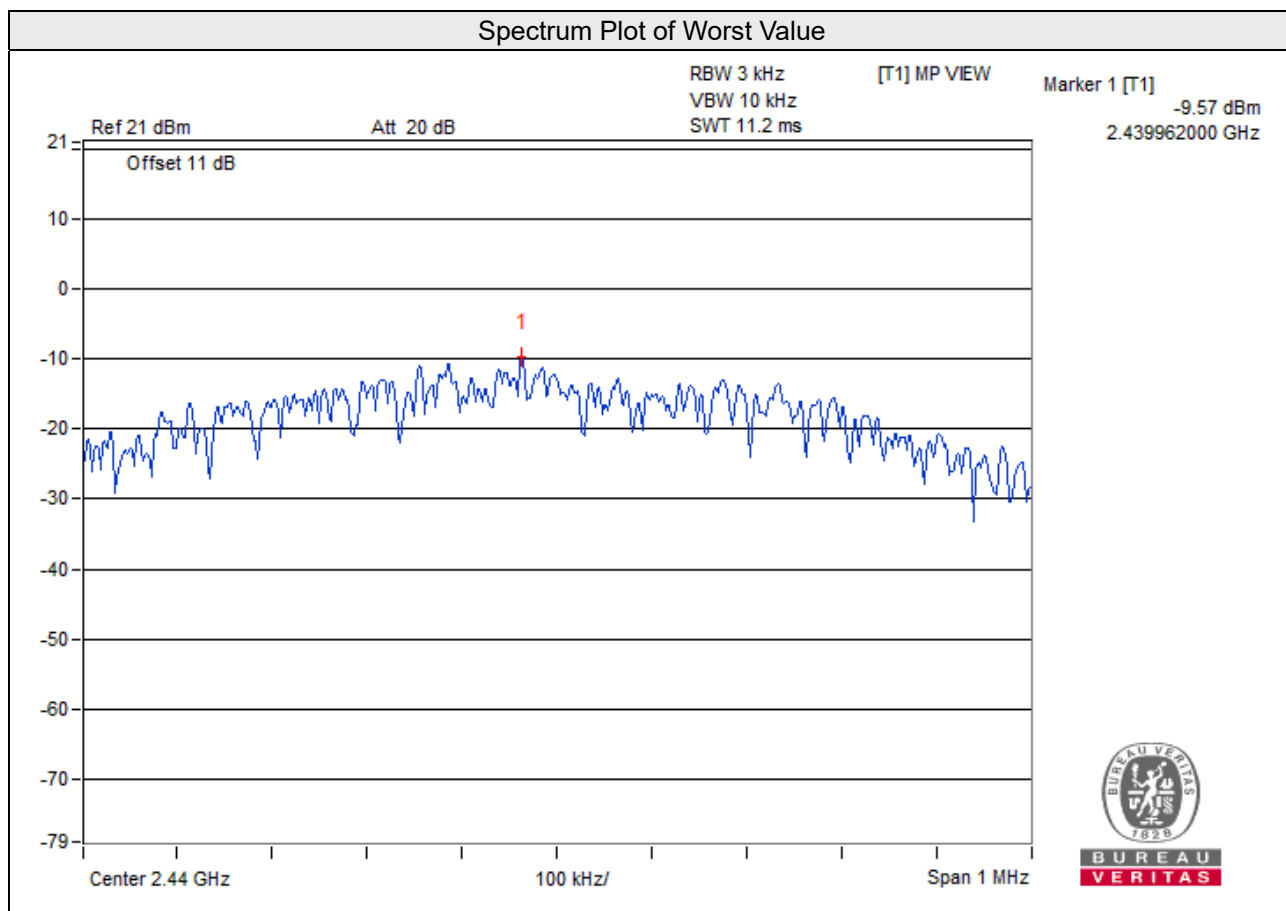
### 4.5.6 EUT Operating Condition

Same as item 4.3.6

#### 4.5.7 Test Results

##### LE 4.0

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	2402	-9.91	8.00	Pass
19	2440	-9.57	8.00	Pass
39	2480	-10.12	8.00	Pass



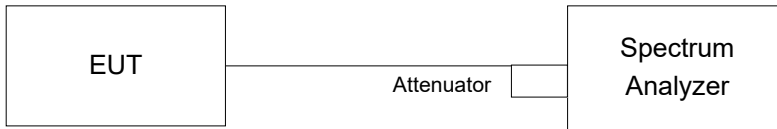


## 4.6 Conducted Out of Band Emission Measurement

### 4.6.1 Limits of Conducted Out of Band Emission Measurement

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

- Set the RBW = 100 kHz.
- Set the VBW  $\geq$  300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

#### MEASUREMENT PROCEDURE OOB

- Set RBW = 100 kHz.
- Set VBW  $\geq$  300 kHz.
- Detector = peak.
- Sweep = auto couple.
- Trace Mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

Same as item 4.3.6

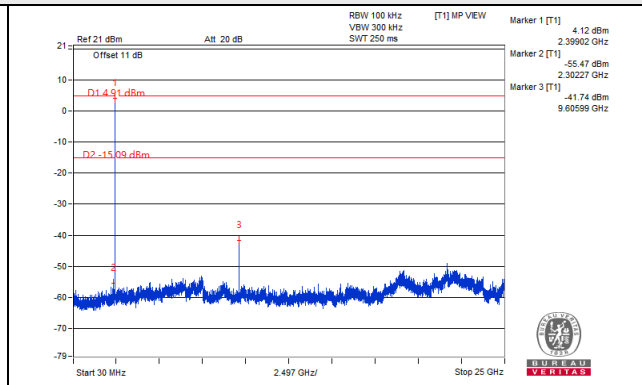
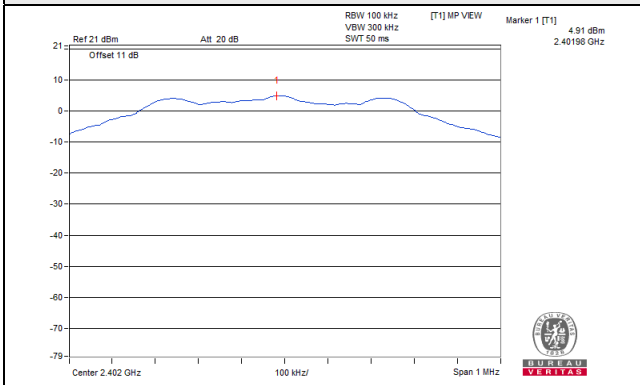
### 4.6.7 Test Results

The conducted emission test is performed on each TX port of operating mode without summing or adding  $10\log(N)$  since the limit is relative emission limit.

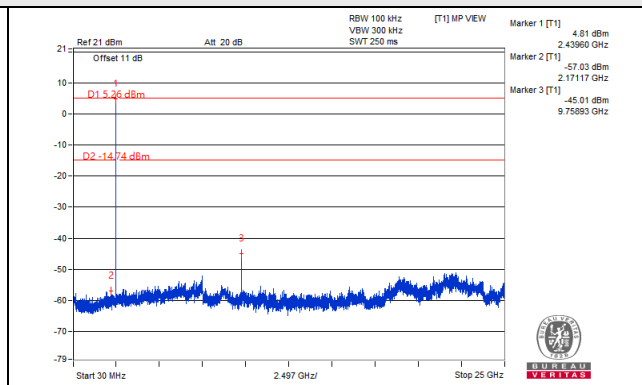
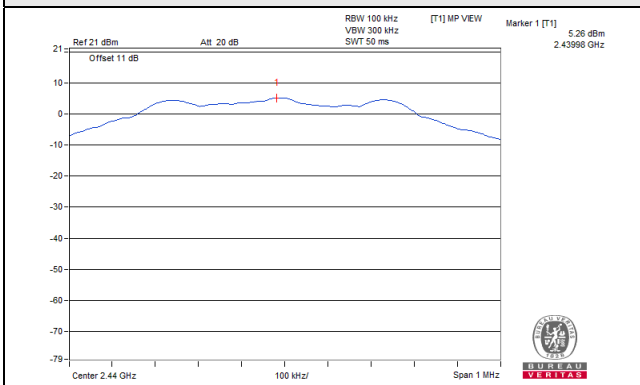
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

LE 4.0

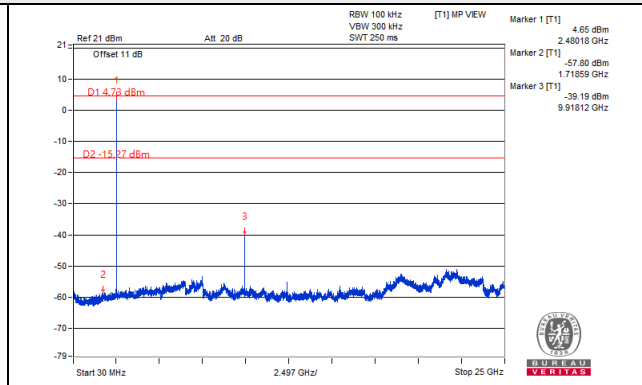
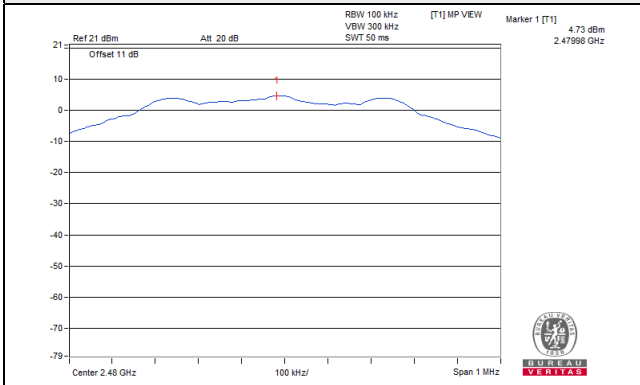
CH 0



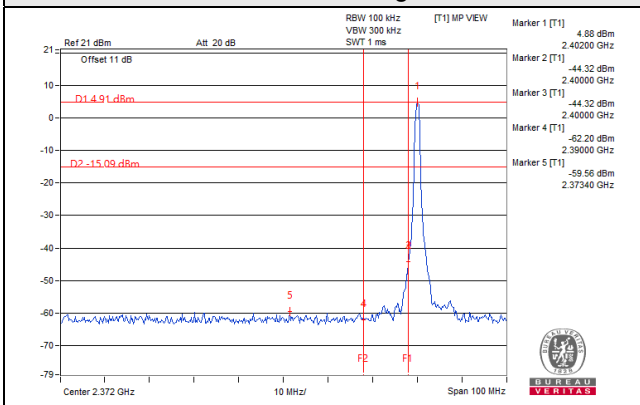
CH 19



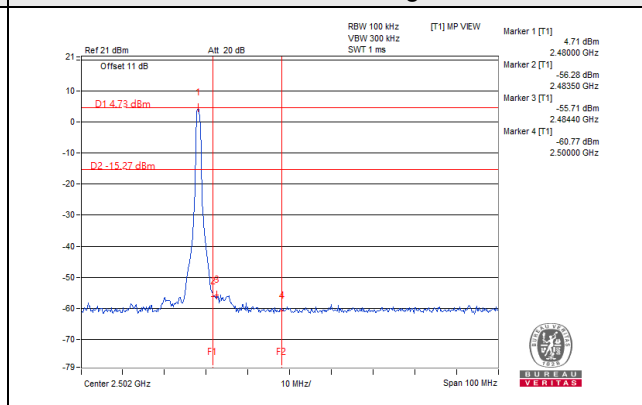
CH 39



CH 0 Band edge

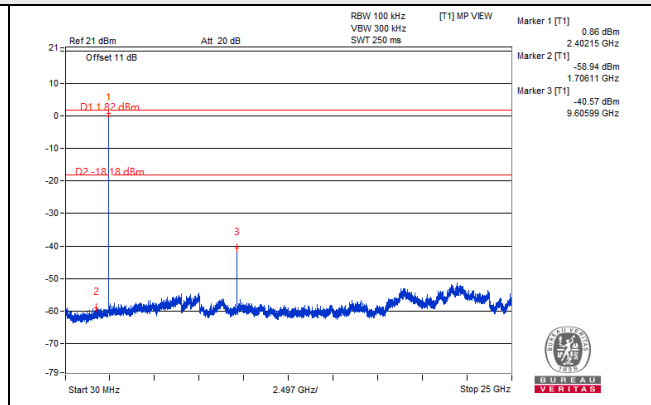
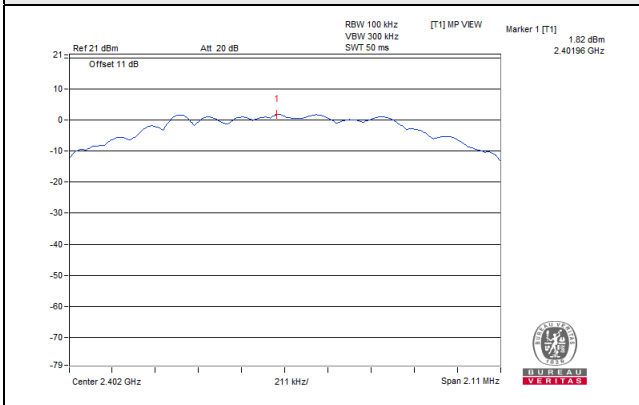


CH 39 Band edge

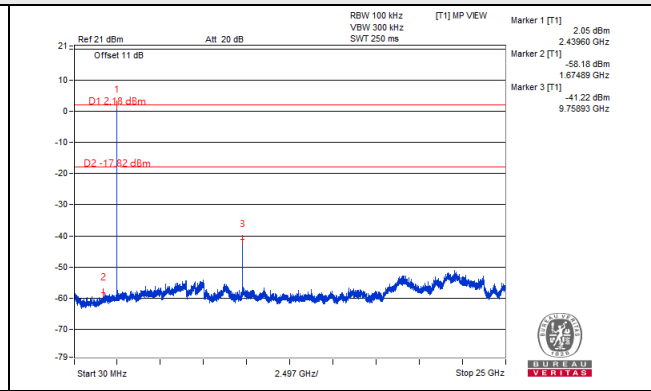
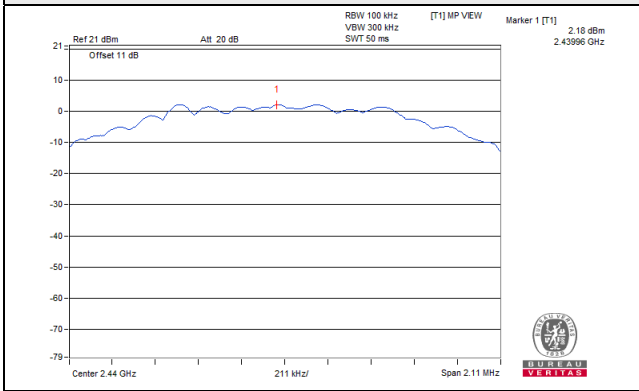


LE 5.0

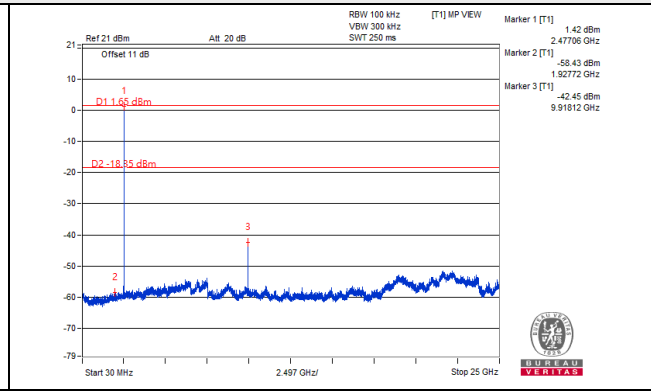
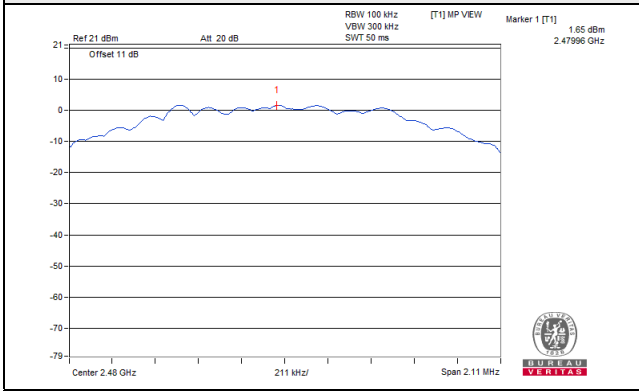
CH 0



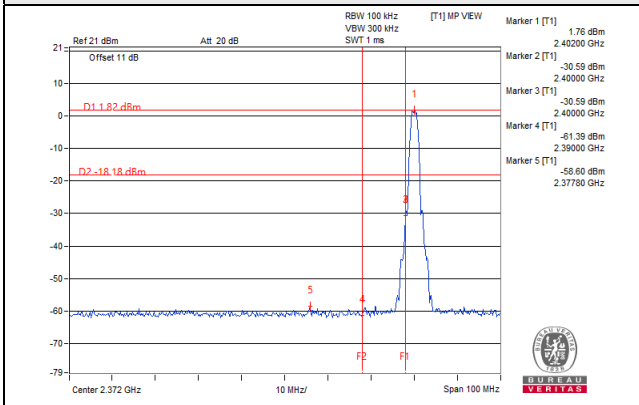
CH 19



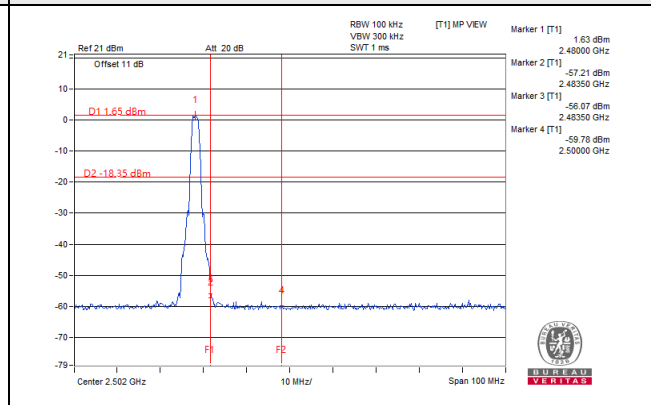
CH 39



CH 0 Band edge



CH 39 Band edge

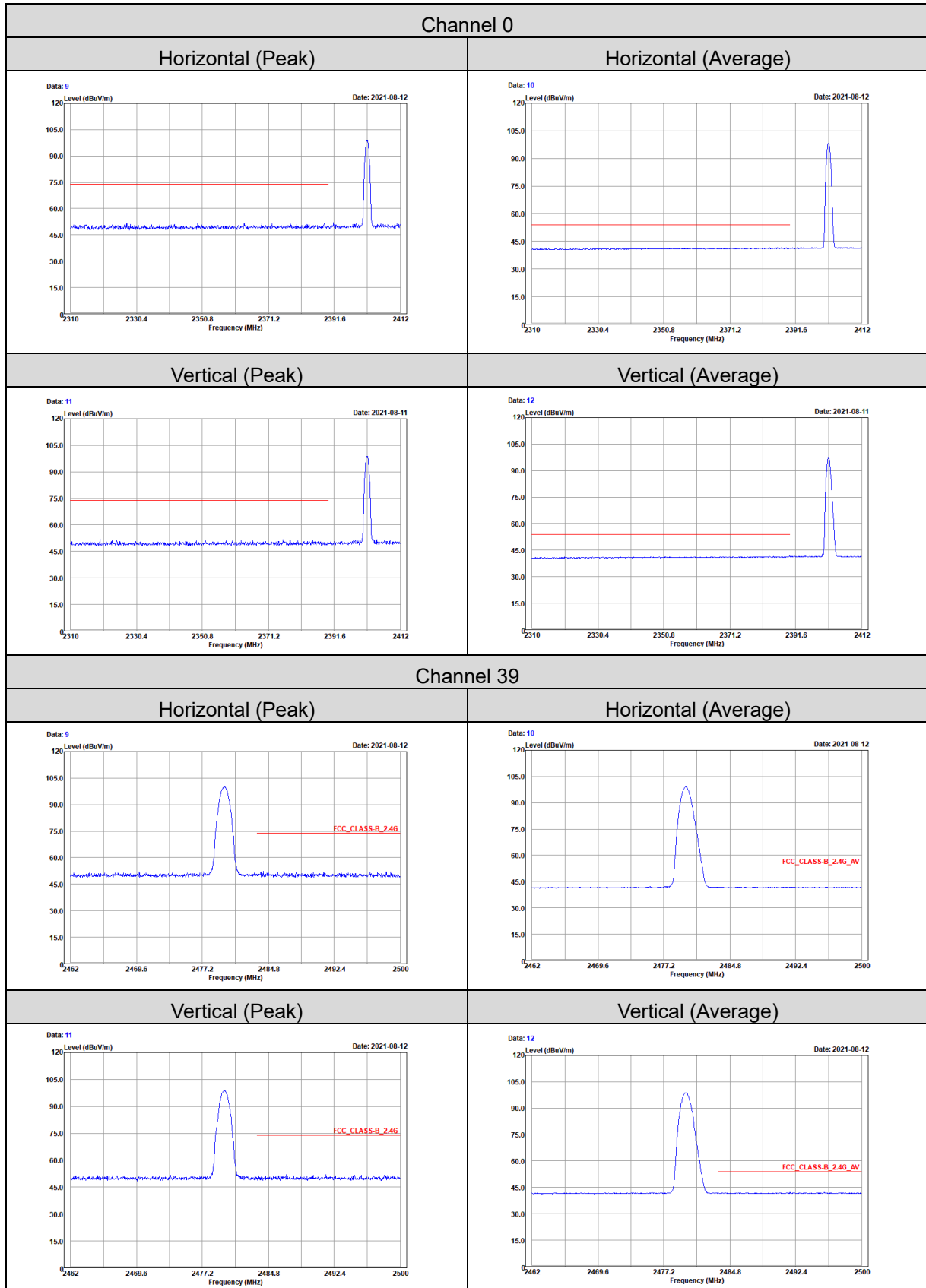


## 5 Pictures of Test Arrangements

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

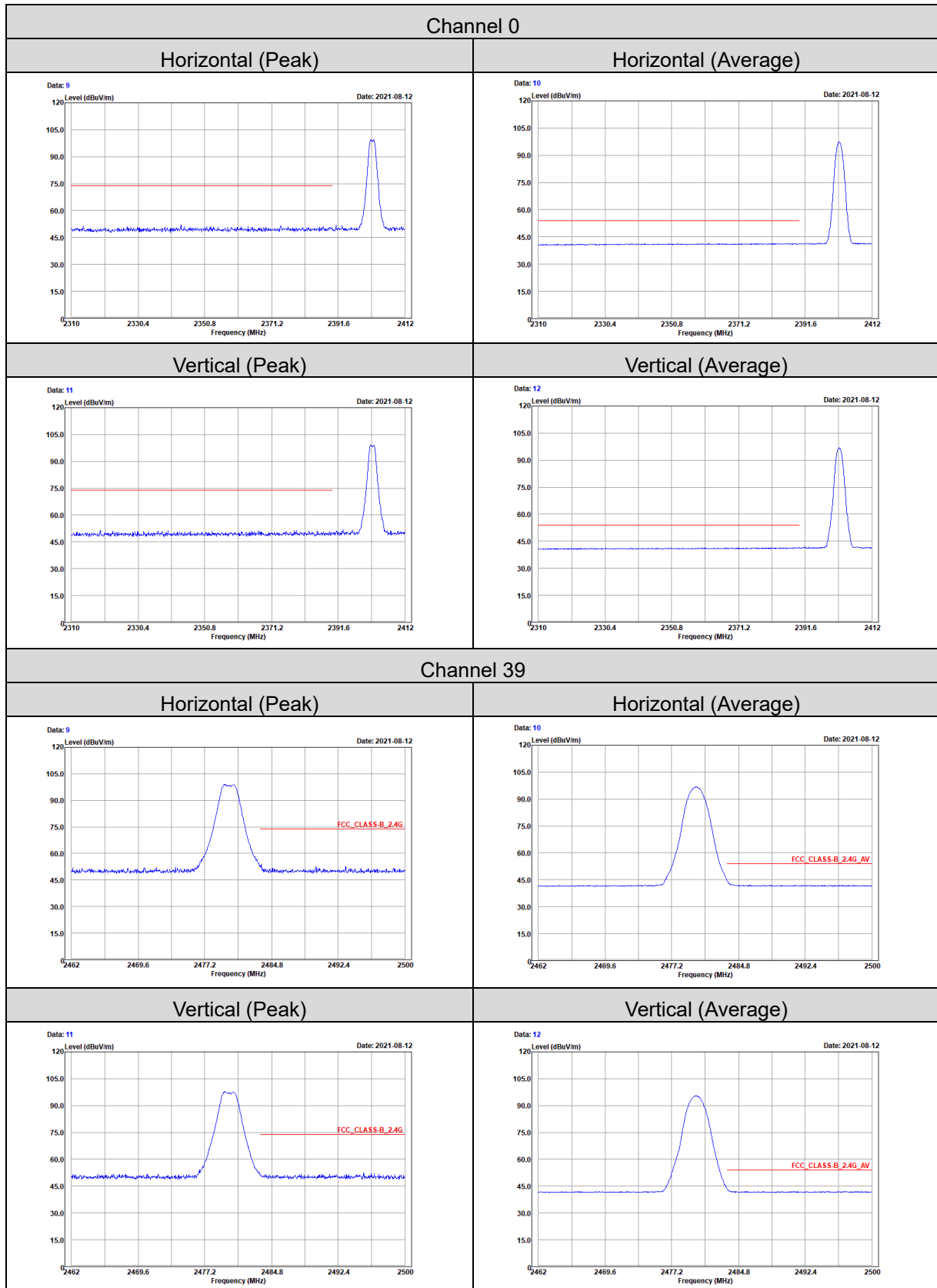
# Annex A- Band Edge Measurement

LE 4.0





LE 5.0



## 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.

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

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