

Supplemental “Transmit Simultaneously” Test Report

Report No.: RFBCKS-WTW-P22080716-3

FCC ID: NKR-WNXL11BWL

Test Model: WNXL11BWL

Received Date: 2022/8/24

Test Date: 2022/9/20 ~ 2022/9/21

Issued Date: 2022/10/5

Applicant: Wistron NeWeb Corp.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Taiwan

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RFBCKS-WTW-P22080716-3	Original release.	2022/10/5

1 Certificate of Conformity

Product: AP

Brand: WNC, Comcast, Cox, Charter

Test Model: WNXL11BWL

Sample Status: Engineering sample

Applicant: Wistron NeWeb Corp.

Test Date: 2022/9/20 ~ 2022/9/21

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)
47 CFR FCC Part 27, Subpart H
47 CFR FCC Part 2
ANSI C63.10: 2013
ANSI C63.26: 2015

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 EMC characteristics under the conditions specified in this report.

Prepared by : Cherry Chuo , **Date:** 2022/10/5
Cherry Chuo / Specialist

Approved by : May Chen , **Date:** 2022/10/5
May Chen / Manager

2 Summary of Test Results

FCC Part 15, Subpart C, E (SECTION 15.247, 15.407)			
FCC Part 27, Subpart H			
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -17.57 dB at 0.15000 MHz.
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -4.3 dB at 35.05 MHz.
2.1053 27.53(g)	Radiated Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -44.62 dB at 3498.50 MHz.

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	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AP
Brand	WNC, Comcast, Cox, Charter
Test Model	WNXL11BWL
Status of EUT	Engineering sample
Power Supply Rating	Refer to Note
Modulation Type	WLAN: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT mode in 2.4GHz 1024QAM for OFDMA in 11ax mode BT-LE: GFSK
Modulation Technology	WLAN: DSSS, OFDM, OFDMA BT-LE: DTS
Transfer Rate	WLAN: 802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps 802.11ax: up to 1201.0Mbps BT-LE: Up to 2Mbps
Operating Frequency	WLAN: 2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18~ 5.24GHz, 5.745 ~ 5.825GHz BT-LE: 2402MHz ~ 2480MHz
Number of Channel	WLAN: 2.4GHz: 802.11b, 802.11g, 802.11n (HT20), VHT20 ,802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 9 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 4 802.11ac (VHT80), 802.11ax (HE80): 2 BT-LE: 40
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Refer to Note
Data Cable Supplied	NA

Note:

1. The EUT contains certified WWAN module which FCC ID: XMR201906EM06A (Brand: QUECTEL; Model: EM06-A)
2. There are WLAN, Bluetooth and WWAN technology used for the EUT.
3. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3
WLAN 2.4GHz + BT-LE	WLAN 5GHz (Low Band)	WLAN 5GHz (High Band)

4. Simultaneously transmission condition.

Condition	Technology				
1	WLAN 2.4GHz	WLAN 5GHz (Low Band)	WLAN 5GHz (High Band)	BT-LE	LTE

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

5. The EUT uses following accessories.

AC Adapter 1		
Brand	Model	Specification
EPS3	ML36-7120300-A1	AC Input : 100-120V, 50/60Hz, 1A DC Output : 12V, 0.3A DC Output Cable : 1.8m Plug : US
AC Adapter 2		
Brand	Model	Specification
EPS3	NBC36G120300VU	AC Input : 100-120V, 50/60Hz, 1A DC Output : 12V, 0.3A DC Output Cable : 1.8m Plug : US

For radiated emissions test, the EUT was pre-tested with above adapters 1 and 2, the worst case was found in adapter 1. Therefore only the test data of the adapter was recorded in this report.

6. The antennas provided to the EUT, please refer to the following table:

Antenna NO.	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type
2G ANT	Chain 0	WNC	XLE	4.00	2.4~2.4835	Dipole	ipex(MHF)
	Chain 1	WNC	XLE	3.20	2.4~2.4835	Dipole	ipex(MHF)
5GL ANT	Chain 0	WNC	XLE	4.60	5.15~5.35	Dipole	ipex(MHF)
	Chain 1	WNC	XLE	4.70	5.15~5.35	Dipole	ipex(MHF)
5GH ANT	Chain 0	WNC	XLE	4.90	5.47~5850	Dipole	ipex(MHF)
	Chain 1	WNC	XLE	4.50	5.47~5850	Dipole	ipex(MHF)
	Chain 2	WNC	XLE	5.00	5.47~5850	Dipole	ipex(MHF)
	Chain 3	WNC	XLE	4.80	5.47~5850	Dipole	ipex(MHF)
BLE ANT	Chain 0	WNC	XLE	4.10	2.4~2.4835	PCB	ipex(MHF)

Antenna NO.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
WWAN	2.00	1.850~1.915 GHz	Dipole	ipex(MHF)
	2.00	1.710~1.780 GHz	Dipole	ipex(MHF)
	3.00	814~849 MHz	Dipole	ipex(MHF)
	2.00	2.496~2.690 GHz	Dipole	ipex(MHF)
	3.00	699-716 MHz	Dipole	ipex(MHF)
	3.00	777-787 MHz	Dipole	ipex(MHF)
	0.00	2.305~2.315 GHz	Dipole	ipex(MHF)

7. The directional antenna gain, please refer to the following table:

Frequency Range (GHz)	Directional Antenna Gain (dBi)	Antenna Type	Antenna Connector
2.4~2.4835	3.63	Dipole	i-pex(MHF)
5.15~5.24	5.68		
5.725~5.85	4.89		

Note: Directional gain is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.

8. The EUT incorporates a MIMO function.

2.4 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
5 GHz Band (Low Band)		
Modulation Mode	TX & RX Configuration	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX
5 GHz Band (High Band)		
Modulation Mode	TX & RX Configuration	
802.11a	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
802.11ac (VHT20)	4TX	4RX
802.11ac (VHT40)	4TX	4RX
802.11ac (VHT80)	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX
802.11ax (HE80)	4TX	4RX

Note: All of modulation mode support beamforming function except 802.11a/b/g modulation mode.

9. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

10. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.1.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE $<$ 1G	PLC	OB	
-	√	√	√	-	-

Where **RE \geq 1G**: Radiated Emission above 1GHz & Bandedge Measurement
RE $<$ 1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission
OB: Conducted Out-Band Emission Measurement

Radiated Emission Test (Above 1GHz):

- The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
802.11b	1 to 11	6	OFDM	BPSK
+				
802.11a	36 to 48	48	OFDM	BPSK
+				
802.11ax (HE40)	151 to 159	159	OFDMA	BPSK
+				
BT-LE	0 to 39	0	DTS	GFSK
+				
WWAN (LTE Band 12)	23017 to 23130	23017	QPSK	-

Radiated Emission Test (Below 1GHz):

- The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
802.11b	1 to 11	6	OFDM	BPSK
+				
802.11a	36 to 48	48	OFDM	BPSK
+				
802.11ax (HE40)	151 to 159	159	OFDMA	BPSK
+				
BT-LE	0 to 39	0	DTS	GFSK
+				
WWAN (LTE Band 12)	23017 to 23130	23017	QPSK	-

Power Line Conducted Emission Test:

- The tested configurations represent the worst-case mode from all possible combinations by the maximum power.
- Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE
802.11b	1 to 11	6	OFDM	BPSK
+				
802.11a	36 to 48	48	OFDM	BPSK
+				
802.11ax (HE40)	151 to 159	159	OFDMA	BPSK
+				
BT-LE	0 to 39	0	DTS	GFSK
+				
WWAN (LTE Band 12)	23017 to 23130	23017	QPSK	-

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE \geq 1G	23deg. C, 66%RH	120Vac, 60Hz	Sampson Chen
RE $<$ 1G	23deg. C, 67%RH	120Vac, 60Hz	Sampson Chen
PLC	22deg. C, 68%RH	120Vac, 60Hz	Sampson Chen

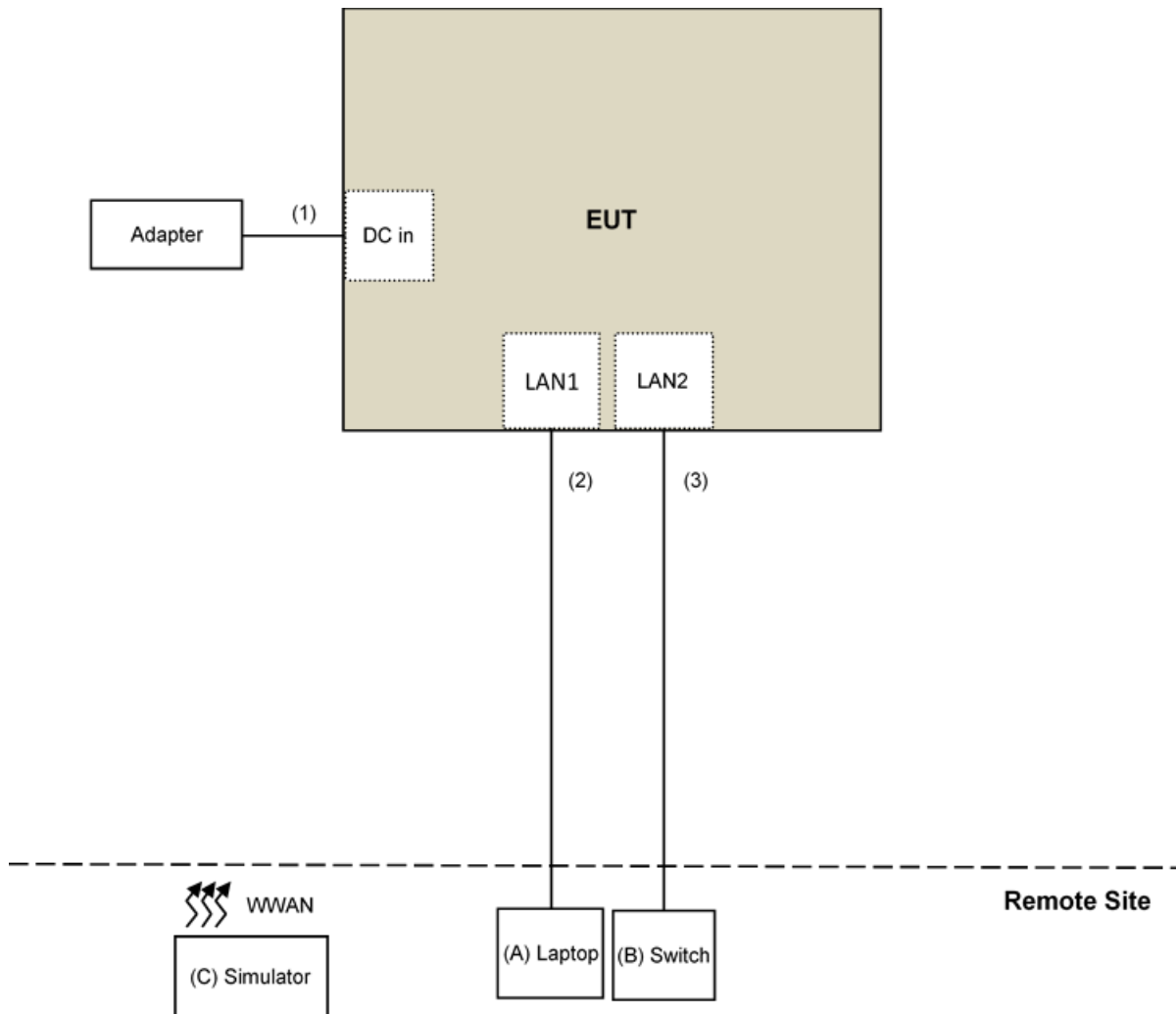
3.2 Description of Support Units

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	Laptop	Dell	P92G	BM6Q4P2	N/A	Provided by Lab
B	Switch	D-Link	DGS-1005D	DR8WC92000523	N/A	Provided by Lab
C	Simulator	Keysight	E7515A	MY55340229	NA	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.8	No	0	Supplied by applicant
2	RJ-45 Cable	1	10	No	0	Provided by Lab
3	RJ-45 Cable	1	10	No	0	Provided by Lab

3.2.1 Configuration of System under Test



4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

For 47 CFR FCC Part 15:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

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.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i) 15.407(b)(4)(ii)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2(dBuV/m) ^{*1} PK: 105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK: 122.2 (dBuV/m) ^{*4}
^{*1} beyond 75 MHz or more above of the band edge. ^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. ^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

FCC Part 27:

Subpart H : LTE Band 12

According to FCC 27.53(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19
Pre_Amplifier EMCI	EMC001340	980142	2022/6/2	2023/6/1
LOOP ANTENNA Electro-Metrics	EM-6879	264	2022/3/18	2023/3/17
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/1/6	2023/1/5
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-002	2022/1/6	2023/1/5
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19
Pre_Amplifier(20M-3G) EMCI	EMC330N	980852	2022/3/28	2023/3/27
Bilog Antenna Schwarzbeck	VULB 9168	9168-0942	2021/10/26	2022/10/25
RF Coaxial Cable COMMATE/PEWC	8D	966-6-1	2022/4/25	2023/4/24
RF Coaxial Cable COMMATE/PEWC	8D	966-6-2	2022/4/25	2023/4/24
RF Coaxial Cable COMMATE/PEWC	8D	966-6-3	2022/4/25	2023/4/24
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-01	2022/1/10	2023/1/9
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-2035	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC12630SE	980385	2022/8/15	2023/8/14
RF Coaxial Cable EMCI	EMC101G-KM-KM-10000	210708	2021/11/9	2022/11/8
RF Cable EMCI	EMC104-SM-SM-1300	210205	2022/5/10	2023/5/9

Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19
Pre_Amplifier EMCI	EMC184045SE	980387	2022/1/10	2023/1/9
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170519	2021/11/14	2022/11/13
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10	2023/1/9
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7

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 966 Chamber No. 6.
3. Tested Date: 2022/9/20 ~ 2022/9/21

4.1.3 Test Procedures

For FCC Part 15:

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) 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.
4. All modes of operation were investigated and the worst-case emissions are reported.

FCC Part 27:

- a. The field strength was measured with Spectrum Analyzer.
- b. Measurement in the semi-anechoic chamber, EUT placed on the 1.5m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
- c. Perform a field strength measurement and then mathematically convert the measured field strength level to EIRP level.
- d. Measurement method refers to ANSI C63.26 section 5.2.7 & 5.5,

$$E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}.$$

$$\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20\log(D) - 104.8; \text{ where D is the measurement distance (in the far field region) in m.}$$

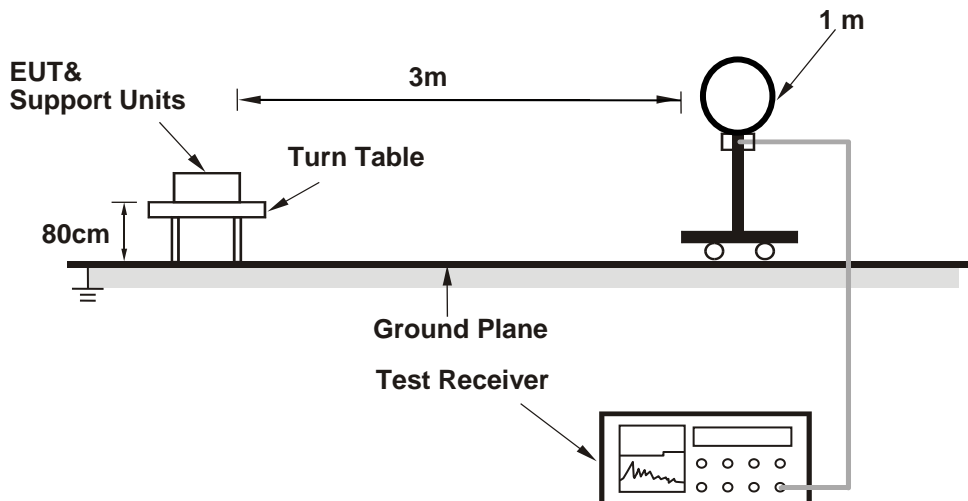
NOTE: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

4.1.4 Deviation from Test Standard

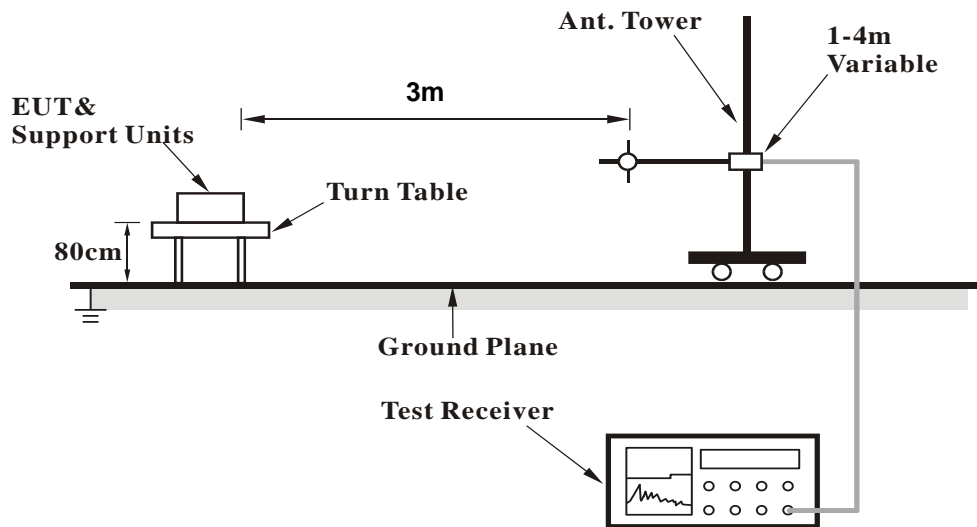
No deviation.

4.1.5 Test Setup

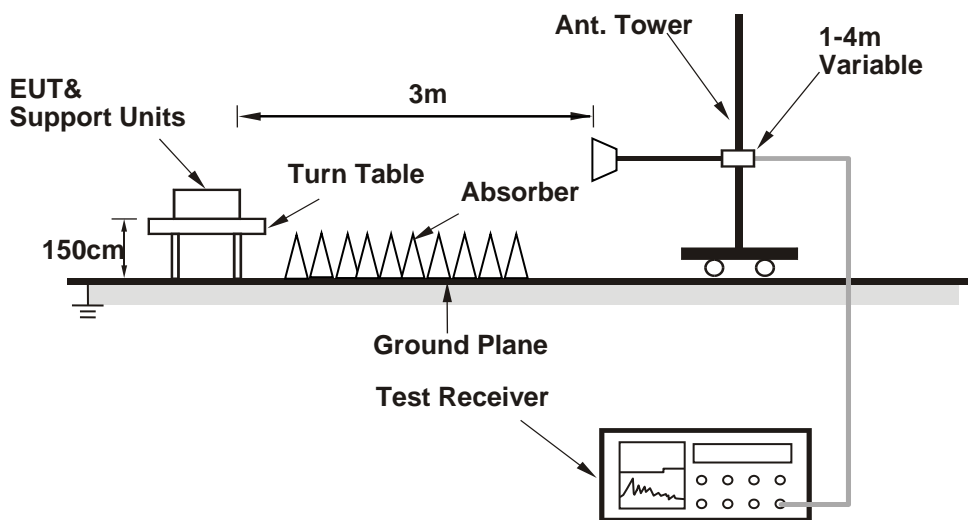
For Radiated emission below 30MHz



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

- a. Placed the EUT on the testing table.
- b. Controlling software (WiFi: accessMTool_REL_3_2_1_5; BT: Telnet paste BT cmd.txt ; WWAN: link Simulator) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data

Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)
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Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	4804.00	44.8 PK	74.0	-29.2	1.49 H	42	40.6	4.2
2	4804.00	35.6 AV	54.0	-18.4	1.49 H	42	31.4	4.2
3	4874.00	44.2 PK	74.0	-29.8	1.18 H	19	40.0	4.2
4	4874.00	39.9 AV	54.0	-14.1	1.18 H	19	35.7	4.2
5	7311.00	48.4 PK	74.0	-25.6	1.04 H	28	38.4	10.0
6	7311.00	42.9 AV	54.0	-11.1	1.04 H	28	32.9	10.0
7	#10480.00	47.8 PK	68.2	-20.4	1.72 H	154	31.7	16.1
8	11590.00	54.6 PK	74.0	-19.4	2.06 H	166	37.8	16.8
9	11590.00	42.1 AV	54.0	-11.9	2.06 H	166	25.3	16.8
10	15720.00	57.0 PK	74.0	-17.0	1.50 H	127	40.6	16.4
11	15720.00	42.7 AV	54.0	-11.3	1.50 H	127	26.3	16.4
12	#17385.00	60.4 PK	68.2	-7.8	3.17 H	342	40.0	20.4

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	4804.00	43.7 PK	74.0	-30.3	2.10 V	0	39.5	4.2
2	4804.00	36.7 AV	54.0	-17.3	2.10 V	0	32.5	4.2
3	4874.00	42.9 PK	74.0	-31.1	1.74 V	219	38.7	4.2
4	4874.00	39.3 AV	54.0	-14.7	1.74 V	219	35.1	4.2
5	7311.00	48.3 PK	74.0	-25.7	1.38 V	202	38.3	10.0
6	7311.00	42.4 AV	54.0	-11.6	1.38 V	202	32.4	10.0
7	#10480.00	48.0 PK	68.2	-20.2	1.53 V	245	31.9	16.1
8	11590.00	55.0 PK	74.0	-19.0	1.62 V	204	38.2	16.8
9	11590.00	44.4 AV	54.0	-9.6	1.62 V	204	27.6	16.8
10	15720.00	54.2 PK	74.0	-19.8	1.71 V	27	37.8	16.4
11	15720.00	40.9 AV	54.0	-13.1	1.71 V	27	24.5	16.4
12	#17385.00	58.3 PK	68.2	-9.9	3.26 V	45	37.9	20.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " # ": The radiated frequency is out of the restricted band.

Mode	TX channel 23017	Frequency Range	Above 1000MHz
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Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1399.40	-61.02	-13.00	-48.02	1.32 H	213	37.43	-98.45
2	2099.10	-59.79	-13.00	-46.79	2.10 H	123	37.22	-97.01
3	2798.80	-59.01	-13.00	-46.01	1.77 H	237	36.62	-95.63
4	3498.50	-57.98	-13.00	-44.98	2.67 H	56	36.19	-94.17
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	1399.40	-60.92	-13.00	-47.92	1.56 V	334	37.53	-98.45
2	2099.10	-59.59	-13.00	-46.59	1.32 V	255	37.42	-97.01
3	2798.80	-58.80	-13.00	-45.80	2.05 V	134	36.83	-95.63
4	3498.50	-57.62	-13.00	-44.62	3.15 V	138	36.55	-94.17

Remarks:

1. $EIRP(dBm) = Raw\ Value(dBuV) + Correction\ Factor(dB/m)$
2. $Correction\ Factor(dB/m) = Antenna\ Factor(dB/m) + Cable\ Factor(dB) - Pre-Amplifier\ Factor(dB) + 20\log(D) - 104.8$
3. Margin value = EIRP – Limit value
4. The other EIRP levels were very low against the limit.

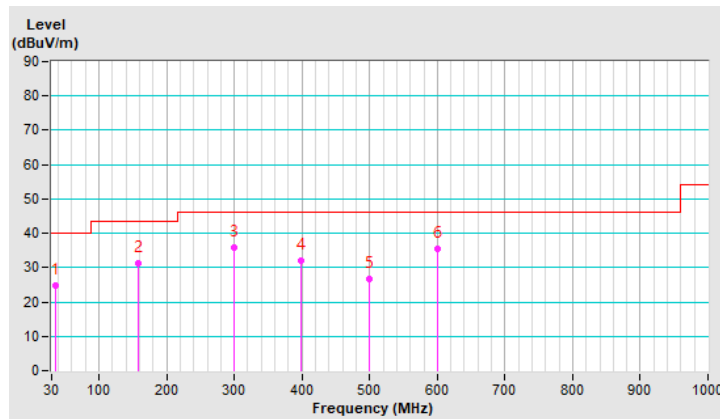
Below 1GHz Data:

Frequency Range	30 MHz ~ 1 GHz	Detector Function	Quasi-Peak (QP)
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Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	36.52	24.9 QP	40.0	-15.1	2.00 H	221	38.2	-13.3
2	158.84	31.1 QP	43.5	-12.4	1.00 H	99	43.5	-12.4
3	299.57	35.8 QP	46.0	-10.2	1.00 H	118	47.9	-12.1
4	399.06	32.0 QP	46.0	-14.0	1.50 H	151	41.6	-9.6
5	498.55	26.8 QP	46.0	-19.2	1.50 H	94	34.2	-7.4
6	600.71	35.5 QP	46.0	-10.5	2.00 H	39	40.1	-4.6

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



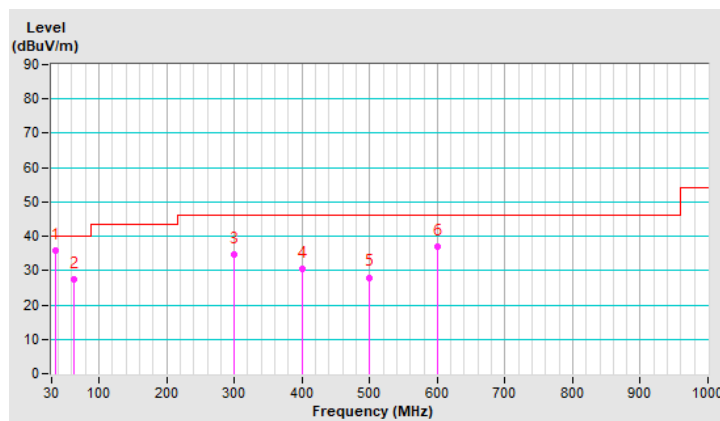
Frequency Range	30 MHz ~ 1 GHz	Detector Function	Quasi-Peak (QP)
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Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	35.05	35.7 QP	40.0	-4.3	1.50 V	334	49.0	-13.3
2	63.28	27.6 QP	40.0	-12.4	1.00 V	260	40.9	-13.3
3	300.32	34.7 QP	46.0	-11.3	1.50 V	83	46.7	-12.0
4	399.73	30.4 QP	46.0	-15.6	1.00 V	200	40.0	-9.6
5	499.75	28.0 QP	46.0	-18.0	1.00 V	274	35.3	-7.3
6	599.99	36.9 QP	46.0	-9.1	3.00 V	127	41.6	-4.7

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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.	Calibrated Date	Calibrated Until
TEST RECEIVER R&S	ESCS 30	847124/029	2021/10/13	2022/10/12
LISN R&S	ESH3-Z5	848773/004	2021/10/29	2022/10/28
50 ohms Terminator NA	50	3	2021/10/27	2022/10/26
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2021/9/25	2022/9/24
Fixed attenuator STI	STI02-2200-10	005	2022/8/24	2023/8/23
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: 2022/9/21

4.2.3 Test Procedures

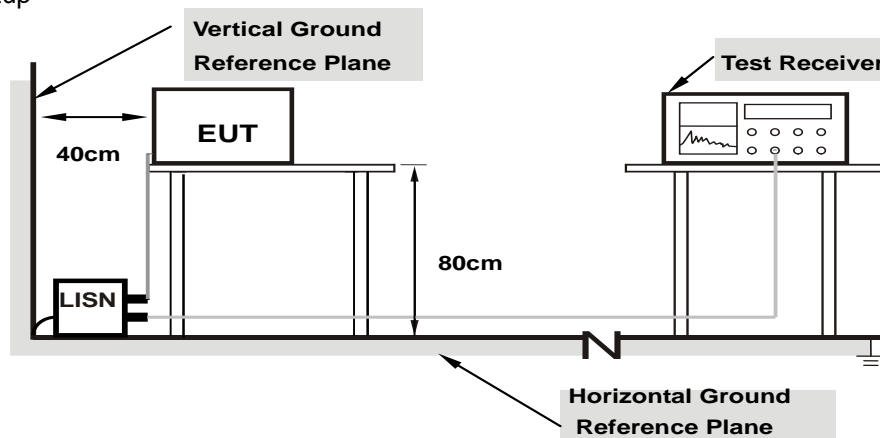
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

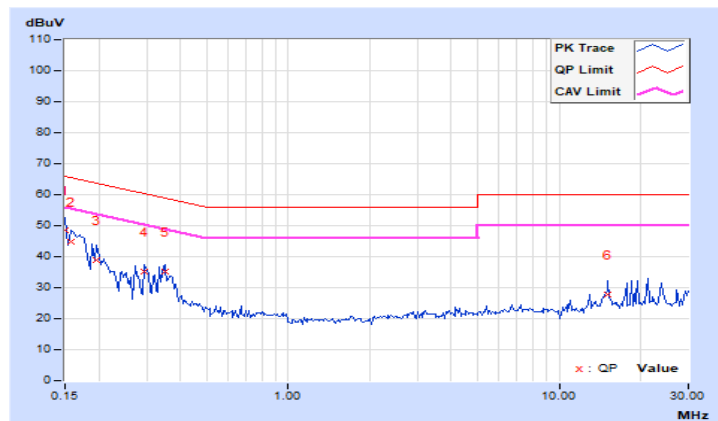
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	38.48	20.86	48.43	30.81	66.00	56.00	-17.57	-25.19
2	0.15781	9.95	34.79	16.23	44.74	26.18	65.58	55.58	-20.84	-29.40
3	0.19687	9.96	28.75	11.14	38.71	21.10	63.74	53.74	-25.03	-32.64
4	0.29453	9.96	25.25	8.43	35.21	18.39	60.40	50.40	-25.19	-32.01
5	0.34922	9.96	25.26	15.47	35.22	25.43	58.98	48.98	-23.76	-23.55
6	15.08203	10.91	16.98	2.23	27.89	13.14	60.00	50.00	-32.11	-36.86

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

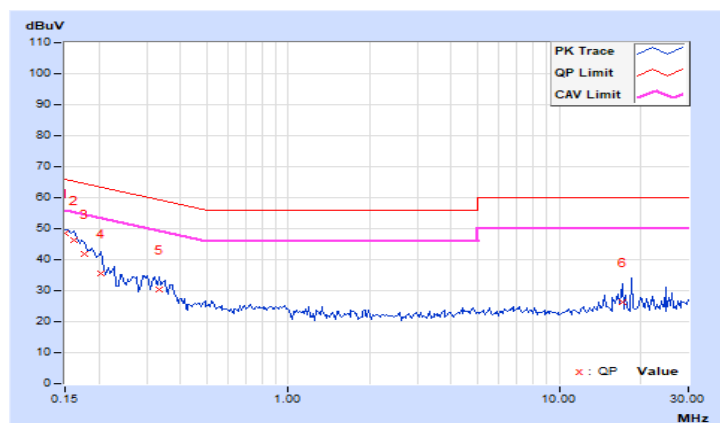


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	38.46	21.14	48.41	31.09	66.00	56.00	-17.59	-24.91
2	0.16172	9.95	36.53	17.87	46.48	27.82	65.38	55.38	-18.90	-27.56
3	0.17734	9.96	31.82	13.94	41.78	23.90	64.61	54.61	-22.83	-30.71
4	0.20469	9.96	25.60	7.10	35.56	17.06	63.42	53.42	-27.86	-36.36
5	0.33359	9.96	20.39	5.27	30.35	15.23	59.36	49.36	-29.01	-34.13
6	17.16016	10.86	15.56	-3.23	26.42	7.63	60.00	50.00	-33.58	-42.37

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



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 according to ISO/IEC 17025.

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

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Email: service.adt@tw.bureauveritas.com

Web Site: 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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