

FCC Test Report (Co-Located)

Report No.: RF200609C14-2

FCC ID: PY320100484

Test Model: SXR80

Series Model: SXS80

Received Date: Jun. 09, 2020

Test Date: Jul. 01 ~ Jul. 05, 2020

Issued Date: Jul. 16, 2020

Applicant: NETGEAR, INC.

Address: 350 East Plumeria Drive, San Jose, CA 95134, USA

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

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33383, TAIWAN

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

Test Location (2): E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
Taiwan.

**FCC Registration /
Designation Number(2):** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF200609C14-2	Original release	Jul. 16, 2020

1 Certificate of Conformity

Product: Orbi Pro WiFi 6 Router / Orbi Pro WiFi 6 Satellite

Brand: NETGEAR

Test Model: SXR80

Series Model: SXS80

Sample Status: Engineering sample

Applicant: NETGEAR, INC.

Test Date: Jul. 01 ~ Jul. 05, 2020

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
47 CFR FCC Part 15, Subpart E (Section 15.407)
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:** Jul. 16, 2020
Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Jul. 16, 2020
Bruce Chen / Senior Project Engineer

2 Summary of Test Results

Applied Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407)		
FCC Clause	Test Item	Result	Remarks
15.207 15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -8.24dB at 0.34141MHz.
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -2.1dB at 790.75MHz.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
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) ($\pm$)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1 GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Orbi Pro WiFi 6 Router / Orbi Pro WiFi 6 Satellite
Brand	NETGEAR
Test Model	SXR80
Series Model	SXS80
Model Difference	Refer to Note for more details
Status of EUT	Engineering sample
Power Supply Rating	12Vdc (adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	2.4GHz: 802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n (HT20/40): up to MCS31 802.11n (VHT20/40): up to MCS9 802.11ax: up to MCS11 5.0GHz: 802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n (HT20/40): up to MCS31 802.11ac (VHT20/40/80): up to MCS9 802.11ax: up to MCS11
Operating Frequency	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	2412 ~ 2462MHz: 802.11b, 802.11g, 802.11n (HT20), 802.11n (VHT20), 802.11ax (HE20): 11 802.11n (HT40), 802.11n (VHT40), 802.11ax (HE40): 7 5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 5 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1

Output Power	2.4GHz Band: CDD Mode: 953.202mW Beamforming Mode: 825.155mW 5GHz Band: CDD Mode: 5180 ~ 5240MHz: 904.311mW 5745 ~ 5825MHz: 978.116mW Beamforming Mode: 5180 ~ 5240MHz: 693.931mW 5745 ~ 5825MHz: 645.219mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Cable Supplied	NA

Note:

1. All models are electrically identical except software firmware. Model: SXR80 is the representative for final test.

Brand	Model	Product Name	RF module	Difference
NETGEAR	SXR80	Orbi Pro WiFi 6 Router	RF module 1	Software firmware: SXR80-V1.0.0.34 Master mode only
			RF module 2	
	SXS80	Orbi Pro WiFi 6 Satellite	RF module 1	Software firmware: SXS80-V1.0.0.34 Master mode and Client mode
			RF module 2	

*RF module 1: 5GHz Band 4 only, RF module 2: 2.4GHz Band & 5GHz Band 1 only

2. The EUT uses following adapters.

Adapter 1	
Brand	NETGEAR
Model	AD2150F10
P/N	332-11093-01
Input Power	100-120Vac~50/60Hz 1.0A
Output Power	12Vdc / 3.5A
Power Cable	1.8m non-shielded power cable without core

Adapter 2	
Brand	NETGEAR
Model	2ABN042F NA
P/N	332-10888-01
Input Power	100-240Vac~50/60Hz 1.3A
Output Power	12.0Vdc / 3.5A
Power Cable	1.85m non-shielded power cable without core

*After pre-testing, Adapter 2 is the worst case for the final tests.

3. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

2.4GHz			
Modulation Mode	CDD Mode	Beamforming Mode	TX Function
802.11b	Support	Not Support	4TX
802.11g	Support	Not Support	4TX
802.11n (HT20)	Support	Not Support	4TX
802.11n (HT40)	Support	Not Support	4TX
802.11ac (VHT20)	Support	Support	4TX
802.11ac (VHT40)	Support	Support	4TX
802.11ax (HE20)	Support	Support	4TX
802.11ax (HE40)	Support	Support	4TX
5.0GHz			
Modulation Mode	CDD Mode	Beamforming Mode	TX Function
802.11a	Support	Not Support	4TX
802.11n (HT20)	Support	Not Support	4TX
802.11n (HT40)	Support	Not Support	4TX
802.11ac (VHT20)	Support	Support	4TX
802.11ac (VHT40)	Support	Support	4TX
802.11ac (VHT80)	Support	Support	4TX
802.11ax (HE20)	Support	Support	4TX
802.11ax (HE40)	Support	Support	4TX
802.11ax (HE80)	Support	Support	4TX

* The bandwidth and modulation are similar for HT20/HT40 on 802.11n mode and VHT20/VHT40 on 802.11ac mode and HE20/HE40 on 802.11ax mode. The bandwidth and modulation are similar for VHT80 on 802.11ac mode and HE80 on 802.11ax mode. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)

* For 802.11n/ac/ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

4. The EUT uses following antennas.

Antenna Type	Dipole		
Antenna Connector	i-pex(MHF)		
Directional Gain (dBi)			
2.4GHz Band	5GHz U-NII-1	5GHz U-NII-3	
6.81	7.56	7.88	

3.2 Description of Test Modes

For 2.4GHz

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20), 802.11n (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40), 802.11n (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

For 5180 ~ 5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to		Description
	RE $\geq$ 1G	RE<1G	
-	√	√	Power from adapter 2

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz & Bandedge Measurement **RE<1G**: Radiated Emission below 1GHz

Note:

- The EUT is designed to be positioned on the X-plane only.

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	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11ax (HE20)	2412~2462	1 to 11	CH 6 + CH 46 + CH 157	BPSK
	802.11ax (HE40)	5180~5240	38 to 46		OFDMA
	802.11ax (HE20)	5745~5825	149 to 165		OFDMA

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	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11ax (HE20)	2412~2462	1 to 11	CH 6 + CH 46 + CH 157	BPSK
	802.11ax (HE40)	5180~5240	38 to 46		OFDMA
	802.11ax (HE20)	5745~5825	149 to 165		OFDMA

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	Mode	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11ax (HE20)	2412~2462	1 to 11	CH 6 + CH 46 + CH 157	BPSK
	802.11ax (HE40)	5180~5240	38 to 46		OFDMA
	802.11ax (HE20)	5745~5825	149 to 165		OFDMA

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	22 deg. C, 70% RH	120Vac, 60Hz	Ryan Du
RE<1G	23 deg. C, 70% RH	120Vac, 60Hz	Ryan Du
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Sampson Chen

3.3 Description of Support Units

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

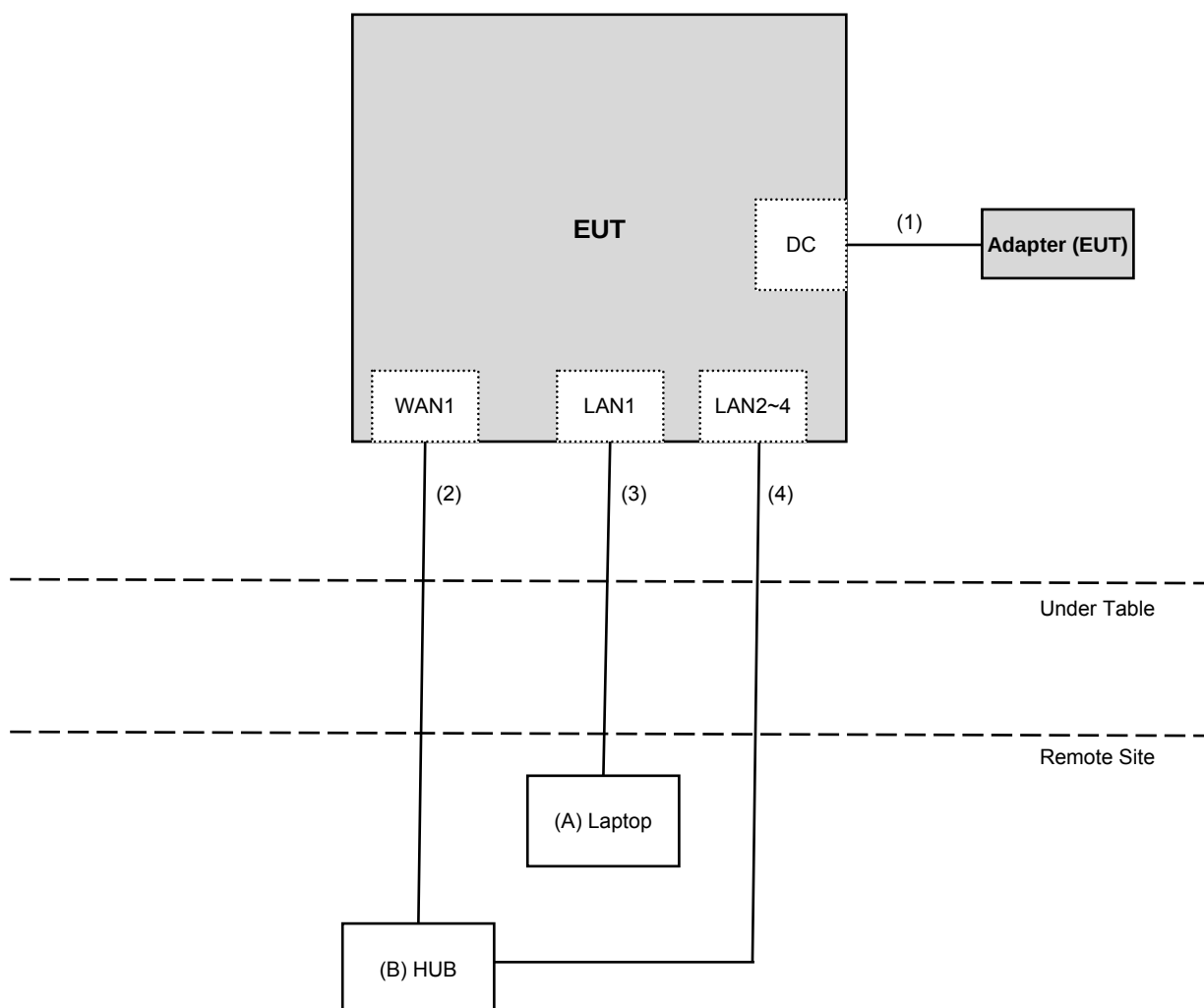
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Lenovo	81A4	YD02YN76	PD93165NGU	-
B.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC Approved	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A, B acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.85	N	0	Accessory of EUT
2.	RJ45 cable	1	10	N	0	-
3.	RJ45 cable	1	10	N	0	-
4.	RJ45 cable	3	10	N	0	-

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission 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.

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 (dBµV/m)	AV: 54 (dBµV/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(dBµV/m)
5250~5350 MHz	15.407(b)(2)			
5470~5725 MHz	15.407(b)(3)			
5725~5850 MHz	☒	15.407(b)(4)(i)	PK: -27 (dBm/MHz) ^{*1} PK: 10 (dBm/MHz) ^{*2} PK: 15.6 (dBm/MHz) ^{*3} PK: 27 (dBm/MHz) ^{*4}	PK: 68.2(dBµV/m) ^{*1} PK: 105.2 (dBµV/m) ^{*2} PK: 110.8(dBµV/m) ^{*3} PK: 122.2 (dBµV/m) ^{*4}
	☐	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge.			^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 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:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Agilent	N9038A	MY51210202	Dec. 13, 2019	Dec. 12, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 25, 2020	May 24, 2021
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 23, 2019	Oct. 22, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-4-1	Mar. 18, 2020	Mar. 17, 2021
RF Cable	8D	966-4-2	Mar. 18, 2020	Mar. 17, 2021
RF Cable	8D	966-4-3	Mar. 18, 2020	Mar. 17, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-2000	180502	Apr. 29, 2020	Apr. 28, 2021
RF Cable	EMC104-SM-SM-6000	180418	Apr. 29, 2020	Apr. 28, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	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 Hsinchu 966 Chamber No. 4.

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 detects 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:

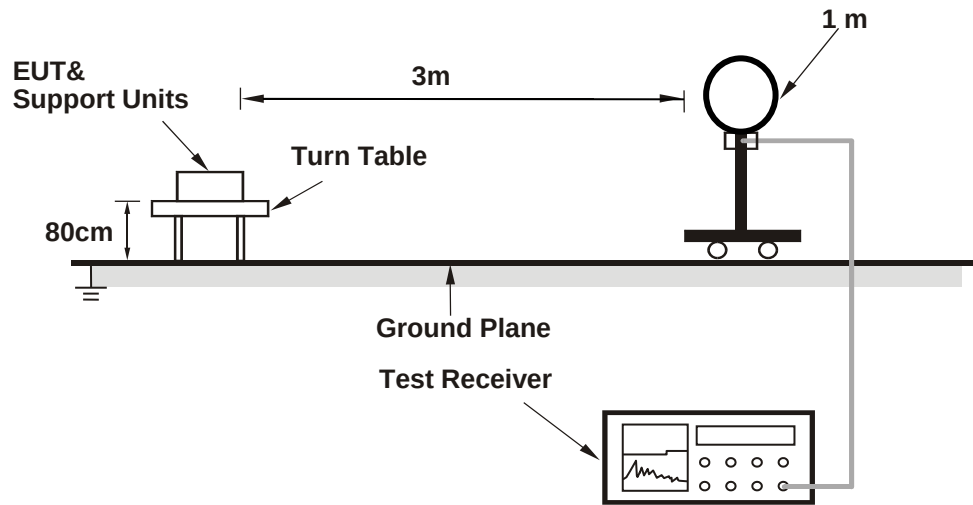
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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.

4.1.4 Deviation from Test Standard

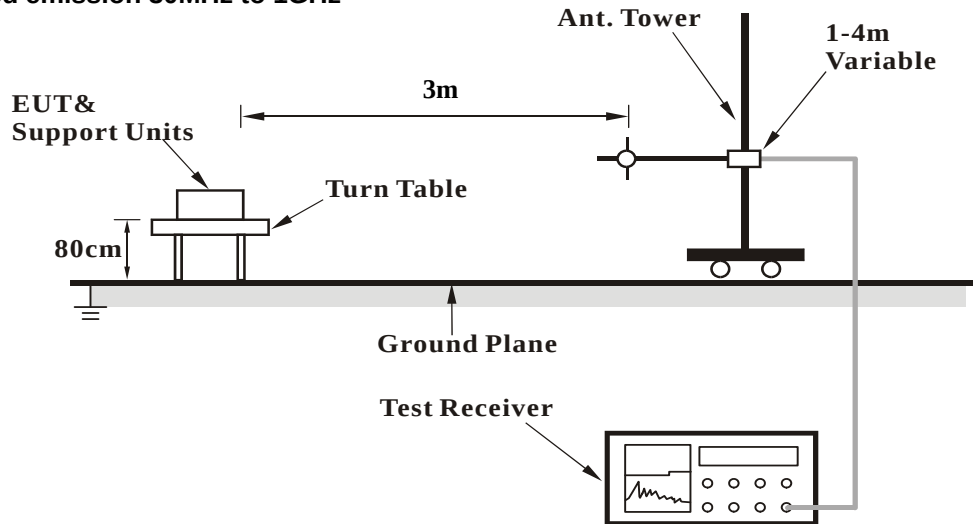
No deviation.

4.1.5 Test Setup

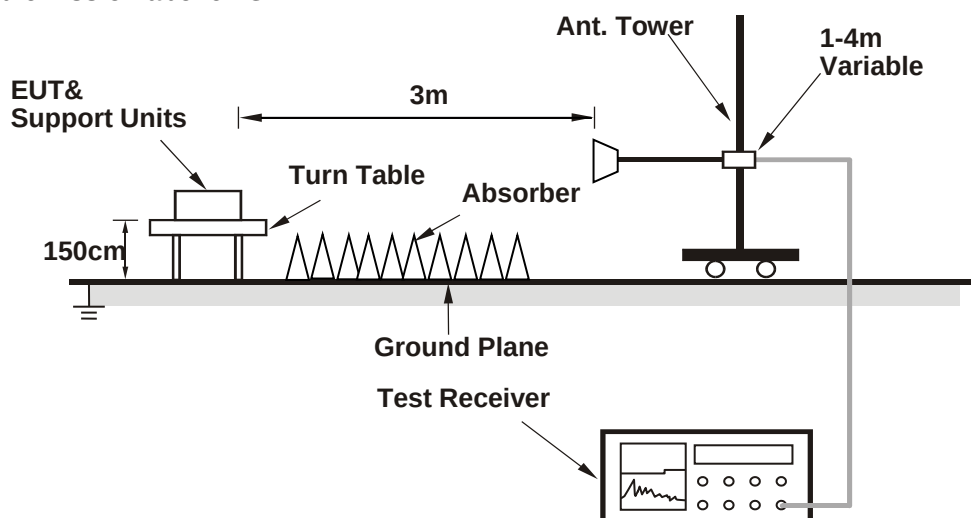
For Radiated emission below 30MHz



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

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The communication partner sent data to EUT by command "PING".

4.1.7 Test Results

Above 1GHz Data:

802.11ax (HE20) + 802.11ax (HE40) + 802.11ax (HE20)

CHANNEL	CH 6 + CH 46 + CH 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4874.00	42.3 PK	74.0	-31.7	1.57 H	176	40.2	2.1
2	4874.00	39.0 AV	54.0	-15.0	1.57 H	176	36.9	2.1
3	7311.00	45.9 PK	74.0	-28.1	1.56 H	264	36.8	9.1
4	7311.00	32.4 AV	54.0	-21.6	1.56 H	264	23.3	9.1
5	#10460.00	51.0 PK	68.2	-17.2	2.12 H	180	37.5	13.5
6	11570.00	50.0 PK	74.0	-24.0	2.10 H	163	36.4	13.6
7	11570.00	29.2 AV	54.0	-24.8	2.10 H	163	15.6	13.6
8	15690.00	49.3 PK	74.0	-24.7	1.55 H	137	35.8	13.5
9	15690.00	39.2 AV	54.0	-14.8	1.55 H	137	25.7	13.5
10	#17355.00	48.6 PK	68.2	-19.6	1.46 H	116	31.6	17.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4874.00	41.6 PK	74.0	-32.4	1.47 V	32	39.5	2.1
2	4874.00	37.8 AV	54.0	-16.2	1.47 V	32	35.7	2.1
3	7311.00	44.8 PK	74.0	-29.2	1.48 V	37	35.7	9.1
4	7311.00	31.8 AV	54.0	-22.2	1.48 V	37	22.7	9.1
5	#10460.00	47.2 PK	68.2	-21.0	1.23 V	50	33.7	13.5
6	11570.00	47.4 PK	74.0	-26.6	1.22 V	38	33.8	13.6
7	11570.00	36.5 AV	54.0	-17.5	1.22 V	38	22.9	13.6
8	15690.00	48.0 PK	74.0	-26.0	1.72 V	9	34.5	13.5
9	15690.00	38.3 AV	54.0	-15.7	1.72 V	9	24.8	13.5
10	#17355.00	48.2 PK	68.2	-20.0	1.78 V	3	31.2	17.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz data

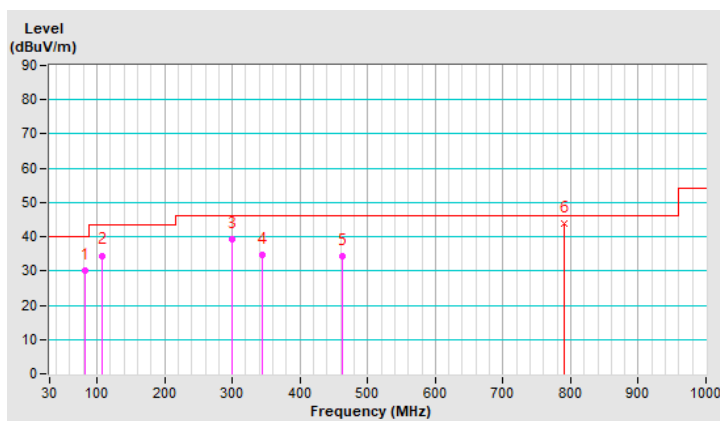
802.11ax (HE20) + 802.11ax (HE40) + 802.11ax (HE20)

CHANNEL	CH 6 + CH 46 + CH 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	81.52	30.0 QP	40.0	-10.0	2.00 H	229	43.0	-13.0
2	107.87	34.5 QP	43.5	-9.0	3.00 H	215	45.2	-10.7
3	299.22	39.2 QP	46.0	-6.8	1.00 H	124	45.7	-6.5
4	344.72	34.8 QP	46.0	-11.2	1.00 H	298	40.3	-5.5
5	462.56	34.2 QP	46.0	-11.8	2.00 H	167	36.1	-1.9
6	790.75	43.9 QP	46.0	-2.1	1.00 H	205	38.9	5.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

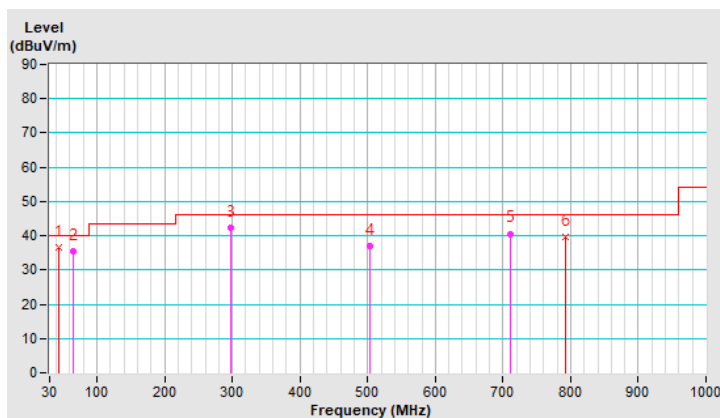


CHANNEL	CH 6 + CH 46 + CH 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	43.39	36.7 QP	40.0	-3.3	1.00 V	221	44.7	-8.0
2	64.60	35.5 QP	40.0	-4.5	3.00 V	220	44.5	-9.0
3	296.97	42.4 QP	46.0	-3.6	2.00 V	192	48.9	-6.5
4	503.82	36.9 QP	46.0	-9.1	1.00 V	261	38.1	-1.2
5	711.06	40.6 QP	46.0	-5.4	1.50 V	52	37.8	2.8
6	792.03	39.5 QP	46.0	-6.5	1.99 V	173	34.4	5.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB 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.	Cal. Date	Cal. Due
Test Receiver R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 30, 2019	Aug. 29, 2020
Software BVADT	BVADT_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 Hsinchu Conduction 1.

4.2.3 Test Procedures

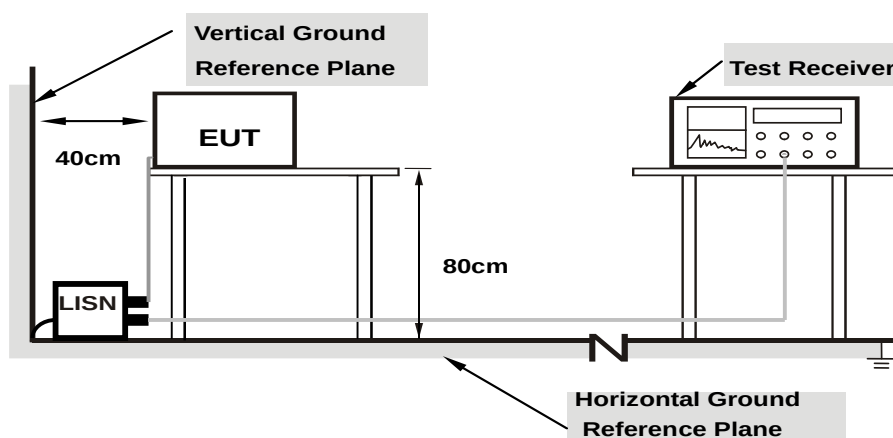
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

Worst-case data:

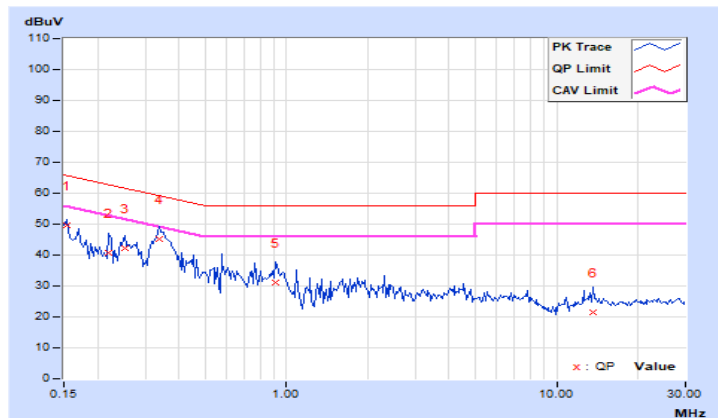
802.11ax (HE20) + 802.11ax (HE40) + 802.11ax (HE20)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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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	0.15391	9.98	39.65	27.09	49.63	37.07	65.79	55.79	-16.16	-18.72
2	0.22031	9.99	30.59	17.55	40.58	27.54	62.81	52.81	-22.23	-25.27
3	0.25156	10.00	32.35	24.34	42.35	34.34	61.71	51.71	-19.36	-17.37
4	0.33750	10.00	35.37	29.67	45.37	39.67	59.26	49.26	-13.89	-9.59
5	0.91172	10.04	20.89	9.84	30.93	19.88	56.00	46.00	-25.07	-26.12
6	13.63281	10.94	10.42	4.38	21.36	15.32	60.00	50.00	-38.64	-34.68

Remarks:

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

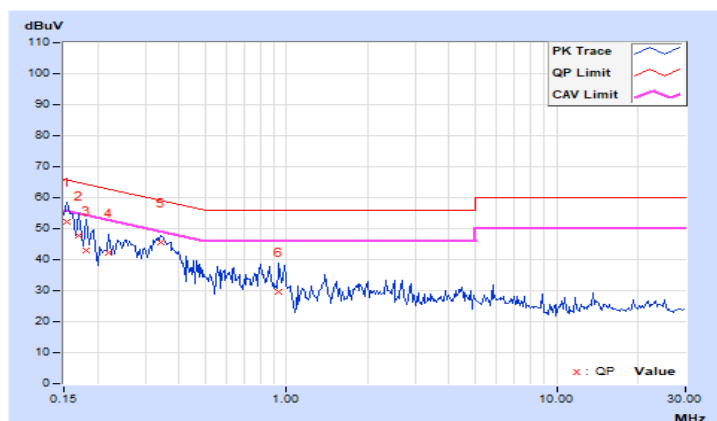


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.99	42.05	29.72	52.04	39.71	65.79	55.79	-13.75	-16.08
2	0.16953	9.99	37.81	22.45	47.80	32.44	64.98	54.98	-17.18	-22.54
3	0.18125	10.00	32.87	20.11	42.87	30.11	64.43	54.43	-21.56	-24.32
4	0.22031	10.00	32.10	19.41	42.10	29.41	62.81	52.81	-20.71	-23.40
5	0.34141	10.02	35.47	30.91	45.49	40.93	59.17	49.17	-13.68	-8.24
6	0.93906	10.08	19.56	10.05	29.64	20.13	56.00	46.00	-26.36	-25.87

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 and approved according to ISO/IEC 17025.

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

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Fax: 886-3-3270892

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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