

Partial FCC Test Report

Report No.: RFBBGM-WTW-P22110832-5

FCC ID: WIYSLM500QA

Test Model: SLM500

Received Date: Nov. 30, 2022

Test Date: Dec. 26, 2022 ~ Feb. 20, 2023

Issued Date: Mar. 13, 2023

Applicant: CASTLES TECHNOLOGY CO., LTD.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 788550 / TW0003



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Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 Summary of Test Results.....	5
2.1 Measurement Uncertainty.....	5
2.2 Modification Record	5
3 General Information	6
3.1 General Description of EUT	6
3.2 Description of Test Modes.....	7
3.2.1 Test Mode Applicability and Tested Channel Detail.....	8
3.3 Duty Cycle of Test Signal	10
3.4 Description of Support Units	11
3.4.1 Configuration of System under Test	11
3.5 General Description of Applied Standards and References	11
4 Test Types and Results	12
4.1 Radiated Emission and Bandedge Measurement	12
4.1.1 Limits of Radiated Emission and Bandedge Measurement	12
4.1.2 Test Instruments	13
4.1.3 Test Procedures.....	14
4.1.4 Deviation from Test Standard	15
4.1.5 Test Set Up	15
4.1.6 EUT Operating Conditions.....	16
4.1.7 Test Results	17
4.2 Conducted Emission Measurement.....	31
4.2.1 Limits of Conducted Emission Measurement	31
4.2.2 Test Instruments	31
4.2.3 Test Procedures.....	32
4.2.4 Deviation from Test Standard	32
4.2.5 Test Setup.....	32
4.2.6 EUT Operating Conditions.....	32
4.2.7 Test Results	33
4.3 Conducted Output Power Measurement	35
4.3.1 Limits of Conducted Output Power Measurement.....	35
4.3.2 Test Setup.....	35
4.3.3 Test Instruments	35
4.3.4 Test Procedures.....	35
4.3.5 Deviation from Test Standard	35
4.3.6 EUT Operating Conditions.....	35
4.3.7 Test Results	36
5 Pictures of Test Arrangements.....	37
Annex A- Band Edge Measurement	38
Appendix – Information of the Testing Laboratories	43

Release Control Record

Issue No.	Description	Date Issued
RFBBGM-WTW-P22110832-5	Original Release	Mar. 13, 2023

1 Certificate of Conformity

Product: Smart module

Brand: 

Test Model: SLM500

Sample Status: Identical Prototype

Applicant: CASTLES TECHNOLOGY CO., LTD.

Test Date: Dec. 26, 2022 ~ Feb. 20, 2023

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 : , **Date:** Mar. 13, 2023
Lena Wang / Specialist

Approved by : , **Date:** Mar. 13, 2023
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 -13.53 dB at 0.68595 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -5.9 dB at 2483.50 MHz.
15.247(d)	Antenna Port Emission	N/A	Refer to note
15.247(a)(2)	6 dB Bandwidth	N/A	Refer to note
---	Occupied Bandwidth Measurement	N/A	Refer to note
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	N/A	Refer to note
15.203	Antenna Requirement	N/A	Refer to note

Note:

1. This report is a partial report, and only test items of AC Power Conducted Emission, Conducted power and Radiated Emissions tests were verified and recorded in this report. Other testing data please refer to SGS report no.: SZCR210300003003.
2. 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.
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) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	2.44 dB
	30 MHz ~ 200 MHz	2.95 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smart module
Brand	
Test Model	SLM500
Status of EUT	Identical Prototype
Power Supply Rating	5.0 Vdc (Adapter) 3.7 Vdc (Li-ion battery)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to 150Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	61.518 mW
Antenna Type	PIFA antenna with 2.13 dBi gain
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of SGS report no.: SZCR210300003003. The differences from the original report are adding an End-product (POS Terminal (Brand: , Model: SATURN1000MINI)), changing antenna type. Only AC Power Conducted Emission, Conducted Power and radiated emissions were verified and recorded in this report. Other testing data please refer to the original SGS report no.: SZCR210300003003.
2. The EUT was installed in POS Terminal (Brand: , Model: SATURN1000MINI).
3. The EUT provides 1 completed transmitter and 1 receiver.

Modulation Mode	Tx Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

4. The POS Terminal contains following accessory devices.

Product	Brand	Model	Description
Adapter		1A52-UB52A	I/P: 100-240 Vac, 50/60 Hz, 0.3 A O/P: 5 Vdc, 2 A
Battery		S1Mini	3.7V 1600mAh / 5.92Wh
USB Cable	CHANG YANG ELECTRON CO.,LTD	CY-AS-HK0059	0.95 m shielded cable w/o core

5. Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.
6. 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.

7. BT & WWAN & NFC (FCC ID: WIYS1MINI001) technology can transmit at same time.
8. WLAN 2.4G & WWAN & NFC (FCC ID: WIYS1MINI001) technology can transmit at same time.
9. WLAN 5G & WWAN & NFC (FCC ID: WIYS1MINI001) technology can transmit at same time.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

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

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	Power	
-	√	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **Power**: Maximum Output Power

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
NOTE: "-" means no effect.

Radiated Emission Test (Above 1 GHz):

- ☒ 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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1 GHz):

- ☒ 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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11n (HT40)	3 to 9	9	OFDM	BPSK	13.5

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	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11n (HT40)	1 to 11	9	OFDM	BPSK	13.5

Conducted Output Power 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	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	21.6 deg. C, 72.8 % RH	120 Vac, 60 Hz	Vincent Chen
RE<1G	24 deg. C, 78 % RH	120 Vac, 60 Hz	Thomas Cheng
PLC	18.1 deg. C, 64.7 % RH	120 Vac, 60 Hz	Thomas Cheng
Power	25 deg. C, 60 % RH	120 Vac, 60 Hz	Ted Chang

3.3 Duty Cycle of Test Signal

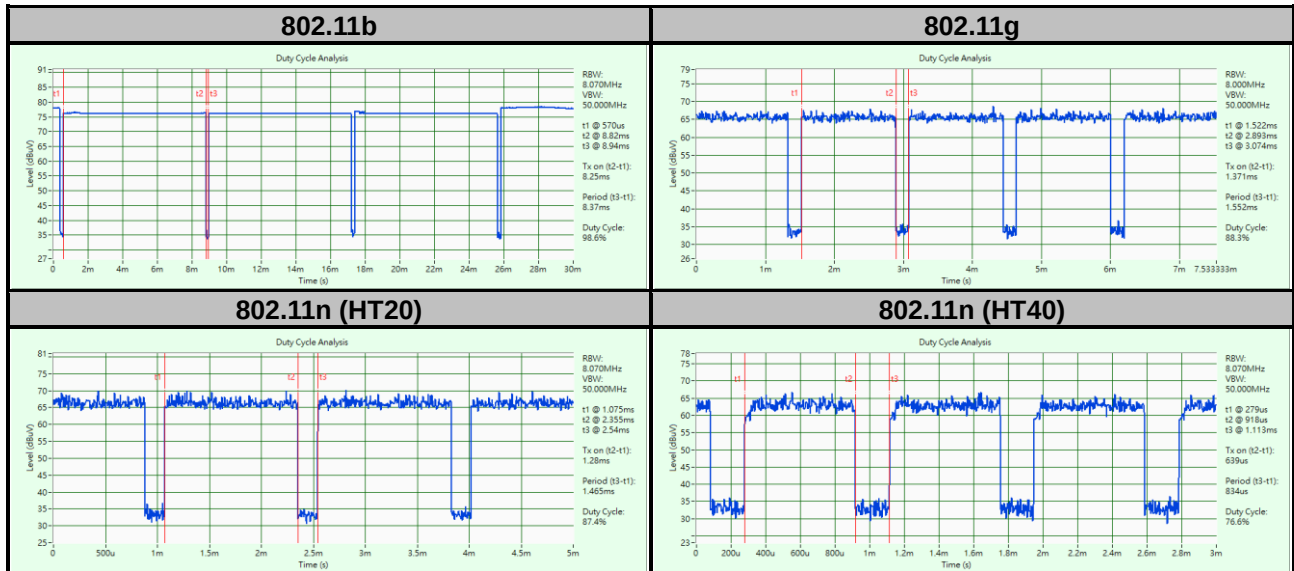
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11b: Duty cycle = $8.25/8.37 = 0.986$, Duty cycle of test signal is $\geq 98 \%$, duty factor is not required.

802.11g: Duty cycle = $1.371/1.552 = 0.883$, Duty factor = $10 * \log(1/0.883) = 0.54$

802.11n (HT20): Duty cycle = $1.28/1.465 = 0.874$, Duty factor = $10 * \log(1/0.874) = 0.59$

802.11n (HT40): Duty cycle = $0.639/0.834 = 0.766$, Duty factor = $10 * \log(1/0.766) = 1.16$



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.

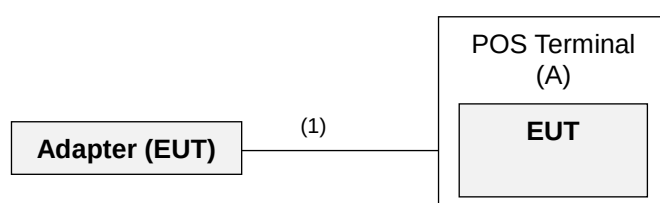
No.	Product	Brand	Model No.	Serial No.	FCC ID
A	POS Terminal	 CASTLES TECHNOLOGY	SATURN1000MINI	N/A	N/A

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.95	Y	0	Provided by client

Note:

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

3.4.1 Configuration of System under Test



Remote site

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 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 20 dB 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 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower & Turn Max-Full	MFA-440H	AT93021705	NA	NA
Turn Table Max-Full	MFT-201SS	NA	NA	NA
Turn Table Controller Max-Full	MG-7802	NA	NA	NA
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 27, 2022	Apr. 26, 2023
Signal Analyzer Agilent	N9010A	MY52220207	Jan. 06, 2022	Jan. 05, 2023
			Jan. 03, 2023	Jan. 02, 2024
Loop Antenna TESEQ	HLA 6121	45745	Jul. 27, 2022	Jul. 26, 2023
Loop Antenna EMCI	EM-6879	269	Sep. 19, 2022	Sep. 18, 2023
Pre-amplifier EMCI	EMC001340	980201	Sep. 23, 2022	Sep. 22, 2023
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	Jan. 15, 2022	Jan. 14, 2023
			Jan. 07, 2023	Jan. 06, 2024
Pre-Amplifier EMCI	EMC 330H	980112	Oct. 01, 2022	Sep. 30, 2023
Bi_Log Antenna Schwarzbeck	VULB9168	9168-472	Oct. 21, 2022	Oct. 20, 2023
RF Coaxial Cable WORKEN	8D-FB	Cable-Ch10-01	Oct. 01, 2022	Sep. 30, 2023
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-969	Nov. 13, 2022	Nov. 12, 2023
Pre-Amplifier EMCI	EMC 012645	980115	Oct. 01, 2022	Sep. 30, 2023
RF Coaxial Cable EMCI	EMC104-SM-SM- 8000+3000	171005	Oct. 01, 2022	Sep. 30, 2023
RF Coaxial Cable HUBER SUHNER	SUCOFLEX 104	EMC104-SM-SM- 1000(140807)	Oct. 01, 2022	Sep. 30, 2023
RF FLITER MICRO-TRONICS	BRM50716	060	Jan. 10, 2022	Jan. 09, 2023
			Jan. 11, 2023	Jan. 10, 2024
RF FLITER MICRO-TRONICS	BRM17690	004	Jan. 10, 2022	Jan. 09, 2023
			Jan. 11, 2023	Jan. 10, 2024
Boresight antenna tower fixture BV	BAF-02	7	NA	NA
Radio Communication Analyzer Anritsu	MT8821C	6201462755	Mar. 03, 2022	Mar. 02, 2023
Pre-Amplifier EMCI	EMC 184045	980116	Oct. 01, 2022	Sep. 30, 2023
Horn Antenna Schwarzbeck	BBHA 9170	148	Nov. 13, 2022	Nov. 12, 2023
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	Jul. 09, 2022	Jul. 08, 2023
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	Jul. 09, 2022	Jul. 08, 2023

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 HY - 966 chamber 5.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- 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 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

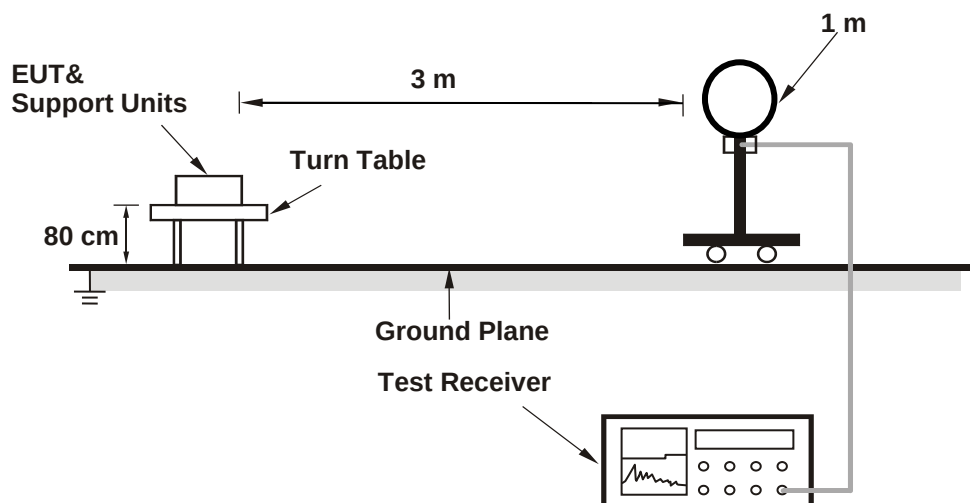
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
(11b: RBW = 1 MHz, VBW = 10 Hz ; 11g: RBW = 1 MHz, VBW = 1 kHz ;
11n (HT20): RBW = 1 MHz, VBW = 1 kHz; 11n (HT40): RBW = 1 MHz, VBW = 2 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

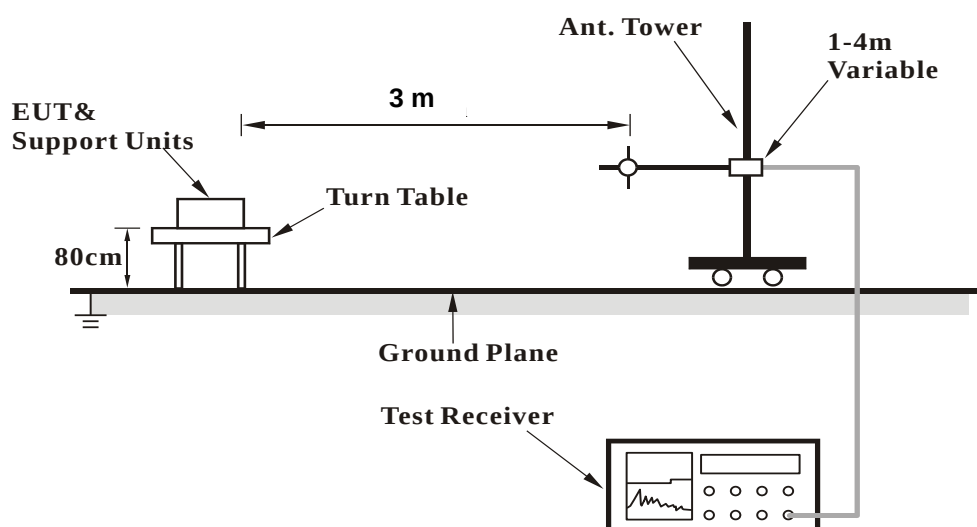
No deviation.

4.1.5 Test Set Up

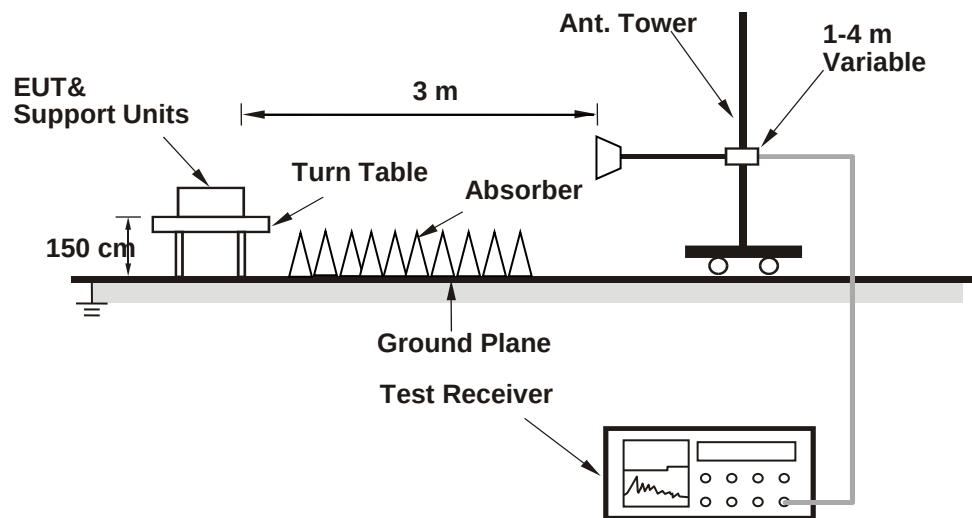
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data :

RF Mode	802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	2390.00	53.3 PK	74.0	-20.7	1.38 H	223	55.8	-2.5
2	2390.00	42.6 AV	54.0	-11.4	1.38 H	223	45.1	-2.5
3	*2412.00	98.8 PK			1.38 H	223	64.6	34.2
4	*2412.00	96.5 AV			1.38 H	223	62.3	34.2
5	4824.00	50.0 PK	74.0	-24.0	2.06 H	152	54.2	-4.2
6	4824.00	39.1 AV	54.0	-14.9	2.06 H	152	43.3	-4.2
Antenna Polarity & Test Distance : Vertical at								
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	2390.00	53.5 PK	74.0	-20.5	1.89 V	155	56.0	-2.5
2	2390.00	42.5 AV	54.0	-11.5	1.89 V	155	45.0	-2.5
3	*2412.00	99.9 PK			1.89 V	155	65.7	34.2
4	*2412.00	97.6 AV			1.89 V	155	63.4	34.2
5	4824.00	51.8 PK	74.0	-22.2	2.06 V	263	56.0	-4.2
6	4824.00	39.8 AV	54.0	-14.2	2.06 V	263	44.0	-4.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11b	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	*2437.00	96.5 PK			1.36 H	221	62.2	34.3
2	*2437.00	94.2 AV			1.36 H	221	59.9	34.3
3	4874.00	49.9 PK	74.0	-24.1	2.06 H	332	54.2	-4.3
4	4874.00	39.0 AV	54.0	-15.0	2.06 H	332	43.3	-4.3
Antenna Polarity & Test Distance : Vertical at								
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	*2437.00	97.9 PK			1.90 V	157	63.6	34.3
2	*2437.00	95.3 AV			1.90 V	157	61.0	34.3
3	4874.00	51.0 PK	74.0	-23.0	2.63 V	251	55.3	-4.3
4	4874.00	40.2 AV	54.0	-13.8	2.63 V	251	44.5	-4.3

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. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	*2462.00	101.0 PK			1.30 H	220	66.6	34.4
2	*2462.00	98.8 AV			1.30 H	220	64.4	34.4
3	2483.50	54.4 PK	74.0	-19.6	1.30 H	220	56.3	-1.9
4	2483.50	43.3 AV	54.0	-10.7	1.30 H	220	45.2	-1.9
5	4924.00	49.9 PK	74.0	-24.1	2.03 H	153	54.3	-4.4
6	4924.00	39.1 AV	54.0	-14.9	2.03 H	153	43.5	-4.4
Antenna Polarity & Test Distance : Vertical at								
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	*2462.00	101.6 PK			2.05 V	157	67.2	34.4
2	*2462.00	99.4 AV			2.05 V	157	65.0	34.4
3	2483.50	54.4 PK	74.0	-19.6	2.05 V	157	56.3	-1.9
4	2483.50	43.5 AV	54.0	-10.5	2.05 V	157	45.4	-1.9
5	4924.00	51.0 PK	74.0	-23.0	1.52 V	206	55.4	-4.4
6	4924.00	40.2 AV	54.0	-13.8	1.52 V	206	44.6	-4.4

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. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	2390.00	52.6 PK	74.0	-21.4	1.37 H	222	55.1	-2.5
2	2390.00	42.7 AV	54.0	-11.3	1.37 H	222	45.2	-2.5
3	*2412.00	98.9 PK			1.37 H	222	64.7	34.2
4	*2412.00	89.4 AV			1.37 H	222	55.2	34.2
5	4824.00	50.1 PK	74.0	-23.9	2.20 H	157	54.3	-4.2
6	4824.00	39.3 AV	54.0	-14.7	2.20 H	157	43.5	-4.2
Antenna Polarity & Test Distance : Vertical at								
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	2390.00	52.9 PK	74.0	-21.1	1.96 V	157	55.4	-2.5
2	2390.00	43.2 AV	54.0	-10.8	1.96 V	157	45.7	-2.5
3	*2412.00	99.8 PK			1.96 V	157	65.6	34.2
4	*2412.00	90.0 AV			1.96 V	157	55.8	34.2
5	4804.00	51.6 PK	74.0	-22.4	2.63 V	252	55.6	-4.0
6	4804.00	40.2 AV	54.0	-13.8	2.63 V	252	44.2	-4.0

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	*2437.00	98.8 PK			1.38 H	222	64.5	34.3
2	*2437.00	89.4 AV			1.38 H	222	55.1	34.3
3	4874.00	49.9 PK	74.0	-24.1	2.32 H	341	54.2	-4.3
4	4874.00	39.0 AV	54.0	-15.0	2.32 H	341	43.3	-4.3
Antenna Polarity & Test Distance : Vertical at								
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	*2437.00	99.8 PK			1.86 V	142	65.5	34.3
2	*2437.00	90.0 AV			1.86 V	142	55.7	34.3
3	4874.00	51.1 PK	74.0	-22.9	2.52 V	198	55.4	-4.3
4	4874.00	39.8 AV	54.0	-14.2	2.52 V	198	44.1	-4.3

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. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	*2462.00	100.7 PK			1.30 H	221	66.3	34.4
2	*2462.00	91.5 AV			1.30 H	221	57.1	34.4
3	2483.50	59.8 PK	74.0	-14.2	1.30 H	221	61.7	-1.9
4	2483.50	45.4 AV	54.0	-8.6	1.30 H	221	47.3	-1.9
5	4924.00	49.8 PK	74.0	-24.2	2.02 H	325	54.2	-4.4
6	4924.00	38.7 AV	54.0	-15.3	2.02 H	325	43.1	-4.4
Antenna Polarity & Test Distance : Vertical at								
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	*2462.00	100.9 PK			2.08 V	154	66.5	34.4
2	*2462.00	92.0 AV			2.08 V	154	57.6	34.4
3	2483.50	62.2 PK	74.0	-11.8	2.08 V	154	64.1	-1.9
4	2483.50	46.6 AV	54.0	-7.4	2.08 V	154	48.5	-1.9
5	4924.00	51.0 PK	74.0	-23.0	1.23 V	253	55.4	-4.4
6	4924.00	39.9 AV	54.0	-14.1	1.23 V	253	44.3	-4.4

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. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11n (HT20)	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	2390.00	52.5 PK	74.0	-21.5	1.22 H	217	55.0	-2.5
2	2390.00	42.6 AV	54.0	-11.4	1.22 H	217	45.1	-2.5
3	*2412.00	97.1 PK			1.22 H	217	62.9	34.2
4	*2412.00	88.0 AV			1.22 H	217	53.8	34.2
5	4824.00	49.8 PK	74.0	-24.2	1.18 H	269	54.0	-4.2
6	4824.00	39.1 AV	54.0	-14.9	1.18 H	269	43.3	-4.2
Antenna Polarity & Test Distance : Vertical at								
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	2390.00	53.6 PK	74.0	-20.4	2.00 V	152	56.1	-2.5
2	2390.00	43.1 AV	54.0	-10.9	2.00 V	152	45.6	-2.5
3	*2412.00	98.2 PK			2.00 V	152	64.0	34.2
4	*2412.00	89.0 AV			2.00 V	152	54.8	34.2
5	4824.00	50.6 PK	74.0	-23.4	2.93 V	3	54.8	-4.2
6	4824.00	39.5 AV	54.0	-14.5	2.93 V	3	43.7	-4.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11n (HT20)	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	*2437.00	97.3 PK			1.21 H	216	63.0	34.3
2	*2437.00	88.1 AV			1.21 H	216	53.8	34.3
3	4874.00	49.8 PK	74.0	-24.2	2.55 H	115	54.1	-4.3
4	4874.00	39.0 AV	54.0	-15.0	2.55 H	115	43.3	-4.3
Antenna Polarity & Test Distance : Vertical at								
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	*2437.00	98.4 PK			2.04 V	145	64.1	34.3
2	*2437.00	89.1 AV			2.04 V	145	54.8	34.3
3	4874.00	50.5 PK	74.0	-23.5	3.88 V	83	54.8	-4.3
4	4874.00	40.0 AV	54.0	-14.0	3.88 V	83	44.3	-4.3

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. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11n (HT20)	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	*2462.00	97.9 PK			1.22 H	216	63.5	34.4
2	*2462.00	88.7 AV			1.22 H	216	54.3	34.4
3	2483.50	61.5 PK	74.0	-12.5	1.22 H	216	63.4	-1.9
4	2483.50	45.2 AV	54.0	-8.8	1.22 H	216	47.1	-1.9
5	4924.00	49.8 PK	74.0	-24.2	3.81 H	255	54.2	-4.4
6	4924.00	39.4 AV	54.0	-14.6	3.81 H	255	43.8	-4.4
Antenna Polarity & Test Distance : Vertical at								
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	*2462.00	98.8 PK			2.04 V	145	64.4	34.4
2	*2462.00	89.6 AV			2.04 V	145	55.2	34.4
3	2483.50	62.5 PK	74.0	-11.5	2.04 V	145	64.4	-1.9
4	2483.50	46.7 AV	54.0	-7.3	2.04 V	145	48.6	-1.9
5	4924.00	50.1 PK	74.0	-23.9	2.28 V	236	54.5	-4.4
6	4924.00	40.1 AV	54.0	-13.9	2.28 V	236	44.5	-4.4

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. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11n (HT40)	Channel	CH 3 : 2422 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	2390.00	56.7 PK	74.0	-17.3	1.20 H	215	59.2	-2.5
2	2390.00	44.6 AV	54.0	-9.4	1.20 H	215	47.1	-2.5
3	*2422.00	95.7 PK			1.20 H	215	61.5	34.2
4	*2422.00	86.5 AV			1.20 H	215	52.3	34.2
5	4844.00	49.7 PK	74.0	-24.3	2.71 H	334	53.9	-4.2
6	4844.00	39.2 AV	54.0	-14.8	2.71 H	334	43.4	-4.2
Antenna Polarity & Test Distance : Vertical at								
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	2390.00	58.8 PK	74.0	-15.2	1.82 V	155	61.3	-2.5
2	2390.00	46.4 AV	54.0	-7.6	1.82 V	155	48.9	-2.5
3	*2422.00	96.7 PK			1.82 V	155	62.5	34.2
4	*2422.00	87.5 AV			1.82 V	155	53.3	34.2
5	4844.00	50.1 PK	74.0	-23.9	1.65 V	107	54.3	-4.2
6	4844.00	40.3 AV	54.0	-13.7	1.65 V	107	44.5	-4.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11n (HT40)	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	*2437.00	96.1 PK			1.20 H	216	61.8	34.3
2	*2437.00	86.8 AV			1.20 H	216	52.5	34.3
3	4874.00	49.8 PK	74.0	-24.2	3.21 H	110	54.1	-4.3
4	4874.00	39.4 AV	54.0	-14.6	3.21 H	110	43.7	-4.3
Antenna Polarity & Test Distance : Vertical at								
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	*2437.00	97.0 PK			1.88 V	156	62.7	34.3
2	*2437.00	87.8 AV			1.88 V	156	53.5	34.3
3	4874.00	50.5 PK	74.0	-23.5	2.46 V	62	54.8	-4.3
4	4874.00	40.3 AV	54.0	-13.7	2.46 V	62	44.6	-4.3

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. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.

RF Mode	802.11n (HT40)	Channel	CH 9 : 2452 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at								
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	*2452.00	95.8 PK			1.13 H	227	61.4	34.4
2	*2452.00	86.6 AV			1.13 H	227	52.2	34.4
3	2483.50	59.5 PK	74.0	-14.5	1.13 H	227	61.4	-1.9
4	2483.50	46.9 AV	54.0	-7.1	1.13 H	227	48.8	-1.9
5	4904.00	50.1 PK	74.0	-23.9	1.63 H	326	54.3	-4.2
6	4904.00	39.3 AV	54.0	-14.7	1.63 H	326	43.5	-4.2
Antenna Polarity & Test Distance : Vertical at								
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	*2452.00	96.8 PK			2.14 V	148	62.4	34.4
2	*2452.00	87.6 AV			2.14 V	148	53.2	34.4
3	2483.50	61.3 PK	74.0	-12.7	2.14 V	148	63.2	-1.9
4	2483.50	48.1 AV	54.0	-5.9	2.14 V	148	50.0	-1.9
5	4904.00	50.5 PK	74.0	-23.5	1.28 V	256	54.7	-4.2
6	4904.00	40.0 AV	54.0	-14.0	1.28 V	256	44.2	-4.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.

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:

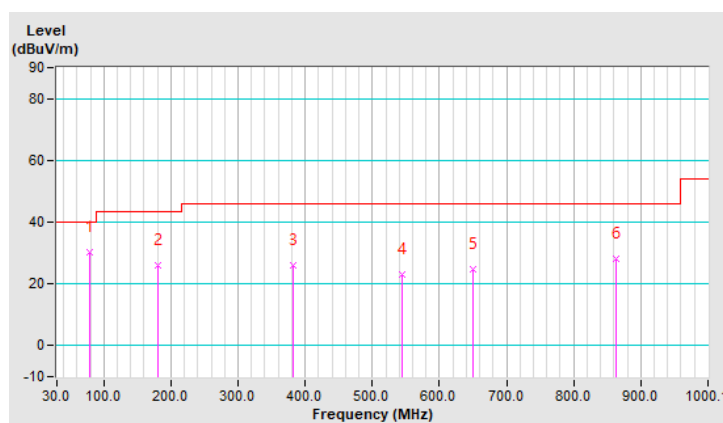
802.11n (HT40)

RF Mode	802.11n (HT40)	Channel	CH 9 : 2452 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz

Antenna Polarity & Test Distance : Horizontal at								
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	79.48	30.2 QP	40.0	-9.8	1.73 H	213	46.9	-16.7
2	181.34	26.1 QP	43.5	-17.4	2.03 H	44	40.3	-14.2
3	381.18	25.9 QP	46.0	-20.1	2.74 H	305	35.7	-9.8
4	544.15	23.2 QP	46.0	-22.8	2.76 H	222	29.5	-6.3
5	649.89	24.7 QP	46.0	-21.3	2.10 H	79	29.1	-4.4
6	863.32	28.2 QP	46.0	-17.8	1.96 H	333	29.7	-1.5

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.

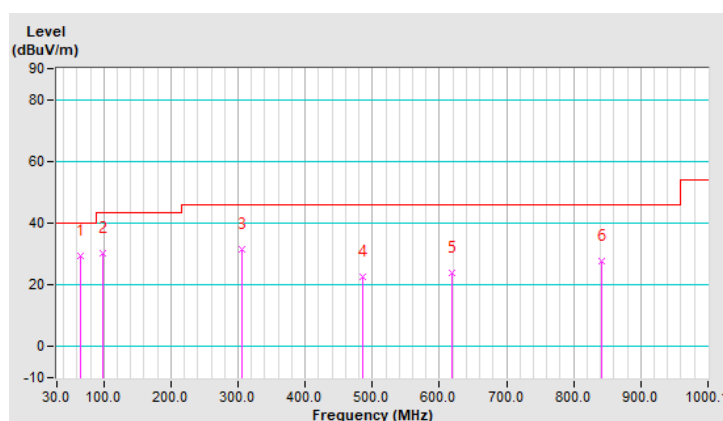


RF Mode	802.11n (HT40)	Channel	CH 9 : 2452 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz

Antenna Polarity & Test Distance : Vertical at								
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	65.89	29.5 QP	40.0	-10.5	1.98 V	58	43.3	-13.8
2	98.88	30.3 QP	43.5	-13.2	1.64 V	153	47.3	-17.0
3	305.51	31.5 QP	46.0	-14.5	2.63 V	43	43.0	-11.5
4	484.98	22.7 QP	46.0	-23.3	2.56 V	84	30.0	-7.3
5	618.85	24.0 QP	46.0	-22.0	1.98 V	202	28.9	-4.9
6	841.00	27.6 QP	46.0	-18.4	3.70 V	99	29.0	-1.4

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.



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 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102783	Dec. 21, 2022	Dec. 20, 2023
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 03, 2022	Sep. 02, 2023
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	May 24, 2022	May 23, 2023
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 2 (Conduction 2).
 3. The VCCI Site Registration No. is C-12047.
 4. Test Date: 2022/12/26

4.2.3 Test Procedures

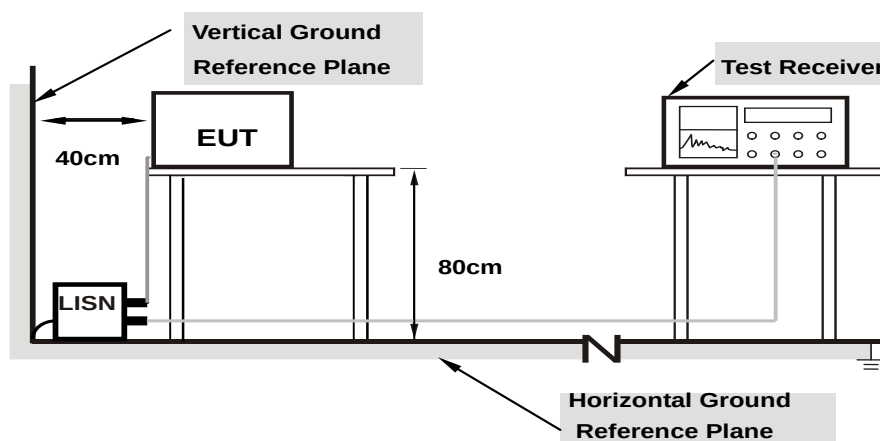
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance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

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

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

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

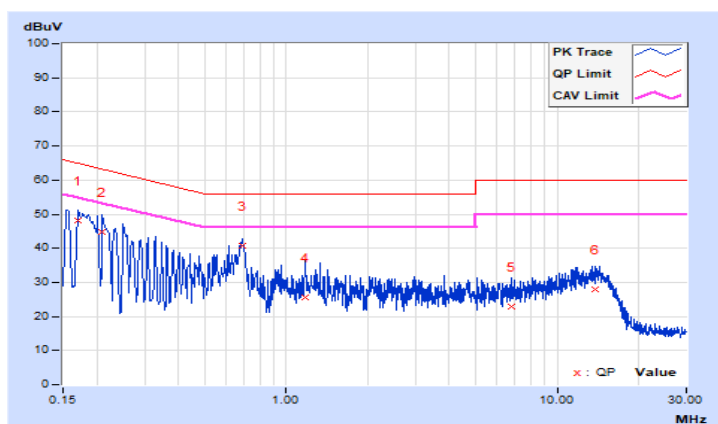
4.2.7 Test Results

RF Mode	802.11n (HT40)	Channel	CH 9 : 2452 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz

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	0.17000	10.13	38.15	22.13	48.28	32.26	64.96	54.96	-16.68	-22.70
2	0.21000	10.14	34.63	17.32	44.77	27.46	63.21	53.21	-18.44	-25.75
3	0.69000	10.17	30.48	22.21	40.65	32.38	56.00	46.00	-15.35	-13.62
4	1.17411	10.19	15.30	5.75	25.49	15.94	56.00	46.00	-30.51	-30.06
5	6.76200	10.27	12.79	2.54	23.06	12.81	60.00	50.00	-36.94	-37.19
6	13.80600	10.34	17.51	7.02	27.85	17.36	60.00	50.00	-32.15	-32.64

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

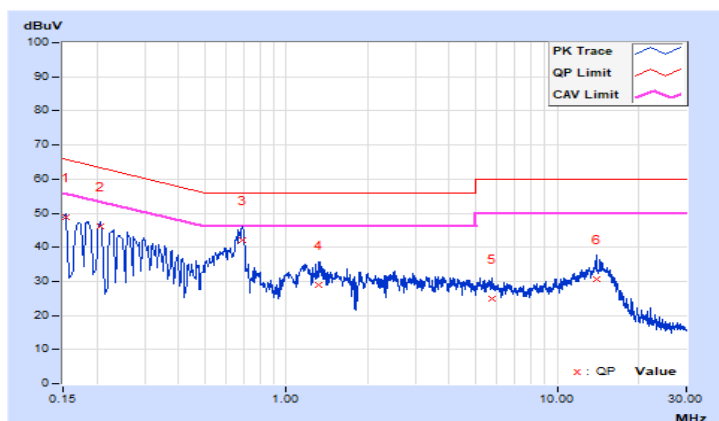


RF Mode	802.11n (HT40)	Channel	CH 9 : 2452 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz

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	0.15400	10.13	38.62	23.76	48.75	33.89	65.78	55.78	-17.03	-21.89
2	0.20577	10.15	35.88	19.50	46.03	29.65	63.37	53.37	-17.34	-23.72
3	0.68595	10.18	32.00	22.29	42.18	32.47	56.00	46.00	-13.82	-13.53
4	1.31800	10.20	18.85	10.73	29.05	20.93	56.00	46.00	-26.95	-25.07
5	5.73400	10.30	14.78	7.45	25.08	17.75	60.00	50.00	-34.92	-32.25
6	13.91800	10.44	20.23	7.68	30.67	18.12	60.00	50.00	-29.33	-31.88

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

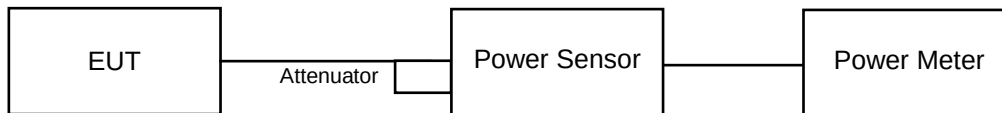


4.3 Conducted Output Power Measurement

4.3.1 Limits of Conducted Output Power Measurement

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

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 Procedures

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.

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.

4.3.5 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 Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	57.677	17.61	32.81	15.16	30	Pass
6	2437	52.966	17.24	29.854	14.75	30	Pass
11	2462	59.566	17.75	33.266	15.22	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	55.335	17.43	10.789	10.33	30	Pass
6	2437	54.45	17.36	10.965	10.40	30	Pass
11	2462	56.885	17.55	11.641	10.66	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	53.456	17.28	9.886	9.95	30	Pass
6	2437	57.81	17.62	9.908	9.96	30	Pass
11	2462	56.234	17.50	9.908	9.96	30	Pass

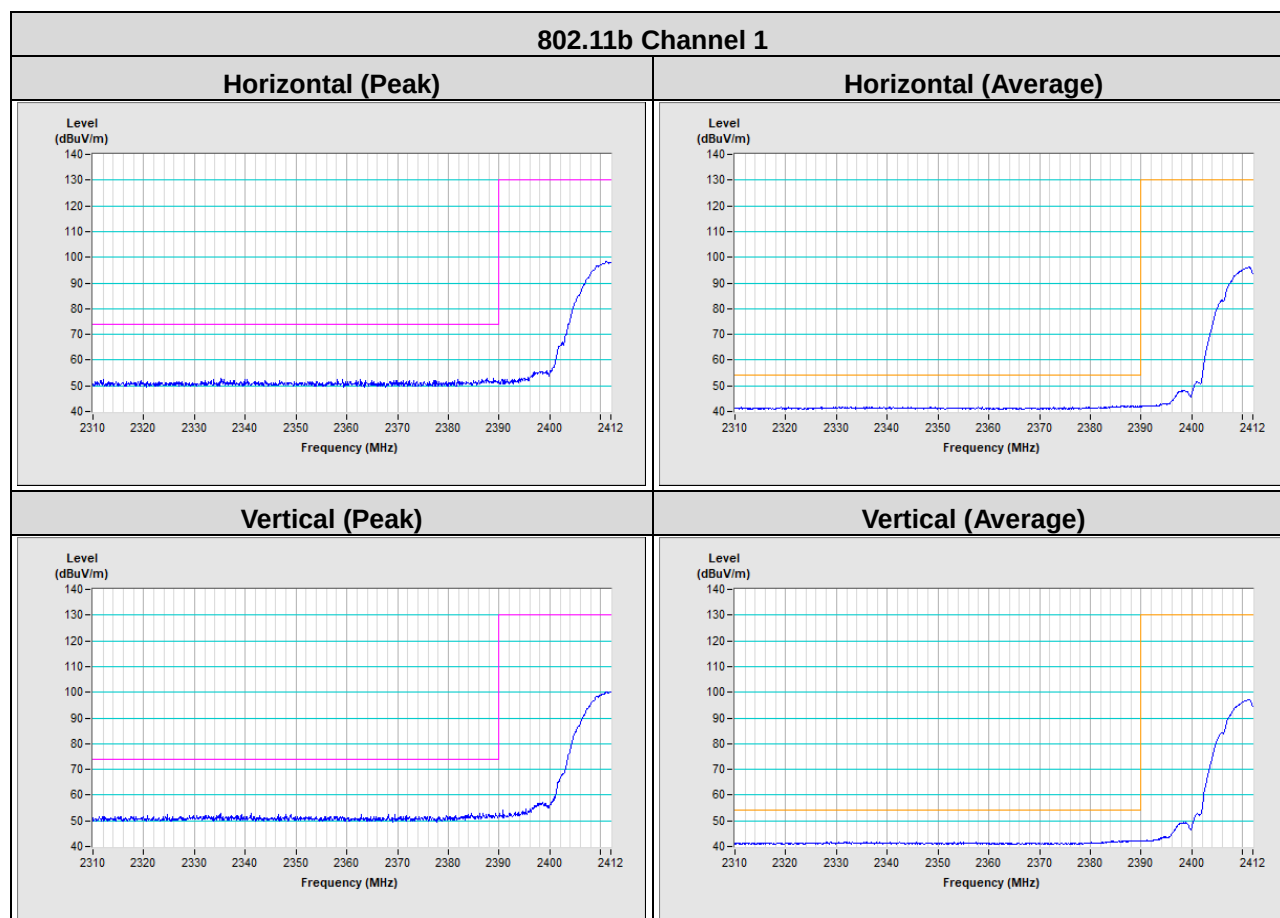
802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	56.754	17.54	11.967	10.78	30	Pass
6	2437	58.21	17.65	12.19	10.86	30	Pass
9	2452	61.518	17.89	12.531	10.98	30	Pass

5 Pictures of Test Arrangements

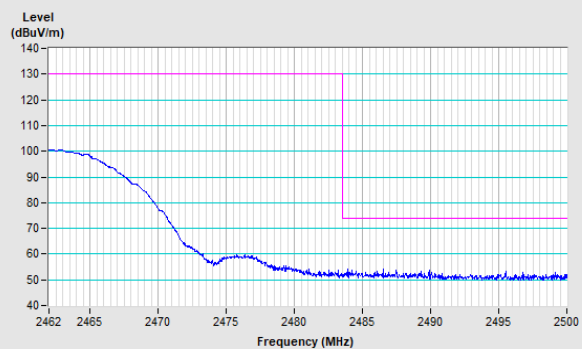
Please refer to the attached file (Test Setup Photo).

Annex A- Band Edge Measurement

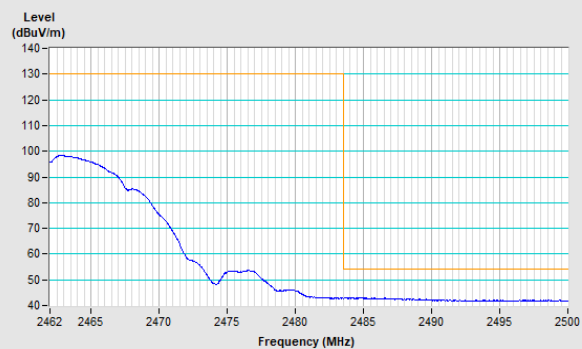


802.11b Channel 11

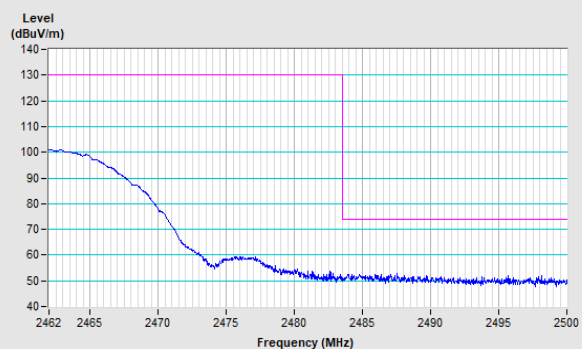
Horizontal (Peak)



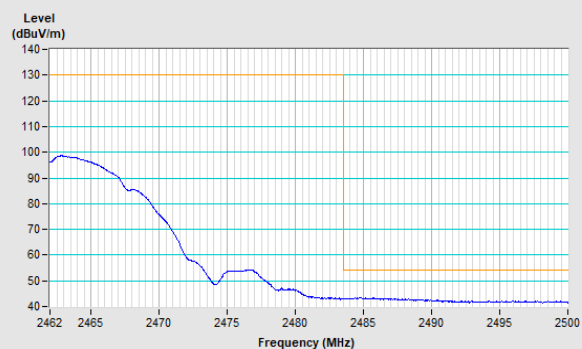
Horizontal (Average)



Vertical (Peak)

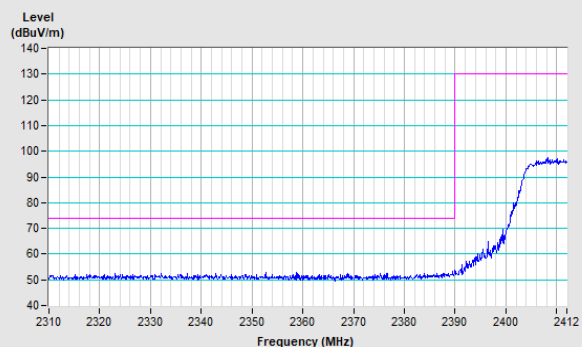


Vertical (Average)

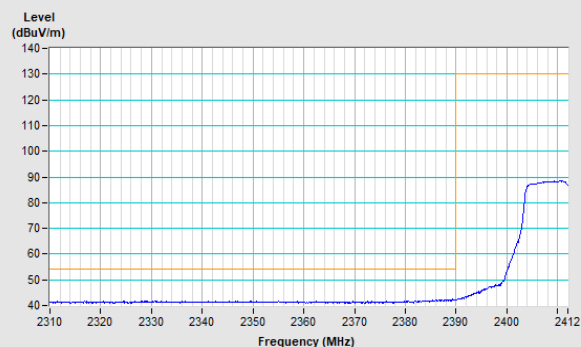


802.11g Channel 1

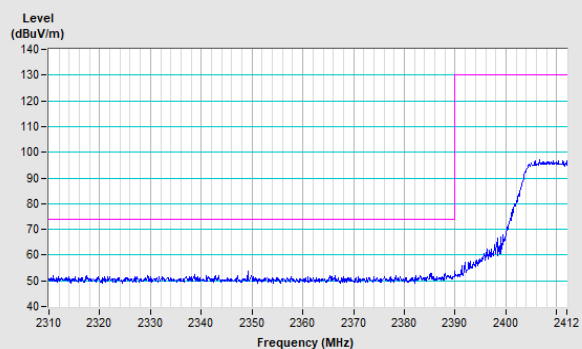
Horizontal (Peak)



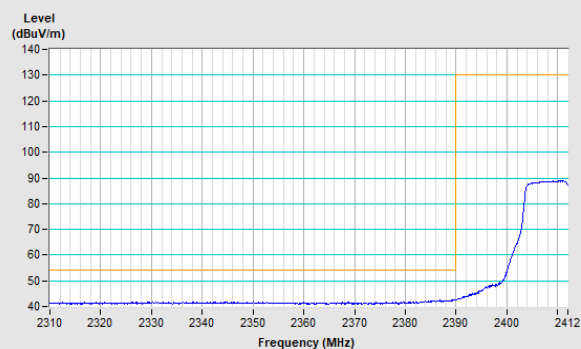
Horizontal (Average)



Vertical (Peak)

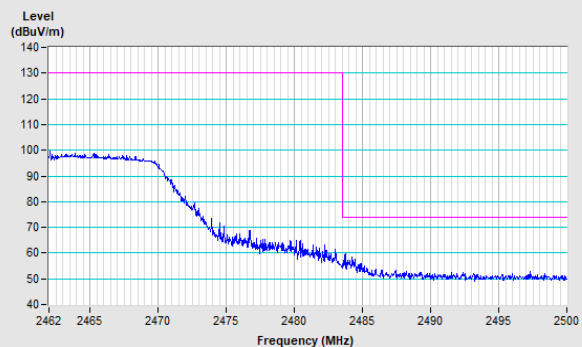


Vertical (Average)

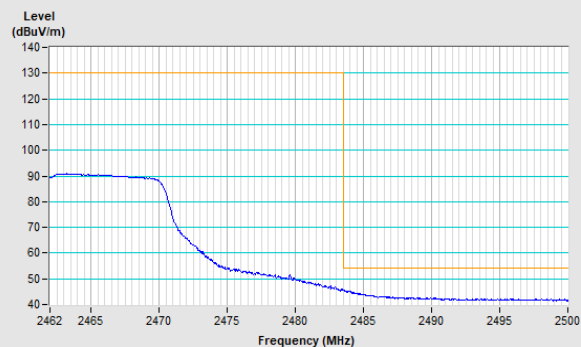


802.11g Channel 11

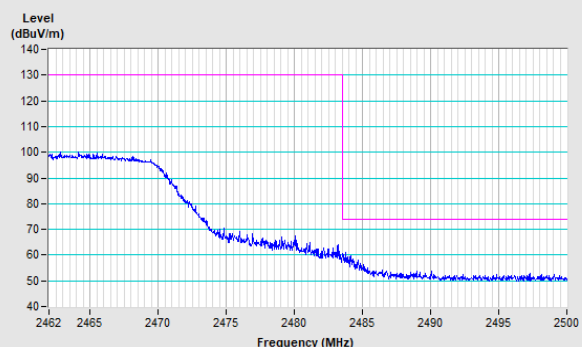
Horizontal (Peak)



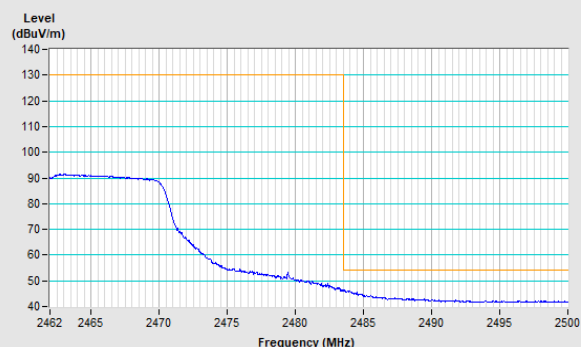
Horizontal (Average)



Vertical (Peak)

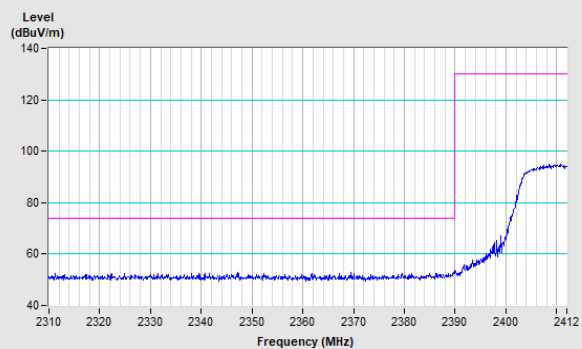


Vertical (Average)

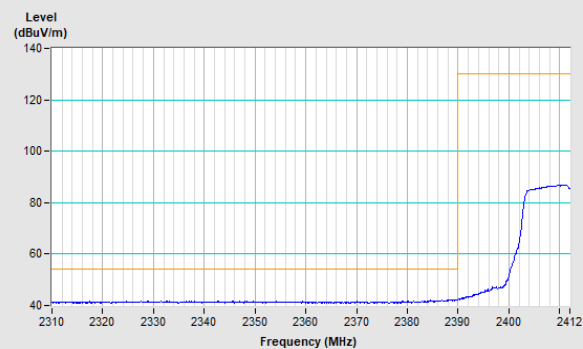


802.11n (HT20) Channel 1

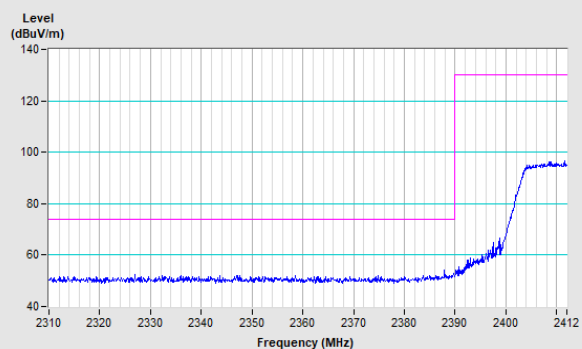
Horizontal (Peak)



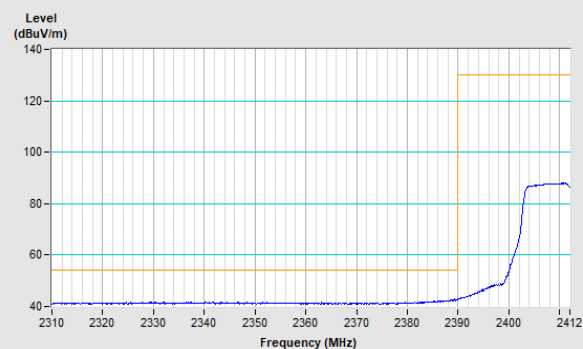
Horizontal (Average)



Vertical (Peak)

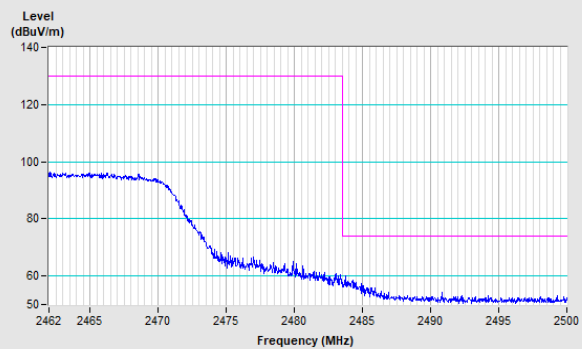


Vertical (Average)

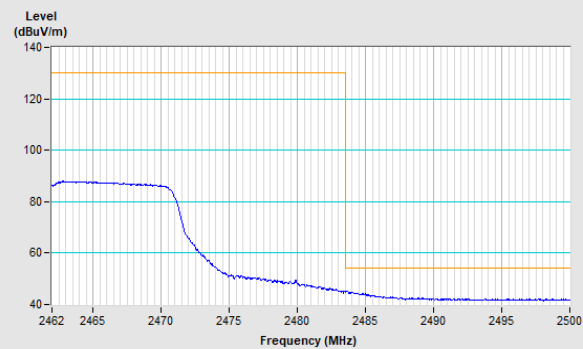


802.11n (HT20) Channel 11

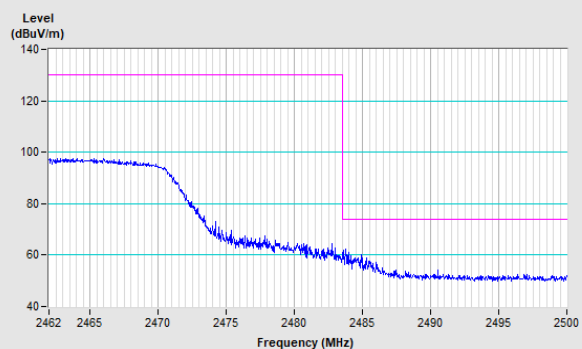
Horizontal (Peak)



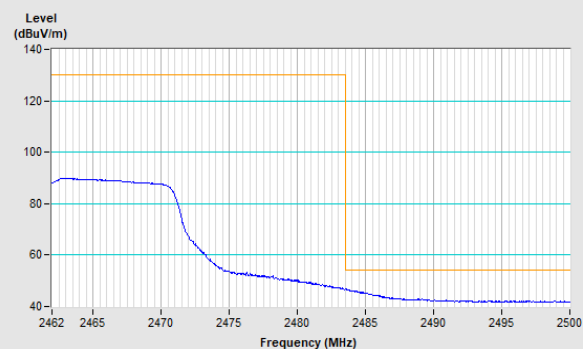
Horizontal (Average)



Vertical (Peak)

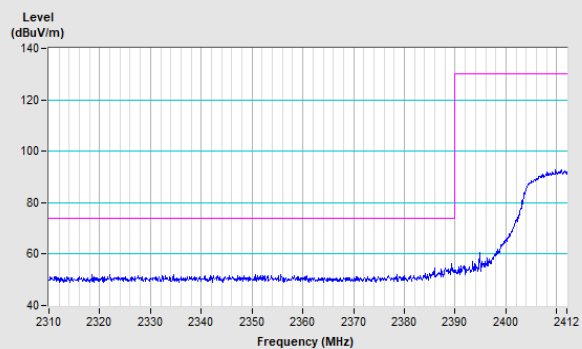


Vertical (Average)

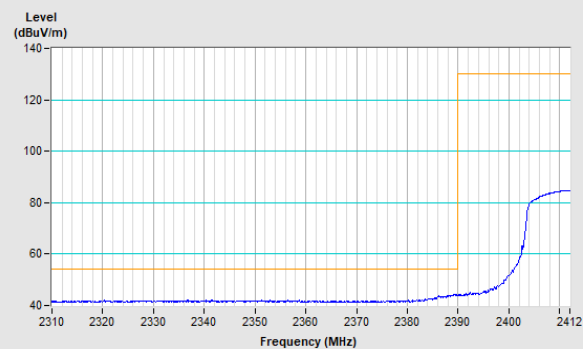


802.11n (HT40) Channel 3

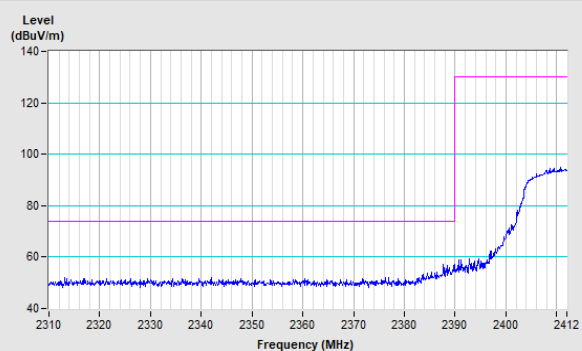
Horizontal (Peak)



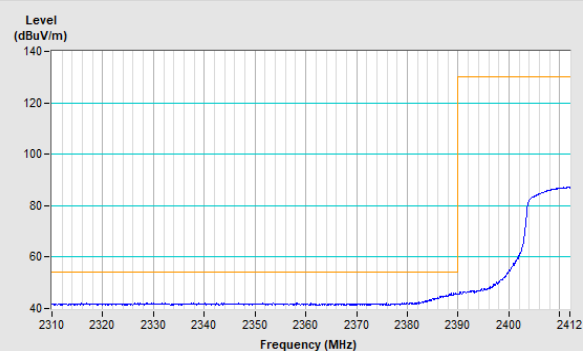
Horizontal (Average)



Vertical (Peak)

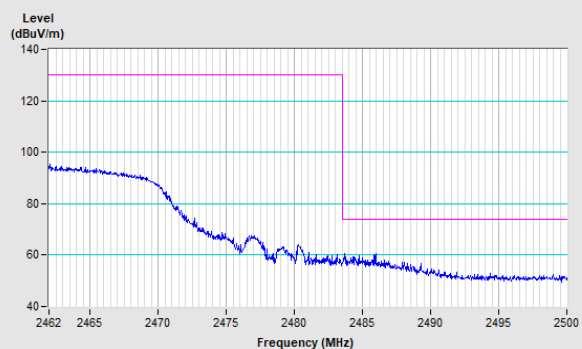


Vertical (Average)

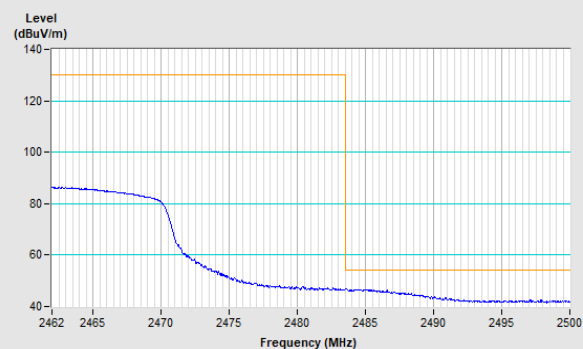


802.11n (HT40) Channel 9

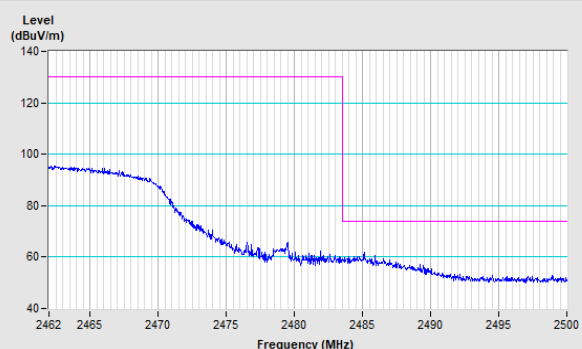
Horizontal (Peak)



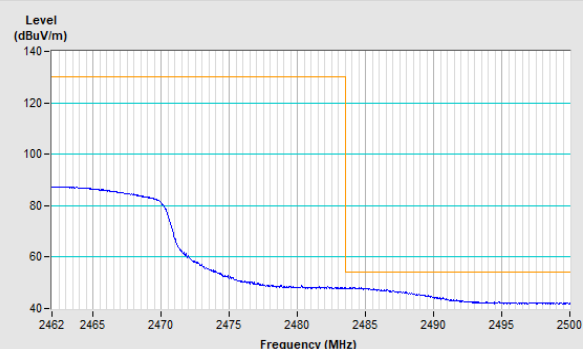
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



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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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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