FCC Test Report (2.4GHz WLAN)

Report No.: RFBEMI-WTW-P21070601A

FCC ID: XHHBNRV1000-A

Test Model: BNRV1000

Received Date: 2020/12/8

Test Date: 2021/12/15 ~ 2021/12/16

Issued Date: 2022/1/18

Applicant: Nook Digital LLC

Address: 33 E 17th Street, New York, NY 10003 United States

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

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan

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

FCC Registration / Designation Number: 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RFBEMI-WTW-P21070601A	Original release.	2022/1/18

1 Certificate of Conformity

Product: EBOOK READER

Brand: nook

Test Model: BNRV1000

Sample Status: Engineering sample

Applicant: Nook Digital LLC

Test Date: 2021/12/15 ~ 2021/12/16

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 EMC characteristics under the conditions specified in this report.

Prepared by : Cherry Chuo , **Date:** 2022/1/18

Cherry Chuo / Specialist

Approved by : , **Date:** 2022/1/18

Clark Lin / Technical Manager

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 -10.18 dB at 0.15931 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.2 dB at 2390.00 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note:

1. For 2.4 GHz band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A.
2. 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	150kHz ~ 30MHz	1.9 dB
Conducted emissions	-	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.5 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.1 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 (2.4GHz WLAN)

Product	EBOOK READER
Brand	nook
Test Model	BNRV1000
Status of EUT	Engineering sample
Power Supply Rating	DC 5V from USB interface or DC 3.7V from battery
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 150 Mbps
Operating Frequency	2.412 ~ 2.462 GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40):7
Output Power	118.304 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Refer to note
Cable Supplied	USB Cable X1 (Shielded, 1.0m)

Note:

1. There are WLAN and Bluetooth technology used for the EUT.
2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

3. The EUT could be supplied with eMMC as following table:

Brand	Model
Samsung	KLM8G1GETF-B041

4. The EUT could be supplied with a rechargeable battery as the following table:

Brand Name	Model No.	Spec.
EVE Energy CO., LTD	PR-284983N	3.7 Vdc ,1500 mAH ,5.25 Wh

5. The antenna provided to the EUT, please refer to the following table:

RF Chain NO.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
0	Walsin Technology Corporation	RFECA3216060AAT	2	2.4~2.4835	CERAMIC ANTENNA	none

6. The EUT was pre-tested under the following modes:

Radiated Emission test	
Test Mode	Description
Mode A	Battery mode
Mode B	**USB Adapter mode**
Note: From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.	
AC Power Conducted Emission test	
Test Mode	Description
Mode A	**USB Adapter mode**
Mode B	Laptop mode
Note: From the above modes, the worst case was found in **Mode A**. Therefore only the test data of the mode was recorded in this report.	

7. The EUT incorporates a SISO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX

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

3.2 Description of Test Modes

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≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
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 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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
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

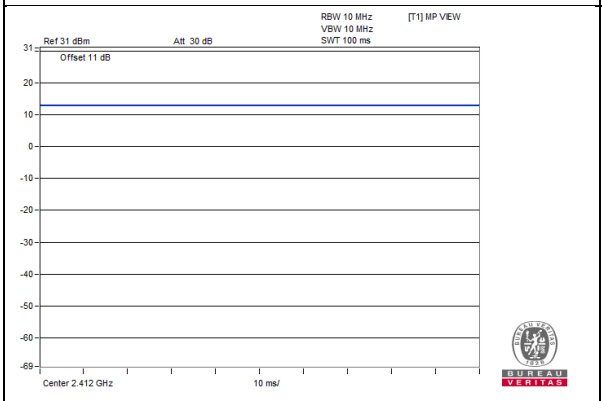
Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE≥1G	25deg. C, 66%RH	120Vac, 60Hz	Tom Yang
RE<1G	25deg. C, 66%RH	120Vac, 60Hz	Tom Yang
PLC	25deg. C, 66%RH	120Vac, 60Hz	Tom Yang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jim Hung

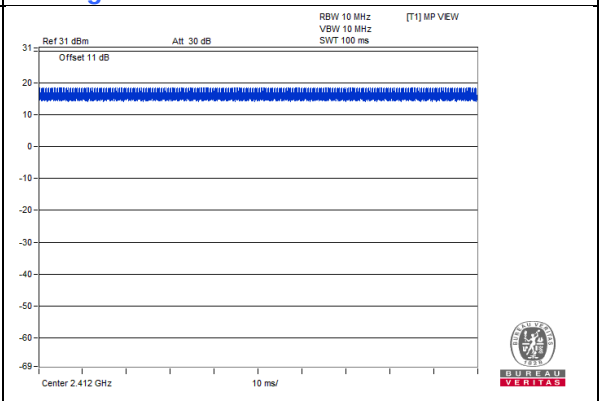
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.

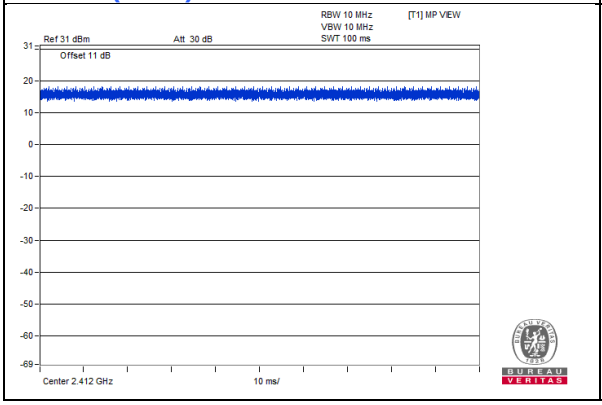
802.11b



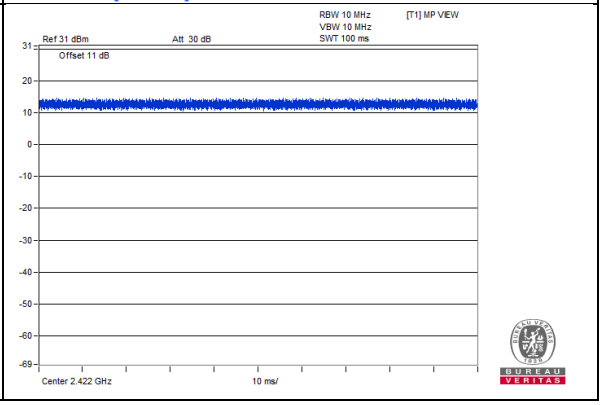
802.11g



802.11n (HT20)



802.11n (HT40)



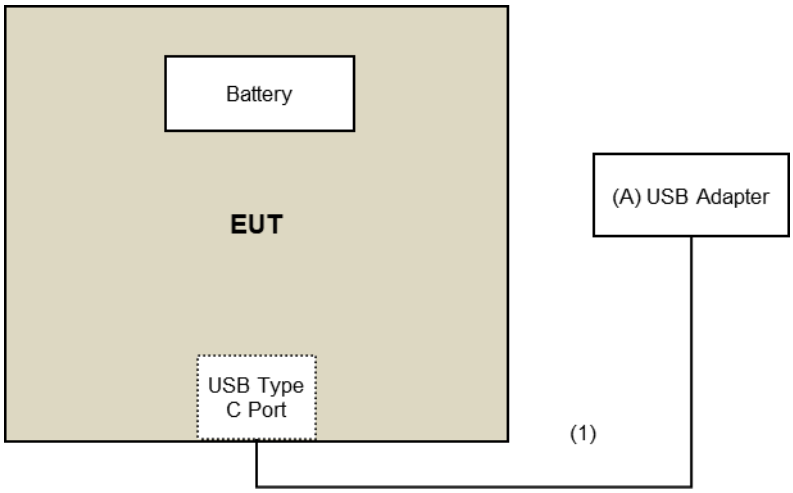
3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	USB Adapter	ASUS	EXA1205UA	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Type A To USB Type C Cable	1	1	Yes	0	Supplied by applicant

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

Test Standard:

FCC Part 15, Subpart C (15.247)
ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

Note:

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

4.1.2 Test Instruments

For Radiated Emission and Bandedge test:

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Signal Analyzer Keysight	N9010A	MY56070348	2021/9/15	2022/9/14
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Pre_Amplifier EMCI	EMC001340	980142	2021/5/24	2022/5/23
LOOP ANTENNA Electro-Metrics	EM-6879	264	2021/3/5	2022/3/4
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2021/1/7	2022/1/6
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-002	2021/1/7	2022/1/6
Pre_Amplifier EMCI	EMC330N	980701	2021/3/10	2022/3/9
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-406	2021/10/27	2022/10/26
RF Coaxial Cable COMMATE/PEWC	8D	966-4-1	2021/3/17	2022/3/16
RF Coaxial Cable COMMATE/PEWC	8D	966-4-2	2021/3/17	2022/3/16
RF Coaxial Cable COMMATE/PEWC	8D	966-4-3	2021/3/17	2022/3/16
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	2021/1/11	2022/1/10
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-783	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC 12630 SE	980638	2021/4/7	2022/4/6
RF Cable-Frequency Range : 1-26.5GHz EMCI	EMC104-SM-SM-1200	160922	2020/12/25	2021/12/24
RF Coaxial Cable EMCI	EMC104-SM-SM-2000	180502	2021/4/26	2022/4/25
RF Coaxial Cable EMCI	EMC104-SM-SM-6000	180418	2021/4/26	2022/4/25
Pre_Amplifier EMCI	EMC184045SE	980387	2021/1/11	2022/1/10
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170519	2021/11/14	2022/11/13
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2021/1/11	2022/1/10
RF cable (40GHz) EMCI	EMC-KM-KM-4000	200214	2021/3/10	2022/3/9

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. 4.
3. Tested Date: 2021/12/15 ~ 2021/12/16

For other test items:

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Spectrum Analyzer R&S	FSV40	101516	2021/3/8	2022/3/7
Power Meter Anritsu	ML2495A	1529002	2021/6/21	2022/6/20
Pulse Power Sensor Anritsu	MA2411B	1339443	2021/5/31	2022/5/30
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2021/4/13	2022/4/12
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

NOTE:
1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2021/12/16

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:

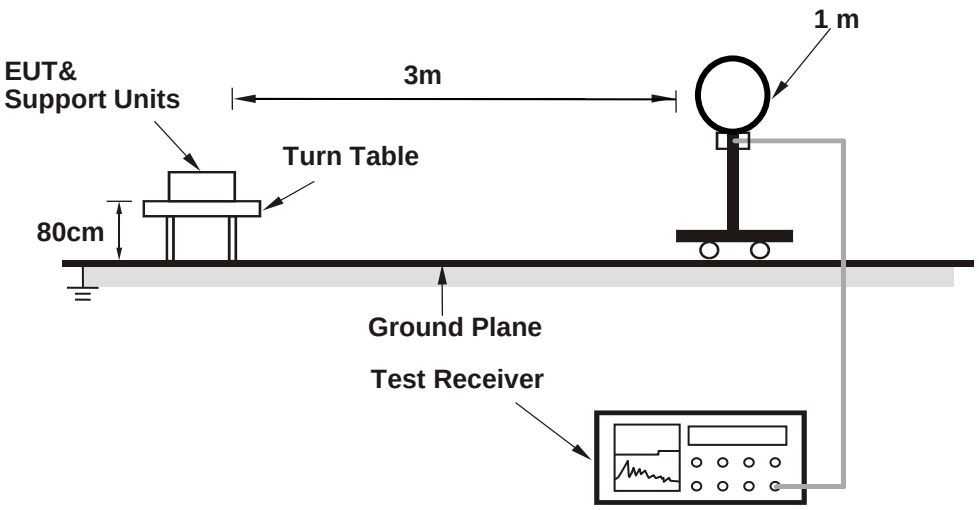
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 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

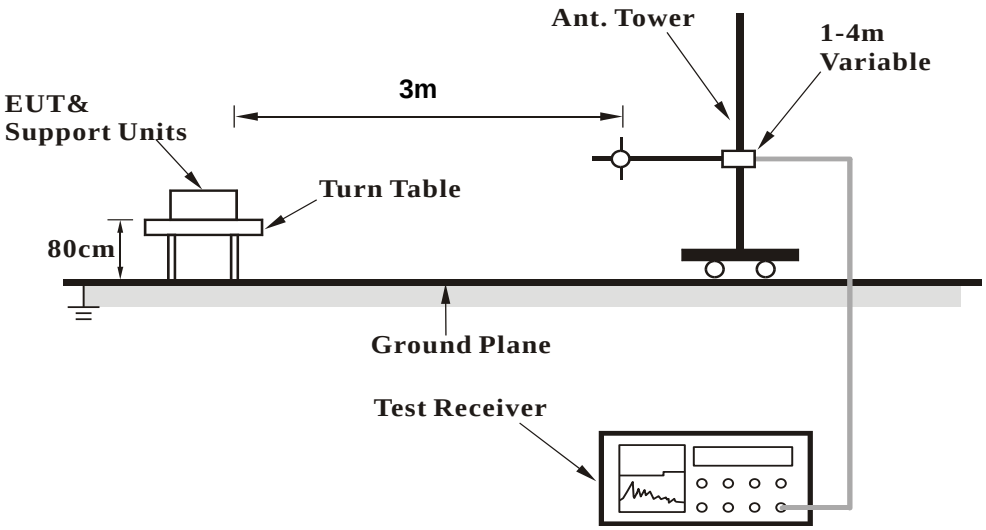
No deviation.

4.1.5 Test Setup

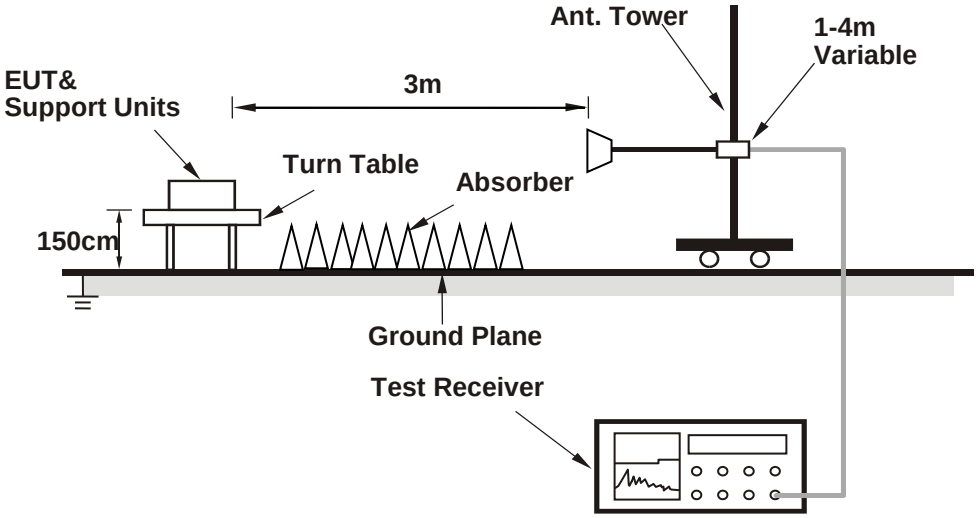
For Radiated emission below 30MHz



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

a. Placed the EUT on the testing table.
b. Controlling software (Run _Wi-Fi.txt) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

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

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	2390.00	59.0 PK	74.0	-15.0	1.27 H	42	63.2	-4.2
2	2390.00	48.4 AV	54.0	-5.6	1.27 H	42	52.6	-4.2
3	*2412.00	106.0 PK			1.27 H	42	110.2	-4.2
4	*2412.00	103.8 AV			1.27 H	42	108.0	-4.2
5	4824.00	43.9 PK	74.0	-30.1	1.35 H	41	43.5	0.4
6	4824.00	41.9 AV	54.0	-12.1	1.35 H	41	41.5	0.4
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	2390.00	56.5 PK	74.0	-17.5	3.71 V	117	60.7	-4.2
2	2390.00	46.1 AV	54.0	-7.9	3.71 V	117	50.3	-4.2
3	*2412.00	103.3 PK			3.71 V	117	107.5	-4.2
4	*2412.00	100.8 AV			3.71 V	117	105.0	-4.2
5	4824.00	43.3 PK	74.0	-30.7	1.05 V	224	42.9	0.4
6	4824.00	40.6 AV	54.0	-13.4	1.05 V	224	40.2	0.4

Remarks:

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

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

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	2390.00	54.1 PK	74.0	-19.9	1.40 H	67	58.3	-4.2
2	2390.00	42.7 AV	54.0	-11.3	1.40 H	67	46.9	-4.2
3	*2437.00	107.0 PK			1.40 H	67	111.2	-4.2
4	*2437.00	105.0 AV			1.40 H	67	109.2	-4.2
5	2483.50	55.2 PK	74.0	-18.8	1.40 H	67	59.4	-4.2
6	2483.50	43.9 AV	54.0	-10.1	1.40 H	67	48.1	-4.2
7	4874.00	44.3 PK	74.0	-29.7	1.35 H	34	44.0	0.3
8	4874.00	42.4 AV	54.0	-11.6	1.35 H	34	42.1	0.3
9	7311.00	51.0 PK	74.0	-23.0	1.00 H	20	44.1	6.9
10	7311.00	47.4 AV	54.0	-6.6	1.00 H	20	40.5	6.9
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	2390.00	53.2 PK	74.0	-20.8	3.76 V	97	57.4	-4.2
2	2390.00	42.1 AV	54.0	-11.9	3.76 V	97	46.3	-4.2
3	*2437.00	105.1 PK			3.76 V	97	109.3	-4.2
4	*2437.00	100.9 AV			3.76 V	97	105.1	-4.2
5	2483.50	54.6 PK	74.0	-19.4	3.76 V	97	58.8	-4.2
6	2483.50	43.3 AV	54.0	-10.7	3.76 V	97	47.5	-4.2
7	4874.00	43.5 PK	74.0	-30.5	1.07 V	228	43.2	0.3
8	4874.00	41.2 AV	54.0	-12.8	1.07 V	228	40.9	0.3
9	7311.00	51.5 PK	74.0	-22.5	1.22 V	105	44.6	6.9
10	7311.00	47.4 AV	54.0	-6.6	1.22 V	105	40.5	6.9

Remarks:

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

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

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	*2462.00	107.0 PK			1.40 H	71	111.2	-4.2
2	*2462.00	104.8 AV			1.40 H	71	109.0	-4.2
3	2483.50	62.6 PK	74.0	-11.4	1.40 H	71	66.8	-4.2
4	2483.50	52.7 AV	54.0	-1.3	1.40 H	71	56.9	-4.2
5	4924.00	44.8 PK	74.0	-29.2	1.33 H	45	44.3	0.5
6	4924.00	42.7 AV	54.0	-11.3	1.33 H	45	42.2	0.5
7	7386.00	51.5 PK	74.0	-22.5	1.03 H	15	44.3	7.2
8	7386.00	47.7 AV	54.0	-6.3	1.03 H	15	40.5	7.2
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	*2462.00	104.8 PK			3.65 V	113	109.0	-4.2
2	*2462.00	100.7 AV			3.65 V	113	104.9	-4.2
3	2483.50	59.9 PK	74.0	-14.1	3.65 V	113	64.1	-4.2
4	2483.50	51.7 AV	54.0	-2.3	3.65 V	113	55.9	-4.2
5	4924.00	43.3 PK	74.0	-30.7	1.06 V	225	42.8	0.5
6	4924.00	40.8 AV	54.0	-13.2	1.06 V	225	40.3	0.5
7	7386.00	51.6 PK	74.0	-22.4	1.17 V	105	44.4	7.2
8	7386.00	47.3 AV	54.0	-6.7	1.17 V	105	40.1	7.2

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.

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

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	2390.00	67.6 PK	74.0	-6.4	1.32 H	51	71.8	-4.2
2	**2390.00**	**53.8 AV**	**54.0**	**-0.2**	**1.32 H**	**51**	**58.0**	**-4.2**
3	*2412.00	106.1 PK			1.32 H	51	110.3	-4.2
4	*2412.00	97.2 AV			1.32 H	51	101.4	-4.2
5	4824.00	42.0 PK	74.0	-32.0	1.37 H	46	41.6	0.4
6	4824.00	30.4 AV	54.0	-23.6	1.37 H	46	30.0	0.4
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	2390.00	65.7 PK	74.0	-8.3	3.64 V	99	69.9	-4.2
2	2390.00	53.4 AV	54.0	-0.6	3.64 V	99	57.6	-4.2
3	*2412.00	105.8 PK			3.64 V	99	110.0	-4.2
4	*2412.00	96.3 AV			3.64 V	99	100.5	-4.2
5	4824.00	44.5 PK	74.0	-29.5	1.09 V	212	44.1	0.4
6	4824.00	31.8 AV	54.0	-22.2	1.09 V	212	31.4	0.4

Remarks:

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

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

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	2390.00	61.1 PK	74.0	-12.9	1.29 H	53	65.3	-4.2
2	2390.00	48.4 AV	54.0	-5.6	1.29 H	53	52.6	-4.2
3	*2437.00	110.2 PK			1.29 H	53	114.4	-4.2
4	*2437.00	100.5 AV			1.29 H	53	104.7	-4.2
5	2483.50	66.7 PK	74.0	-7.3	1.29 H	53	70.9	-4.2
6	2483.50	53.6 AV	54.0	-0.4	1.29 H	53	57.8	-4.2
7	4874.00	41.7 PK	74.0	-32.3	1.32 H	38	41.4	0.3
8	4874.00	30.2 AV	54.0	-23.8	1.32 H	38	29.9	0.3
9	7311.00	49.7 PK	74.0	-24.3	1.02 H	30	42.8	6.9
10	7311.00	37.7 AV	54.0	-16.3	1.02 H	30	30.8	6.9
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	2390.00	60.4 PK	74.0	-13.6	3.67 V	107	64.6	-4.2
2	2390.00	48.6 AV	54.0	-5.4	3.67 V	107	52.8	-4.2
3	*2437.00	107.7 PK			3.67 V	107	111.9	-4.2
4	*2437.00	99.0 AV			3.67 V	107	103.2	-4.2
5	2483.50	63.4 PK	74.0	-10.6	3.67 V	107	67.6	-4.2
6	2483.50	51.5 AV	54.0	-2.5	3.67 V	107	55.7	-4.2
7	4874.00	44.4 PK	74.0	-29.6	1.10 V	242	44.1	0.3
8	4874.00	31.2 AV	54.0	-22.8	1.10 V	242	30.9	0.3
9	7311.00	48.7 PK	74.0	-25.3	1.20 V	98	41.8	6.9
10	7311.00	36.4 AV	54.0	-17.6	1.20 V	98	29.5	6.9

Remarks:

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

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

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	*2462.00	105.5 PK			1.25 H	72	109.7	-4.2
2	*2462.00	96.3 AV			1.25 H	72	100.5	-4.2
3	2483.50	70.0 PK	74.0	-4.0	1.25 H	72	74.2	-4.2
4	2483.50	53.5 AV	54.0	-0.5	1.25 H	72	57.7	-4.2
5	4924.00	42.2 PK	74.0	-31.8	1.28 H	57	41.7	0.5
6	4924.00	30.6 AV	54.0	-23.4	1.28 H	57	30.1	0.5
7	7386.00	49.4 PK	74.0	-24.6	1.00 H	5	42.2	7.2
8	7386.00	37.4 AV	54.0	-16.6	1.00 H	5	30.2	7.2
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	*2462.00	105.4 PK			3.68 V	92	109.6	-4.2
2	*2462.00	96.6 AV			3.68 V	92	100.8	-4.2
3	2483.50	66.1 PK	74.0	-7.9	3.68 V	92	70.3	-4.2
4	2483.50	51.1 AV	54.0	-2.9	3.68 V	92	55.3	-4.2
5	4924.00	44.4 PK	74.0	-29.6	1.07 V	220	43.9	0.5
6	4924.00	31.4 AV	54.0	-22.6	1.07 V	220	30.9	0.5
7	7386.00	48.9 PK	74.0	-25.1	1.19 V	105	41.7	7.2
8	7386.00	36.5 AV	54.0	-17.5	1.19 V	105	29.3	7.2

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.

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

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	2390.00	69.4 PK	74.0	-4.6	1.30 H	48	73.6	-4.2
2	2390.00	53.6 AV	54.0	-0.4	1.30 H	48	57.8	-4.2
3	*2412.00	105.8 PK			1.30 H	48	110.0	-4.2
4	*2412.00	96.6 AV			1.30 H	48	100.8	-4.2
5	4824.00	41.8 PK	74.0	-32.2	1.40 H	60	41.4	0.4
6	4824.00	30.2 AV	54.0	-23.8	1.40 H	60	29.8	0.4
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	2390.00	64.8 PK	74.0	-9.2	3.67 V	100	69.0	-4.2
2	2390.00	50.9 AV	54.0	-3.1	3.67 V	100	55.1	-4.2
3	*2412.00	105.1 PK			3.67 V	100	109.3	-4.2
4	*2412.00	95.4 AV			3.67 V	100	99.6	-4.2
5	4824.00	44.9 PK	74.0	-29.1	1.13 V	200	44.5	0.4
6	4824.00	31.8 AV	54.0	-22.2	1.13 V	200	31.4	0.4

Remarks:

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

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

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	2390.00	61.7 PK	74.0	-12.3	1.34 H	62	65.9	-4.2
2	2390.00	48.6 AV	54.0	-5.4	1.34 H	62	52.8	-4.2
3	*2437.00	110.0 PK			1.34 H	62	114.2	-4.2
4	*2437.00	100.6 AV			1.34 H	62	104.8	-4.2
5	2483.50	66.6 PK	74.0	-7.4	1.34 H	62	70.8	-4.2
6	2483.50	53.7 AV	54.0	-0.3	1.34 H	62	57.9	-4.2
7	4874.00	42.1 PK	74.0	-31.9	1.32 H	50	41.8	0.3
8	4874.00	30.3 AV	54.0	-23.7	1.32 H	50	30.0	0.3
9	7311.00	49.2 PK	74.0	-24.8	1.01 H	21	42.3	6.9
10	7311.00	37.2 AV	54.0	-16.8	1.01 H	21	30.3	6.9
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	2390.00	60.3 PK	74.0	-13.7	3.77 V	113	64.5	-4.2
2	2390.00	48.1 AV	54.0	-5.9	3.77 V	113	52.3	-4.2
3	*2437.00	107.4 PK			3.77 V	113	111.6	-4.2
4	*2437.00	98.8 AV			3.77 V	113	103.0	-4.2
5	2483.50	63.9 PK	74.0	-10.1	3.77 V	113	68.1	-4.2
6	2483.50	51.7 AV	54.0	-2.3	3.77 V	113	55.9	-4.2
7	4874.00	44.4 PK	74.0	-29.6	1.12 V	235	44.1	0.3
8	4874.00	31.4 AV	54.0	-22.6	1.12 V	235	31.1	0.3
9	7311.00	48.4 PK	74.0	-25.6	1.20 V	116	41.5	6.9
10	7311.00	36.2 AV	54.0	-17.8	1.20 V	116	29.3	6.9

Remarks:

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

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

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	*2462.00	106.0 PK			1.36 H	56	110.2	-4.2
2	*2462.00	95.7 AV			1.36 H	56	99.9	-4.2
3	2483.50	69.9 PK	74.0	-4.1	1.36 H	56	74.1	-4.2
4	2483.50	53.3 AV	54.0	-0.7	1.36 H	56	57.5	-4.2
5	4924.00	42.8 PK	74.0	-31.2	1.30 H	53	42.3	0.5
6	4924.00	30.8 AV	54.0	-23.2	1.30 H	53	30.3	0.5
7	7386.00	49.1 PK	74.0	-24.9	1.00 H	3	41.9	7.2
8	7386.00	37.0 AV	54.0	-17.0	1.00 H	3	29.8	7.2
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	*2462.00	102.1 PK			3.63 V	99	106.3	-4.2
2	*2462.00	93.0 AV			3.63 V	99	97.2	-4.2
3	2483.50	70.1 PK	74.0	-3.9	3.63 V	99	74.3	-4.2
4	2483.50	52.2 AV	54.0	-1.8	3.63 V	99	56.4	-4.2
5	4924.00	44.0 PK	74.0	-30.0	1.08 V	222	43.5	0.5
6	4924.00	31.2 AV	54.0	-22.8	1.08 V	222	30.7	0.5
7	7386.00	47.7 PK	74.0	-26.3	1.25 V	114	40.5	7.2
8	7386.00	35.8 AV	54.0	-18.2	1.25 V	114	28.6	7.2

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.

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

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	2390.00	65.4 PK	74.0	-8.6	1.32 H	53	69.6	-4.2
2	2390.00	53.7 AV	54.0	-0.3	1.32 H	53	57.9	-4.2
3	*2422.00	103.0 PK			1.32 H	53	107.2	-4.2
4	*2422.00	94.2 AV			1.32 H	53	98.4	-4.2
5	4844.00	42.8 PK	74.0	-31.2	1.32 H	48	42.5	0.3
6	4844.00	31.0 AV	54.0	-23.0	1.32 H	48	30.7	0.3
7	7266.00	48.4 PK	74.0	-25.6	1.00 H	8	41.6	6.8
8	7266.00	36.3 AV	54.0	-17.7	1.00 H	8	29.5	6.8
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	2390.00	65.1 PK	74.0	-8.9	3.76 V	110	69.3	-4.2
2	2390.00	52.4 AV	54.0	-1.6	3.76 V	110	56.6	-4.2
3	*2422.00	101.3 PK			3.76 V	110	105.5	-4.2
4	*2422.00	90.4 AV			3.76 V	110	94.6	-4.2
5	4844.00	43.9 PK	74.0	-30.1	1.02 V	224	43.6	0.3
6	4844.00	31.4 AV	54.0	-22.6	1.02 V	224	31.1	0.3
7	7266.00	47.9 PK	74.0	-26.1	1.19 V	102	41.1	6.8
8	7266.00	36.2 AV	54.0	-17.8	1.19 V	102	29.4	6.8

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.

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

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	2390.00	63.6 PK	74.0	-10.4	1.29 H	64	67.8	-4.2
2	2390.00	50.4 AV	54.0	-3.6	1.29 H	64	54.6	-4.2
3	*2437.00	102.3 PK			1.29 H	64	106.5	-4.2
4	*2437.00	92.1 AV			1.29 H	64	96.3	-4.2
5	2483.50	68.0 PK	74.0	-6.0	1.29 H	64	72.2	-4.2
6	2483.50	53.5 AV	54.0	-0.5	1.29 H	64	57.7	-4.2
7	4874.00	42.6 PK	74.0	-31.4	1.36 H	36	42.3	0.3
8	4874.00	30.6 AV	54.0	-23.4	1.36 H	36	30.3	0.3
9	7311.00	49.0 PK	74.0	-25.0	1.00 H	1	42.1	6.9
10	7311.00	36.8 AV	54.0	-17.2	1.00 H	1	29.9	6.9
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	2390.00	63.0 PK	74.0	-11.0	3.68 V	105	67.2	-4.2
2	2390.00	48.1 AV	54.0	-5.9	3.68 V	105	52.3	-4.2
3	*2437.00	100.6 PK			3.68 V	105	104.8	-4.2
4	*2437.00	91.4 AV			3.68 V	105	95.6	-4.2
5	2483.50	65.3 PK	74.0	-8.7	3.68 V	105	69.5	-4.2
6	2483.50	50.5 AV	54.0	-3.5	3.68 V	105	54.7	-4.2
7	4874.00	43.6 PK	74.0	-30.4	1.07 V	219	43.3	0.3
8	4874.00	30.9 AV	54.0	-23.1	1.07 V	219	30.6	0.3
9	7311.00	47.9 PK	74.0	-26.1	1.18 V	112	41.0	6.9
10	7311.00	36.0 AV	54.0	-18.0	1.18 V	112	29.1	6.9

Remarks:

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

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

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	*2452.00	100.6 PK			1.35 H	43	104.8	-4.2
2	*2452.00	90.4 AV			1.35 H	43	94.6	-4.2
3	2483.50	68.2 PK	74.0	-5.8	1.35 H	43	72.4	-4.2
4	2483.50	53.4 AV	54.0	-0.6	1.35 H	43	57.6	-4.2
5	4904.00	42.2 PK	74.0	-31.8	1.35 H	57	41.8	0.4
6	4904.00	30.6 AV	54.0	-23.4	1.35 H	57	30.2	0.4
7	7356.00	48.2 PK	74.0	-25.8	1.05 H	19	41.1	7.1
8	7356.00	35.9 AV	54.0	-18.1	1.05 H	19	28.8	7.1
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	*2452.00	96.8 PK			3.50 V	95	101.0	-4.2
2	*2452.00	88.8 AV			3.50 V	95	93.0	-4.2
3	2483.50	65.8 PK	74.0	-8.2	3.50 V	95	70.0	-4.2
4	2483.50	50.7 AV	54.0	-3.3	3.50 V	95	54.9	-4.2
5	4904.00	43.9 PK	74.0	-30.1	1.06 V	224	43.5	0.4
6	4904.00	31.6 AV	54.0	-22.4	1.06 V	224	31.2	0.4
7	7356.00	47.8 PK	74.0	-26.2	1.20 V	92	40.7	7.1
8	7356.00	36.1 AV	54.0	-17.9	1.20 V	92	29.0	7.1

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

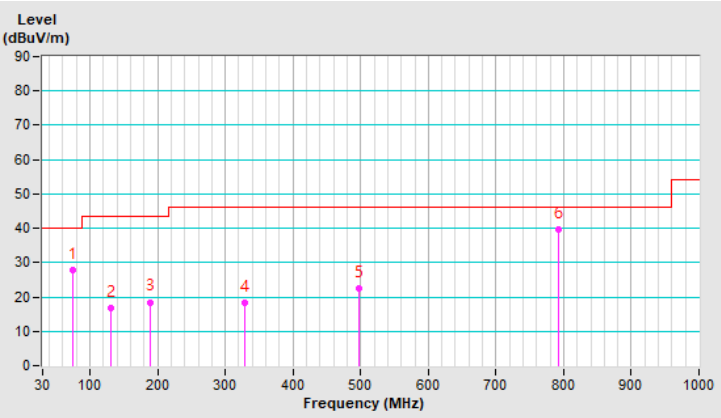
Below 1GHz Data:

RF Mode	TX 802.11b	Channel	CH 6：2437 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	74.82	27.8 QP	40.0	-12.2	2.00 H	100	43.8	-16.0
2	130.35	16.6 QP	43.5	-26.9	3.00 H	71	29.8	-13.2
3	189.04	18.5 QP	43.5	-25.0	1.00 H	215	33.1	-14.6
4	328.29	18.1 QP	46.0	-27.9	3.00 H	151	28.1	-10.0
5	497.47	22.4 QP	46.0	-23.6	2.00 H	1	27.7	-5.3
6	791.91	39.5 QP	46.0	-6.5	1.00 H	60	38.5	1.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

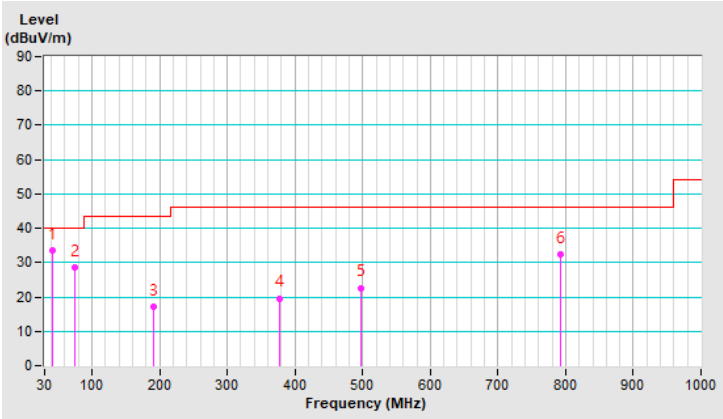


RF Mode	TX 802.11b	Channel	CH 6：2437 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	41.30	33.6 QP	40.0	-6.4	1.50 V	352	46.5	-12.9
2	74.11	28.7 QP	40.0	-11.3	1.50 V	288	44.6	-15.9
3	190.74	17.0 QP	43.5	-26.5	1.00 V	20	31.7	-14.7
4	378.15	19.6 QP	46.0	-26.4	2.00 V	282	28.2	-8.6
5	497.18	22.7 QP	46.0	-23.3	2.00 V	169	28.0	-5.3
6	791.98	32.5 QP	46.0	-13.5	2.00 V	292	31.5	1.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: 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
LISN R & S	ESH3-Z5	835239/001	2021/3/26	2022/3/25
50 ohms Terminator	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	2021/8/27	2022/8/26
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: 2021/12/16

4.2.3 Test Procedures

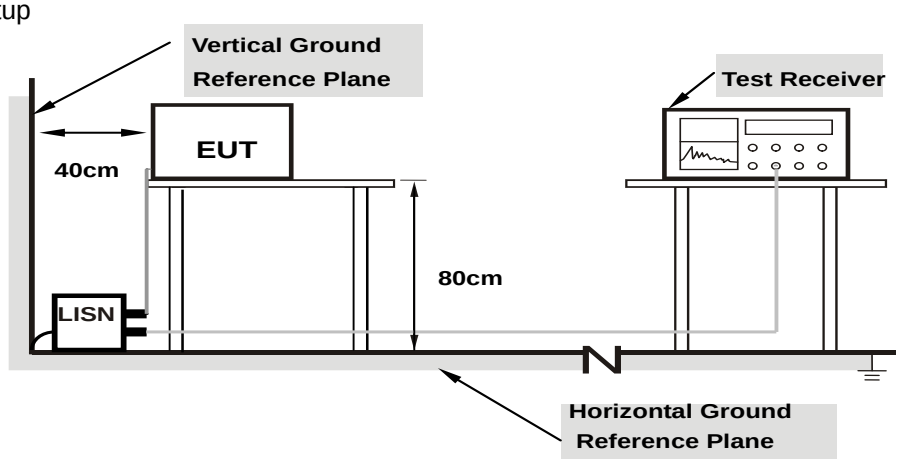
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. 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.

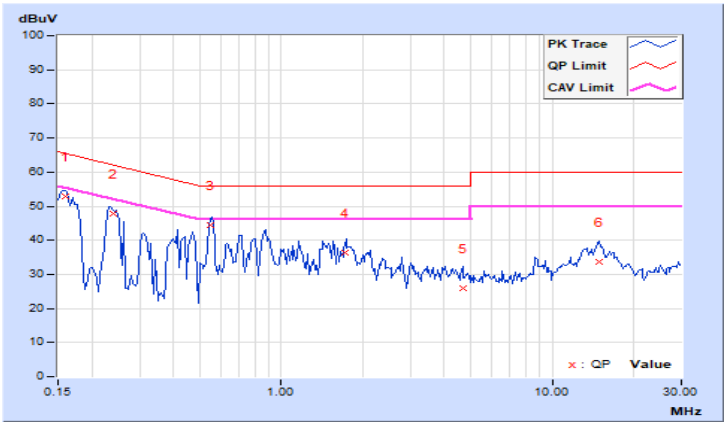
4.2.7 Test Results

RF Mode	TX 802.11b	Channel	CH 6：2437 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	**0.15931**	**10.07**	**42.73**	**35.25**	**52.80**	**45.32**	**65.50**	**55.50**	**-12.70**	**-10.18**
2	0.24117	10.09	37.67	31.54	47.76	41.63	62.06	52.06	-14.30	-10.43
3	0.54915	10.12	34.25	23.84	44.37	33.96	56.00	46.00	-11.63	-12.04
4	1.72371	10.19	26.12	15.94	36.31	26.13	56.00	46.00	-19.69	-19.87
5	4.67084	10.40	15.68	5.03	26.08	15.43	56.00	46.00	-29.92	-30.57
6	14.94371	11.18	22.44	14.40	33.62	25.58	60.00	50.00	-26.38	-24.42

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

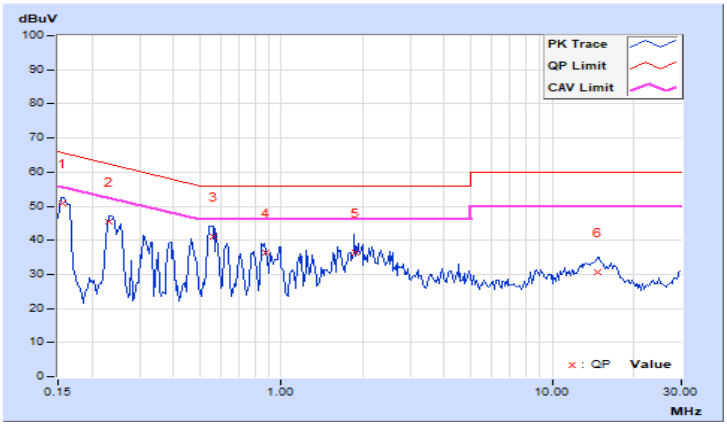


RF Mode	TX 802.11b	Channel	CH 6：2437 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.15544	10.05	40.71	29.15	50.76	39.20	65.70	55.70	-14.94	-16.50
2	0.23047	10.08	35.46	27.37	45.54	37.45	62.43	52.43	-16.89	-14.98
3	0.55971	10.11	30.82	24.56	40.93	34.67	56.00	46.00	-15.07	-11.33
4	0.87194	10.13	26.24	18.63	36.37	28.76	56.00	46.00	-19.63	-17.24
5	1.89084	10.21	26.15	16.53	36.36	26.74	56.00	46.00	-19.64	-19.26
6	14.66671	10.96	19.77	13.33	30.73	24.29	60.00	50.00	-29.27	-25.71

Remarks:

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

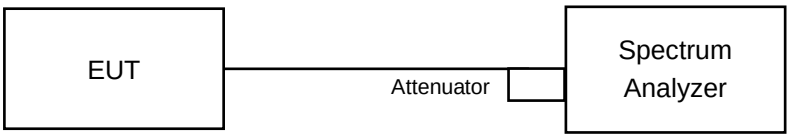


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.11	0.5	Pass
6	2437	10.1	0.5	Pass
11	2462	10.1	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.59	0.5	Pass
6	2437	16.6	0.5	Pass
11	2462	16.6	0.5	Pass

802.11n (HT20)

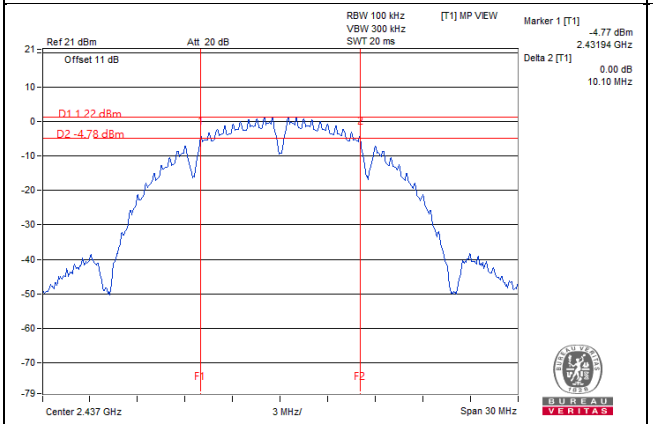
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.78	0.5	Pass
6	2437	17.75	0.5	Pass
11	2462	17.75	0.5	Pass

802.11n (HT40)

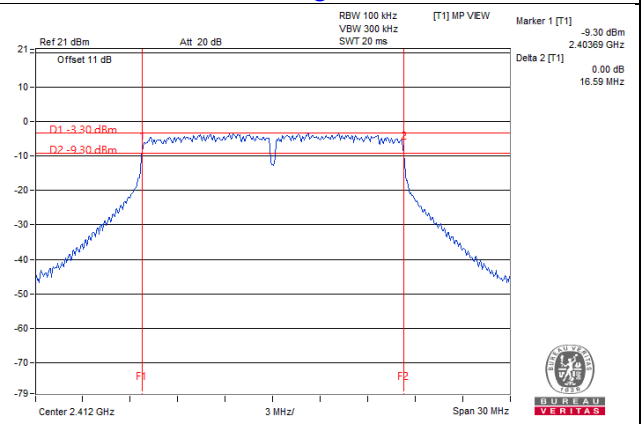
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	36.57	0.5	Pass
6	2437	36.57	0.5	Pass
9	2452	36.57	0.5	Pass

Spectrum Plot of Worst Value

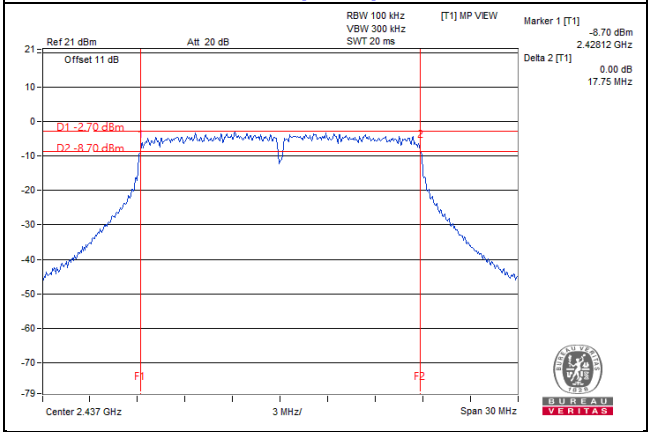
802.11b / CH6



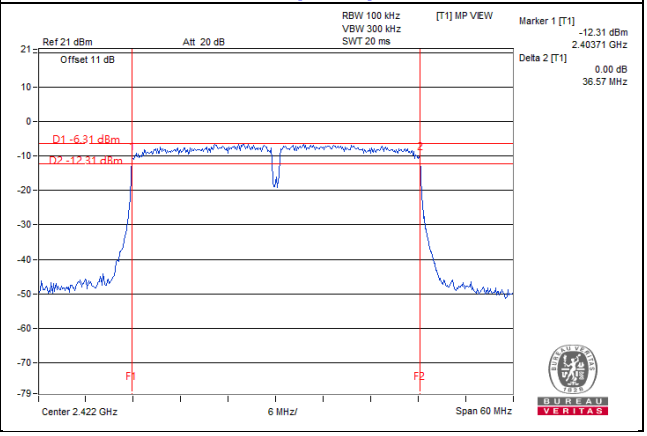
802.11g / CH1



802.11n (HT20) / CH6



802.11n (HT40) / CH3

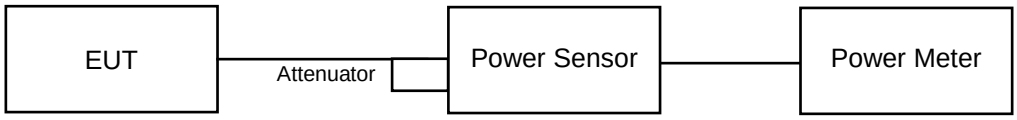


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	20.989	13.22	30	Pass
6	2437	21.577	13.34	30	Pass
11	2462	23.121	13.64	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	112.72	20.52	30	Pass
6	2437	118.304	20.73	30	Pass
11	2462	117.761	20.71	30	Pass

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	103.276	20.14	30	Pass
6	2437	107.399	20.31	30	Pass
11	2462	105.925	20.25	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	90.365	19.56	30	Pass
6	2437	94.189	19.74	30	Pass
9	2452	92.257	19.65	30	Pass

FOR AVERAGE POWER

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	14.421	11.59
6	2437	14.825	11.71
11	2462	14.655	11.66

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	14.256	11.54
6	2437	14.555	11.63
11	2462	14.421	11.59

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	14.256	11.54
6	2437	14.588	11.64
11	2462	14.488	11.61

802.11n (HT40)

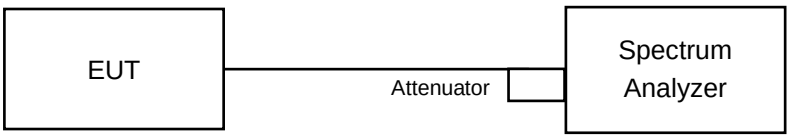
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	14.289	11.55
6	2437	14.723	11.68
9	2452	14.622	11.65

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
1	2412	-18.96	8.00	Pass
6	2437	-18.86	8.00	Pass
11	2462	-18.92	8.00	Pass

802.11g

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
1	2412	-17.74	8.00	Pass
6	2437	-17.51	8.00	Pass
11	2462	-17.43	8.00	Pass

802.11n (HT20)

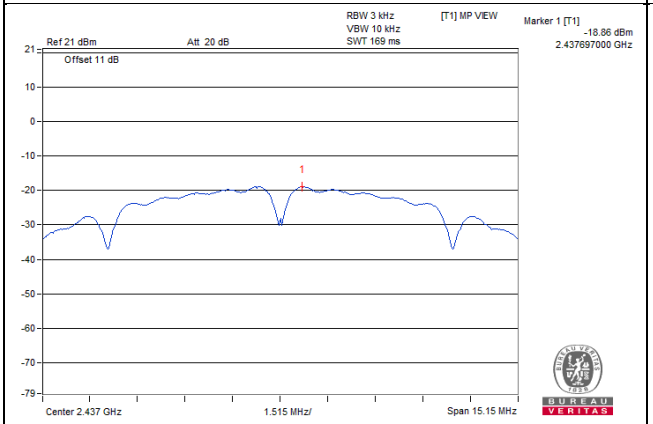
Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
1	2412	-17.19	8.00	Pass
6	2437	-17.36	8.00	Pass
11	2462	-16.91	8.00	Pass

802.11n (HT40)

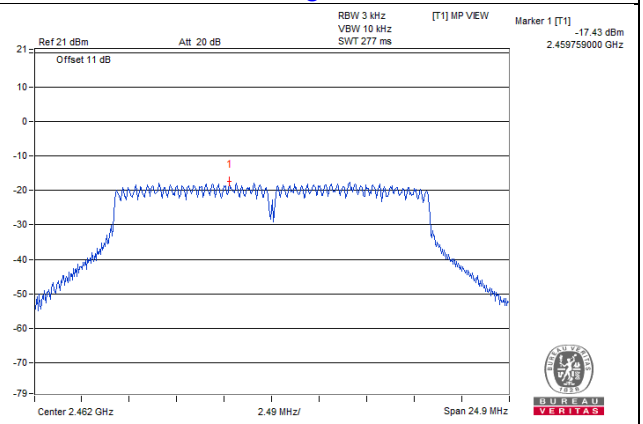
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
3	2422	-17.51	8.00	Pass
6	2437	-18.05	8.00	Pass
9	2452	-17.04	8.00	Pass

Spectrum Plot of Worst Value

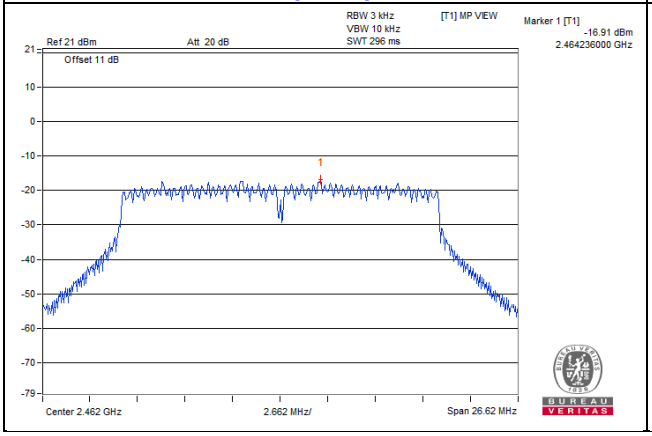
802.11b / CH6



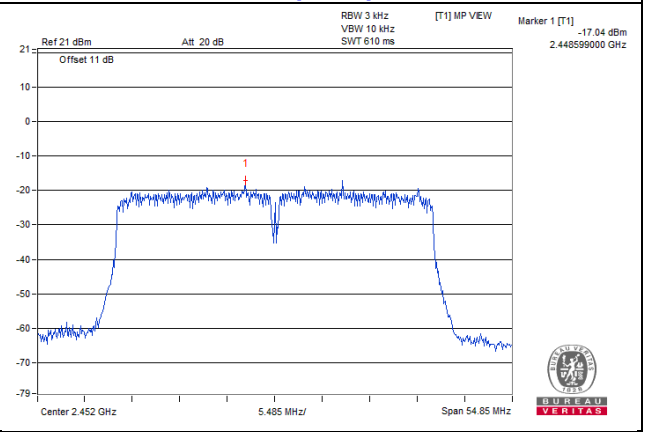
802.11g / CH11



802.11n (HT20) / CH11



802.11n (HT40) / CH9

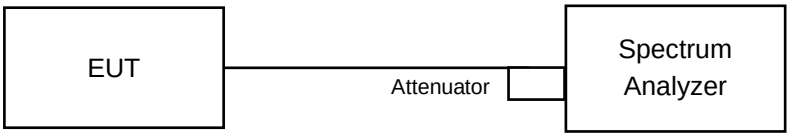


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

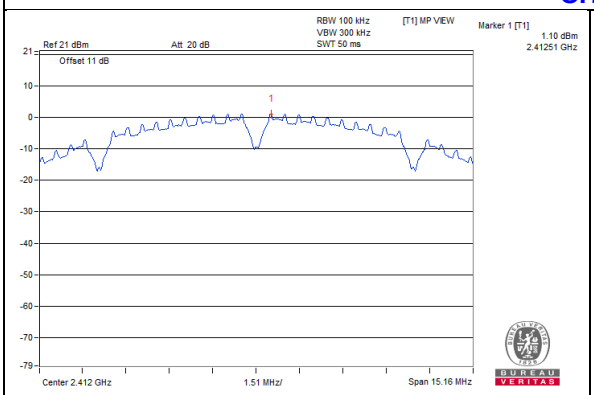
Same as Item 4.3.6

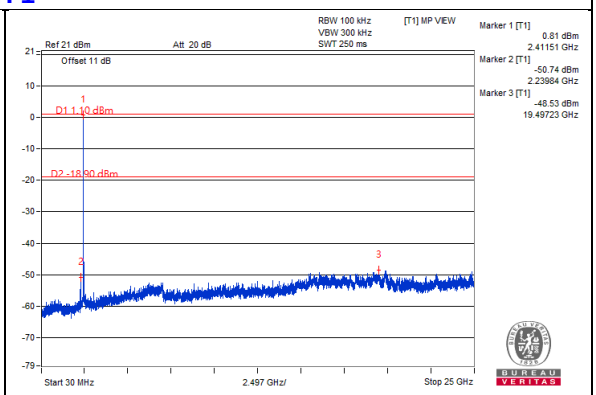
4.6.7 Test Results

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

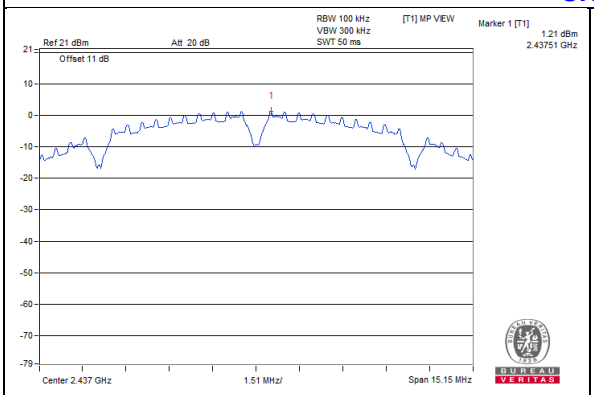
802.11b

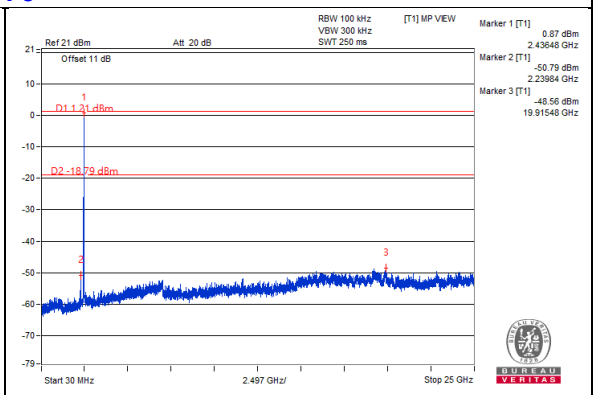
CH 1



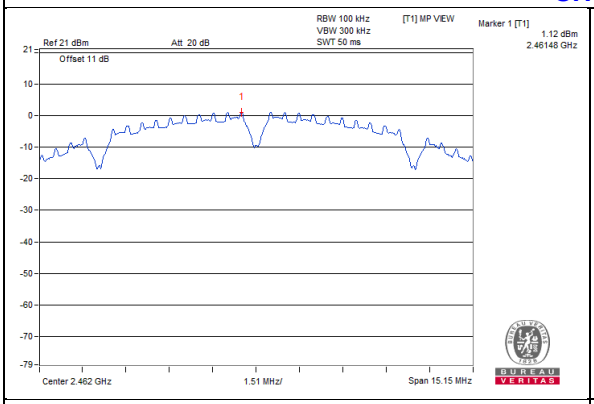


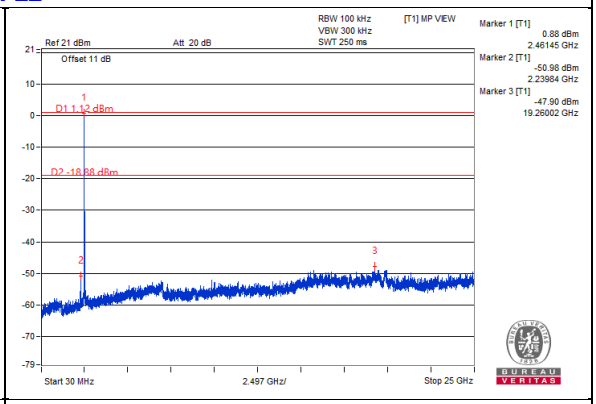
CH 6



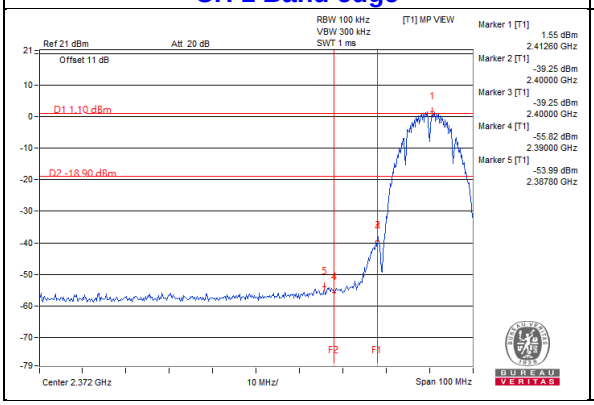


CH 11

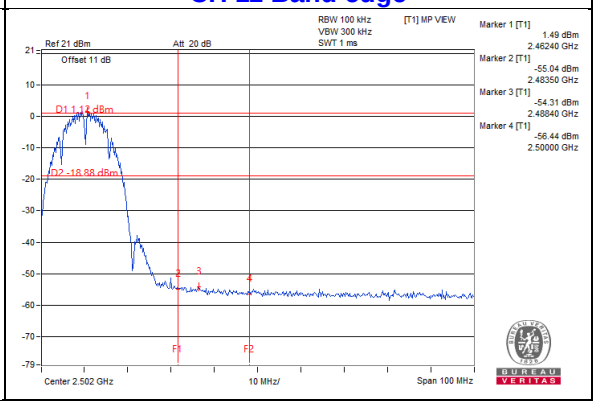




CH 1 Band edge

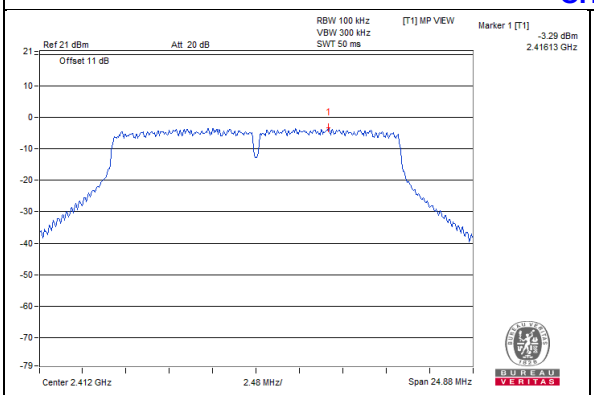


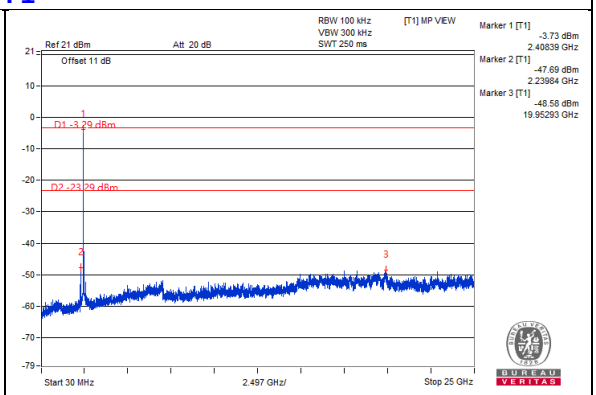
CH 11 Band edge



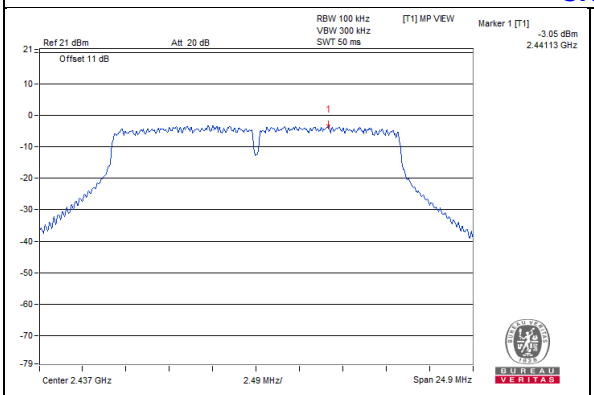
802.11g

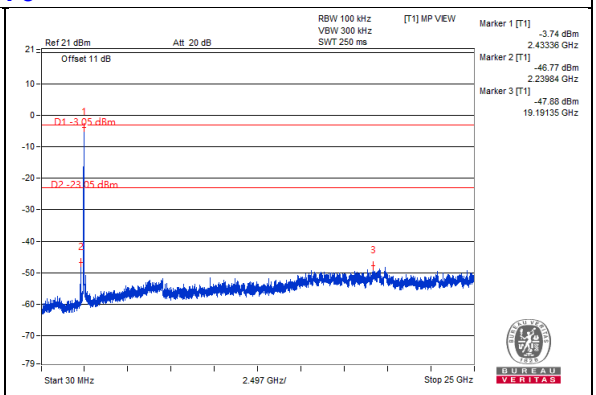
CH 1



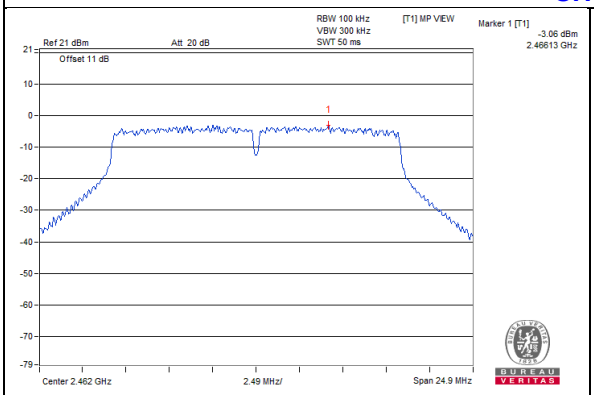


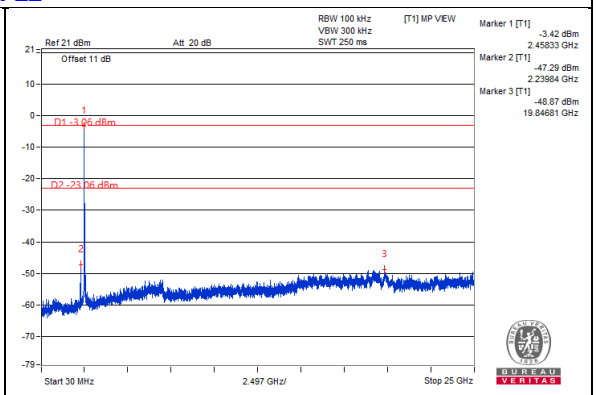
CH 6



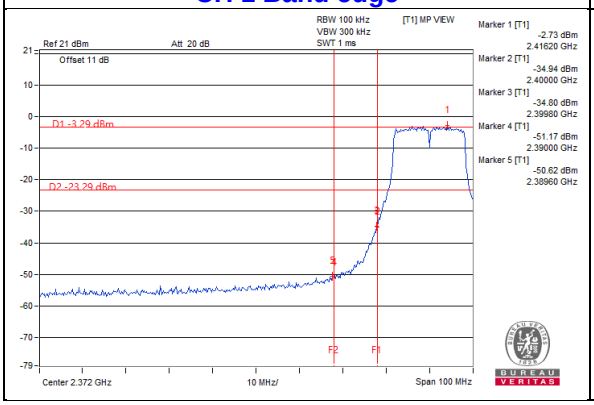


CH 11

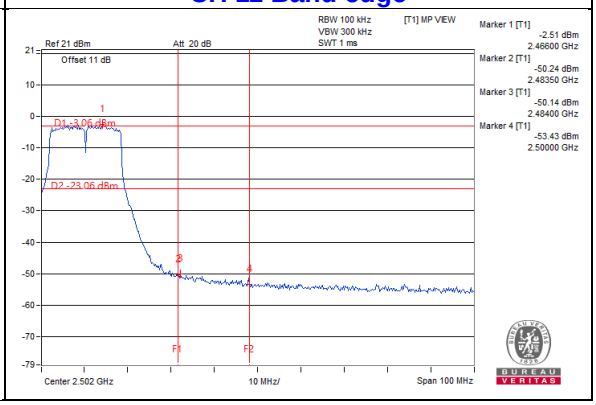




CH 1 Band edge

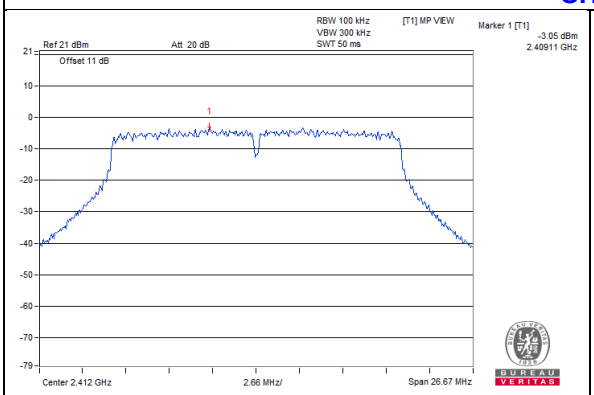


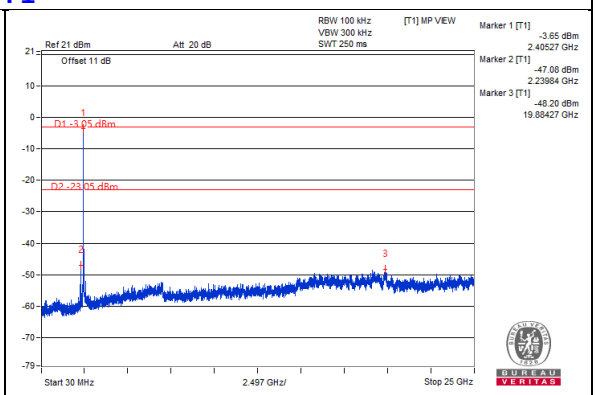
CH 11 Band edge



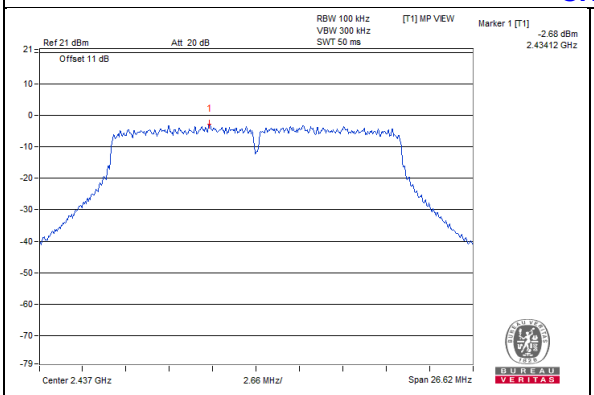
802.11n (HT20)

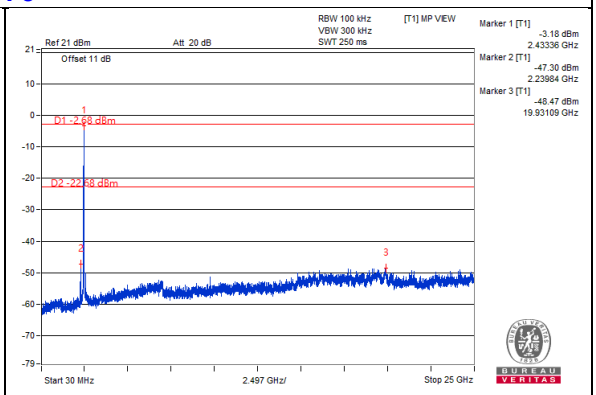
CH 1



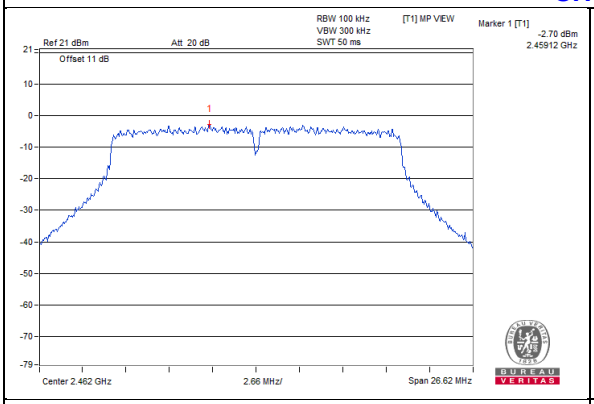


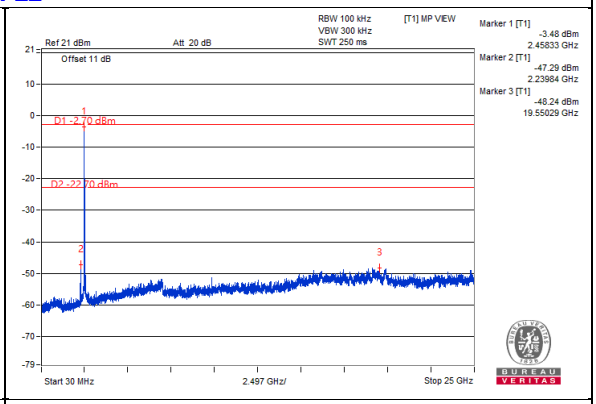
CH 6



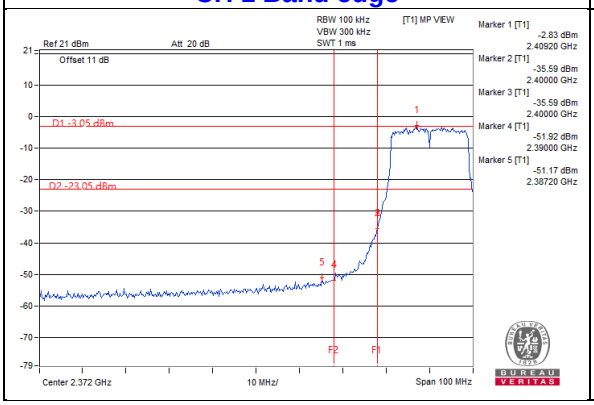


CH 11

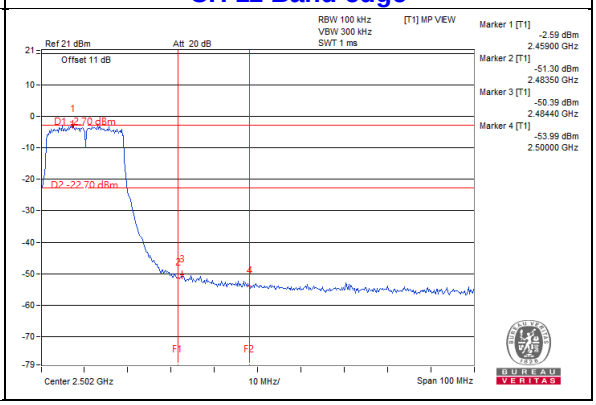




CH 1 Band edge

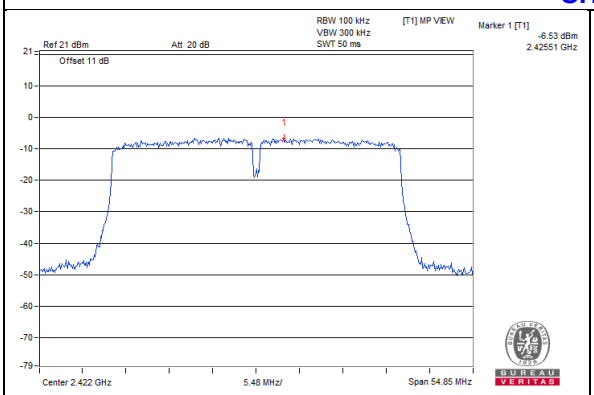


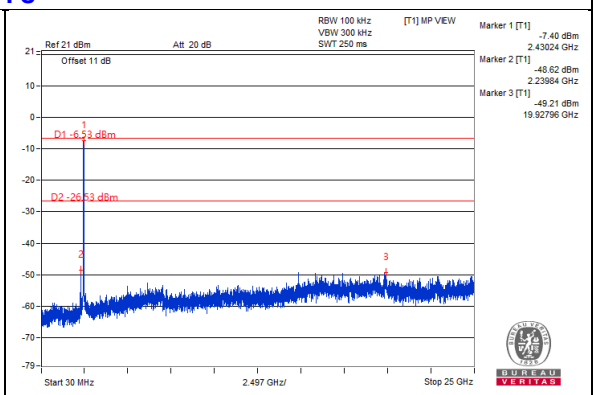
CH 11 Band edge



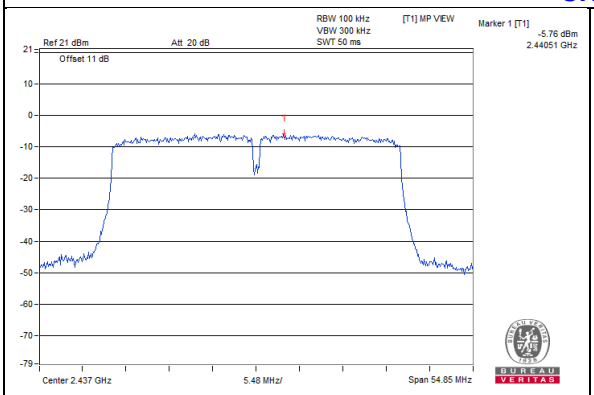
802.11n (HT40)

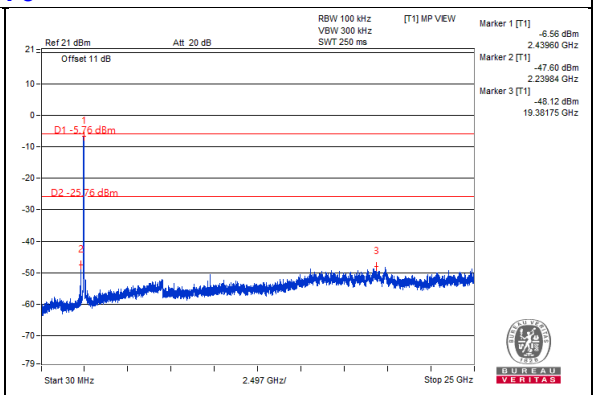
CH 3



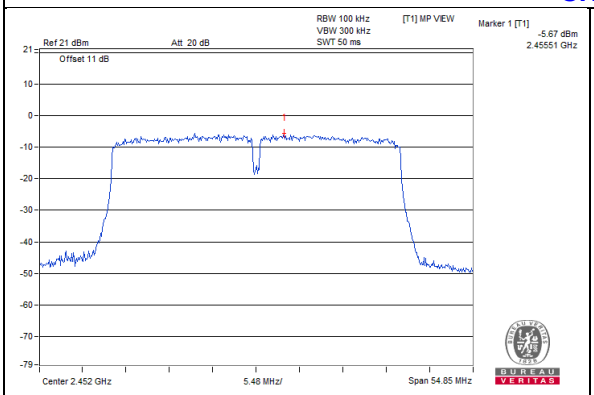


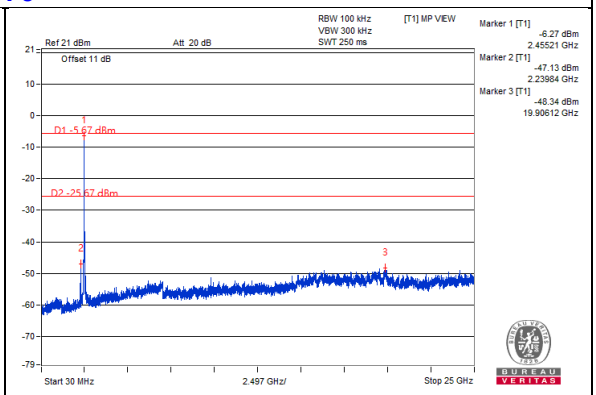
CH 6



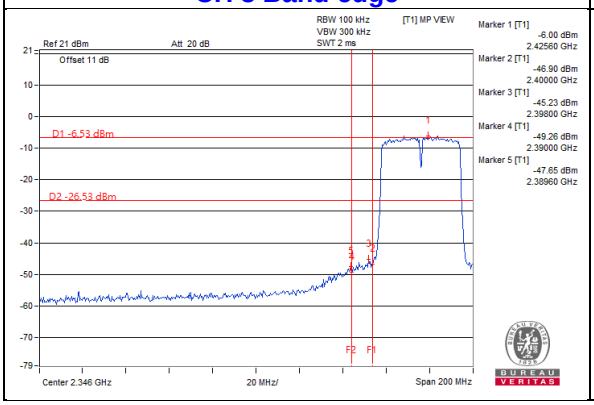


CH 9

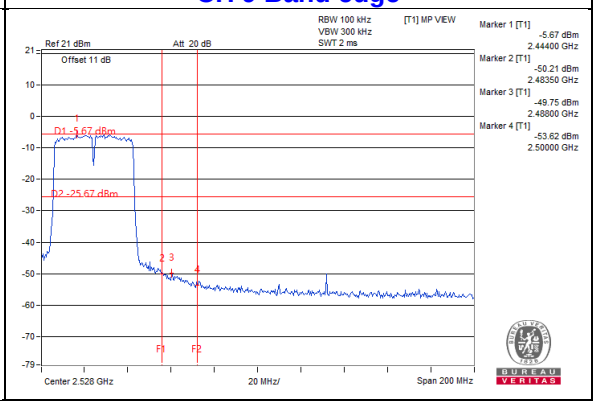




CH 3 Band edge



CH 9 Band edge



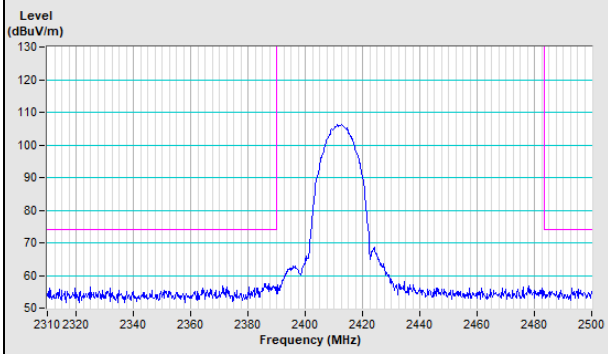
5 Pictures of Test Arrangements

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

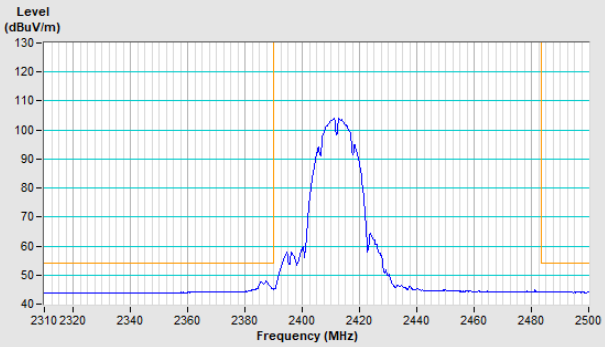
Annex A - Band-Edge Measurement

802.11b Channel 1

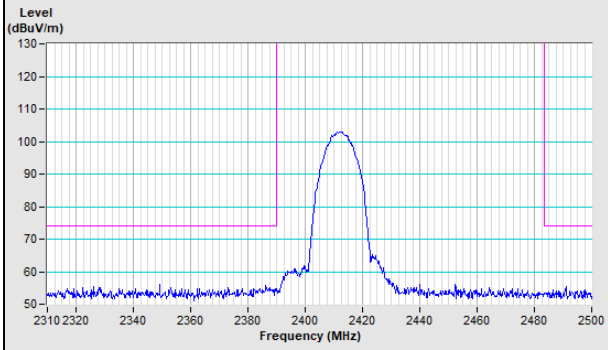
Horizontal (Peak)



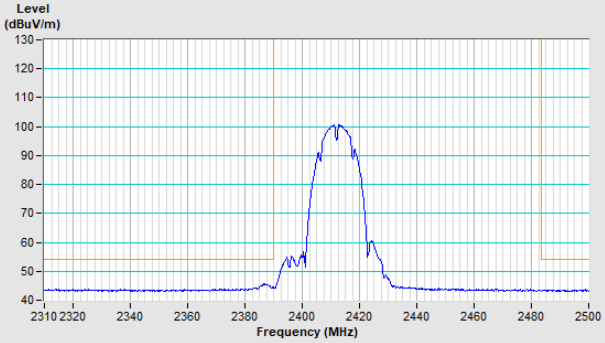
Horizontal (Average)



Vertical (Peak)

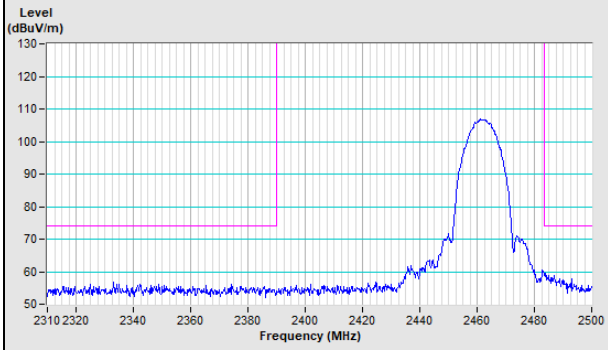


Vertical (Average)

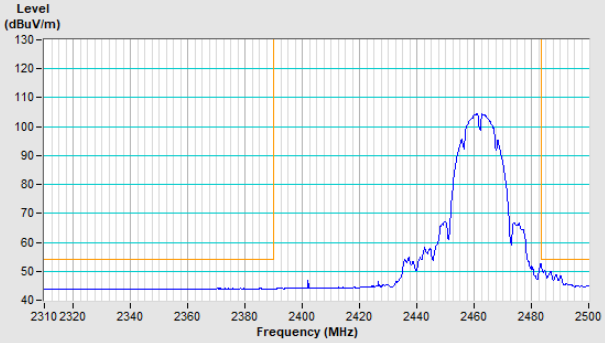


802.11b Channel 11

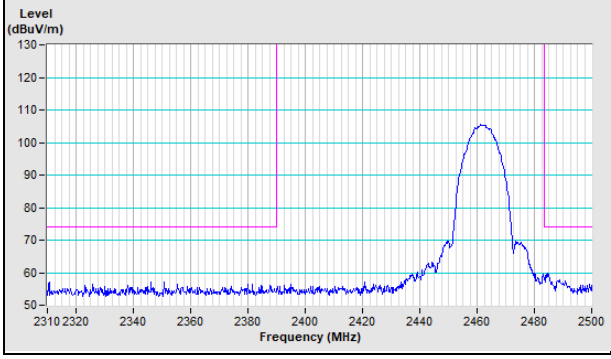
Horizontal (Peak)



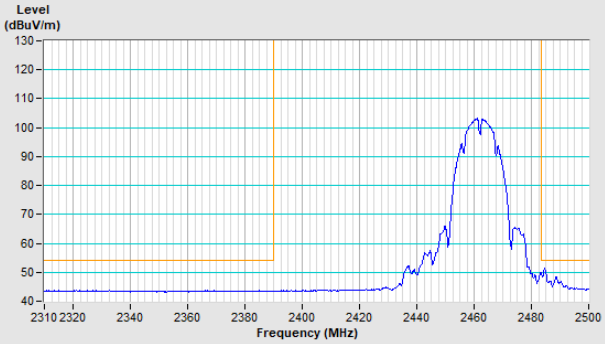
Horizontal (Average)



Vertical (Peak)

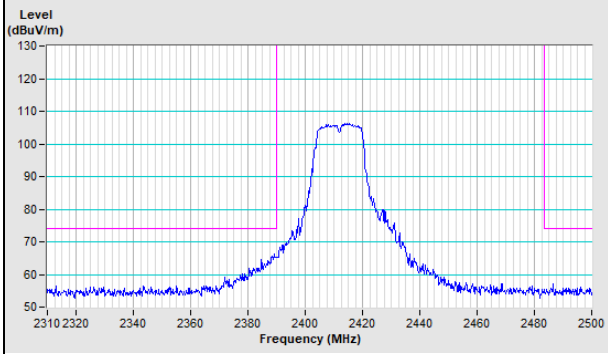


Vertical (Average)

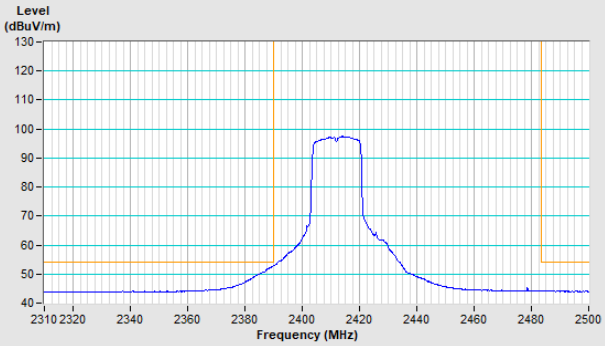


802.11g Channel 1

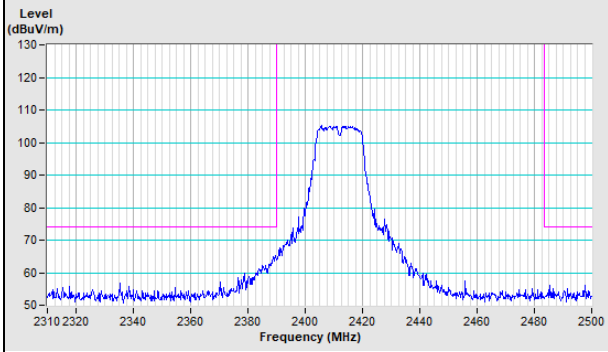
Horizontal (Peak)



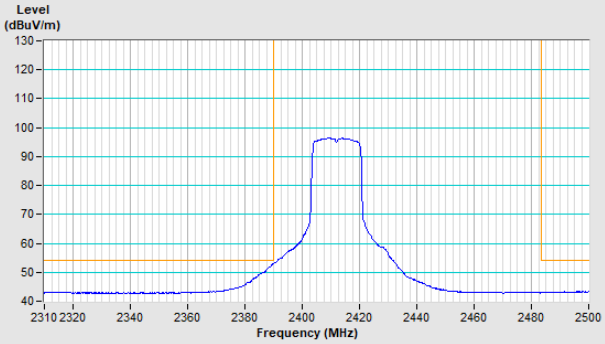
Horizontal (Average)



Vertical (Peak)

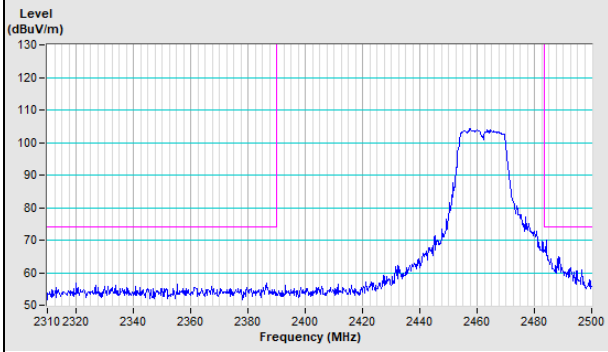


Vertical (Average)

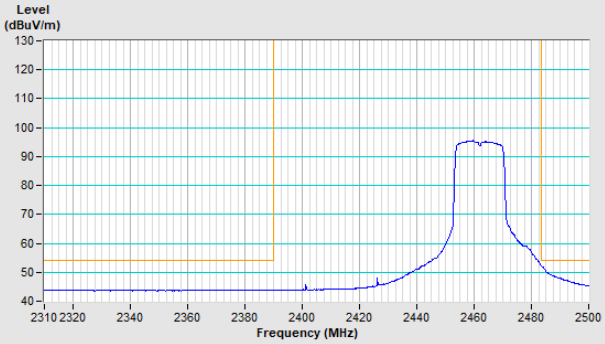


802.11g Channel 11

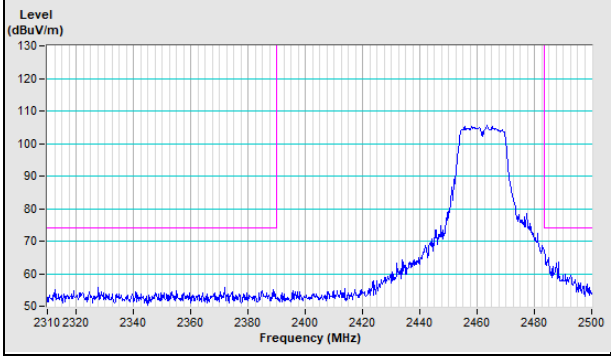
Horizontal (Peak)



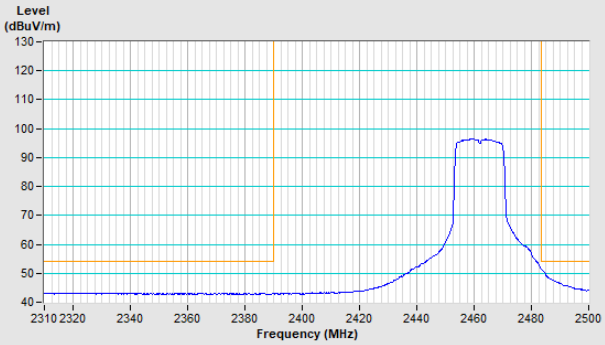
Horizontal (Average)



Vertical (Peak)

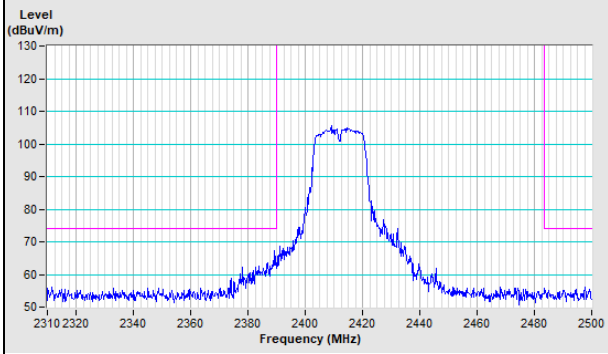


Vertical (Average)

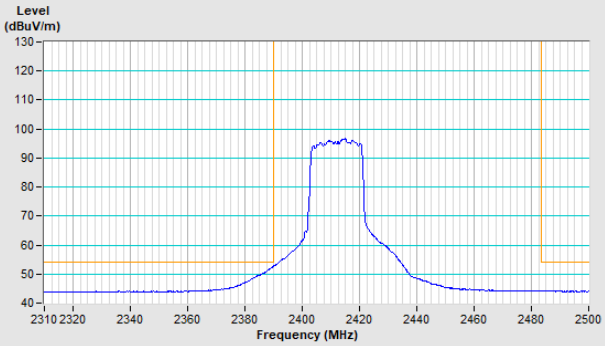


802.11n (HT20) Channel 1

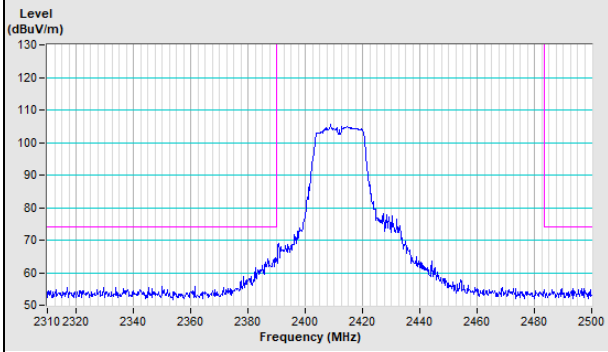
Horizontal (Peak)



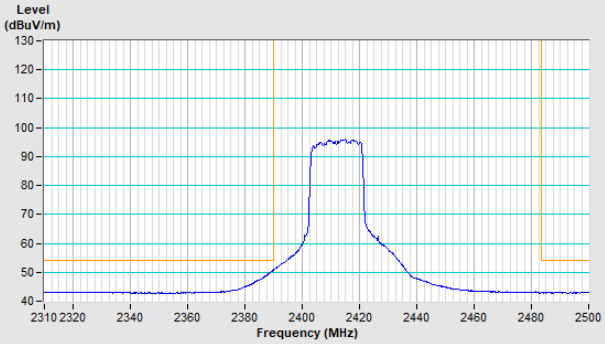
Horizontal (Average)



Vertical (Peak)

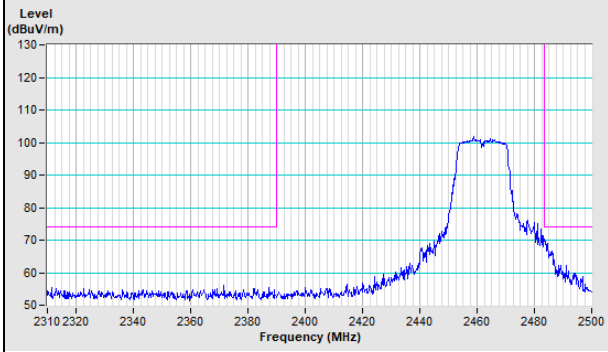


Vertical (Average)

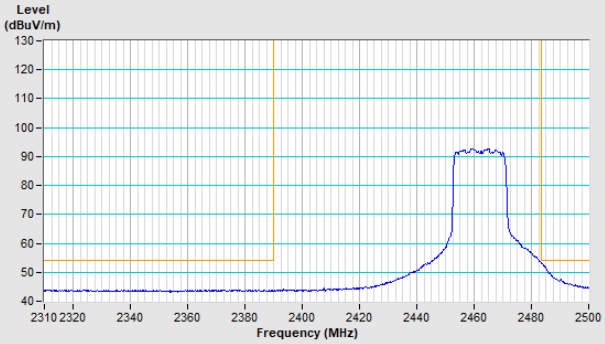


802.11n (HT20) Channel 11

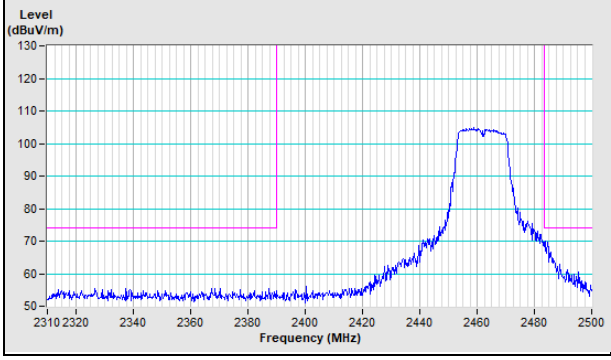
Horizontal (Peak)



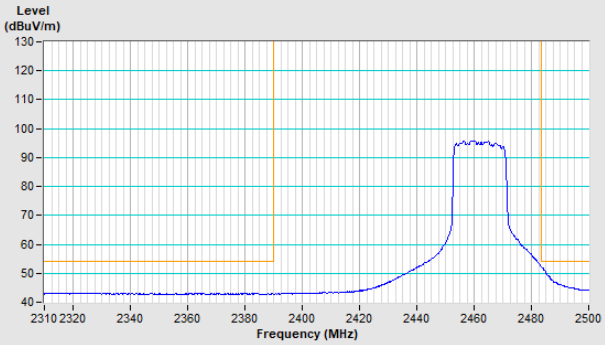
Horizontal (Average)



Vertical (Peak)

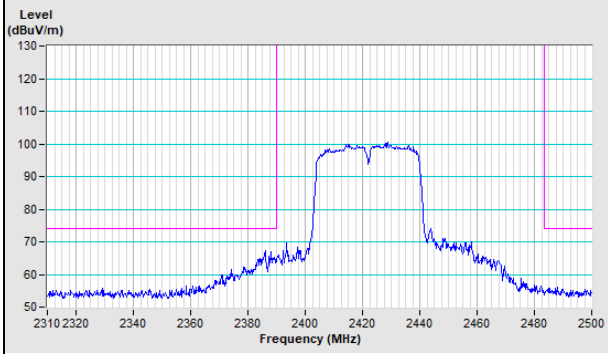


Vertical (Average)

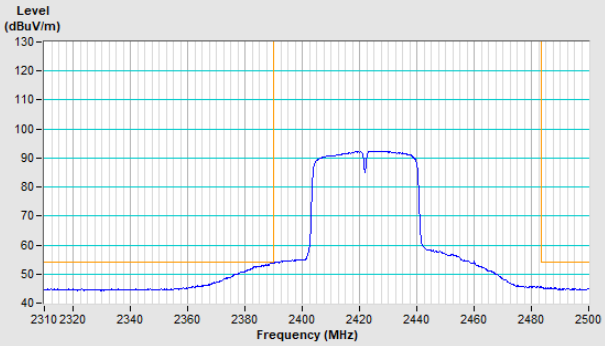


802.11n (HT40) Channel 3

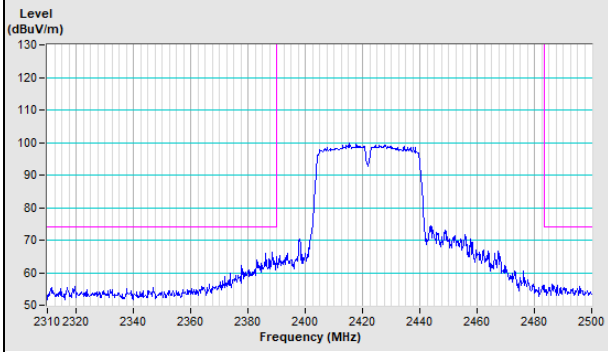
Horizontal (Peak)



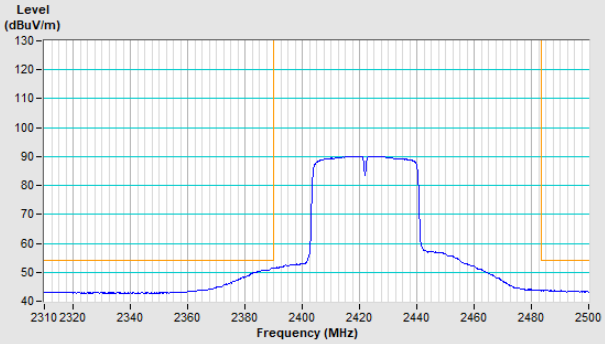
Horizontal (Average)



Vertical (Peak)

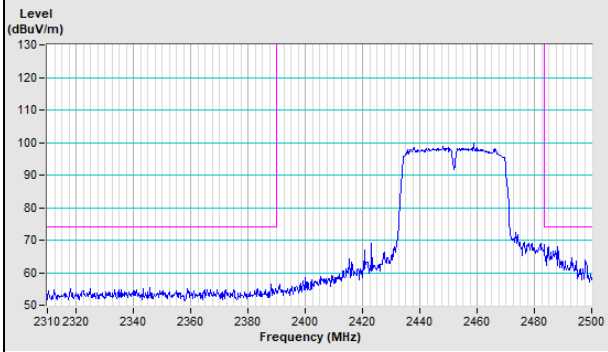


Vertical (Average)

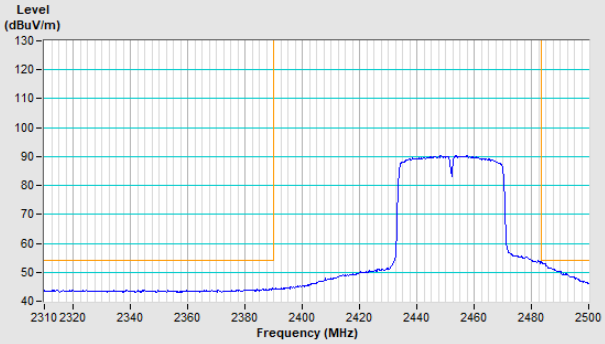


802.11n (HT40) Channel 9

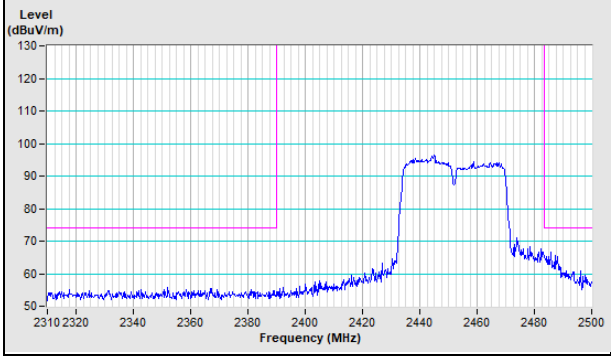
Horizontal (Peak)



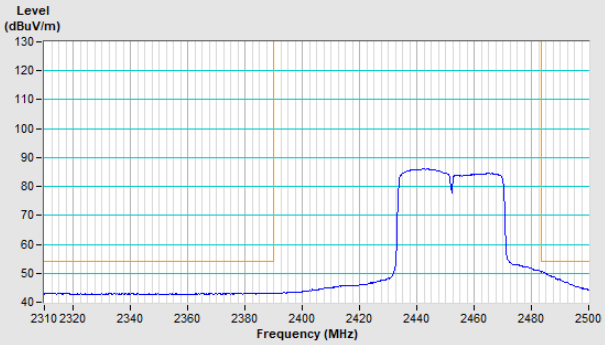
Horizontal (Average)



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:

Lin Kou 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
Tel: 886-3-3183232
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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