

FCC Test Report

Report No.: RFBDNB-WTW-P21060086

FCC ID: SERAOFN200

Test Model: AOFN-200

Received Date: June 02, 2021

Test Date: June 19 to 24, 2021

Issued Date: July 20, 2021

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RFBDNB-WTW-P21060086	Original release.	July 20, 2021

1 Certificate of Conformity

Product: WiFi Module

Brand: Sintai

Test Model: AOFN-200

Sample Status: PILOT PRODUCT

Applicant: Sintai Optical (Shenzhen) Co., Ltd.

Test Date: June 19 to 24, 2021

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by :  , **Date:** July 20, 2021
Claire Kuan / Specialist

Approved by :  , **Date:** July 20, 2021
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 -6.83 dB at 4.61719 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.5dB at 2483.5 MHz & 2485.8 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	Antenna connector is i-pex(MHF) not a standard connector.

Note:

- For 2.4 GHz band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Conducted emissions	-	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	WiFi Module
Brand	Sintai
Test Model	AOFN-200
Status of EUT	PILOT PRODUCT
Power Supply Rating	3.3 Vdc from host equipment
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	477.529 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

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

Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
Walsin	RFANT5220110A0T	2	2.4~2.4835GHz	Monopole	ipex(MHF)

2. The EUT incorporates a SISO function:

MODULATION MODE	TX & RX CONFIGURATION	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX

3. 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.

4. 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	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

RE $<$ 1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-place for below 1GHz and Z-place for above 1GHz.**

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	11	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	11	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.

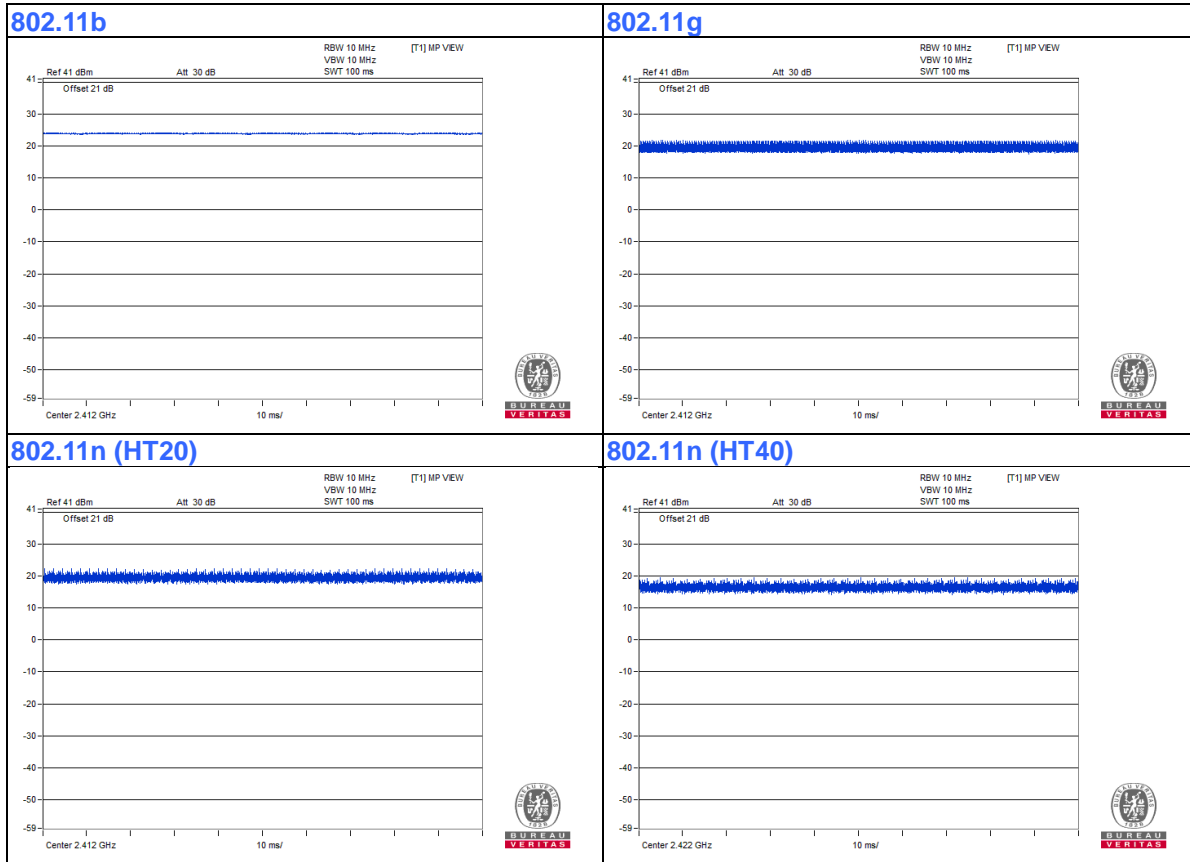
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested By
RE \geq 1G	25deg. C, 65%RH,	120Vac, 60Hz	Ryan Du Nelson Teng
RE<1G	25deg. C, 65%RH,	120Vac, 60Hz	Ryan Du
PLC	25deg. C, 75%RH	120Vac, 60Hz	Ryan Du
APCM	25deg. C, 60%RH	120Vac, 60Hz	Kevin Ko

3.3 Duty Cycle of Test Signal

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



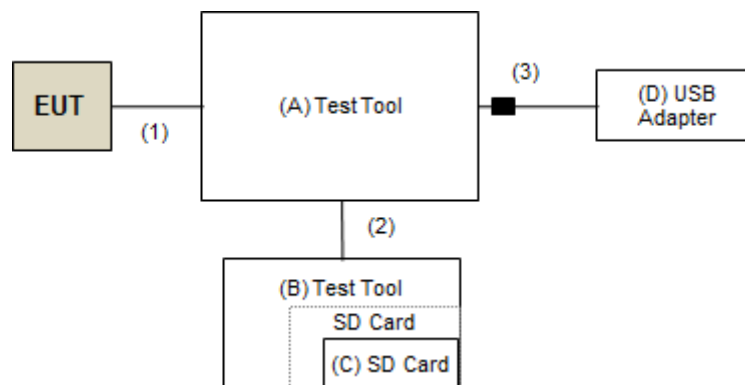
3.4 Description of Support Units

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.	Test Tool	Sintai Optical (Shenzhen) Co., Ltd.	NA	NA	NA	Supplied by client
B.	Test Tool	Sintai Optical (Shenzhen) Co., Ltd.	NA	NA	NA	Supplied by client
C.	SD Card	Sandisk	NA	NA	NA	Supplied by client
D.	USB Adapter	Plantronics	SSC-4W5 050075	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Console Cable	1	0.02	No	0	Supplied by client
2.	Console Cable	1	0.025	No	0	Supplied by client
3.	USB Cable	1	0.6	Yes	1	Supplied by client

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

KDB 662911 D01 Multiple Transmitter Output v02r01

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 test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 06, 2020	July 05, 2021
Pre-Amplifier EMCI	EMC001340	980142	May 24, 2021	May 23, 2022
Loop Antenna Electro-Metrics	EM-6879	264	Mar. 05, 2021	Mar. 04, 2022
RF Cable	5D-FB	LOOPCAB-001	Jan. 07, 2021	Jan. 06, 2022
RF Cable	5D-FB	LOOPCAB-002	Jan. 07, 2021	Jan. 06, 2022
Pre-Amplifier Mini-Circuits	ZFL-1000VH2	QA0838008	Oct. 20, 2020	Oct. 19, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 05, 2020	Nov. 04, 2021
RF Cable	8D	966-3-1	Mar. 16, 2021	Mar. 15, 2022
RF Cable	8D	966-3-2	Mar. 16, 2021	Mar. 15, 2022
RF Cable	8D	966-3-3	Mar. 16, 2021	Mar. 15, 2022
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 24, 2020	Sep. 23, 2021
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 11, 2021	Jan. 10, 2022
RF Cable	EMC104-SM-SM-1500	180504	Apr. 26, 2021	Apr. 25, 2022
RF Cable	EMC104-SM-SM-2000	180601	June 08, 2021	June 07, 2022
RF Cable	EMC104-SM-SM-6000	210201	May 13, 2021	May 12, 2022
Spectrum Analyzer Keysight	N9030A	MY54490679	July 13, 2020	July 12, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 11, 2021	Jan. 10, 2022
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 22, 2020	Nov. 21, 2021
RF Cable	EMC102-KM-KM-1200	160924	Jan. 11, 2021	Jan. 10, 2022
RF Cable	EMC-KM-KM-4000	200214	Mar. 10, 2021	Mar. 09, 2022
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	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 966 Chamber No. 3.
3. Tested Date: June 19 to 20, 2021

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	101516	Mar. 08, 2021	Mar. 07, 2022
Power meter Anritsu	ML2495A	1529002	July 22, 2020	July 21, 2021
Power sensor Anritsu	MA2411B	1339443	July 22, 2020	July 21, 2021
10dB Attenuator Woken	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
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: June 24, 2021

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

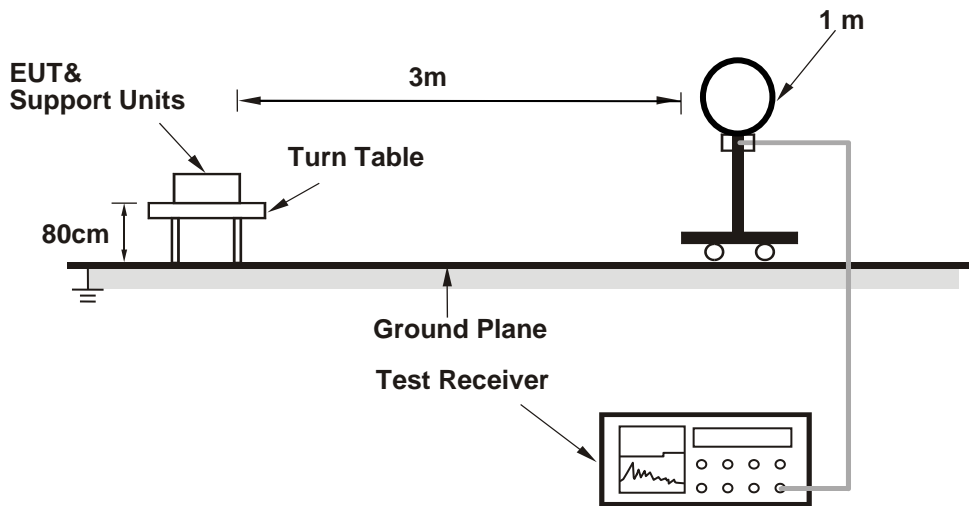
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

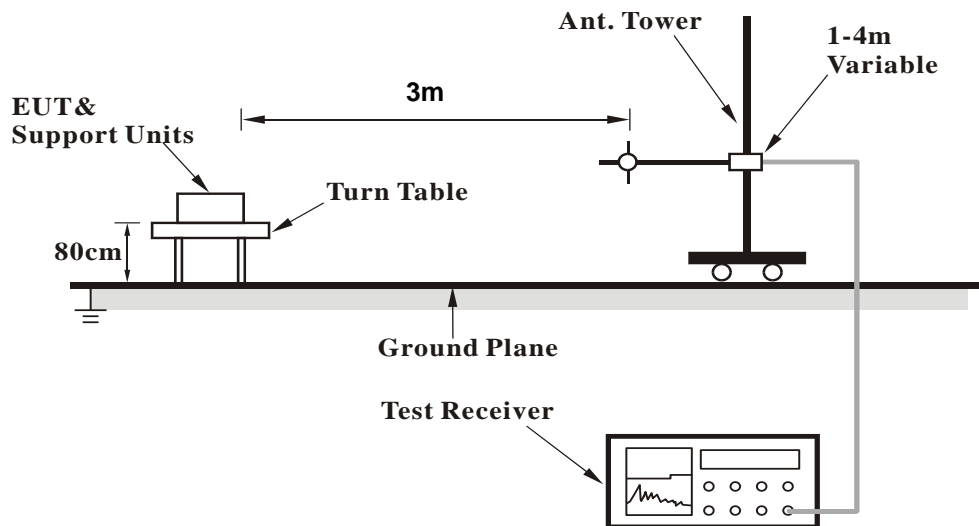
No deviation.

4.1.5 Test Setup

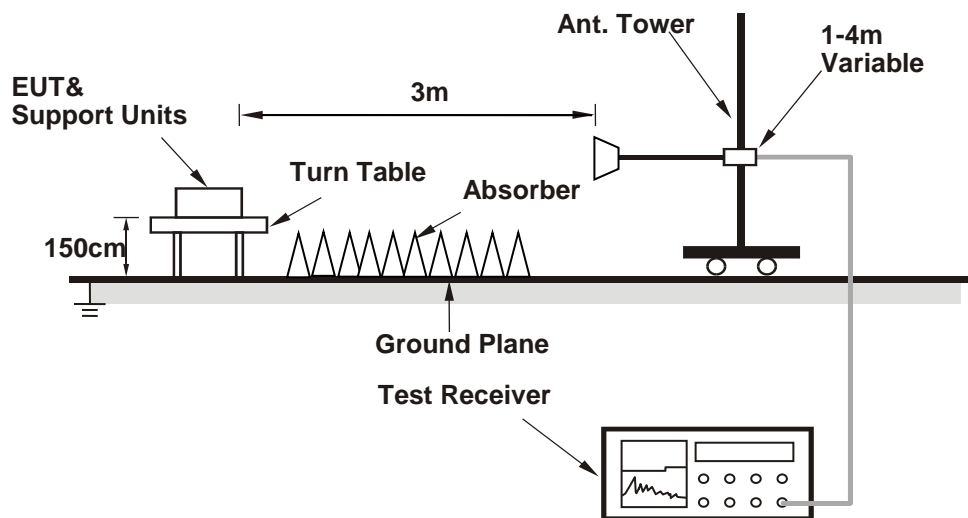
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- a. Placed the EUT on the testing table.
- b. Controlling software (mp tool use mp_cmd.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	2334.70	56.8 PK	74.0	-17.2	1.19 H	112	57.9	-1.1
2	2334.70	44.0 AV	54.0	-10.0	1.19 H	112	45.1	-1.1
3	*2412.00	99.9 PK			1.19 H	112	101.1	-1.2
4	*2412.00	97.3 AV			1.19 H	112	98.5	-1.2
5	4824.00	49.0 PK	74.0	-25.0	1.49 H	265	45.3	3.7
6	4824.00	47.1 AV	54.0	-6.9	1.49 H	265	43.4	3.7
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	2379.50	56.8 PK	74.0	-17.2	3.70 V	42	58.0	-1.2
2	2379.50	43.4 AV	54.0	-10.6	3.70 V	42	44.6	-1.2
3	*2412.00	99.7 PK			3.70 V	42	100.9	-1.2
4	*2412.00	96.8 AV			3.70 V	42	98.0	-1.2
5	4824.00	49.4 PK	74.0	-24.6	1.58 V	92	45.7	3.7
6	4824.00	47.1 AV	54.0	-6.9	1.58 V	92	43.4	3.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	1.22 H	110	55.3	-1.2
2	2390.00	42.7 AV	54.0	-11.3	1.22 H	110	43.9	-1.2
3	*2437.00	101.6 PK			1.22 H	110	102.8	-1.2
4	*2437.00	99.4 AV			1.22 H	110	100.6	-1.2
5	2483.50	55.6 PK	74.0	-18.4	1.22 H	110	56.8	-1.2
6	2483.50	45.3 AV	54.0	-8.7	1.22 H	110	46.5	-1.2
7	4874.00	49.4 PK	74.0	-24.6	1.06 H	126	45.6	3.8
8	4874.00	46.9 AV	54.0	-7.1	1.06 H	126	43.1	3.8
9	7311.00	49.2 PK	74.0	-24.8	1.38 H	223	39.5	9.7
10	7311.00	44.0 AV	54.0	-10.0	1.38 H	223	34.3	9.7

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	54.1 PK	74.0	-19.9	3.63 V	48	55.3	-1.2
2	2390.00	42.9 AV	54.0	-11.1	3.63 V	48	44.1	-1.2
3	*2437.00	100.4 PK			3.63 V	48	101.6	-1.2
4	*2437.00	98.5 AV			3.63 V	48	99.7	-1.2
5	2483.50	55.3 PK	74.0	-18.7	3.63 V	48	56.5	-1.2
6	2483.50	44.9 AV	54.0	-9.1	3.63 V	48	46.1	-1.2
7	4874.00	49.2 PK	74.0	-24.8	1.62 V	82	45.4	3.8
8	4874.00	46.9 AV	54.0	-7.1	1.62 V	82	43.1	3.8
9	7311.00	48.9 PK	74.0	-25.1	1.49 V	84	39.2	9.7
10	7311.00	42.9 AV	54.0	-11.1	1.49 V	84	33.2	9.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	103.9 PK			1.26 H	128	105.1	-1.2
2	*2462.00	101.3 AV			1.26 H	128	102.5	-1.2
3	2487.70	58.5 PK	74.0	-15.5	1.26 H	128	59.7	-1.2
4	2487.70	50.7 AV	54.0	-3.3	1.26 H	128	51.9	-1.2
5	4924.00	48.9 PK	74.0	-25.1	1.00 H	118	45.0	3.9
6	4924.00	46.6 AV	54.0	-7.4	1.00 H	118	42.7	3.9
7	7386.00	49.2 PK	74.0	-24.8	1.32 H	232	39.5	9.7
8	7386.00	44.2 AV	54.0	-9.8	1.32 H	232	34.5	9.7

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	102.3 PK			3.64 V	38	103.5	-1.2
2	*2462.00	99.8 AV			3.64 V	38	101.0	-1.2
3	2487.90	58.2 PK	74.0	-15.8	3.64 V	38	59.4	-1.2
4	2487.90	51.1 AV	54.0	-2.9	3.64 V	38	52.3	-1.2
5	4924.00	49.3 PK	74.0	-24.7	1.62 V	94	45.4	3.9
6	4924.00	47.1 AV	54.0	-6.9	1.62 V	94	43.2	3.9
7	7386.00	49.3 PK	74.0	-24.7	1.48 V	98	39.6	9.7
8	7386.00	43.1 AV	54.0	-10.9	1.48 V	98	33.4	9.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	2349.30	56.3 PK	74.0	-17.7	1.25 H	119	57.4	-1.1
2	2349.30	44.0 AV	54.0	-10.0	1.25 H	119	45.1	-1.1
3	*2412.00	98.1 PK			1.25 H	119	99.3	-1.2
4	*2412.00	88.7 AV			1.25 H	119	89.9	-1.2
5	4824.00	44.9 PK	74.0	-29.1	1.02 H	114	41.2	3.7
6	4824.00	42.6 AV	54.0	-11.4	1.02 H	114	38.9	3.7
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	2373.70	56.0 PK	74.0	-18.0	3.42 V	38	57.2	-1.2
2	2373.70	43.2 AV	54.0	-10.8	3.42 V	38	44.4	-1.2
3	*2412.00	95.9 PK			3.42 V	38	97.1	-1.2
4	*2412.00	86.3 AV			3.42 V	38	87.5	-1.2
5	4824.00	45.8 PK	74.0	-28.2	1.65 V	119	42.1	3.7
6	4824.00	43.1 AV	54.0	-10.9	1.65 V	119	39.4	3.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	54.5 PK	74.0	-19.5	1.25 H	137	55.7	-1.2
2	2390.00	43.0 AV	54.0	-11.0	1.25 H	137	44.2	-1.2
3	*2437.00	100.5 PK			1.25 H	137	101.7	-1.2
4	*2437.00	90.3 AV			1.25 H	137	91.5	-1.2
5	2483.50	66.7 PK	74.0	-7.3	1.25 H	137	67.9	-1.2
6	2483.50	47.9 AV	54.0	-6.1	1.25 H	137	49.1	-1.2
7	4874.00	44.8 PK	74.0	-29.2	1.00 H	136	41.0	3.8
8	4874.00	42.6 AV	54.0	-11.4	1.00 H	136	38.8	3.8
9	7311.00	45.4 PK	74.0	-28.6	1.35 H	222	35.7	9.7
10	7311.00	38.8 AV	54.0	-15.2	1.35 H	222	29.1	9.7

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	55.0 PK	74.0	-19.0	3.60 V	54	56.2	-1.2
2	2390.00	42.8 AV	54.0	-11.2	3.60 V	54	44.0	-1.2
3	*2437.00	98.6 PK			3.60 V	54	99.8	-1.2
4	*2437.00	88.2 AV			3.60 V	54	89.4	-1.2
5	2483.50	66.5 PK	74.0	-7.5	3.60 V	54	67.7	-1.2
6	2483.50	47.2 AV	54.0	-6.8	3.60 V	54	48.4	-1.2
7	4874.00	45.8 PK	74.0	-28.2	1.66 V	99	42.0	3.8
8	4874.00	43.2 AV	54.0	-10.8	1.66 V	99	39.4	3.8
9	7311.00	45.4 PK	74.0	-28.6	1.53 V	70	35.7	9.7
10	7311.00	38.9 AV	54.0	-15.1	1.53 V	70	29.2	9.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	102.9 PK			1.25 H	125	104.1	-1.2
2	*2462.00	93.5 AV			1.25 H	125	94.7	-1.2
3	2483.50	69.0 PK	74.0	-5.0	1.25 H	125	70.2	-1.2
4	2483.50	52.0 AV	54.0	-2.0	1.25 H	125	53.2	-1.2
5	4924.00	44.8 PK	74.0	-29.2	1.01 H	125	40.9	3.9
6	4924.00	42.6 AV	54.0	-11.4	1.01 H	125	38.7	3.9
7	7386.00	44.8 PK	74.0	-29.2	1.35 H	218	35.1	9.7
8	7386.00	38.5 AV	54.0	-15.5	1.35 H	218	28.8	9.7

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	100.3 PK			3.63 V	39	101.5	-1.2
2	*2462.00	91.0 AV			3.63 V	39	92.2	-1.2
3	2483.50	66.6 PK	74.0	-7.4	3.63 V	39	67.8	-1.2
4	2483.50	50.1 AV	54.0	-3.9	3.63 V	39	51.3	-1.2
5	4924.00	45.6 PK	74.0	-28.4	1.65 V	104	41.7	3.9
6	4924.00	43.1 AV	54.0	-10.9	1.65 V	104	39.2	3.9
7	7386.00	44.7 PK	74.0	-29.3	1.50 V	86	35.0	9.7
8	7386.00	38.4 AV	54.0	-15.6	1.50 V	86	28.7	9.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	2375.75	56.7 PK	74.0	-17.3	1.24 H	122	57.9	-1.2
2	2375.75	43.0 AV	54.0	-11.0	1.24 H	122	44.2	-1.2
3	2390.00	54.3 PK	74.0	-19.7	1.24 H	122	55.5	-1.2
4	2390.00	43.6 AV	54.0	-10.4	1.24 H	122	44.8	-1.2
5	*2412.00	94.5 PK			1.24 H	122	95.7	-1.2
6	*2412.00	87.0 AV			1.24 H	122	88.2	-1.2
7	4824.00	45.7 PK	74.0	-28.3	1.10 H	128	42.0	3.7
8	4824.00	43.3 AV	54.0	-10.7	1.10 H	128	39.6	3.7

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	2384.95	56.7 PK	74.0	-17.3	3.42 V	38	57.9	-1.2
2	2384.95	43.8 AV	54.0	-10.2	3.42 V	38	45.0	-1.2
3	*2412.00	95.0 PK			3.42 V	38	96.2	-1.2
4	*2412.00	85.9 AV			3.42 V	38	87.1	-1.2
5	4824.00	44.9 PK	74.0	-29.1	1.63 V	96	41.2	3.7
6	4824.00	42.2 AV	54.0	-11.8	1.63 V	96	38.5	3.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	54.3 PK	74.0	-19.7	1.25 H	134	55.5	-1.2
2	2390.00	42.6 AV	54.0	-11.4	1.25 H	134	43.8	-1.2
3	*2437.00	100.1 PK			1.25 H	134	101.3	-1.2
4	*2437.00	90.3 AV			1.25 H	134	91.5	-1.2
5	2483.50	66.7 PK	74.0	-7.3	1.25 H	134	67.9	-1.2
6	2483.50	47.8 AV	54.0	-6.2	1.25 H	134	49.0	-1.2
7	4874.00	45.2 PK	74.0	-28.8	1.07 H	119	41.4	3.8
8	4874.00	43.0 AV	54.0	-11.0	1.07 H	119	39.2	3.8
9	7311.00	44.5 PK	74.0	-29.5	1.34 H	233	34.8	9.7
10	7311.00	38.5 AV	54.0	-15.5	1.34 H	233	28.8	9.7

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	54.8 PK	74.0	-19.2	3.62 V	31	56.0	-1.2
2	2390.00	42.7 AV	54.0	-11.3	3.62 V	31	43.9	-1.2
3	*2437.00	97.5 PK			3.62 V	31	98.7	-1.2
4	*2437.00	87.2 AV			3.62 V	31	88.4	-1.2
5	2483.50	66.1 PK	74.0	-7.9	3.62 V	31	67.3	-1.2
6	2483.50	47.0 AV	54.0	-7.0	3.62 V	31	48.2	-1.2
7	4874.00	45.1 PK	74.0	-28.9	1.61 V	96	41.3	3.8
8	4874.00	42.6 AV	54.0	-11.4	1.61 V	96	38.8	3.8
9	7311.00	45.8 PK	74.0	-28.2	1.49 V	66	36.1	9.7
10	7311.00	39.4 AV	54.0	-14.6	1.49 V	66	29.7	9.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	102.3 PK			1.24 H	126	103.5	-1.2
2	*2462.00	93.4 AV			1.24 H	126	94.6	-1.2
3	2483.50	72.9 PK	74.0	-1.1	1.24 H	126	74.1	-1.2
4	2483.50	53.5 AV	54.0	-0.5	1.24 H	126	54.7	-1.2
5	4924.00	44.8 PK	74.0	-29.2	1.05 H	141	40.9	3.9
6	4924.00	42.8 AV	54.0	-11.2	1.05 H	141	38.9	3.9
7	7386.00	45.2 PK	74.0	-28.8	1.34 H	232	35.5	9.7
8	7386.00	38.5 AV	54.0	-15.5	1.34 H	232	28.8	9.7

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	100.4 PK			3.56 V	40	101.6	-1.2
2	*2462.00	91.2 AV			3.56 V	40	92.4	-1.2
3	2483.50	68.4 PK	74.0	-5.6	3.56 V	40	69.6	-1.2
4	2483.50	50.5 AV	54.0	-3.5	3.56 V	40	51.7	-1.2
5	2484.00	70.3 PK	74.0	-3.7	3.56 V	40	71.5	-1.2
6	2484.00	50.2 AV	54.0	-3.8	3.56 V	40	51.4	-1.2
7	4924.00	45.2 PK	74.0	-28.8	1.62 V	83	41.3	3.9
8	4924.00	42.7 AV	54.0	-11.3	1.62 V	83	38.8	3.9
9	7386.00	45.2 PK	74.0	-28.8	1.53 V	70	35.5	9.7
10	7386.00	39.0 AV	54.0	-15.0	1.53 V	70	29.3	9.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	2386.65	56.3 PK	74.0	-17.7	1.03 H	124	57.5	-1.2
2	2386.65	43.4 AV	54.0	-10.6	1.03 H	124	44.6	-1.2
3	*2422.00	97.1 PK			1.03 H	124	98.3	-1.2
4	*2422.00	87.7 AV			1.03 H	124	88.9	-1.2
5	4844.00	42.8 PK	74.0	-31.2	1.06 H	114	39.0	3.8
6	4844.00	40.0 AV	54.0	-14.0	1.06 H	114	36.2	3.8
7	7266.00	42.0 PK	74.0	-32.0	1.22 H	255	32.5	9.5
8	7266.00	38.8 AV	54.0	-15.2	1.22 H	255	29.3	9.5

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	2339.80	56.5 PK	74.0	-17.5	3.37 V	37	57.6	-1.1
2	2339.80	43.3 AV	54.0	-10.7	3.37 V	37	44.4	-1.1
3	*2422.00	94.0 PK			3.37 V	37	95.2	-1.2
4	*2422.00	85.0 AV			3.37 V	37	86.2	-1.2
5	4844.00	43.1 PK	74.0	-30.9	1.59 V	68	39.3	3.8
6	4844.00	40.5 AV	54.0	-13.5	1.59 V	68	36.7	3.8
7	7266.00	42.5 PK	74.0	-31.5	1.53 V	66	33.0	9.5
8	7266.00	39.2 AV	54.0	-14.8	1.53 V	66	29.7	9.5

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.
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	55.7 PK	74.0	-18.3	1.01 H	125	56.9	-1.2
2	2390.00	42.4 AV	54.0	-11.6	1.01 H	125	43.6	-1.2
3	*2437.00	98.8 PK			1.01 H	125	100.0	-1.2
4	*2437.00	89.2 AV			1.01 H	125	90.4	-1.2
5	2483.50	63.1 PK	74.0	-10.9	1.01 H	125	64.3	-1.2
6	2483.50	47.4 AV	54.0	-6.6	1.01 H	125	48.6	-1.2
7	4874.00	43.2 PK	74.0	-30.8	1.08 H	125	39.4	3.8
8	4874.00	40.3 AV	54.0	-13.7	1.08 H	125	36.5	3.8
9	7311.00	42.6 PK	74.0	-31.4	1.23 H	260	32.9	9.7
10	7311.00	39.2 AV	54.0	-14.8	1.23 H	260	29.5	9.7

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	53.8 PK	74.0	-20.2	3.61 V	32	55.0	-1.2
2	2390.00	42.1 AV	54.0	-11.9	3.61 V	32	43.3	-1.2
3	*2437.00	96.9 PK			3.61 V	32	98.1	-1.2
4	*2437.00	86.8 AV			3.61 V	32	88.0	-1.2
5	2483.50	60.7 PK	74.0	-13.3	3.61 V	32	61.9	-1.2
6	2483.50	46.3 AV	54.0	-7.7	3.61 V	32	47.5	-1.2
7	4874.00	43.3 PK	74.0	-30.7	1.67 V	73	39.5	3.8
8	4874.00	40.4 AV	54.0	-13.6	1.67 V	73	36.6	3.8
9	7311.00	42.5 PK	74.0	-31.5	1.50 V	67	32.8	9.7
10	7311.00	39.3 AV	54.0	-14.7	1.50 V	67	29.6	9.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	100.0 PK			1.25 H	125	101.2	-1.2
2	*2452.00	90.7 AV			1.25 H	125	91.9	-1.2
3	2483.50	70.6 PK	74.0	-3.4	1.25 H	125	71.8	-1.2
4	2483.50	53.5 AV	54.0	-0.5	1.25 H	125	54.7	-1.2
5	2485.80	73.5 PK	74.0	-0.5	1.25 H	125	74.7	-1.2
6	2485.80	53.1 AV	54.0	-0.9	1.25 H	125	54.3	-1.2
7	4904.00	43.6 PK	74.0	-30.4	1.08 H	115	39.7	3.9
8	4904.00	40.6 AV	54.0	-13.4	1.08 H	115	36.7	3.9
9	7356.00	42.5 PK	74.0	-31.5	1.28 H	246	32.6	9.9
10	7356.00	39.3 AV	54.0	-14.7	1.28 H	246	29.4	9.9

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	*2452.00	97.3 PK			3.60 V	41	98.5	-1.2
2	*2452.00	87.9 AV			3.60 V	41	89.1	-1.2
3	2483.50	68.3 PK	74.0	-5.7	3.60 V	41	69.5	-1.2
4	2483.50	52.0 AV	54.0	-2.0	3.60 V	41	53.2	-1.2
5	2485.60	71.1 PK	74.0	-2.9	3.60 V	41	72.3	-1.2
6	2485.60	51.4 AV	54.0	-2.6	3.60 V	41	52.6	-1.2
7	4904.00	43.1 PK	74.0	-30.9	1.61 V	78	39.2	3.9
8	4904.00	40.2 AV	54.0	-13.8	1.61 V	78	36.3	3.9
9	7356.00	42.1 PK	74.0	-31.9	1.52 V	58	32.2	9.9
10	7356.00	39.0 AV	54.0	-15.0	1.52 V	58	29.1	9.9

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.

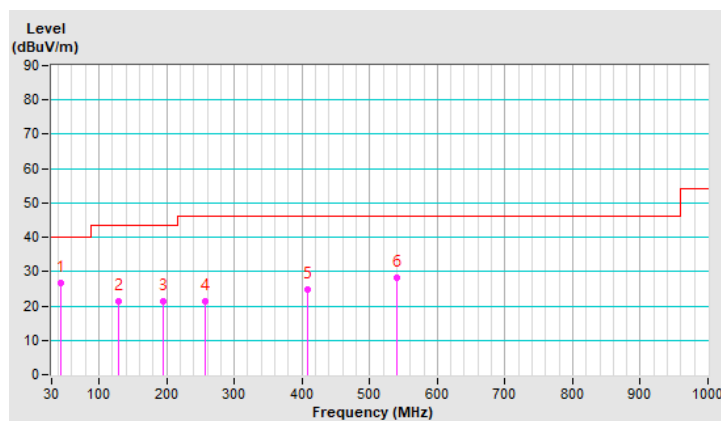
Below 1GHz Data:

RF Mode	TX 802.11b	Channel	CH 11 : 2462 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	42.63	26.8 QP	40.0	-13.2	3.00 H	109	35.2	-8.4
2	128.16	21.4 QP	43.5	-22.1	1.00 H	268	30.4	-9.0
3	195.82	21.2 QP	43.5	-22.3	2.00 H	177	31.7	-10.5
4	257.10	21.2 QP	46.0	-24.8	1.00 H	160	29.6	-8.4
5	409.17	24.7 QP	46.0	-21.3	2.00 H	360	28.2	-3.5
6	540.54	28.1 QP	46.0	-17.9	2.00 H	360	28.5	-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 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.



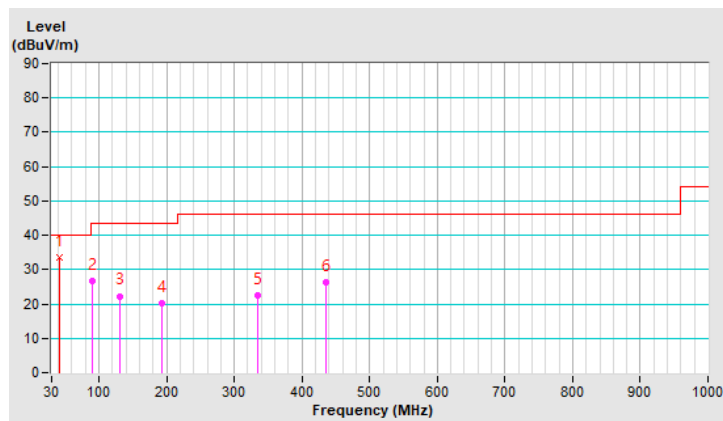
RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	41.09	33.5 QP	40.0	-6.5	1.00 V	54	41.9	-8.4
2	89.27	26.6 QP	43.5	-16.9	1.00 V	0	40.4	-13.8
3	130.54	22.3 QP	43.5	-21.2	2.00 V	0	31.1	-8.8
4	193.49	20.2 QP	43.5	-23.3	2.00 V	0	30.6	-10.4
5	333.85	22.5 QP	46.0	-23.5	2.00 V	0	27.8	-5.3
6	434.81	26.3 QP	46.0	-19.7	1.00 V	148	28.8	-2.5

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 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	Oct. 20, 2020	Oct. 19, 2021
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 27, 2020	Oct. 26, 2021
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 26, 2021	Mar. 25, 2022
50 ohms Terminator	50	3	Oct. 26, 2020	Oct. 25, 2021
RF Cable	5D-FB	COCCAB-001	Sep. 26, 2020	Sep. 25, 2021
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 29, 2020	Aug. 28, 2021
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: June 20, 2021

4.2.3 Test Procedures

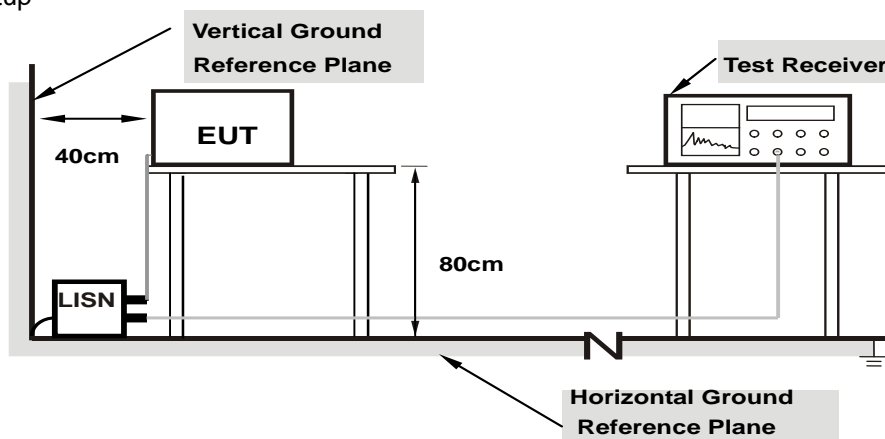
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

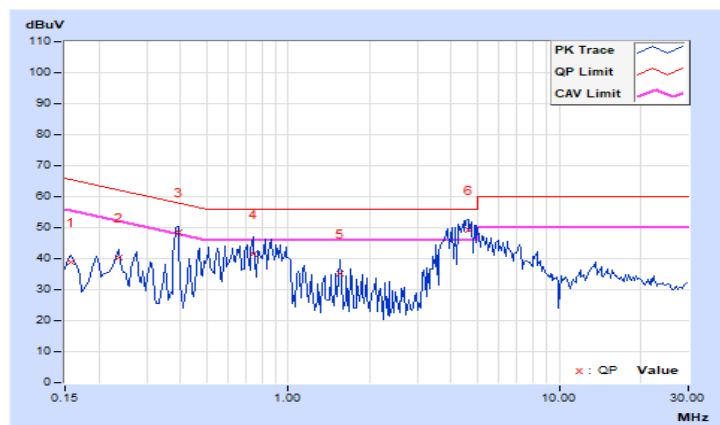
4.2.7 Test Results

RF Mode	TX 802.11b	Channel	CH 11 : 2462 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	0.15781	9.97	28.99	17.22	38.96	27.19	65.58	55.58	-26.62	-28.39
2	0.23594	10.01	30.34	18.53	40.35	28.54	62.24	52.24	-21.89	-23.70
3	0.39219	10.03	38.67	28.29	48.70	38.32	58.02	48.02	-9.32	-9.70
4	0.74375	10.05	31.51	15.97	41.56	26.02	56.00	46.00	-14.44	-19.98
5	1.56250	10.10	25.18	11.55	35.28	21.65	56.00	46.00	-20.72	-24.35
6	4.61719	10.31	38.86	24.03	49.17	34.34	56.00	46.00	-6.83	-11.66

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

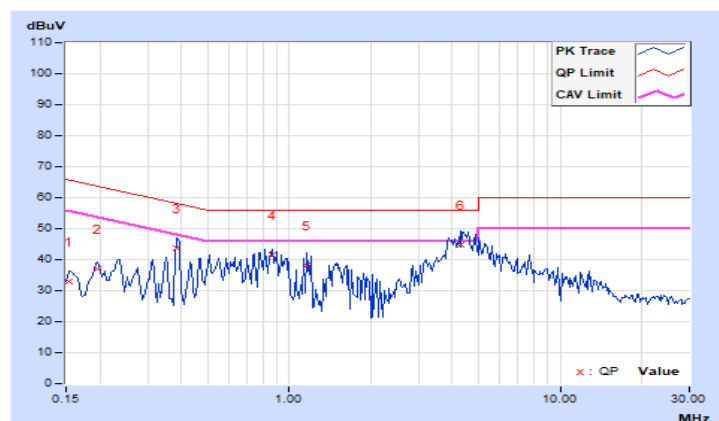


RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.15391	9.95	22.83	11.65	32.78	21.60	65.79	55.79	-33.01	-34.19
2	0.19687	10.00	27.03	15.73	37.03	25.73	63.74	53.74	-26.71	-28.01
3	0.38438	10.02	33.82	21.68	43.84	31.70	58.18	48.18	-14.34	-16.48
4	0.86094	10.05	31.57	18.45	41.62	28.50	56.00	46.00	-14.38	-17.50
5	1.16406	10.07	28.05	11.63	38.12	21.70	56.00	46.00	-17.88	-24.30
6	4.31094	10.26	34.71	23.15	44.97	33.41	56.00	46.00	-11.03	-12.59

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

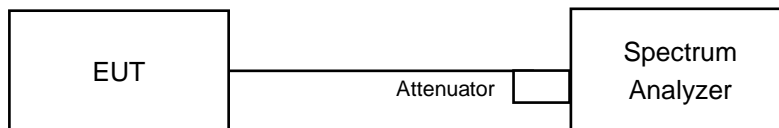


4.3 6dB Bandwidth Measurement

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) $\geq 3 \times$ 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 specific channel frequencies individually.

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.1	0.5	Pass
6	2437	8.63	0.5	Pass
11	2462	9.13	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.62	0.5	Pass
6	2437	16.63	0.5	Pass
11	2462	16.64	0.5	Pass

802.11n (HT20)

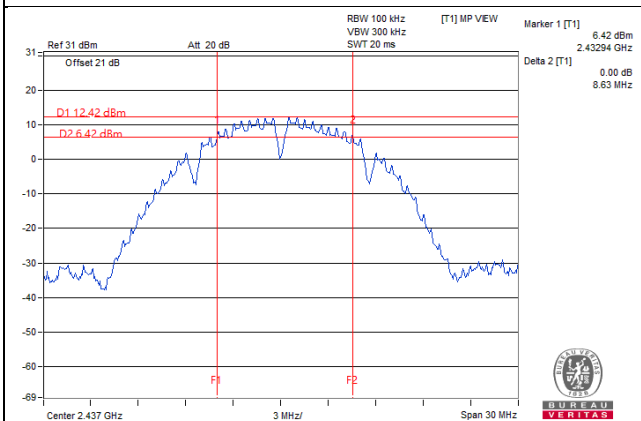
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.85	0.5	Pass
6	2437	17.85	0.5	Pass
11	2462	17.84	0.5	Pass

802.11n (HT40)

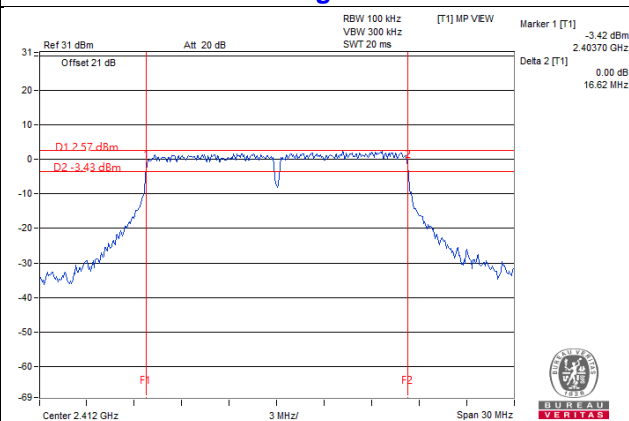
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	36.59	0.5	Pass
6	2437	36.64	0.5	Pass
9	2452	36.66	0.5	Pass

Spectrum Plot of Worst Value

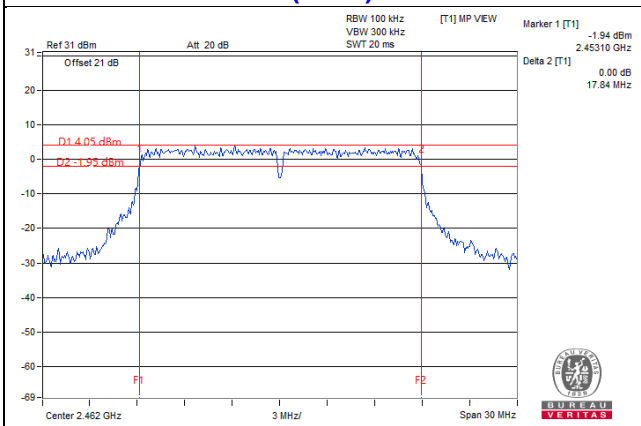
802.11b / CH6



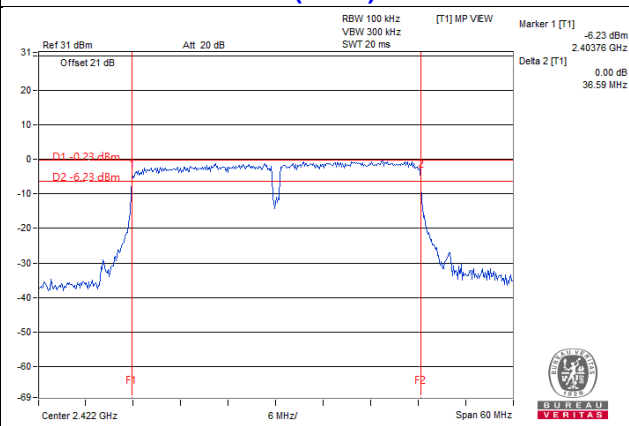
802.11g / CH1



802.11n (HT20) / CH11



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)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

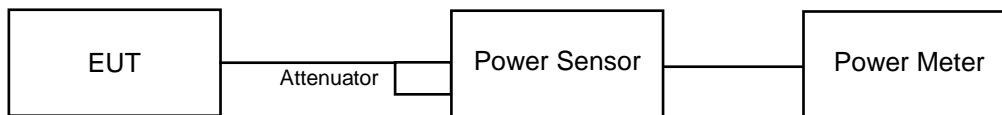
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

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

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	330.37	25.19	30	Pass
6	2437	386.367	25.87	30	Pass
11	2462	437.522	26.41	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	422.669	26.26	30	Pass
6	2437	477.529	26.79	30	Pass
11	2462	476.431	26.78	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	363.915	25.61	30	Pass
6	2437	430.527	26.34	30	Pass
11	2462	453.942	26.57	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	397.192	25.99	30	Pass
6	2437	432.514	26.36	30	Pass
9	2452	433.511	26.37	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	190.985	22.81
6	2437	237.684	23.76
11	2462	283.792	24.53

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	65.464	18.16
6	2437	105.925	20.25
11	2462	101.859	20.08

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	61.518	17.89
6	2437	90.157	19.55
11	2462	94.189	19.74

802.11n (HT40)

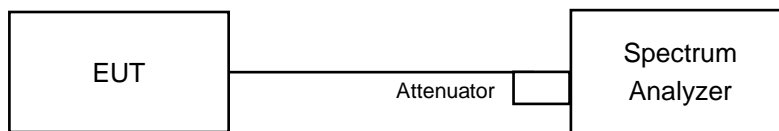
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	74.645	18.73
6	2437	86.896	19.39
9	2452	97.724	19.90

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-8.75	8	Pass
6	2437	-7.84	8	Pass
11	2462	-7.13	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-11.96	8	Pass
6	2437	-11.11	8	Pass
11	2462	-10.83	8	Pass

802.11n (HT20)

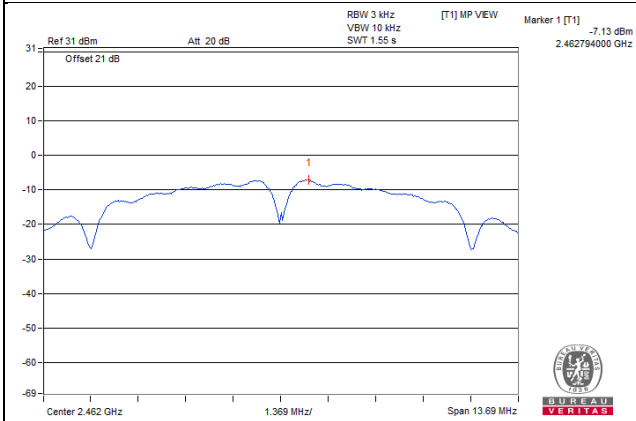
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-12.13	8	Pass
6	2437	-10.96	8	Pass
11	2462	-9.87	8	Pass

802.11n (HT40)

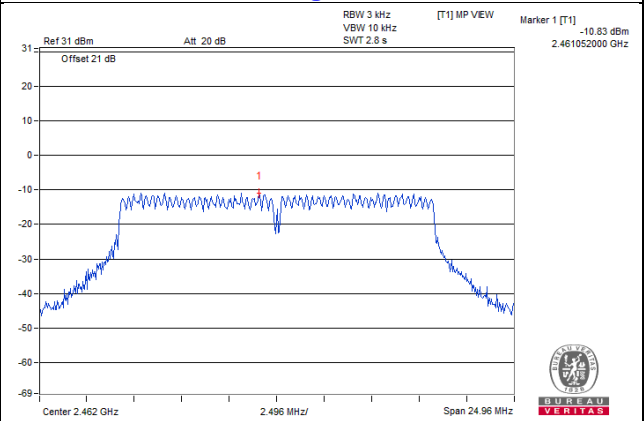
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
3	2422	-13.18	8	Pass
6	2437	-11.05	8	Pass
9	2452	-12.00	8	Pass

Spectrum Plot of Worst Value

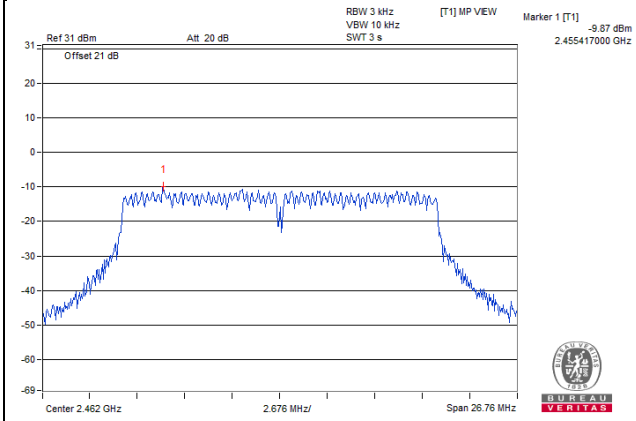
802.11b / CH11



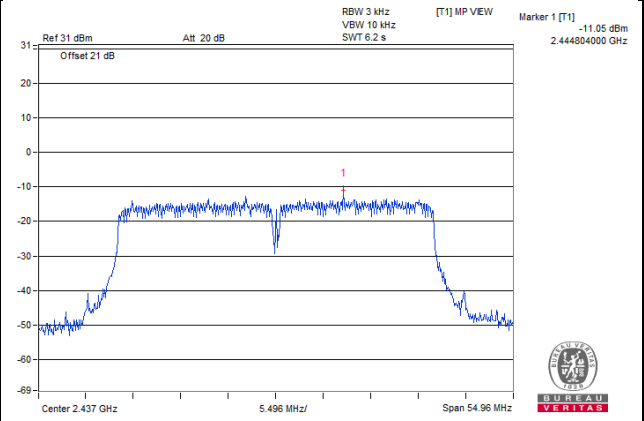
802.11g / CH11



802.11n (HT20) / CH11



802.11n (HT40) / CH6

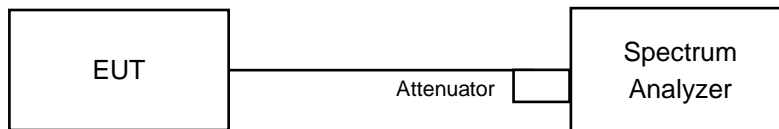


4.6 Conducted Out of Band Emission Measurement

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 \geq 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 OOB

1. Set RBW = 100 kHz.
2. Set VBW \geq 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

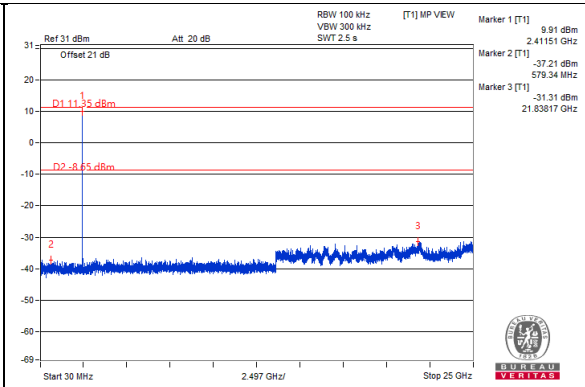
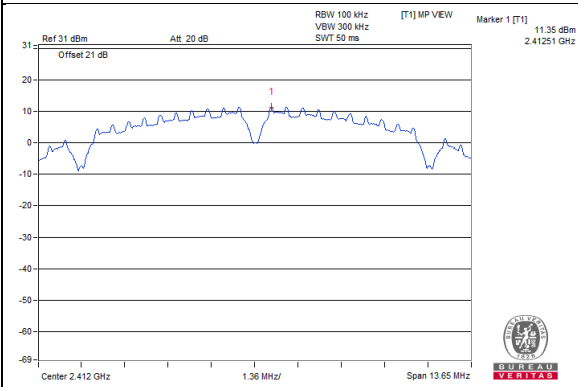
Same as Item 4.3.6

4.6.7 Test Results

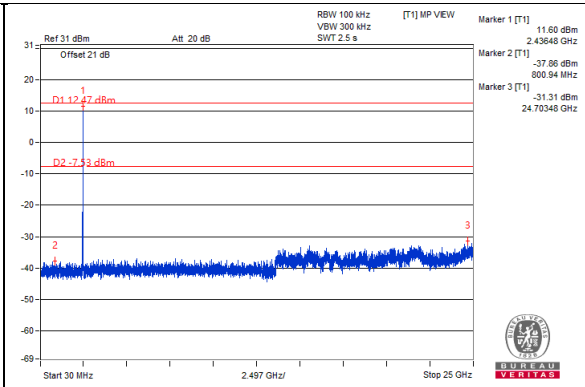
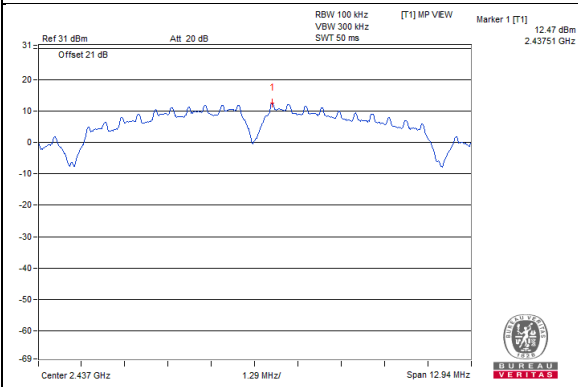
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

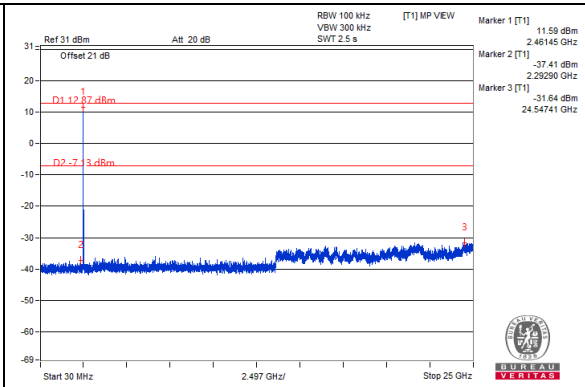
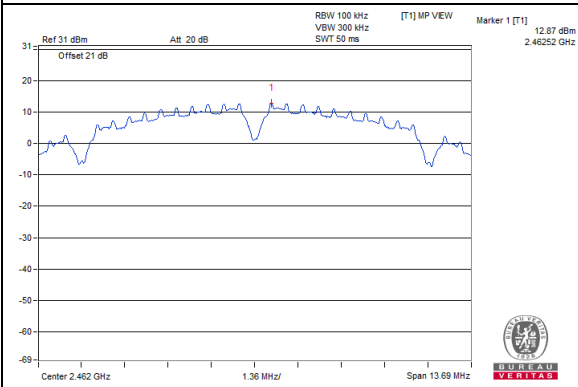
CH 1



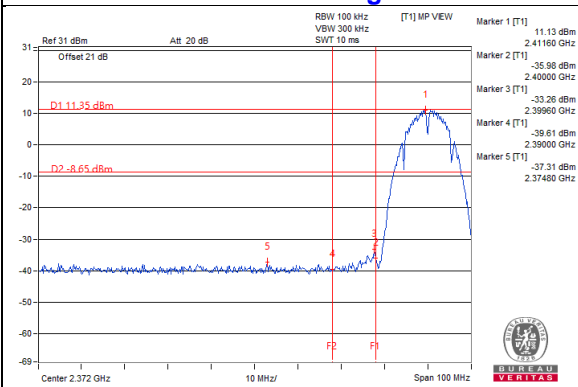
CH 6



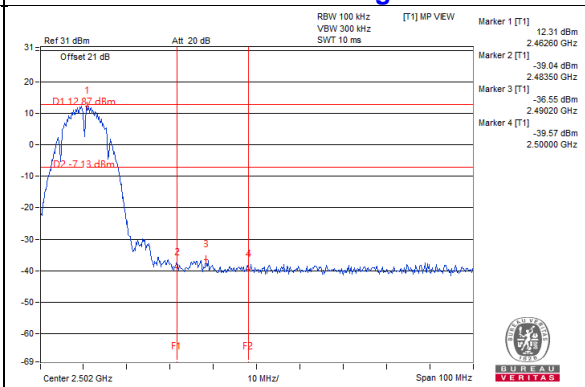
CH 11



CH 1 Band edge

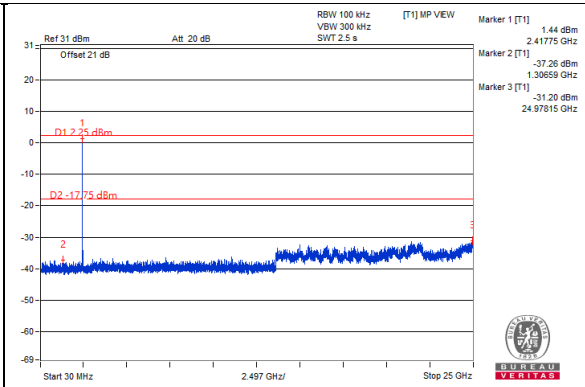
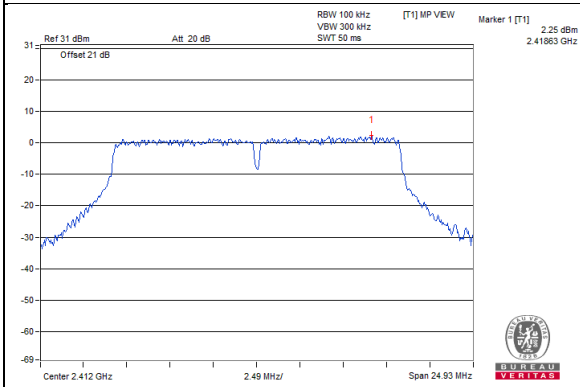


CH 11 Band edge

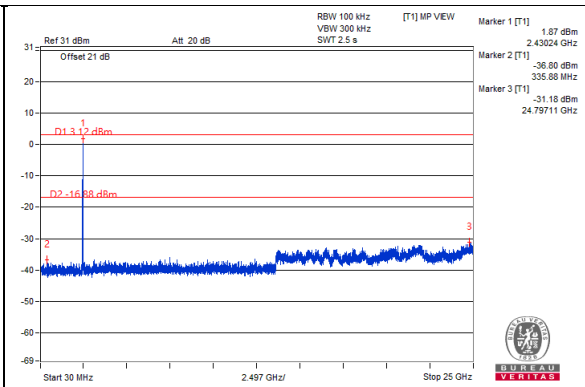
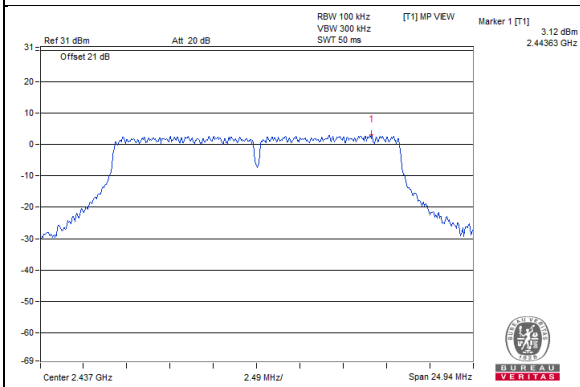


802.11g

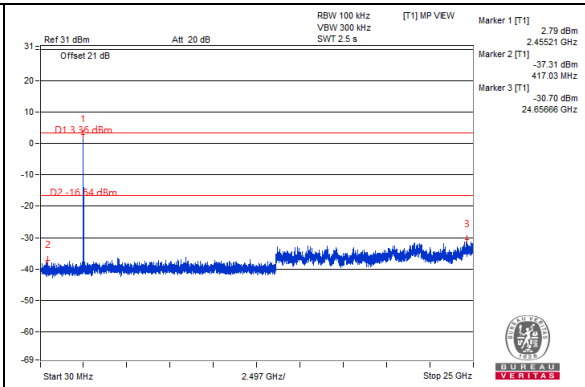
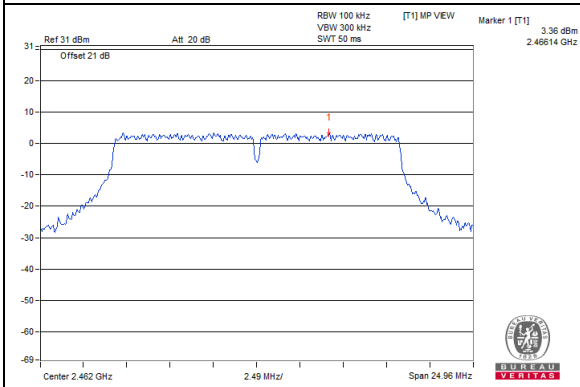
CH 1



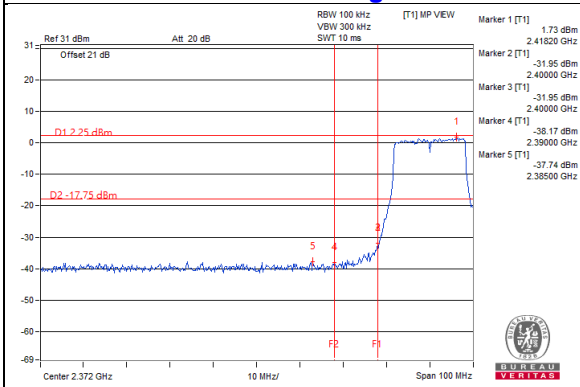
CH 6



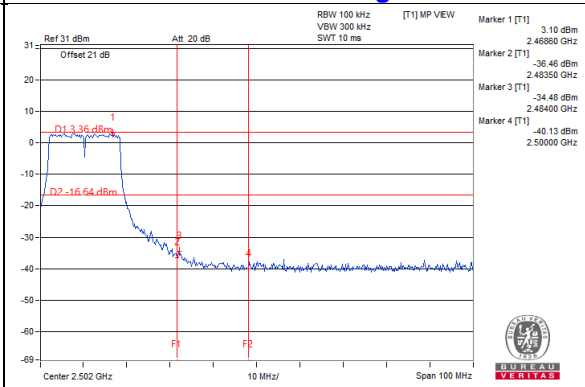
CH 11



CH 1 Band edge

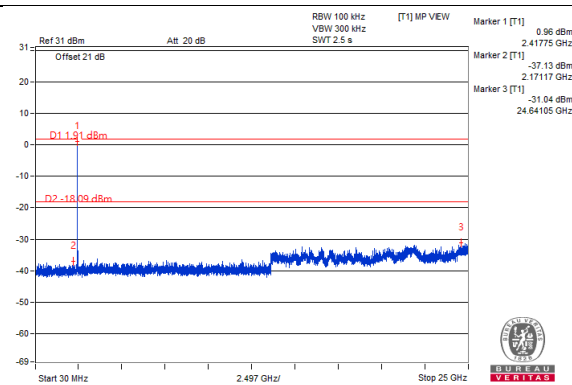
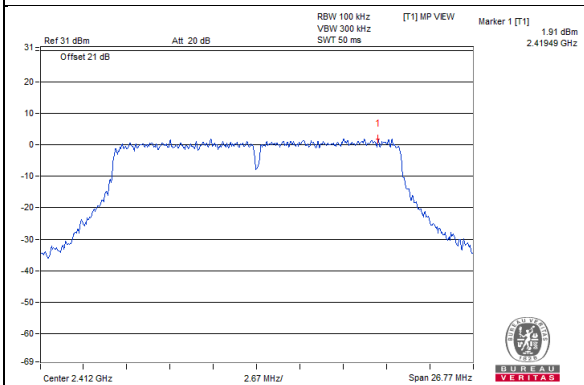


CH 11 Band edge

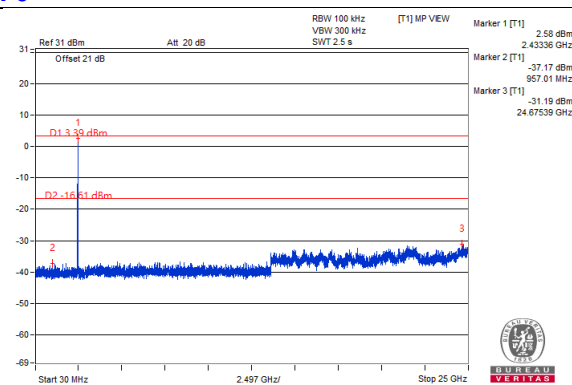
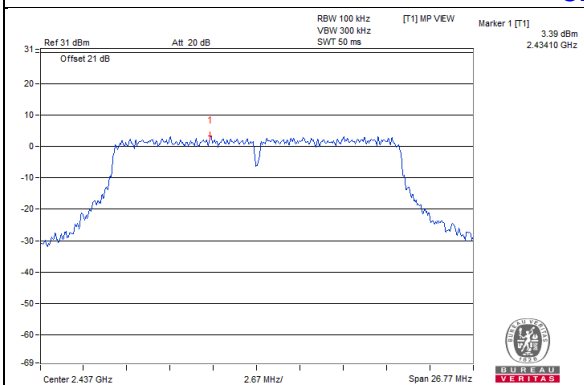


802.11n (HT20)

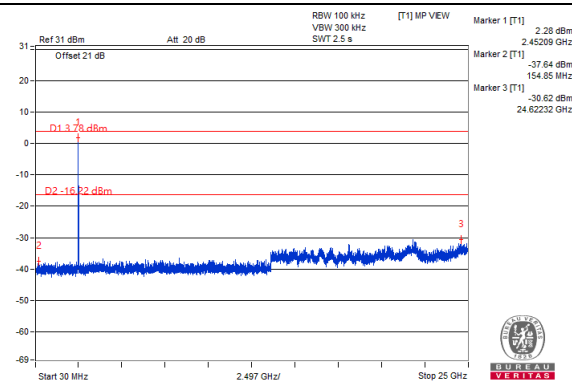
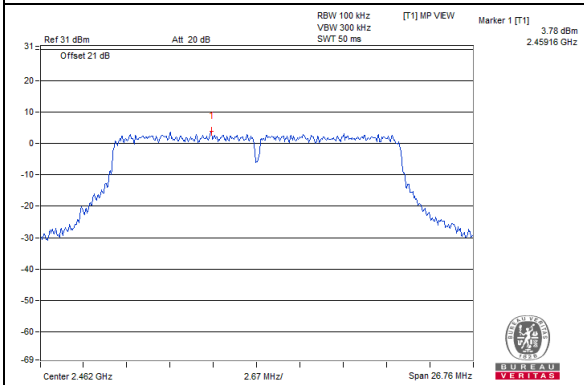
CH 1



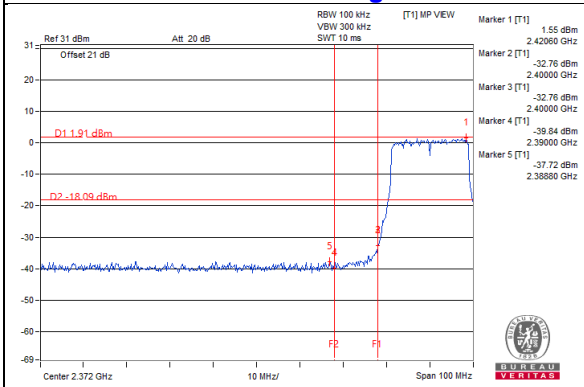
CH 6



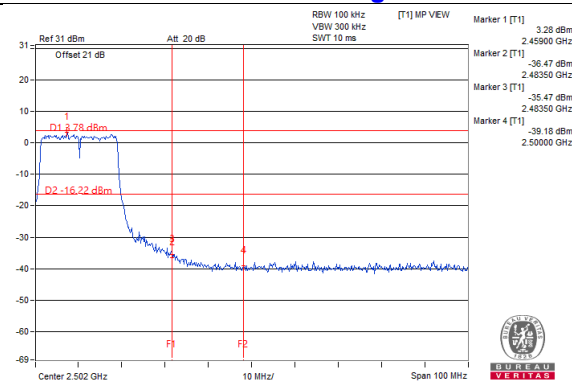
CH 11



CH 1 Band edge

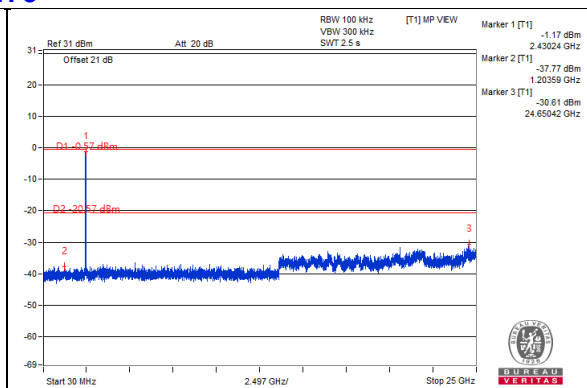
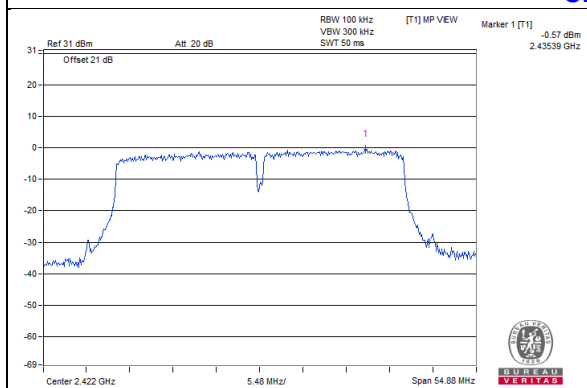


CH 11 Band edge

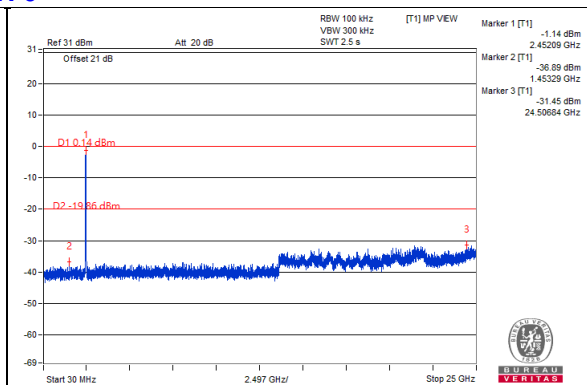
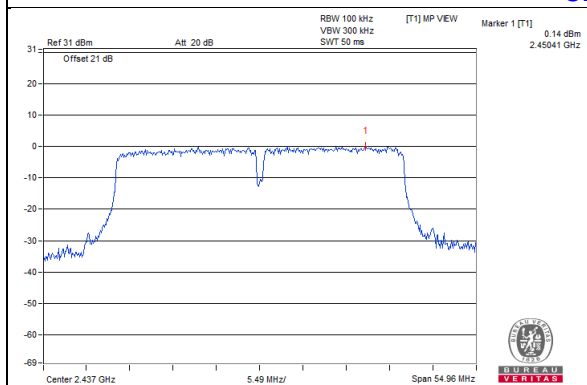


802.11n (HT40)

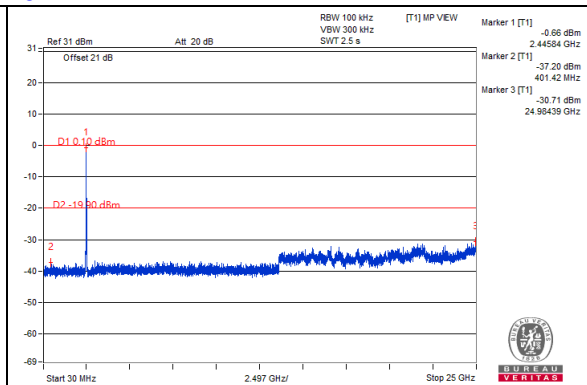
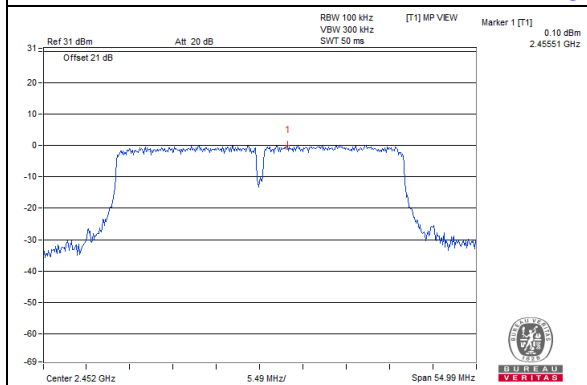
CH 3



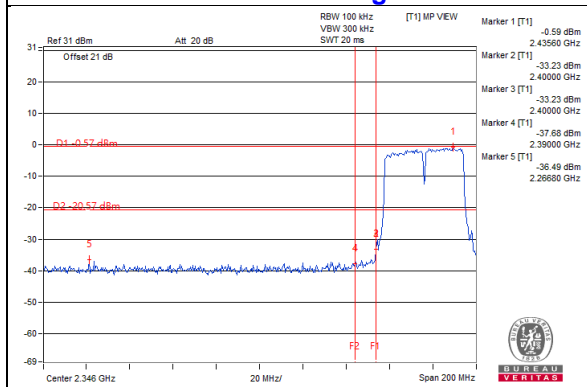
CH 6



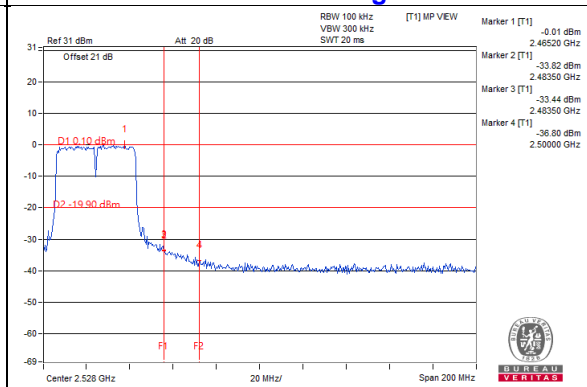
CH 9



CH 3 Band edge



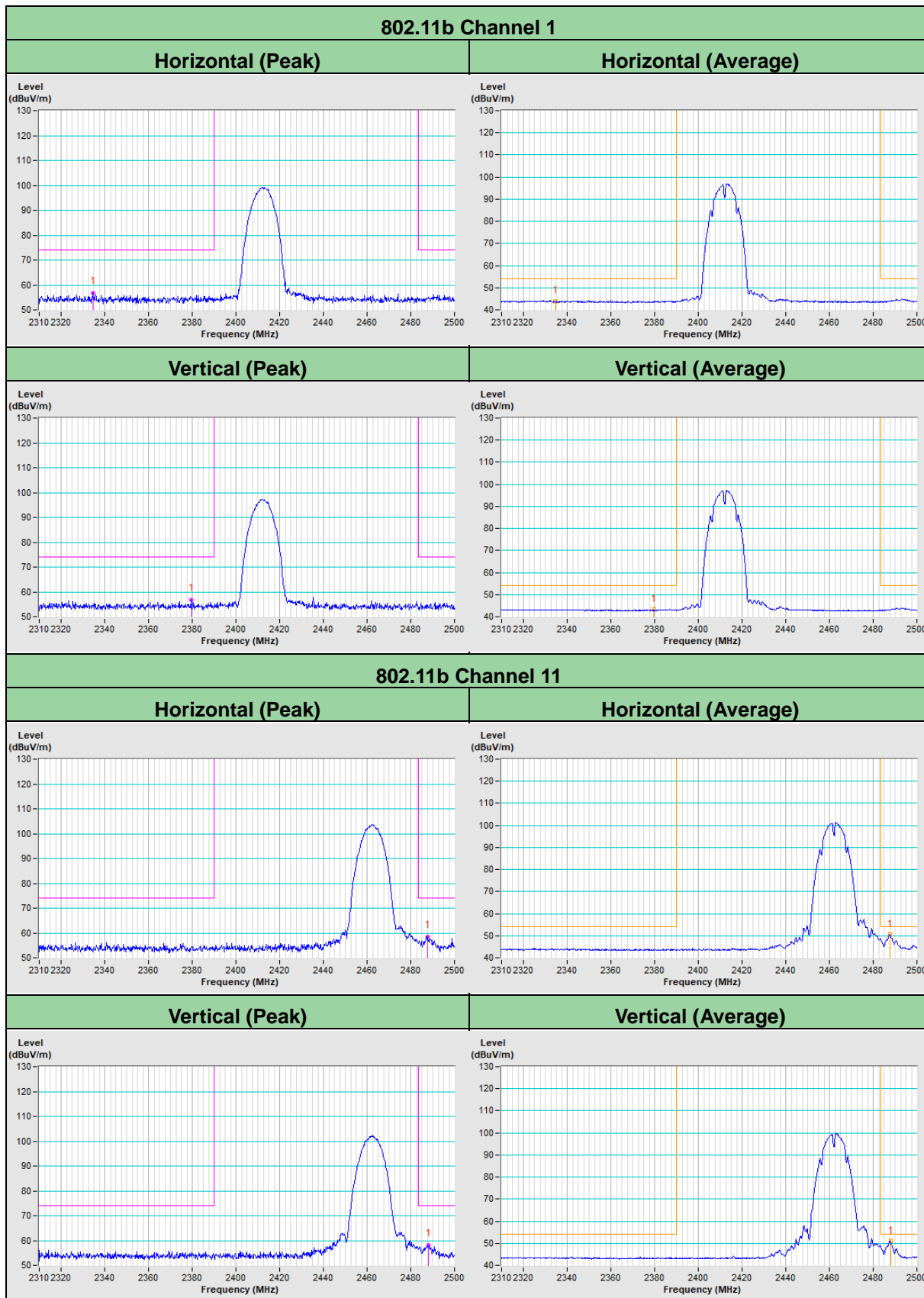
CH 9 Band edge



5 Pictures of Test Arrangements

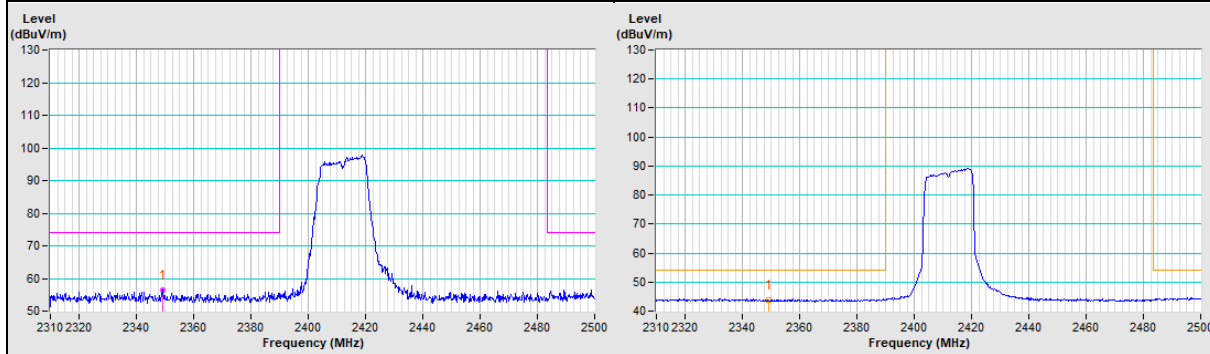
Please refer to the attached file (Test Setup Photo).

Annex A - Band-Edge Measurement

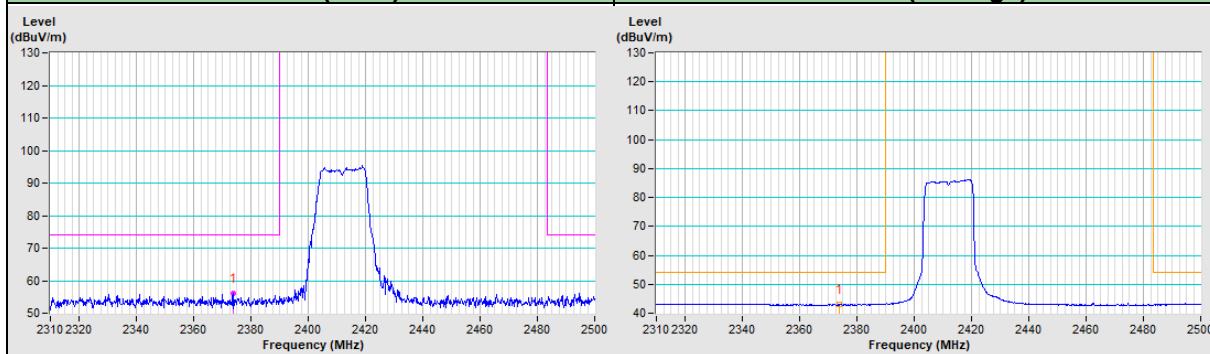


802.11g Channel 1

Horizontal (Peak)	Horizontal (Average)
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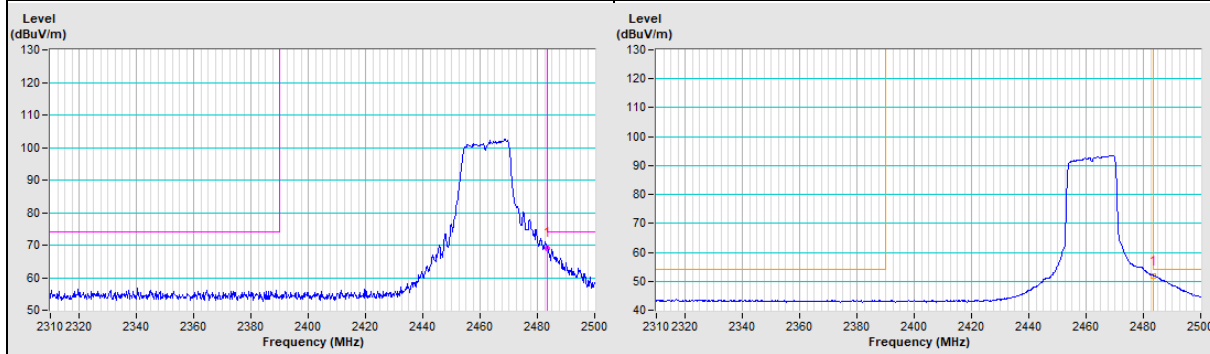


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

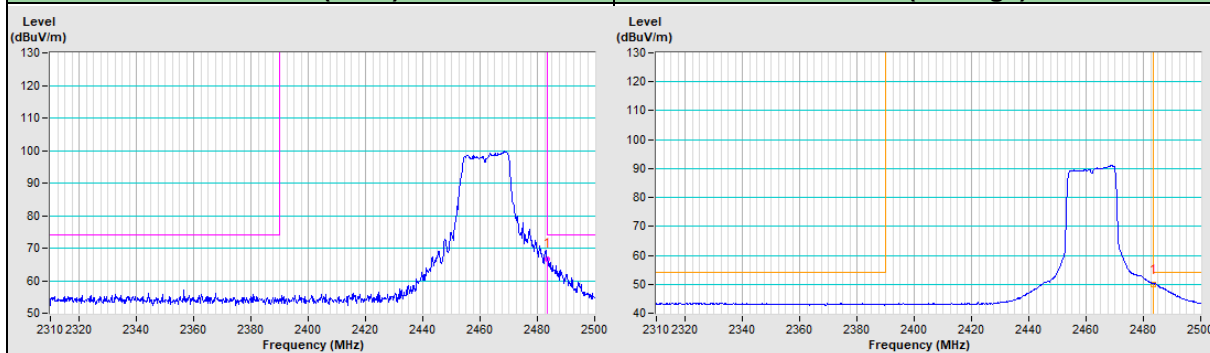


802.11g Channel 11

Horizontal (Peak)	Horizontal (Average)
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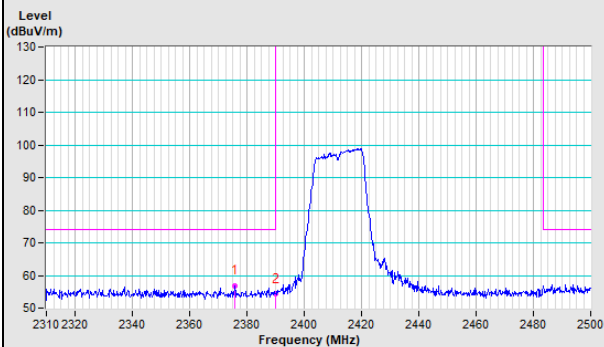


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

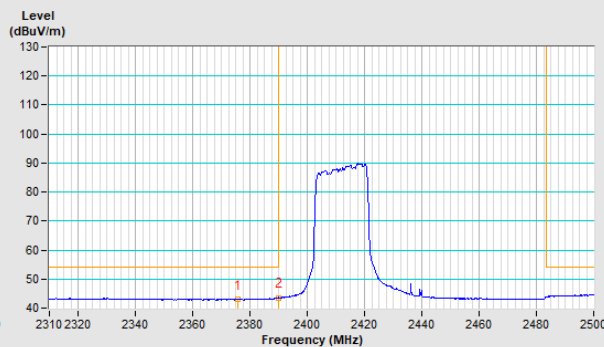


802.11n (HT20) Channel 1

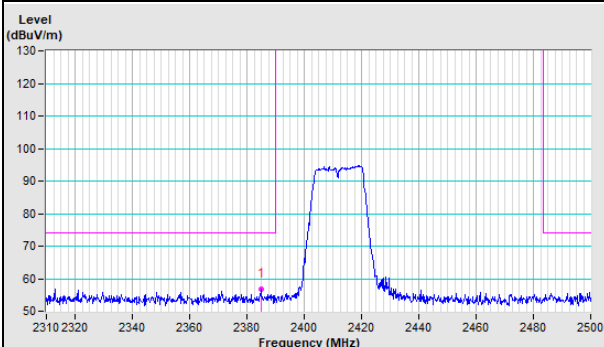
Horizontal (Peak)



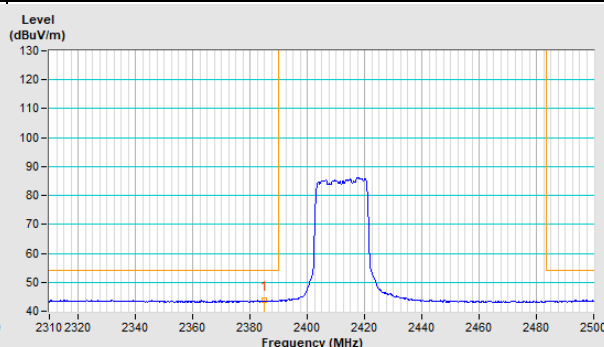
Horizontal (Average)



Vertical (Peak)

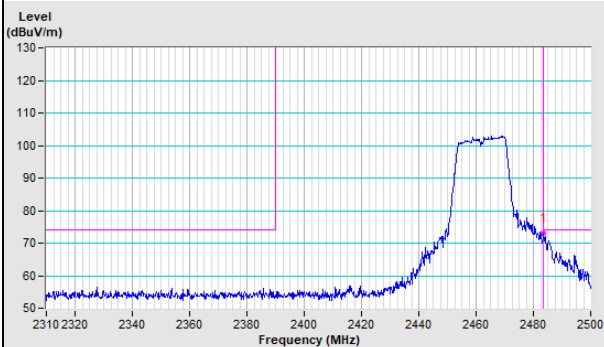


Vertical (Average)

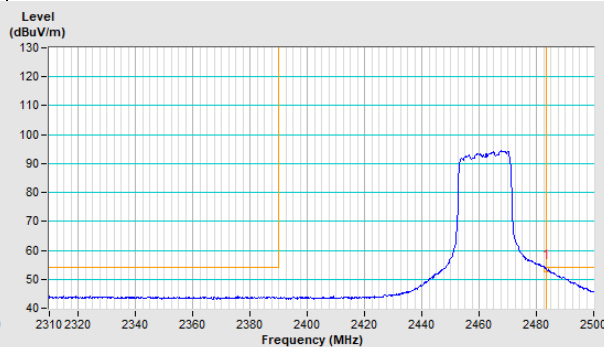


802.11n (HT20) Channel 11

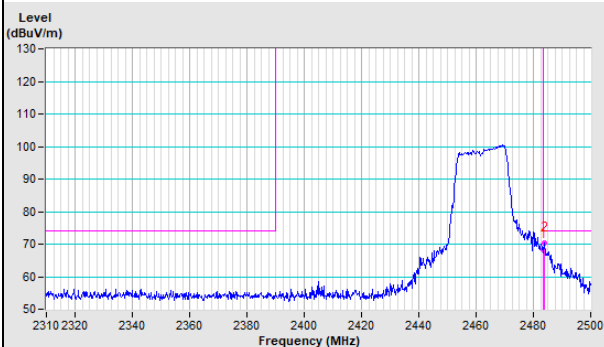
Horizontal (Peak)



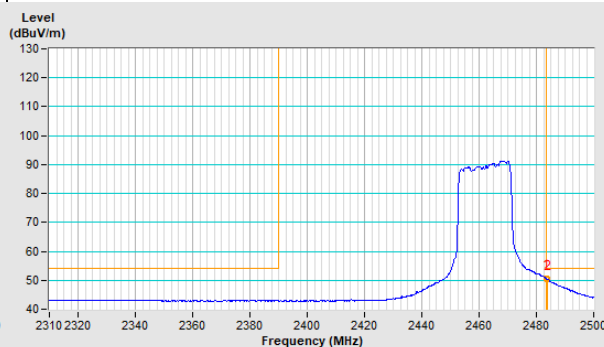
Horizontal (Average)



Vertical (Peak)

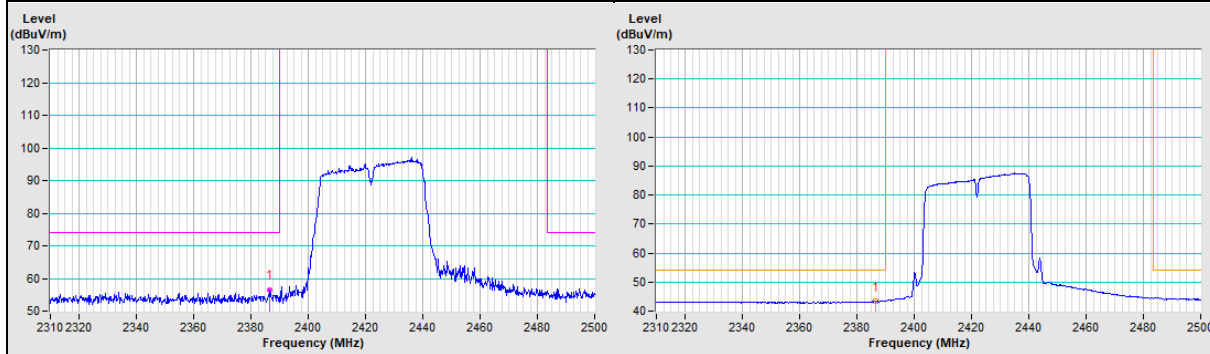


Vertical (Average)

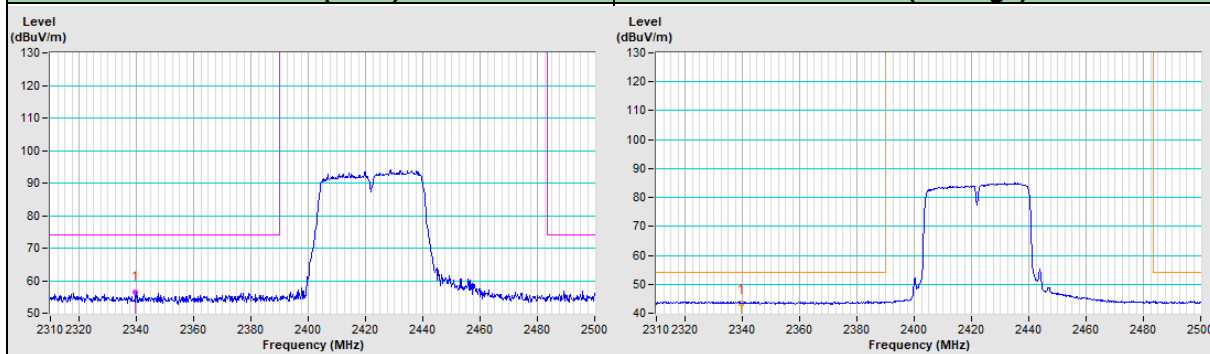


802.11n (HT40) Channel 3

Horizontal (Peak)	Horizontal (Average)
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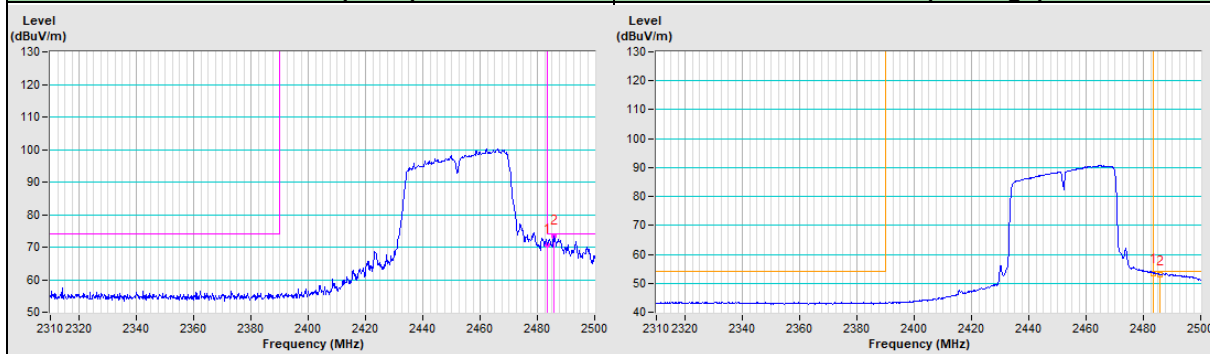


Vertical (Peak)	Vertical (Average)
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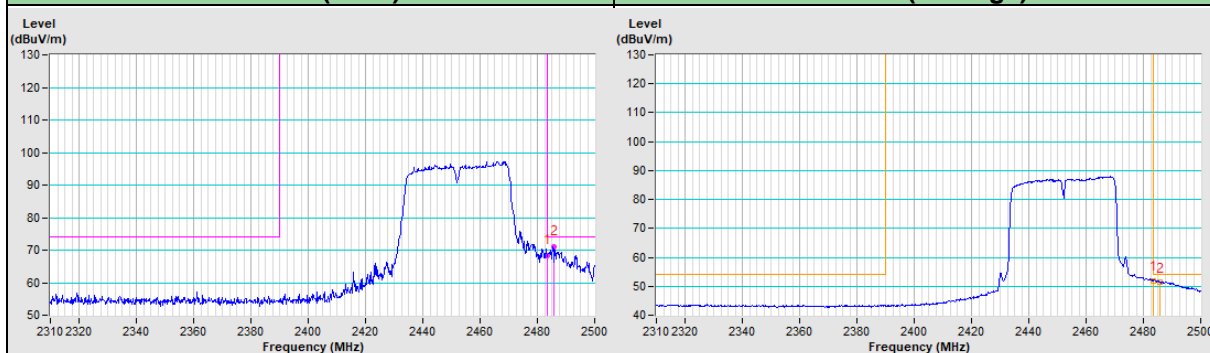


802.11n (HT40) Channel 9

Horizontal (Peak)	Horizontal (Average)
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Vertical (Peak)	Vertical (Average)
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Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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