FCC Test Report

Report No.:	RFBEIH-WTW-P21040843
FCC ID:	P27XHC3
Test Model:	XHC3
Series Model:	XHC3xxxxxxxx, SCHC3AExxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-" , for marketing purpose)
Received Date:	Apr. 22, 2021
Test Date:	May 7 to 28, 2021
Issued Date:	Jun. 9, 2021
Applicant:	Sercomm Corp.
Address:	8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
FCC Registration / Designation Number:	198487 / TW2021

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Release Control Record

Issue No.	Description	Date Issued
RFBEIH-WTW-P21040843	Original release.	Jun. 9, 2021

1 Certificate of Conformity

Product:	Comcast Xfinity Low Cost Camera
Brand:	Sercomm, Comcast, Xfinity
Test Model:	XHC3
Series Model:	XHC3xxxxxxxx, SCHC3AExxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-" , for marketing purpose)
Sample Status:	Engineering sample
Applicant:	Sercomm Corp.
Test Date:	May 7 to 28, 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 RF characteristics under the conditions specified in this report.

Prepared by : Annie Chang , **Date:** Jun. 9, 2021

Annie Chang / Senior Specialist

Approved by : Rex. Lai , **Date:** Jun. 9, 2021

Rex Lai / Associate 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 -11.59dB at 0.49400MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.03dB at 2390.00MHz.
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 IPEX not a standard connector.

Note:
1. For 2.4GHz band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
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	3.00 dB
Conducted Emissions	9kHz ~ 40GHz	2.63 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.61 dB
	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.42 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Comcast Xfinity Low Cost Camera
Brand	Sercomm, Comcast, Xfinity
Test Model	XHC3
Series Model	XHC3xxxxxxxx, SCHC3AExxxxxxxxx (the 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-" , for marketing purpose)
Model Difference	For marketing purpose
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from Adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 400Mbps
Operating Frequency	2412MHz ~ 2462MHz
Number of Channel	802.11b/ 802.11g/802.11n (HT20/VHT20): 11 802.11n (HT40/VHT40): 7
Output Power	906.335mW
Antenna Type	Dipole antenna with 2.65dBi gain
Antenna Connector	IPEX
Accessory Device	Adapter
Data Cable Supplied	N/A

Note:

1. The EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	TX Function	RX Function
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11n (VHT20)	2TX	2RX
802.11n (VHT40)	2TX	2RX

* The modulation and bandwidth are similar for 802.11n mode for HT20 (HT40) and 802.11n mode for VHT20 (VHT40), therefore investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

2. All models are listed as below. Model: XHC3 is the representative for final test.

Brand	Model	Difference
Sercomm	XHC3xxxxxxxx	All models are electrically identical, different model names are for brand difference and marketing purpose.
Comcast, Xfinity	SCHC3AExxxxxxxxx	
The 1st x should be "blank" or "-"; the rest x could be 0 to 9, A to Z, a to z, "blank" or "-" , for marketing purpose		

3. The EUT uses following adapter.

Brand	APD
Model	WB-12G12FU
Input Power	100-240V, 50-60Hz, 0.3A
Output Power	12Vdc, 1A, 12W
Power Line	AC 2 Pin, Non-shielded DC cable (3.0m)

4. WLAN 2.4GHz, WLAN 5GHz and BT LE technologies cannot transmit at same time.

5. 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.

6. 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.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20/VHT20):

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

7 channels are provided for 802.11n (HT40/VHT40):

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≥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 **Z-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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11n (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

Radiated Emission Test (Below 1GHz):

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	1 to 11	6	OFDM	BPSK	6.0

Power Line Conducted Emission Test:

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	1 to 11	6	OFDM	BPSK	6.0

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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11n (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	15.0

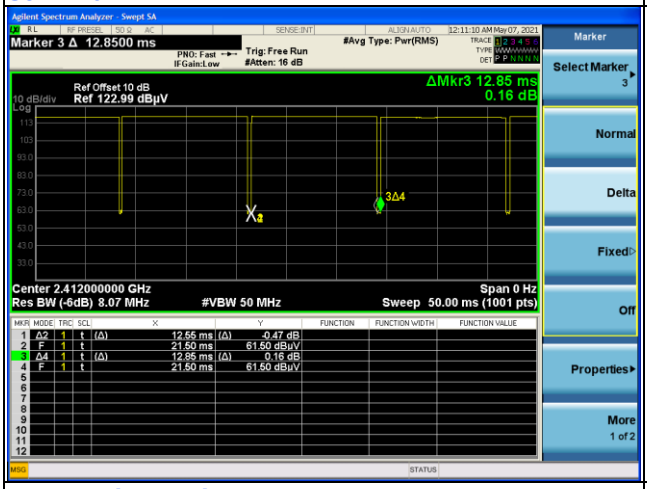
Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	24deg. C, 63%RH	120Vac, 60Hz	Jed Wu
RE<1G	21deg. C, 68%RH	120Vac, 60Hz	Ian Chang
PLC	25deg. C, 75%RH	120Vac, 60Hz	Ian Chang
APCM	25deg. C, 76%RH	120Vac, 60Hz	Pirar Hsieh

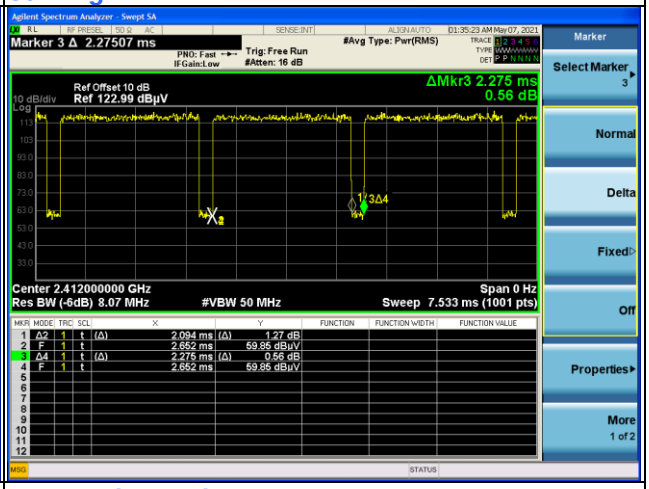
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11b: Duty cycle = 12.55/12.85 = 0.977, Duty factor = 10 * log(1/0.977) = 0.10
802.11g: Duty cycle = 2.094/2.275 = 0.920, Duty factor = 10 * log(1/0.920) = 0.36
802.11n (VHT20): Duty cycle = 1.959/2.109 = 0.929, Duty factor = 10 * log(1/0.929) = 0.32
802.11n (VHT40): Duty cycle = 0.96/1.125 = 0.853, Duty factor = 10 * log(1/0.853) = 0.69

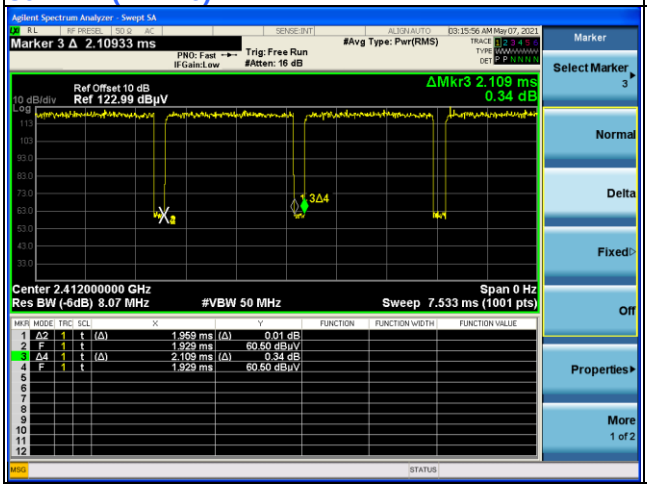
802.11b



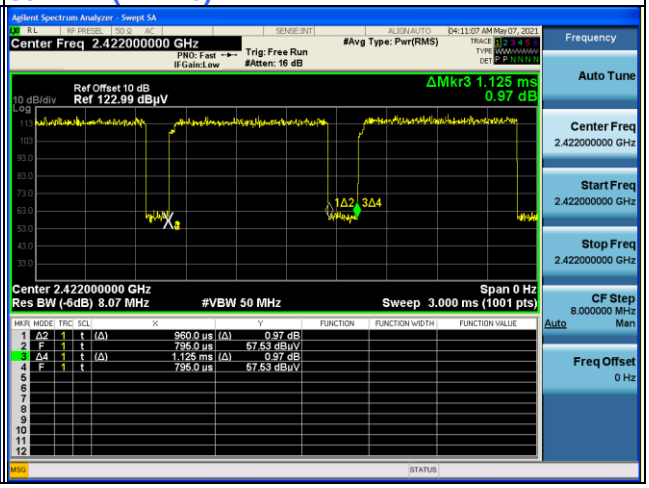
802.11g



802.11n (VHT20)



802.11n (VHT40)



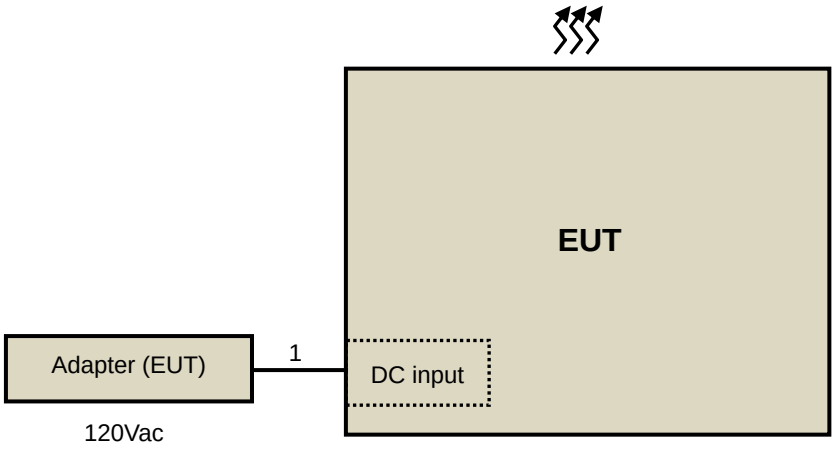
3.4 Description of Support Units

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	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	3.0	N	0	Supplied by client

Note: The core(s) is(are) originally attached to the cable(s).

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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 18, 2021	Feb. 17, 2022
HP Preamplifier	8449B	3008A01201	Feb. 19, 2021	Feb. 18, 2022
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 18, 2021	Feb. 17, 2022
Agilent TEST RECEIVER	N9038A	MY51210129	Mar. 12, 2021	Mar. 11, 2022
Schwarzbeck Antenna	VULB 9168	139	Nov. 6, 2020	Nov. 5, 2021
Schwarzbeck Antenna	VHBA 9123	480	Jun. 3, 2019	Jun. 2, 2021
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 22, 2020	Nov. 21, 2021
EMCO Horn Antenna	3115	00027024	Nov. 22, 2020	Nov.21, 2021
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Jul. 9, 2020	Jul. 8, 2021
EMEC RF cable With 3/4dB PAD	EM102-KMKM	01	Aug. 21, 2020	Aug. 20, 2021
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 16, 2020	Jun. 15, 2021
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 22, 2020	Jul. 21, 2021
Loop Antenna EMCI	LPA600	270	Aug. 23, 2019	Aug. 22, 2021
EMCO Horn Antenna	3115	00028257	Nov. 22, 2020	Nov. 21, 2021
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 8, 2020	Sep. 7, 2021
Anritsu Power Sensor	MA2411B	0738404	Apr. 15, 2021	Apr. 14, 2022
Anritsu Power Meter	ML2495A	0842014	Apr. 14, 2021	Apr. 13, 2022

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.

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. (802.11b: RBW = 1MHz, VBW = 82Hz; 802.11g: RBW = 1MHz, VBW = 510Hz; 802.11n (VHT20): RBW = 1MHz, VBW = 560Hz; 802.11n (VHT40): RBW = 1MHz, VBW = 1.1kHz)

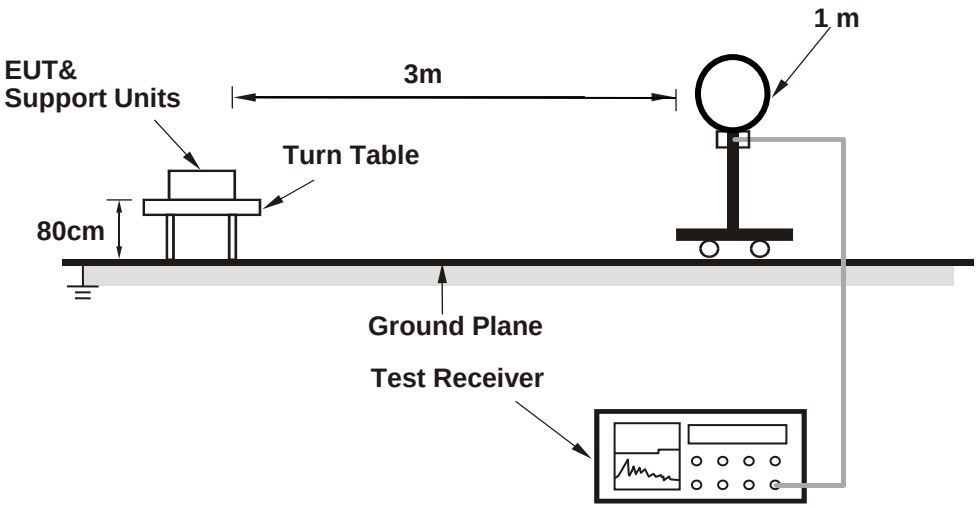
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

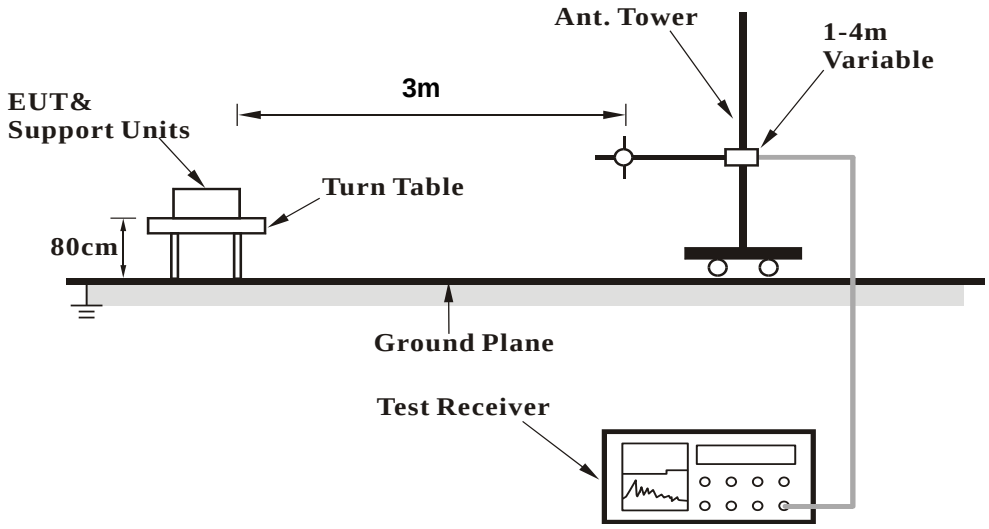
No deviation.

4.1.5 Test Setup

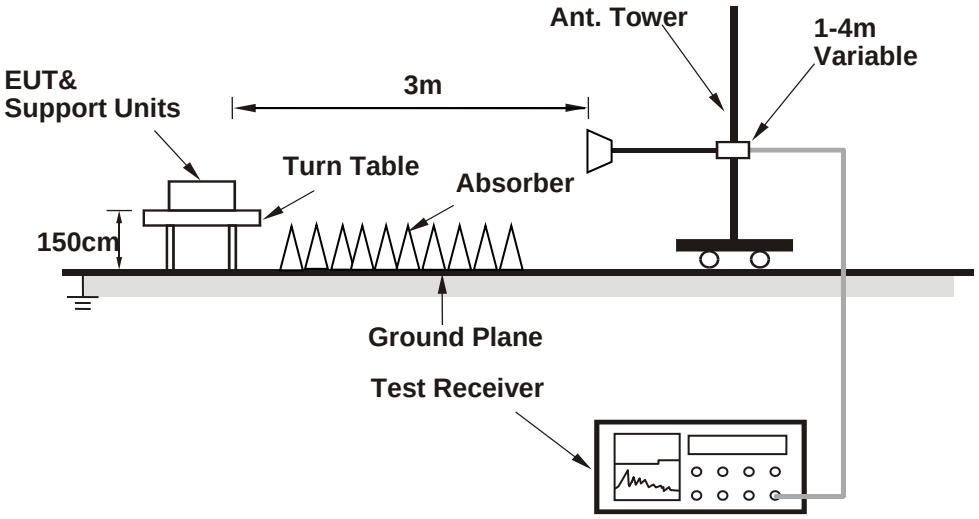
For Radiated emission below 30MHz



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

Set the EUT under transmission condition continuously at specific channel frequency continuously.

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	56.14 PK	74.00	-17.86	2.30 H	343	54.26	1.88
2	2390.00	36.04 AV	54.00	-17.96	2.30 H	343	34.16	1.88
3	*2412.00	104.54 PK			2.30 H	343	102.57	1.97
4	*2412.00	102.63 AV			2.30 H	343	100.66	1.97
5	4824.00	50.46 PK	74.00	-23.54	1.95 H	222	40.26	10.20
6	4824.00	40.55 AV	54.00	-13.45	1.95 H	222	30.35	10.20
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	58.73 PK	74.00	-15.27	1.43 V	0	56.85	1.88
2	2390.00	48.84 AV	54.00	-5.16	1.43 V	0	46.96	1.88
3	*2412.00	110.12 PK			1.43 V	0	108.15	1.97
4	*2412.00	107.68 AV			1.43 V	0	105.71	1.97
5	4824.00	51.79 PK	74.00	-22.21	2.00 V	89	41.59	10.20
6	4824.00	41.28 AV	54.00	-12.72	2.00 V	89	31.08	10.20

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	*2437.00	104.71 PK			2.24 H	341	102.69	2.02
2	*2437.00	102.35 AV			2.24 H	341	100.33	2.02
3	4874.00	50.39 PK	74.00	-23.61	1.67 H	145	40.22	10.17
4	4874.00	40.53 AV	54.00	-13.47	1.67 H	145	30.36	10.17
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	*2437.00	109.98 PK			1.47 V	12	107.96	2.02
2	*2437.00	107.70 AV			1.47 V	12	105.68	2.02
3	4874.00	51.42 PK	74.00	-22.58	1.65 V	239	41.25	10.17
4	4874.00	41.53 AV	54.00	-12.47	1.65 V	239	31.36	10.17

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	100.78 PK			2.25 H	356	98.67	2.11
2	*2462.00	98.76 AV			2.25 H	356	96.65	2.11
3	2483.50	55.49 PK	74.00	-18.51	2.25 H	356	53.26	2.23
4	2483.50	35.39 AV	54.00	-18.61	2.25 H	356	33.16	2.23
5	4924.00	50.43 PK	74.00	-23.57	1.45 H	251	40.22	10.21
6	4924.00	40.47 AV	54.00	-13.53	1.45 H	251	30.26	10.21
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	106.79 PK			1.92 V	352	104.68	2.11
2	*2462.00	104.28 AV			1.92 V	352	102.17	2.11
3	2483.50	56.88 PK	74.00	-17.12	1.92 V	352	54.65	2.23
4	2483.50	46.59 AV	54.00	-7.41	1.92 V	352	44.36	2.23
5	4924.00	51.24 PK	74.00	-22.76	1.87 V	44	41.03	10.21
6	4924.00	41.47 AV	54.00	-12.53	1.87 V	44	31.26	10.21

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	60.99 PK	74.00	-13.01	1.50 H	18	59.11	1.88
2	2390.00	48.05 AV	54.00	-5.95	1.50 H	18	46.17	1.88
3	*2412.00	102.89 PK			1.50 H	18	100.92	1.97
4	*2412.00	95.23 AV			1.50 H	18	93.26	1.97
5	4824.00	49.54 PK	74.00	-24.46	1.45 H	189	39.34	10.20
6	4824.00	38.84 AV	54.00	-15.16	1.45 H	189	28.64	10.20
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	67.47 PK	74.00	-6.53	1.06 V	332	65.59	1.88
2	**2390.00**	**52.97 AV**	**54.00**	**-1.03**	**1.06 V**	**332**	**51.09**	**1.88**
3	*2412.00	109.10 PK			1.06 V	332	107.13	1.97
4	*2412.00	100.45 AV			1.06 V	332	98.48	1.97
5	4824.00	50.42 PK	74.00	-23.58	2.35 V	185	40.22	10.20
6	4824.00	39.54 AV	54.00	-14.46	2.35 V	185	29.34	10.20

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	*2437.00	106.57 PK			2.35 H	344	104.55	2.02
2	*2437.00	98.71 AV			2.35 H	344	96.69	2.02
3	4874.00	49.72 PK	74.00	-24.28	1.77 H	123	39.55	10.17
4	4874.00	38.84 AV	54.00	-15.16	1.77 H	123	28.67	10.17
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	*2437.00	112.54 PK			1.48 V	11	110.52	2.02
2	*2437.00	104.65 AV			1.48 V	11	102.63	2.02
3	4874.00	50.72 PK	74.00	-23.28	1.84 V	77	40.55	10.17
4	4874.00	39.80 AV	54.00	-14.20	1.84 V	77	29.63	10.17

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	99.65 PK			1.44 H	36	97.54	2.11
2	*2462.00	92.63 AV			1.44 H	36	90.52	2.11
3	2483.50	58.57 PK	74.00	-15.43	1.44 H	36	56.34	2.23
4	2483.50	45.75 AV	54.00	-8.25	1.44 H	36	43.52	2.23
5	4924.00	49.49 PK	74.00	-24.51	1.57 H	163	39.28	10.21
6	4924.00	38.97 AV	54.00	-15.03	1.57 H	163	28.76	10.21
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	106.57 PK			2.47 V	170	104.46	2.11
2	*2462.00	99.39 AV			2.47 V	170	97.28	2.11
3	2483.50	66.12 PK	74.00	-7.88	2.47 V	170	63.89	2.23
4	2483.50	52.56 AV	54.00	-1.44	2.47 V	170	50.33	2.23
5	4924.00	50.56 PK	74.00	-23.44	1.48 V	125	40.35	10.21
6	4924.00	39.55 AV	54.00	-14.45	1.48 V	125	29.34	10.21

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 (VHT20)	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	60.30 PK	74.00	-13.70	2.28 H	351	58.42	1.88
2	2390.00	46.24 AV	54.00	-7.76	2.28 H	351	44.36	1.88
3	*2412.00	104.43 PK			2.28 H	351	102.46	1.97
4	*2412.00	97.65 AV			2.28 H	351	95.68	1.97
5	4824.00	49.72 PK	74.00	-24.28	1.77 H	148	39.52	10.20
6	4824.00	38.53 AV	54.00	-15.47	1.77 H	148	28.33	10.20
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	66.09 PK	74.00	-7.91	1.44 V	0	64.21	1.88
2	2390.00	52.51 AV	54.00	-1.49	1.44 V	0	50.63	1.88
3	*2412.00	110.64 PK			1.44 V	0	108.67	1.97
4	*2412.00	103.22 AV			1.44 V	0	101.25	1.97
5	4824.00	50.74 PK	74.00	-23.26	1.96 V	235	40.54	10.20
6	4824.00	39.85 AV	54.00	-14.15	1.96 V	235	29.65	10.20

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 (VHT20)	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	*2437.00	106.40 PK			2.32 H	350	104.38	2.02
2	*2437.00	99.91 AV			2.32 H	350	97.89	2.02
3	4874.00	49.43 PK	74.00	-24.57	1.88 H	201	39.26	10.17
4	4874.00	38.81 AV	54.00	-15.19	1.88 H	201	28.64	10.17
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	*2437.00	112.25 PK			1.45 V	3	110.23	2.02
2	*2437.00	104.91 AV			1.45 V	3	102.89	2.02
3	4874.00	50.42 PK	74.00	-23.58	1.85 V	247	40.25	10.17
4	4874.00	39.51 AV	54.00	-14.49	1.85 V	247	29.34	10.17

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 (VHT20)	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	102.45 PK			2.29 H	347	100.34	2.11
2	*2462.00	94.37 AV			2.29 H	347	92.26	2.11
3	2483.50	61.17 PK	74.00	-12.83	2.29 H	347	58.94	2.23
4	2483.50	46.23 AV	54.00	-7.77	2.29 H	347	44.00	2.23
5	4924.00	49.87 PK	74.00	-24.13	1.72 H	201	39.66	10.21
6	4924.00	38.70 AV	54.00	-15.30	1.72 H	201	28.49	10.21
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	108.47 PK			1.42 V	2	106.36	2.11
2	*2462.00	101.05 AV			1.42 V	2	98.94	2.11
3	2483.50	66.69 PK	74.00	-7.31	1.42 V	2	64.46	2.23
4	2483.50	52.63 AV	54.00	-1.37	1.42 V	2	50.40	2.23
5	4924.00	50.79 PK	74.00	-23.21	1.89 V	266	40.58	10.21
6	4924.00	39.85 AV	54.00	-14.15	1.89 V	266	29.64	10.21

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 (VHT40)	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	59.36 PK	74.00	-14.64	2.28 H	341	57.48	1.88
2	2390.00	46.84 AV	54.00	-7.16	2.28 H	341	44.96	1.88
3	*2422.00	98.89 PK			2.28 H	341	96.89	2.00
4	*2422.00	91.69 AV			2.28 H	341	89.69	2.00
5	4844.00	49.84 PK	74.00	-24.16	2.01 H	134	39.64	10.20
6	4844.00	39.04 AV	54.00	-14.96	2.01 H	134	28.84	10.20
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	65.31 PK	74.00	-8.69	1.42 V	3	63.43	1.88
2	2390.00	52.64 AV	54.00	-1.36	1.42 V	3	50.76	1.88
3	*2422.00	104.91 PK			1.42 V	3	102.91	2.00
4	*2422.00	97.82 AV			1.42 V	3	95.82	2.00
5	4844.00	50.45 PK	74.00	-23.55	1.98 V	168	40.25	10.20
6	4844.00	39.54 AV	54.00	-14.46	1.98 V	168	29.34	10.20

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 (VHT40)	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	58.22 PK	74.00	-15.78	2.31 H	150	56.34	1.88
2	2390.00	46.40 AV	54.00	-7.60	2.31 H	150	44.52	1.88
3	*2437.00	101.91 PK			2.31 H	150	99.89	2.02
4	*2437.00	93.86 AV			2.31 H	150	91.84	2.02
5	4874.00	49.69 PK	74.00	-24.31	1.98 H	241	39.52	10.17
6	4874.00	38.63 AV	54.00	-15.37	1.98 H	241	28.46	10.17
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	64.81 PK	74.00	-9.19	1.43 V	1	62.93	1.88
2	2390.00	52.55 AV	54.00	-1.45	1.43 V	1	50.67	1.88
3	*2437.00	107.24 PK			1.43 V	1	105.22	2.02
4	*2437.00	100.00 AV			1.43 V	1	97.98	2.02
5	4874.00	50.69 PK	74.00	-23.31	1.66 V	224	40.52	10.17
6	4874.00	39.79 AV	54.00	-14.21	1.66 V	224	29.62	10.17

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 (VHT40)	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	97.74 PK			2.32 H	341	95.68	2.06
2	*2452.00	90.80 AV			2.32 H	341	88.74	2.06
3	2483.50	58.57 PK	74.00	-15.43	2.32 H	341	56.34	2.23
4	2483.50	46.41 AV	54.00	-7.59	2.32 H	341	44.18	2.23
5	4904.00	49.40 PK	74.00	-24.60	1.84 H	274	39.25	10.15
6	4904.00	38.79 AV	54.00	-15.21	1.84 H	274	28.64	10.15
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	103.95 PK			1.41 V	2	101.89	2.06
2	*2452.00	96.66 AV			1.41 V	2	94.60	2.06
3	2483.50	63.77 PK	74.00	-10.23	1.41 V	2	61.54	2.23
4	2483.50	52.73 AV	54.00	-1.27	1.41 V	2	50.50	2.23
5	4904.00	50.38 PK	74.00	-23.62	2.10 V	205	40.23	10.15
6	4904.00	39.49 AV	54.00	-14.51	2.10 V	205	29.34	10.15

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.

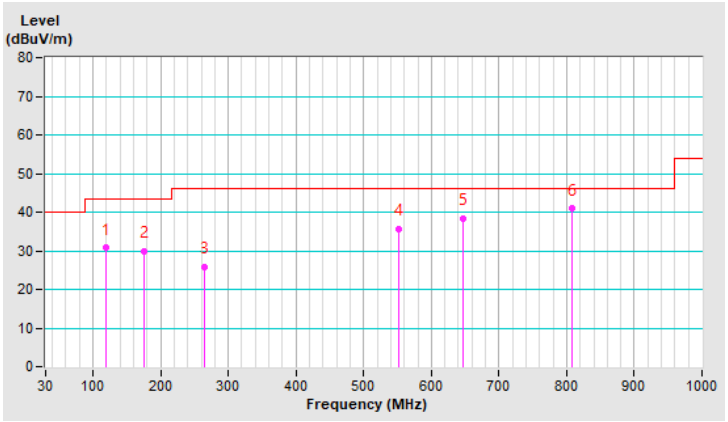
BELOW 1GHz WORST-CASE DATA

RF Mode	TX 802.11g	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	119.24	30.68 QP	43.50	-12.82	3.28 H	139	39.78	-9.10
2	175.50	29.95 QP	43.50	-13.55	3.11 H	155	36.89	-6.94
3	263.77	25.87 QP	46.00	-20.13	2.88 H	179	31.68	-5.81
4	551.86	35.56 QP	46.00	-10.44	2.36 H	229	34.64	0.92
5	647.89	38.46 QP	46.00	-7.54	2.10 H	255	35.26	3.20
6	806.97	40.88 QP	46.00	-5.12	1.84 H	281	34.85	6.03

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.

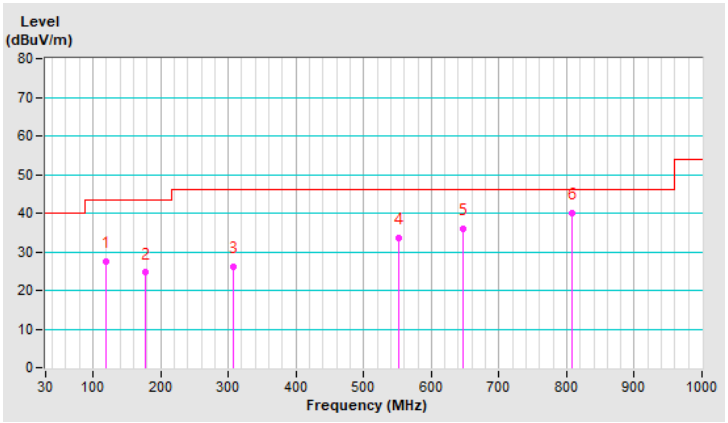


RF Mode	TX 802.11g	Channel	CH 6：2437 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	119.24	27.45 QP	43.50	-16.05	2.35 V	138	36.55	-9.10
2	176.47	24.65 QP	43.50	-18.85	2.63 V	166	31.70	-7.05
3	307.42	26.12 QP	46.00	-19.88	2.07 V	110	30.18	-4.06
4	551.86	33.59 QP	46.00	-12.41	1.87 V	91	32.67	0.92
5	647.89	35.87 QP	46.00	-10.13	1.64 V	68	32.67	3.20
6	807.94	40.00 QP	46.00	-6.00	3.08 V	210	33.97	6.03

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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESR3	102412	Jan. 29, 2021	Jan. 28, 2022
SCHWARZBECK Artificial Mains Network (for EUT)	NSLK 8128	8128-244	Nov. 19, 2020	Nov. 18, 2021
LISN With Adapter (for EUT)	AD10	C05Ada-001	Nov. 19, 2020	Nov. 18, 2021
R&S Artificial Mains Network (for peripheral)	ESH3-Z5	100220	Dec. 1, 2020	Nov. 30, 2021
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C05.01	Jan. 29, 2021	Jan. 28, 2022
LYNICS Terminator (For R&S LISN)	0900510	E1-01-305	Feb. 17, 2021	Feb. 16, 2022

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 Shielded Room No. 5. (Conduction 5)
3. The VCCI Site Registration No. C-11093.

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.

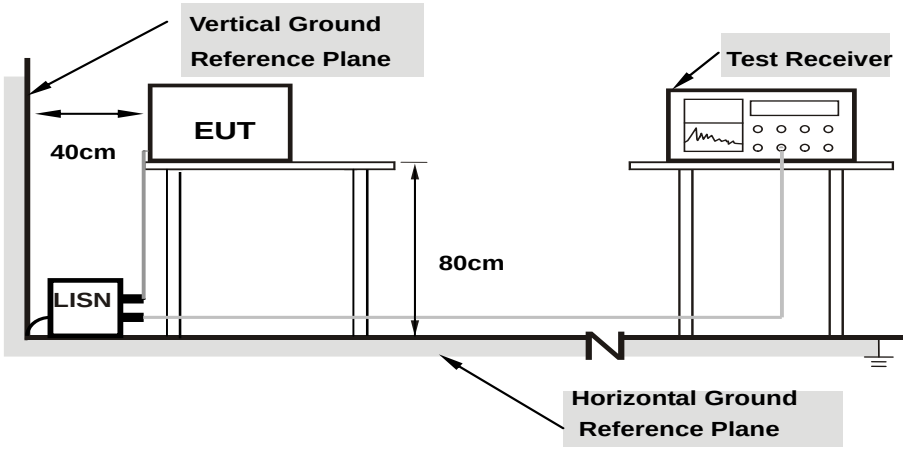
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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.

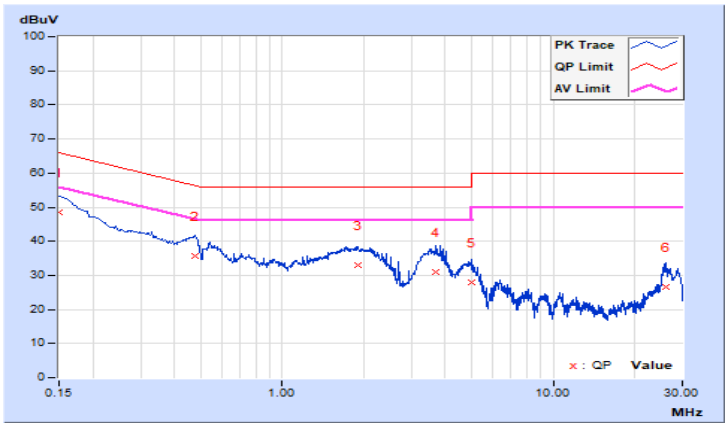
4.2.7 Test Results

RF Mode	TX 802.11g	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	0.15000	9.72	38.80	20.36	48.52	30.08	66.00	56.00	-17.48	-25.92
2	0.47558	9.71	26.00	14.36	35.71	24.07	56.42	46.42	-20.71	-22.35
3	1.89600	9.77	23.39	6.58	33.16	16.35	56.00	46.00	-22.84	-29.65
4	3.70000	9.85	21.24	6.05	31.09	15.90	56.00	46.00	-24.91	-30.10
5	4.99200	9.90	18.19	4.18	28.09	14.08	56.00	46.00	-27.91	-31.92
6	25.99600	10.28	16.42	5.96	26.70	16.24	60.00	50.00	-33.30	-33.76

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

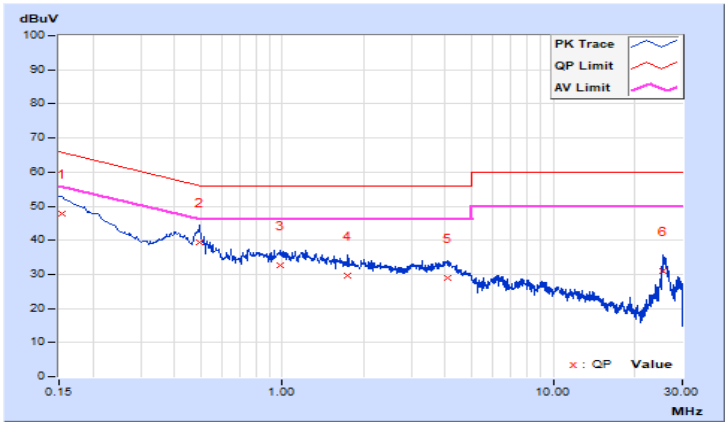


RF Mode	TX 802.11g	Channel	CH 6：2437 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.15400	9.72	38.21	19.10	47.93	28.82	65.78	55.78	-17.85	-26.96
2	**0.49400**	**9.72**	**29.52**	**24.79**	**39.24**	**34.51**	**56.10**	**46.10**	**-16.86**	**-11.59**
3	0.98000	9.76	22.83	15.17	32.59	24.93	56.00	46.00	-23.41	-21.07
4	1.74400	9.78	19.74	13.40	29.52	23.18	56.00	46.00	-26.48	-22.82
5	4.06400	9.87	19.25	11.09	29.12	20.96	56.00	46.00	-26.88	-25.04
6	25.31200	10.31	20.69	4.13	31.00	14.44	60.00	50.00	-29.00	-35.56

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

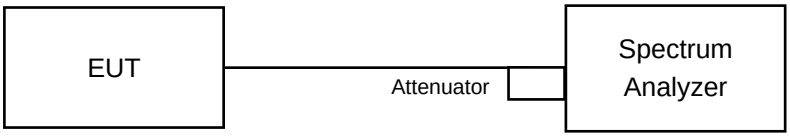


4.3 6dB Bandwidth Measurement

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 fromTest 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	10.13	0.5	Pass
6	2437	10.14	0.5	Pass
11	2462	10.13	0.5	Pass

802.11g

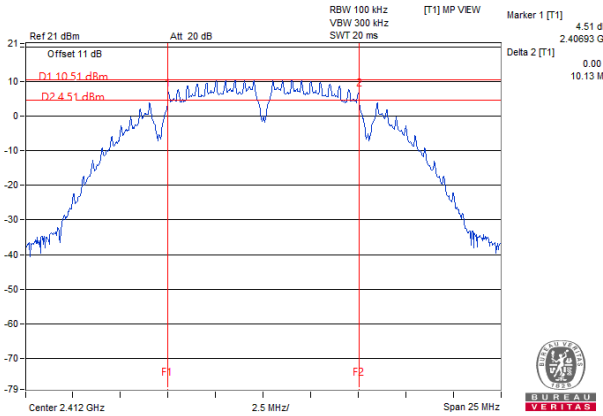
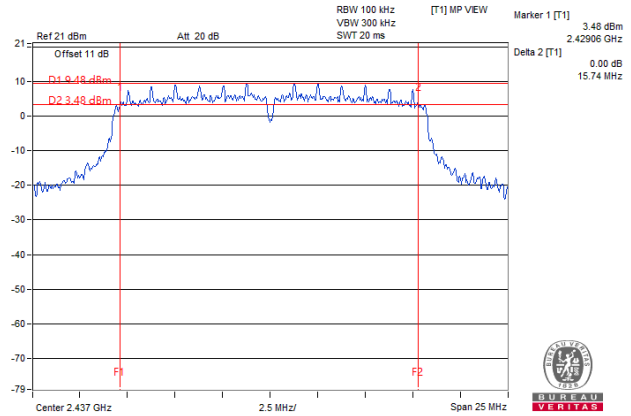
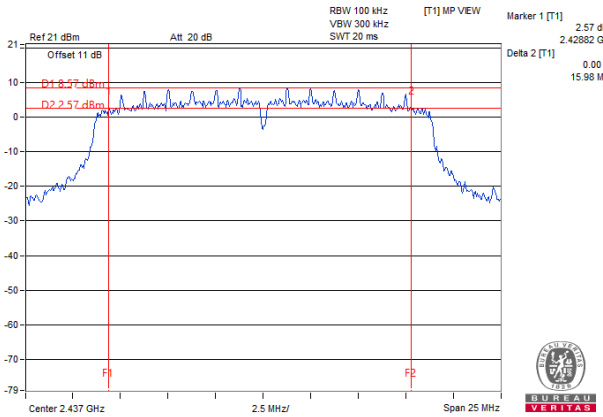
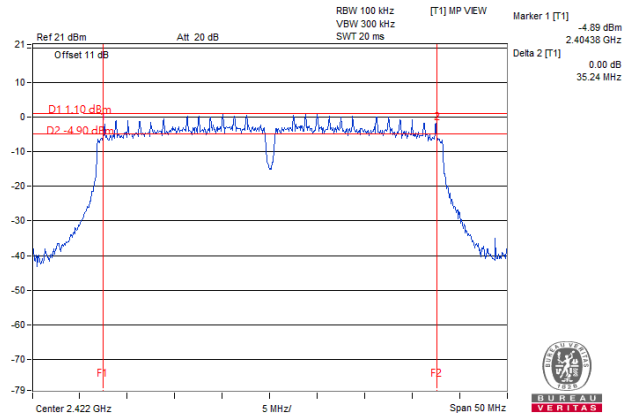
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.77	0.5	Pass
6	2437	15.74	0.5	Pass
11	2462	15.87	0.5	Pass

802.11n (VHT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.81	16.94	0.5	Pass
6	2437	15.98	16.34	0.5	Pass
11	2462	16.32	16.68	0.5	Pass

802.11n (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.24	35.25	0.5	Pass
6	2437	35.25	35.25	0.5	Pass
9	2452	35.27	35.27	0.5	Pass

Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (VHT20)	**802.11n (VHT40)**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

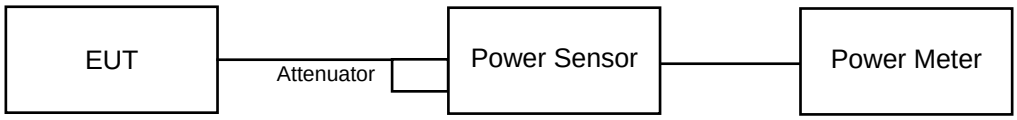
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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	156.675	21.95	30	Pass
6	2437	155.239	21.91	30	Pass
11	2462	159.956	22.04	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	438.531	26.42	30	Pass
6	2437	510.505	27.08	30	Pass
11	2462	468.813	26.71	30	Pass

802.11n (VHT20)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	26.06	26.48	848.277	29.29	30	Pass
6	2437	26.71	26.41	**906.335**	29.57	30	Pass
11	2462	26.19	26.11	824.230	29.16	30	Pass

802.11n (VHT40)

Channel	Frequency (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	25.77	26.00	775.679	28.90	30	Pass
6	2437	26.69	26.37	900.170	29.54	30	Pass
9	2452	25.68	25.33	711.021	28.52	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	98.175	19.92
6	2437	98.175	19.92
11	2462	101.391	20.06

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	76.384	18.83
6	2437	99.312	19.97
11	2462	97.949	19.91

802.11n (VHT20)

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Avg.Power (mW)	Total Avg.Power (dBm)
		Chain 0	Chain 1		
1	2412	19.48	19.38	175.412	22.44
6	2437	20.04	19.98	200.466	23.02
11	2462	18.73	18.89	152.091	21.82

802.11n (VHT40)

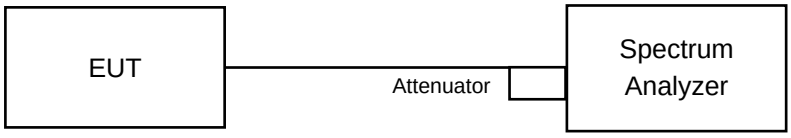
Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Avg.Power (mW)	Total Avg.Power (dBm)
		Chain 0	Chain 1		
3	2422	16.77	17.32	101.485	20.06
6	2437	19.81	19.25	179.859	22.55
9	2452	17.33	17.20	106.556	20.28

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

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-3.11	8	Pass
6	2437	-3.04	8	Pass
11	2462	-2.77	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-6.28	8	Pass
6	2437	-4.00	8	Pass
11	2462	-4.86	8	Pass

802.11n (VHT20)

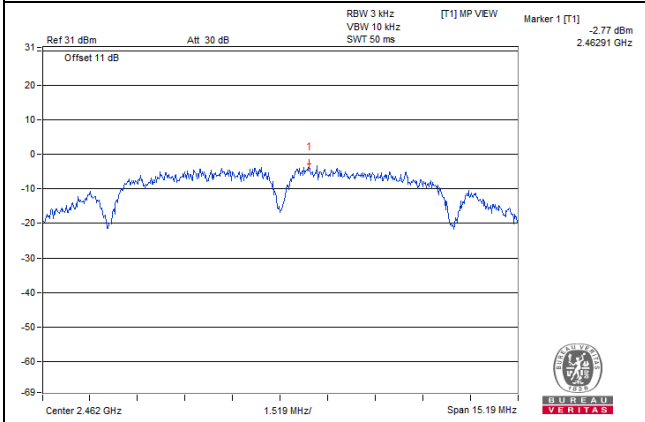
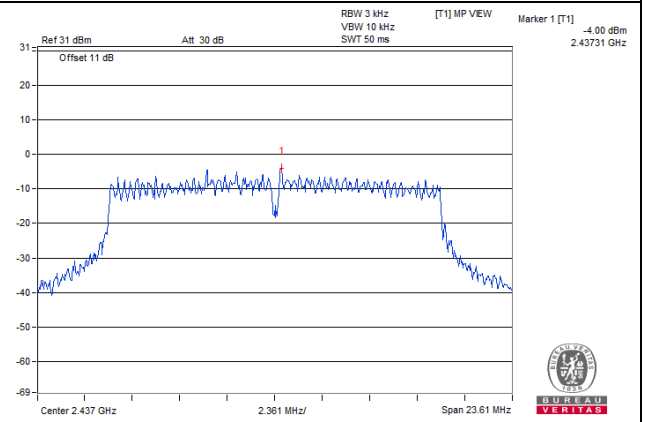
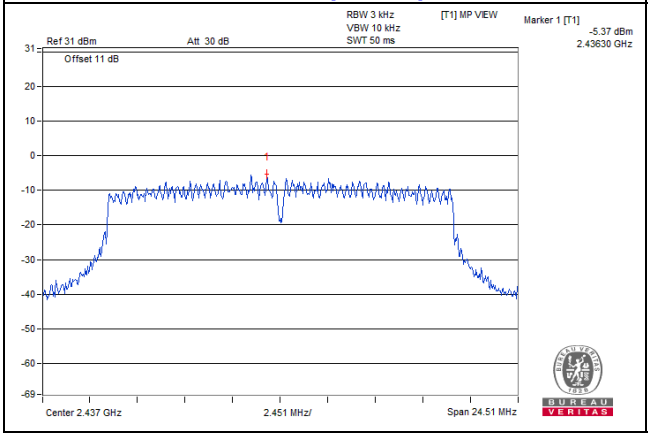
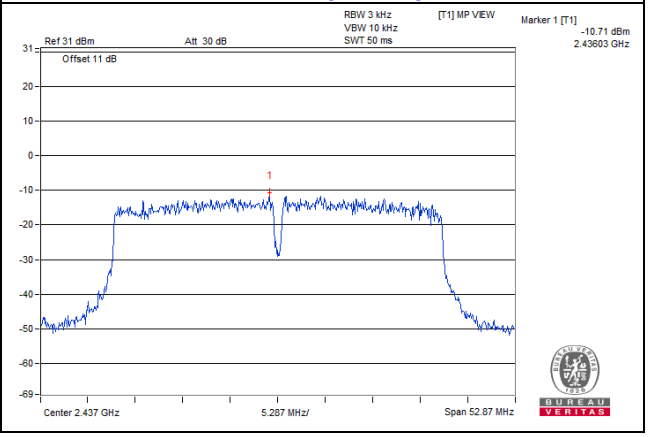
Chan.	Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1			
1	2412	-8.49	-8.91	-5.68	8	Pass
6	2437	-6.00	-5.37	-2.66	8	Pass
11	2462	-9.11	-9.45	-6.27	8	Pass

Note:
1. Method E) 2) b) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 2.65dBi + 10log(2) = 5.66dBi < 6dBi , so the power density limit is not reduced.

802.11n (VHT40)

Chan.	Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1			
3	2422	-14.42	-14.53	-11.46	8	Pass
6	2437	-10.71	-11.41	-8.04	8	Pass
9	2452	-13.47	-13.14	-10.29	8	Pass

Note:
1. Method E) 2) b) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 2.65dBi + 10log(2) = 5.66dBi < 6dBi , so the power density limit is not reduced.

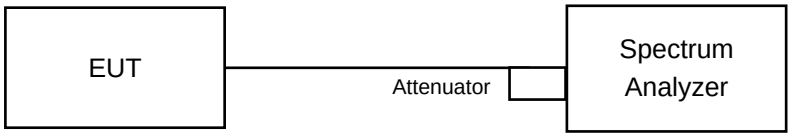
Spectrum Plot of Worst Value	
802.11b	**802.11g**
	
802.11n (VHT20)	**802.11n (VHT40)**
	

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

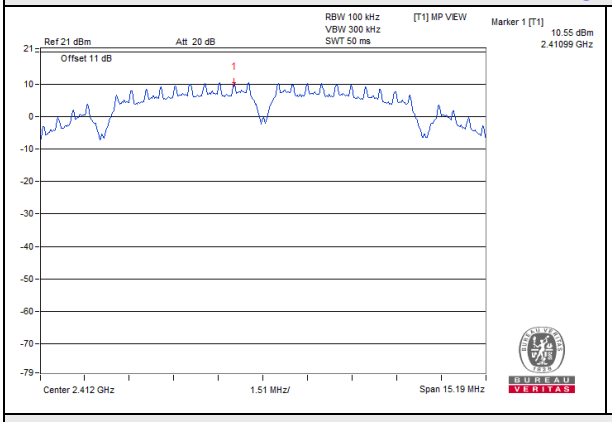
Same as Item 4.3.6

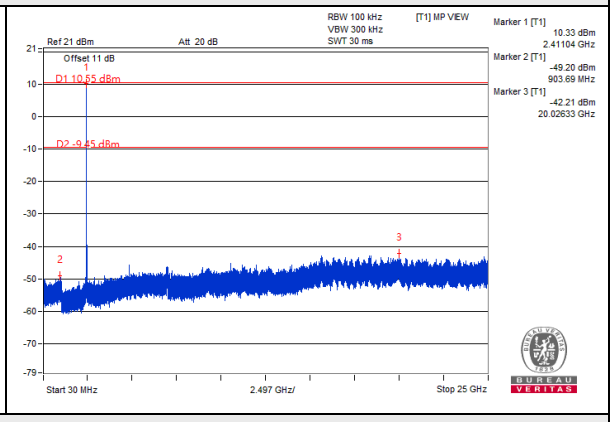
4.6.7 Test Results

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.

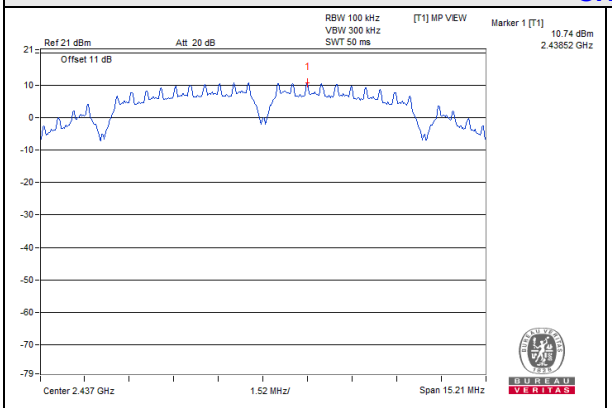
802.11b

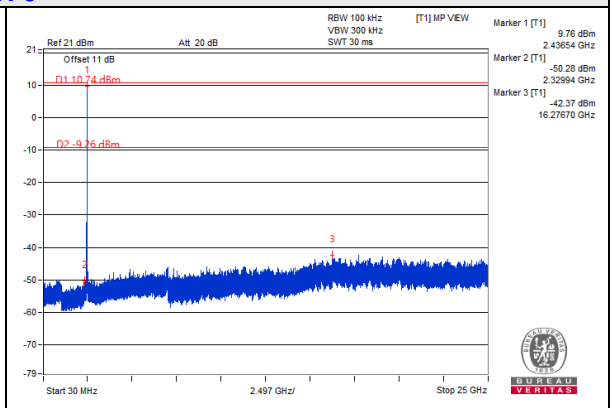
CH 1



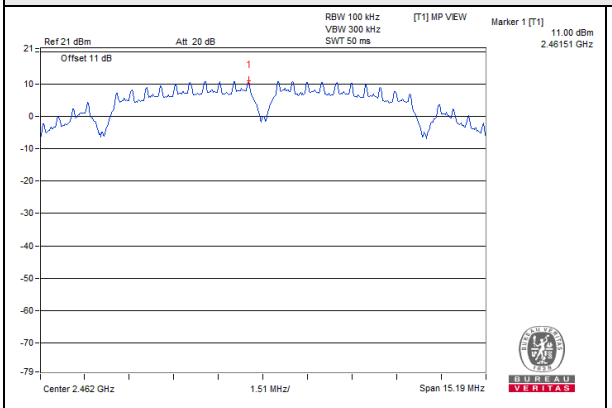


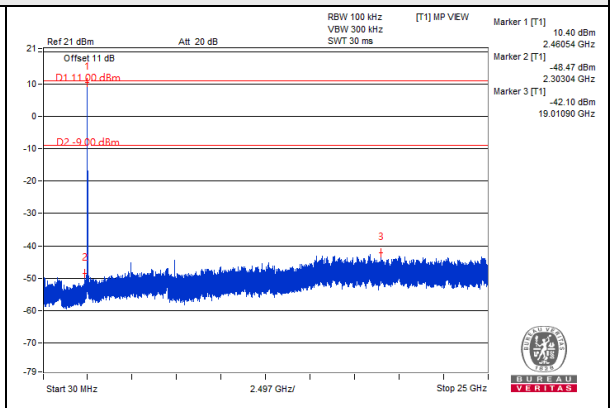
CH 6



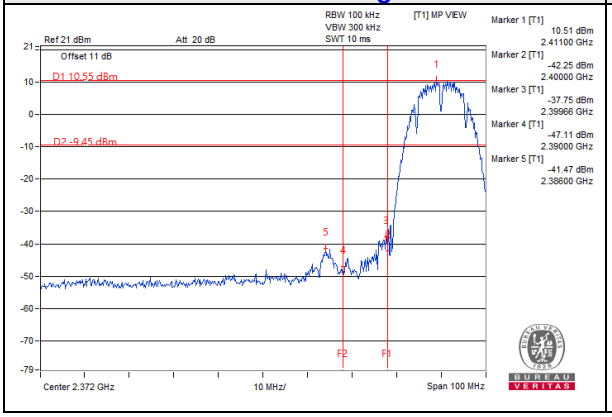


CH 11

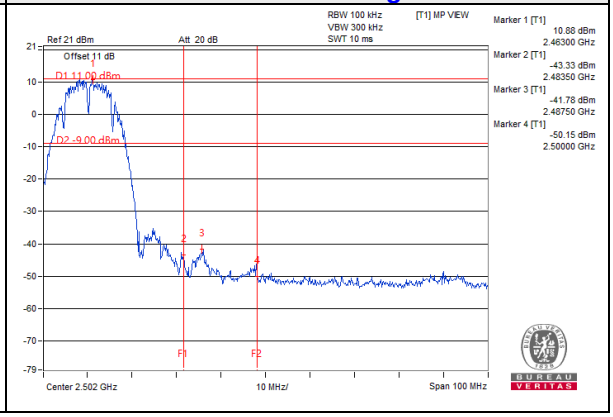




CH 1 Band edge

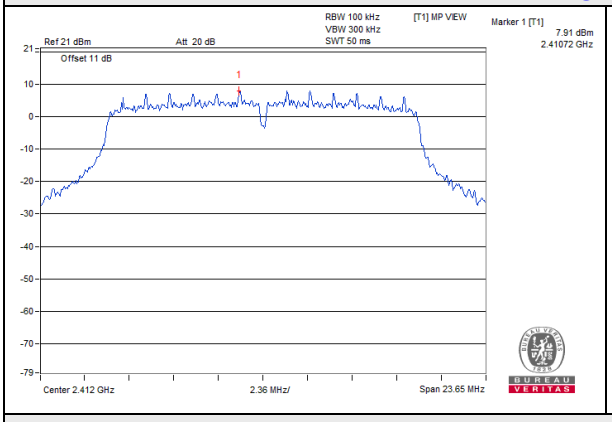


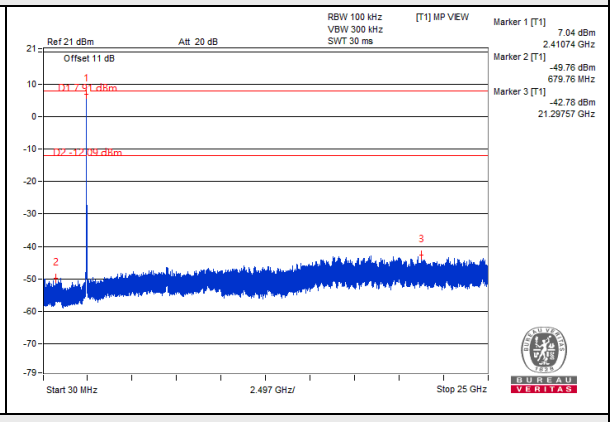
CH 11 Band edge



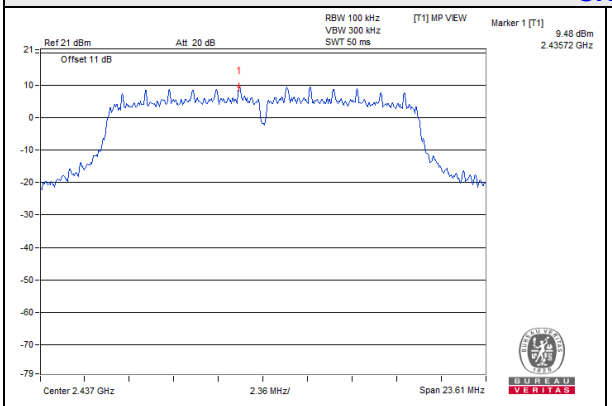
802.11g

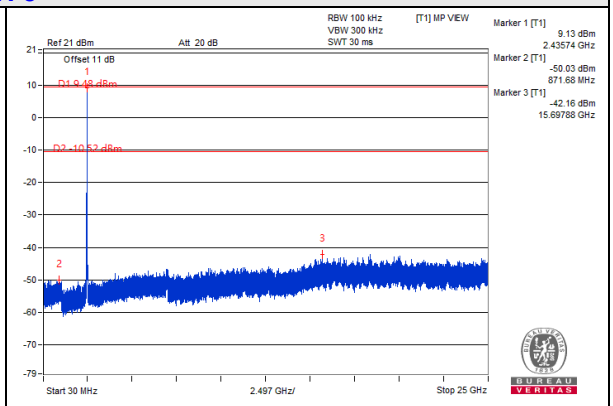
CH 1



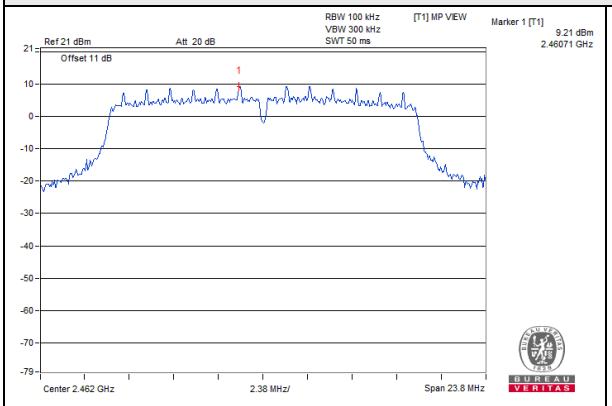


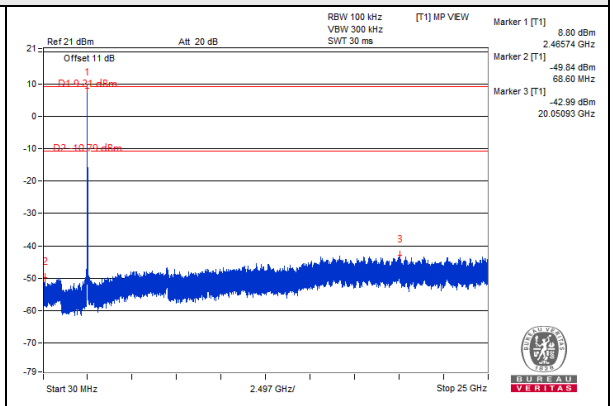
CH 6



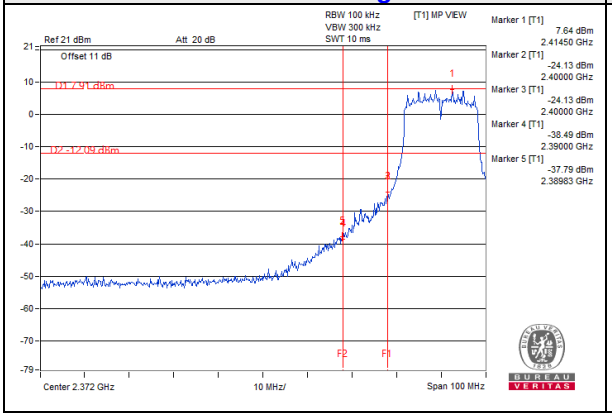


CH 11

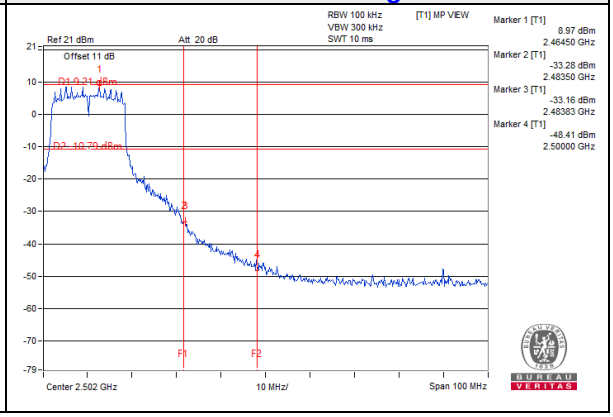




CH 1 Band edge

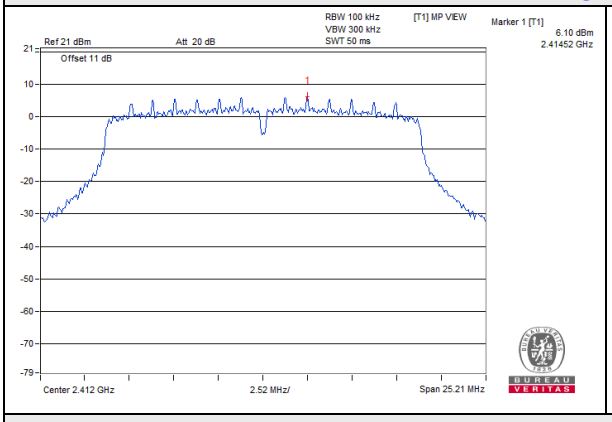


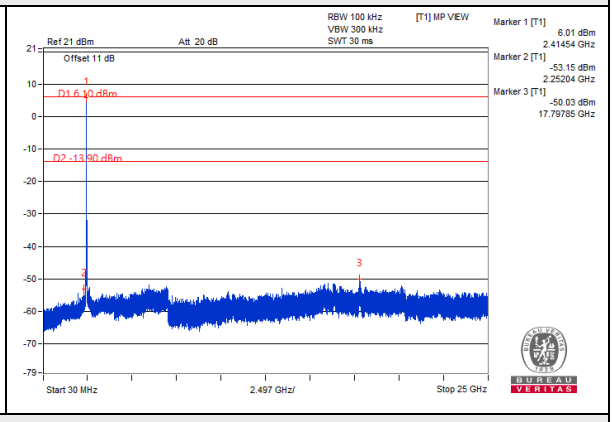
CH 11 Band edge



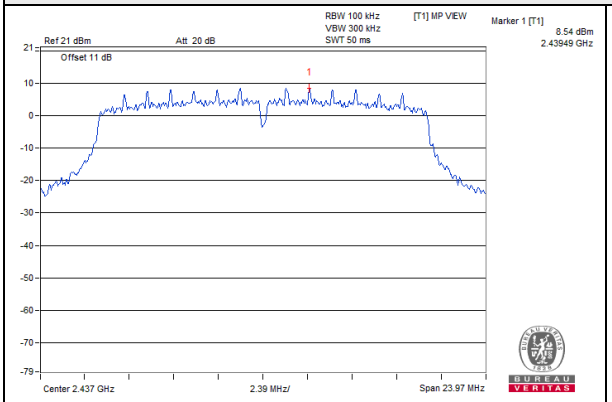
802.11n (VHT20): Chain 0

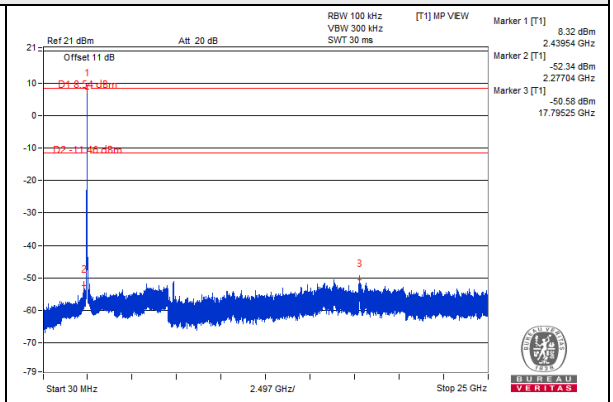
CH 1



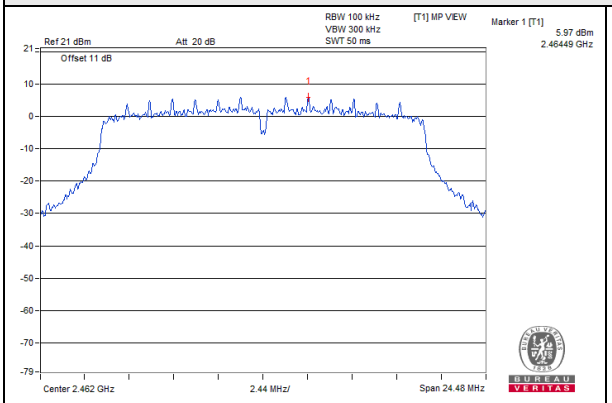


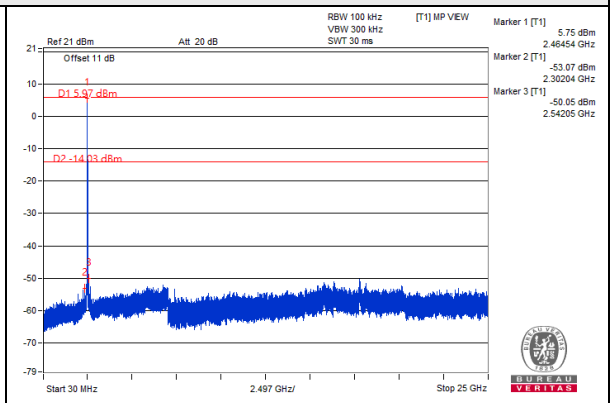
CH 6



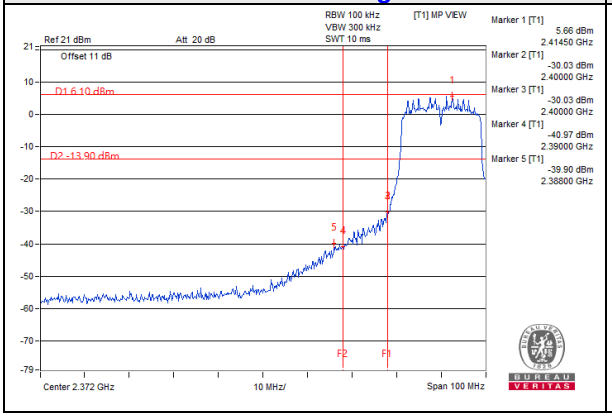


CH 11

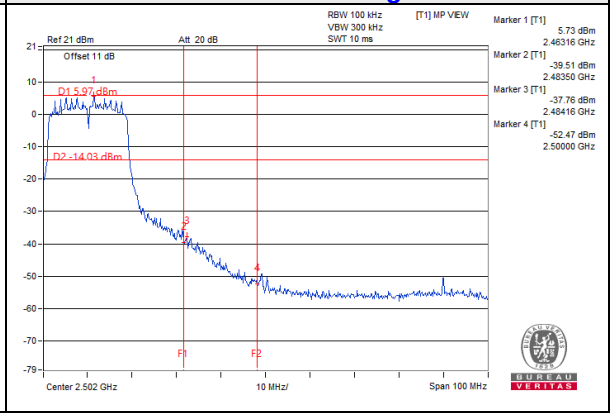




CH 1 Band edge

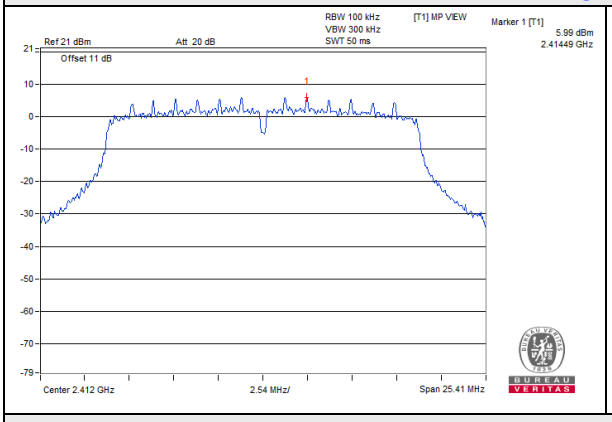


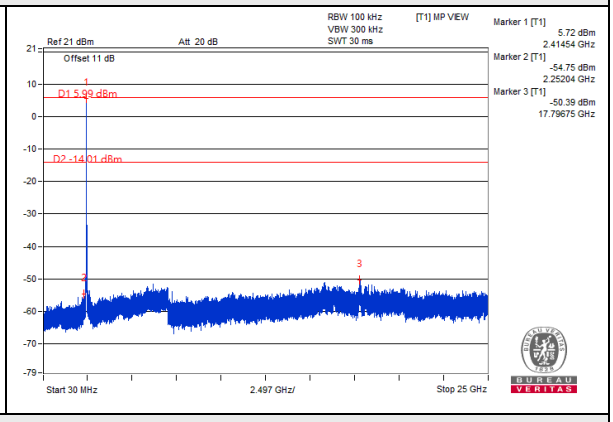
CH 11 Band edge



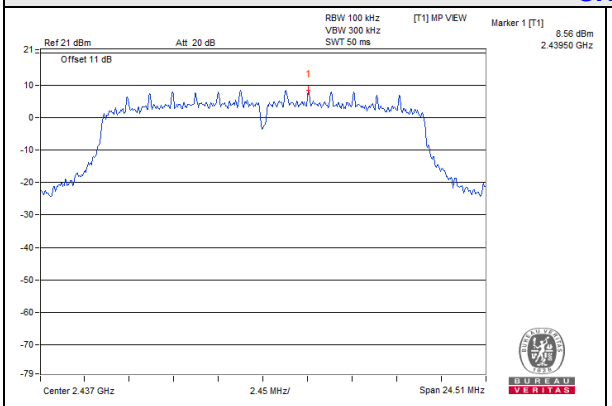
802.11n (VHT20): Chain 1

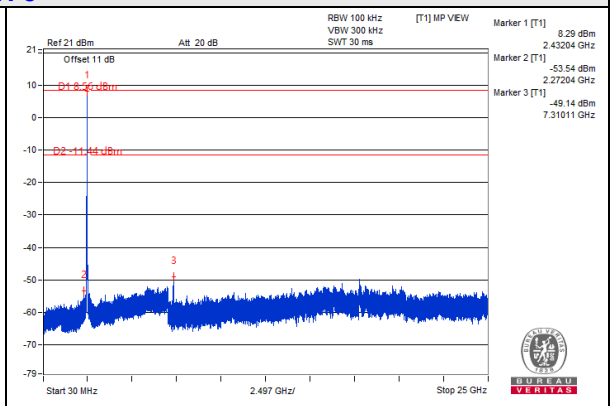
CH 1



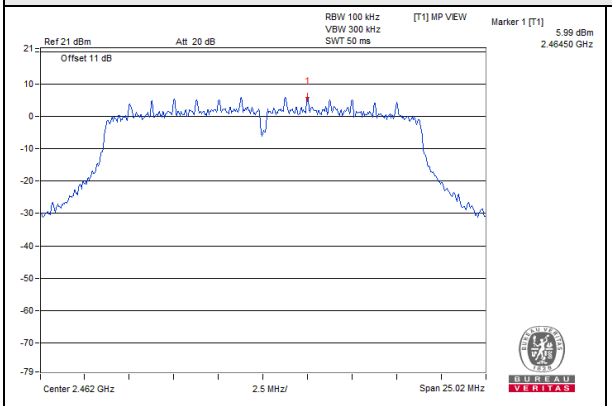


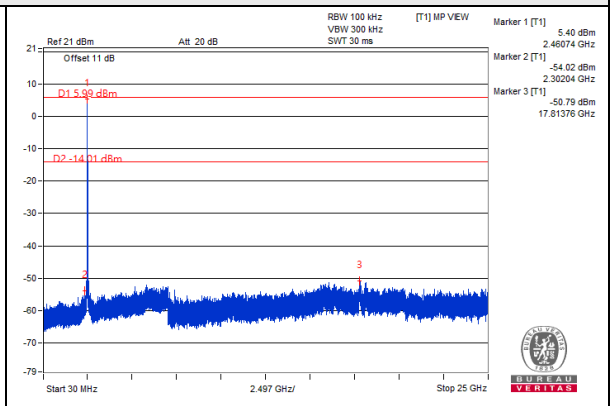
CH 6



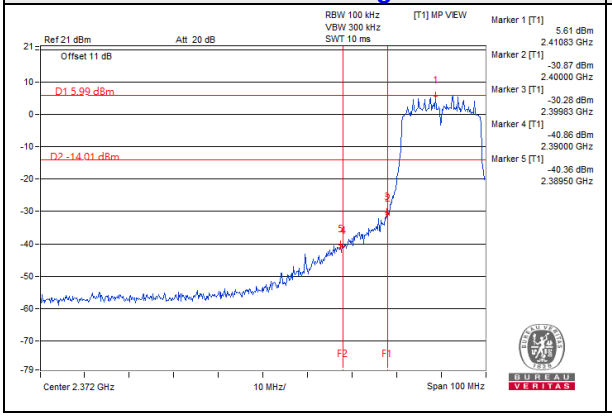


CH 11

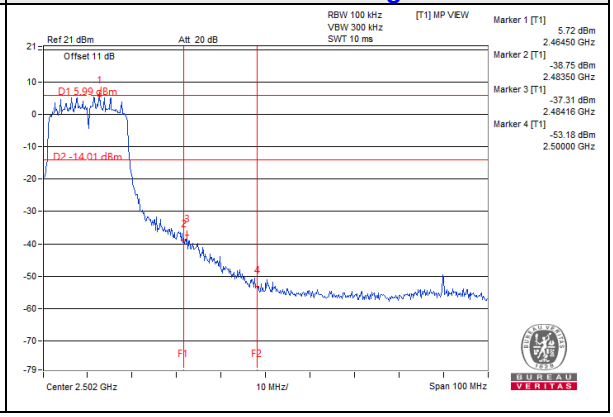




CH 1 Band edge

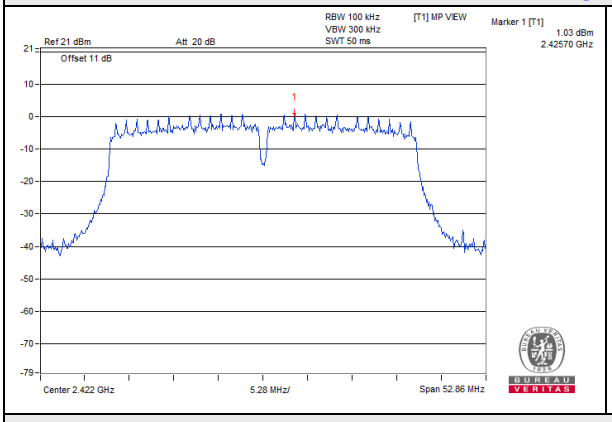


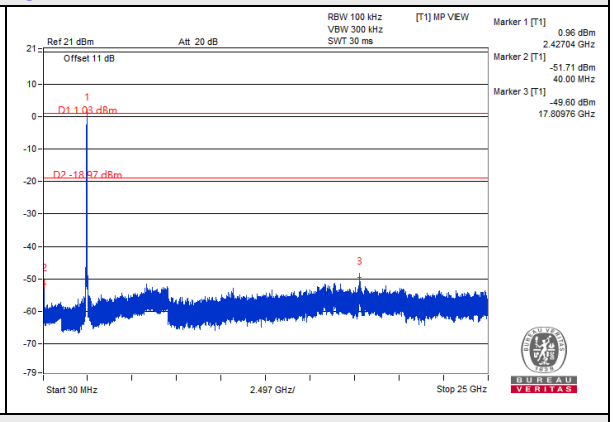
CH 11 Band edge



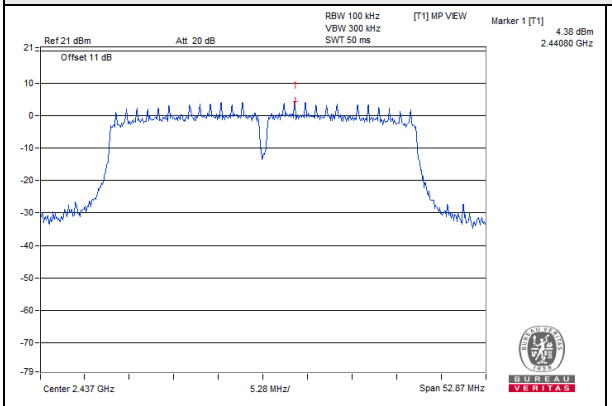
802.11n (VHT40): Chain 0

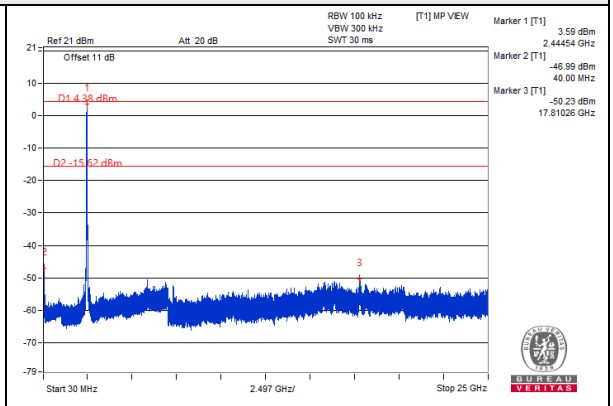
CH 3



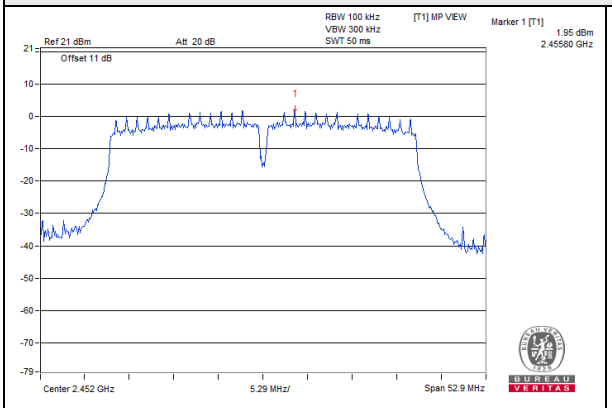


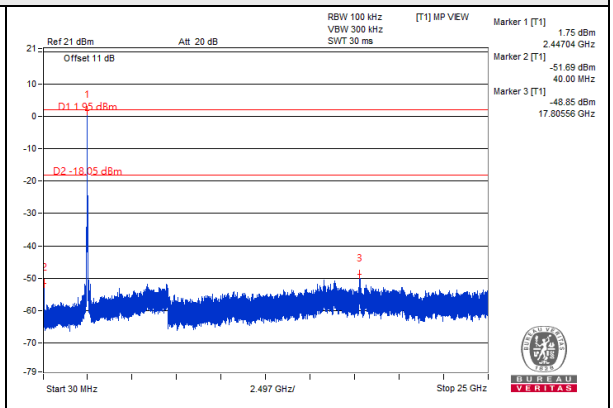
CH 6



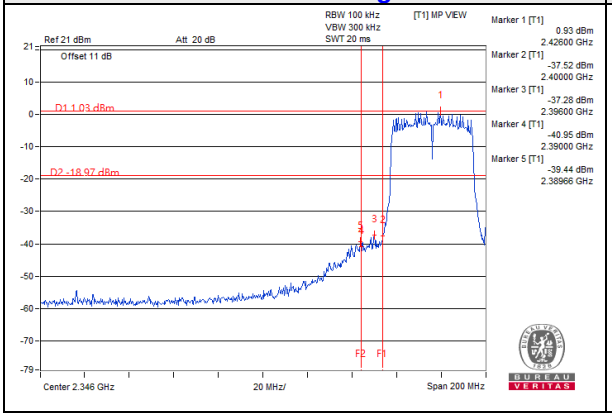


CH 9

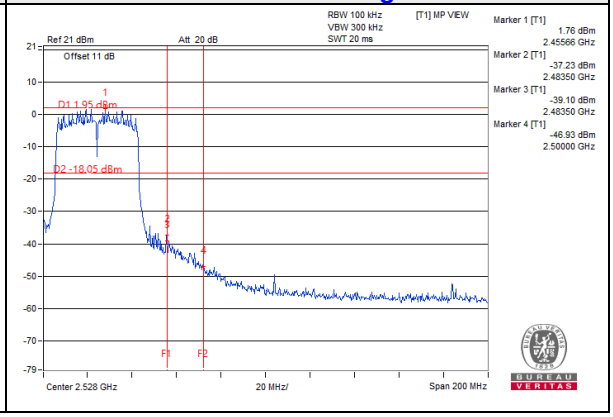




CH 3 Band edge

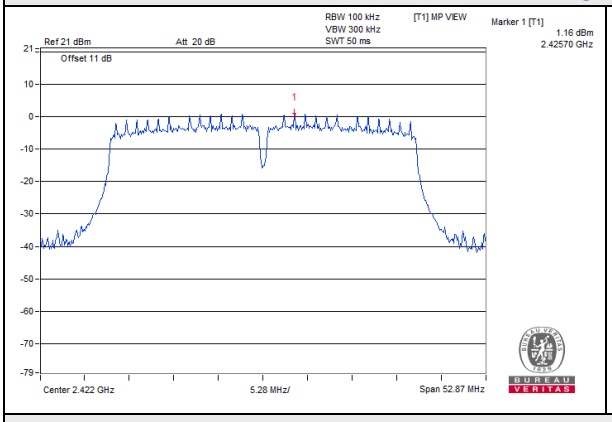


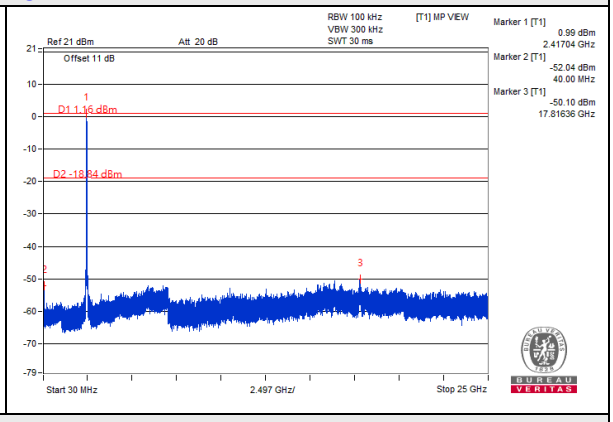
CH 9 Band edge



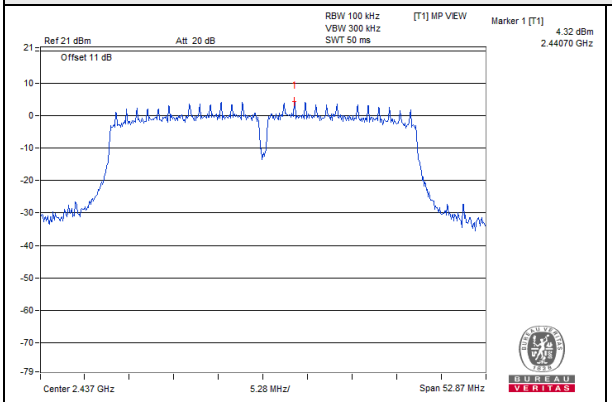
802.11n (VHT40): Chain 1

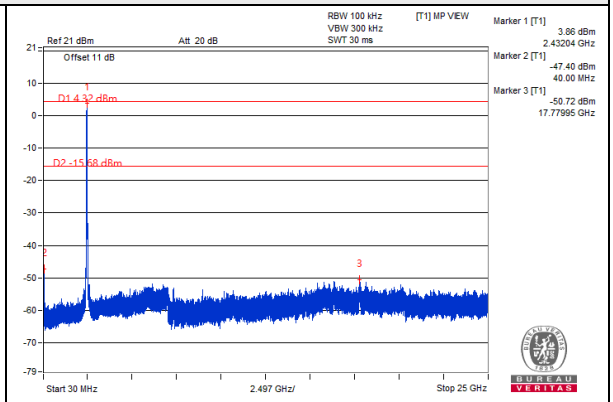
CH 3



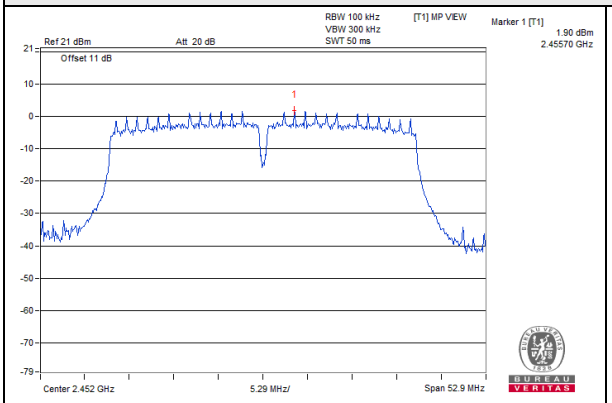


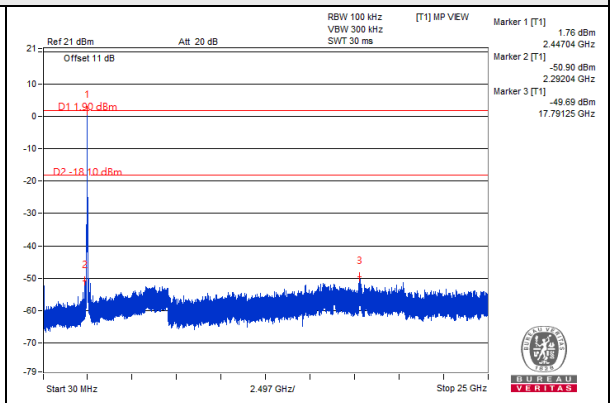
CH 6



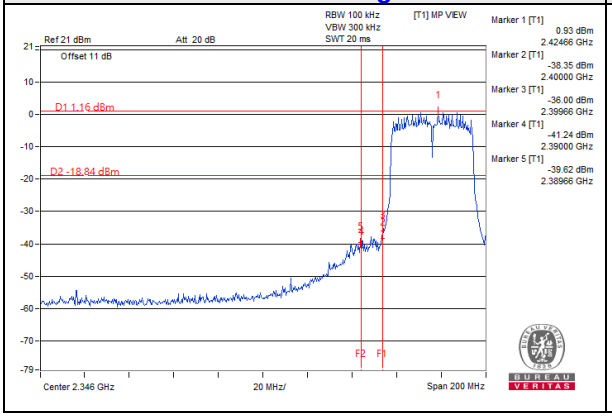


CH 9

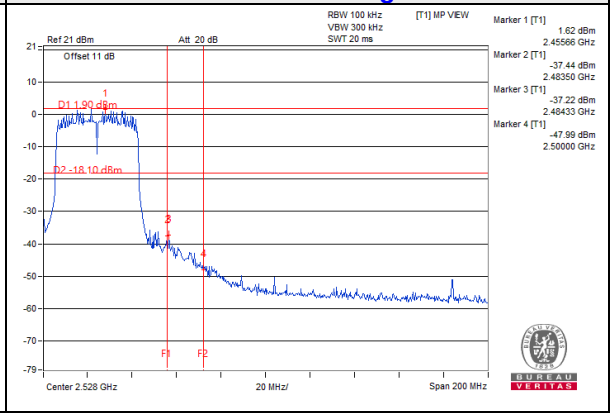




CH 3 Band edge



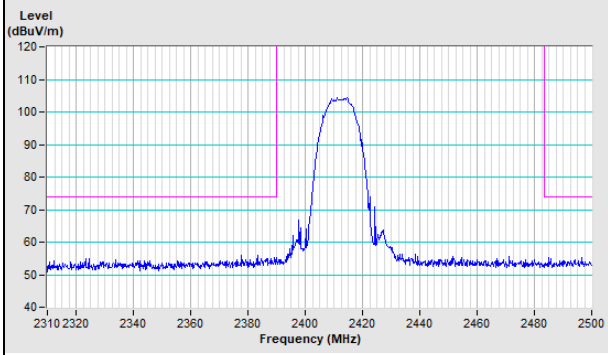
CH 9 Band edge



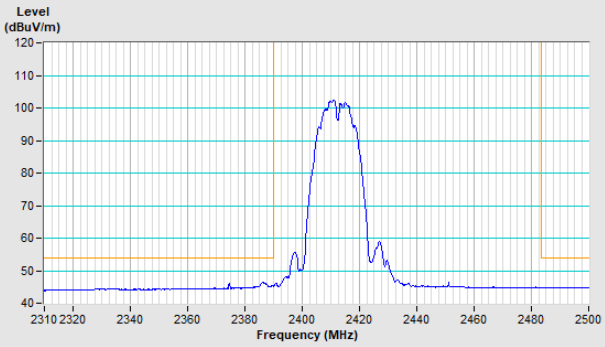
Annex A- Band Edge Measurement

802.11b Channel 1

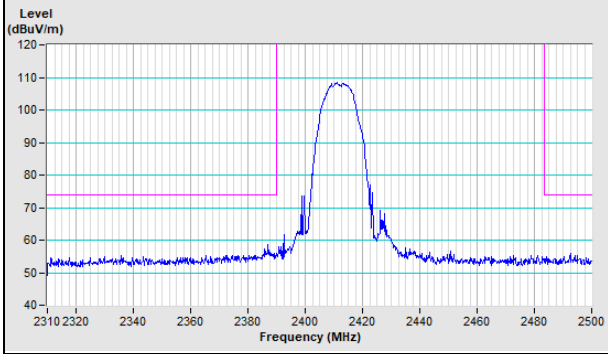
Horizontal (Peak)



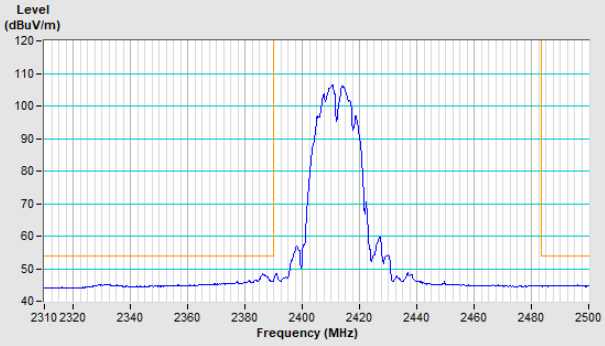
Horizontal (Average)



Vertical (Peak)

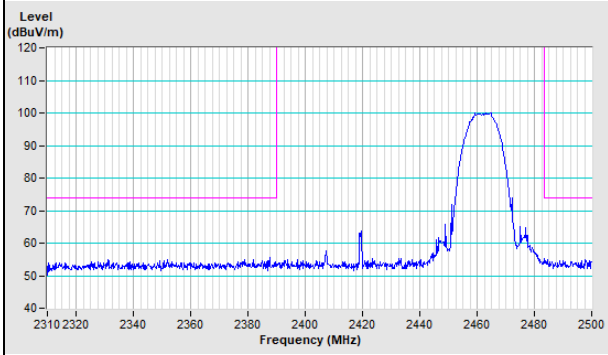


Vertical (Average)

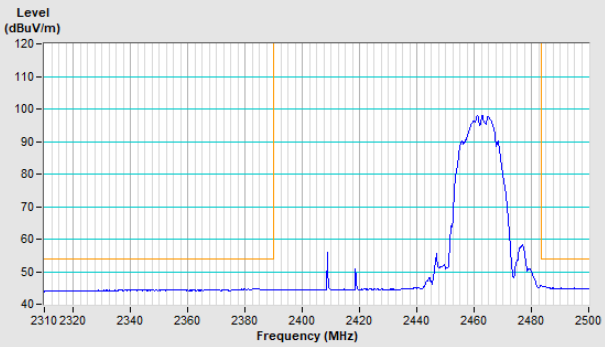


802.11b Channel 11

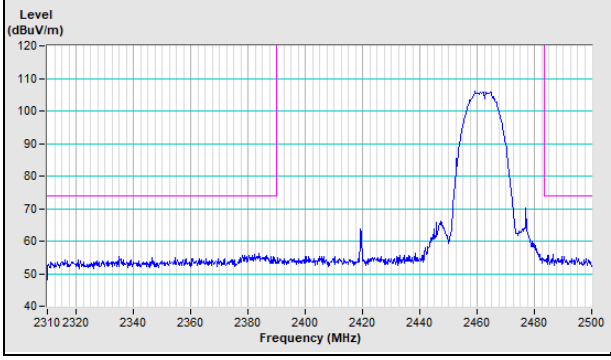
Horizontal (Peak)



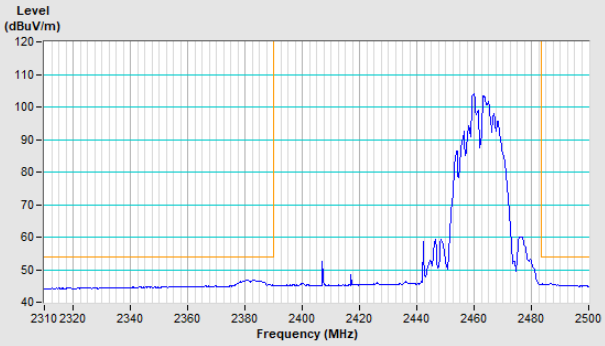
Horizontal (Average)



Vertical (Peak)

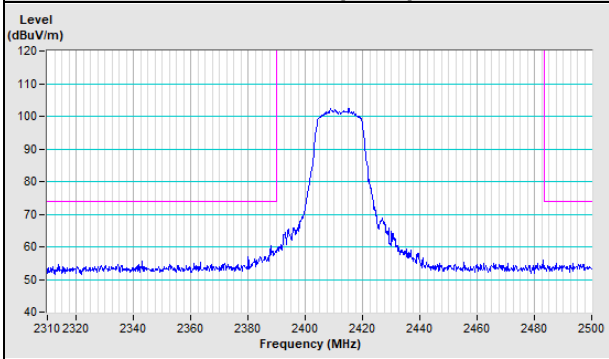


Vertical (Average)

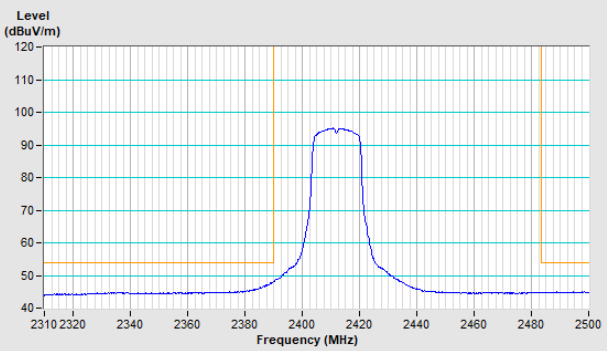


802.11g Channel 1

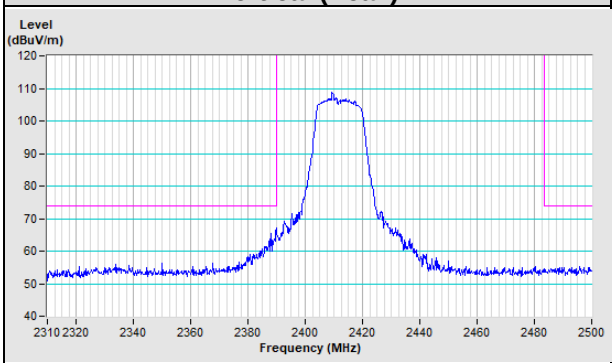
Horizontal (Peak)



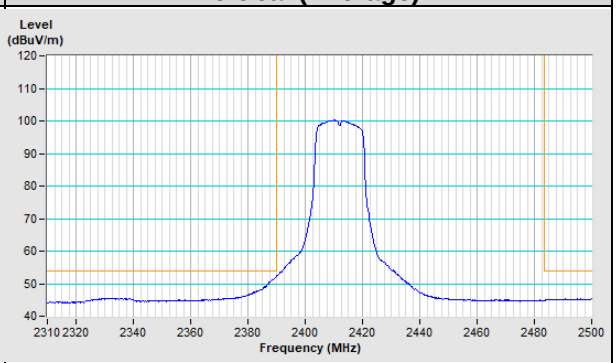
Horizontal (Average)



Vertical (Peak)

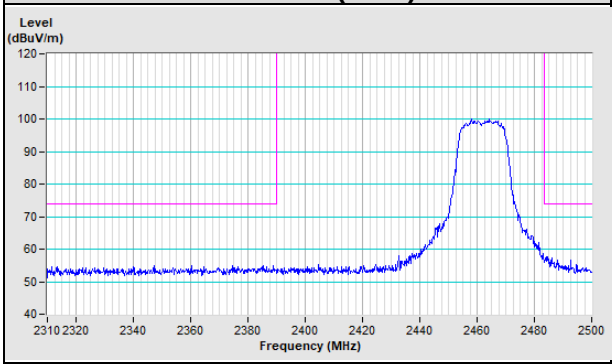


Vertical (Average)

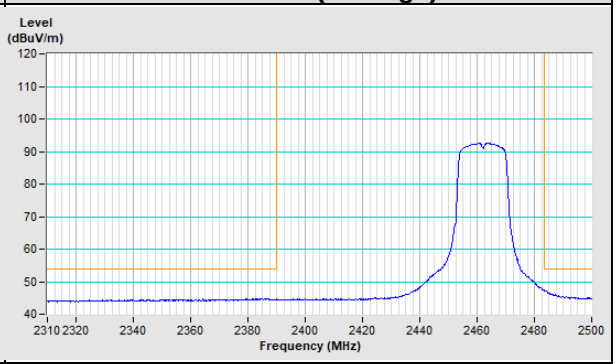


802.11g Channel 11

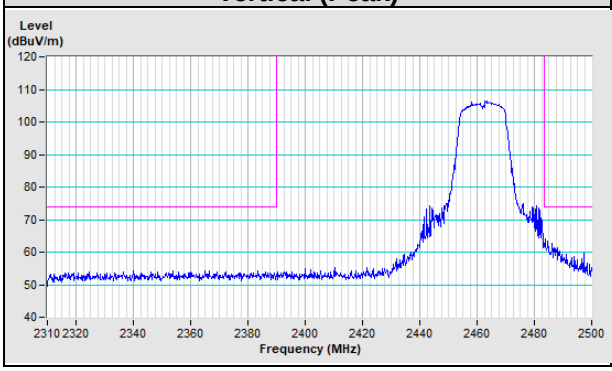
Horizontal (Peak)



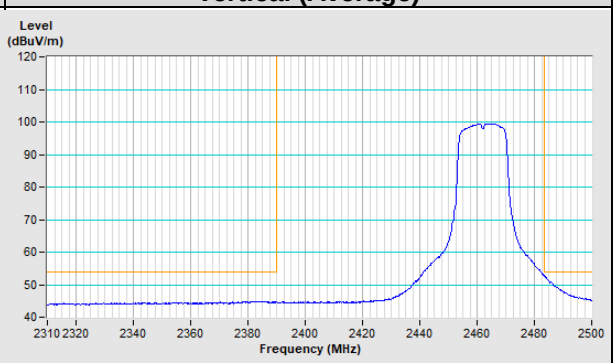
Horizontal (Average)



Vertical (Peak)

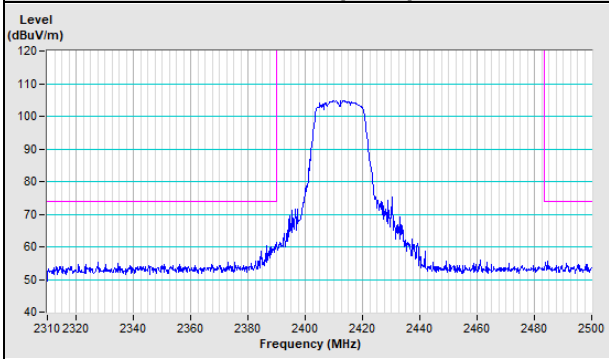


Vertical (Average)

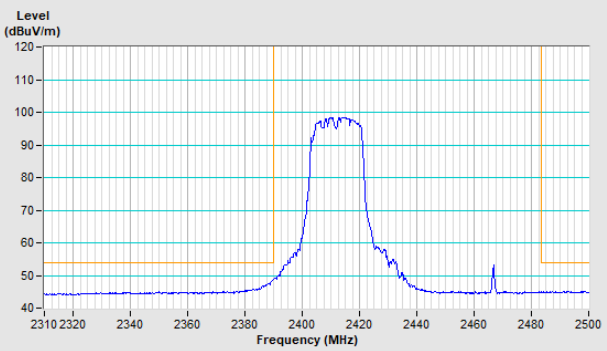


802.11n (VHT20) Channel 1

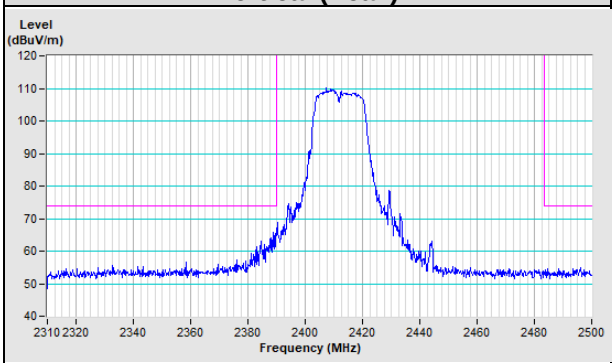
Horizontal (Peak)



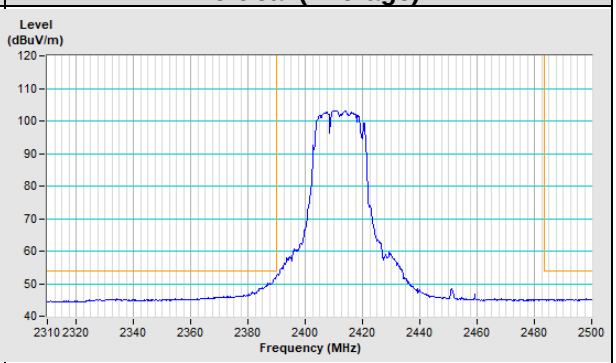
Horizontal (Average)



Vertical (Peak)

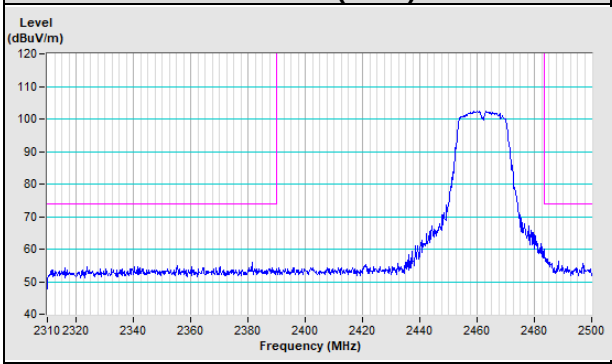


Vertical (Average)

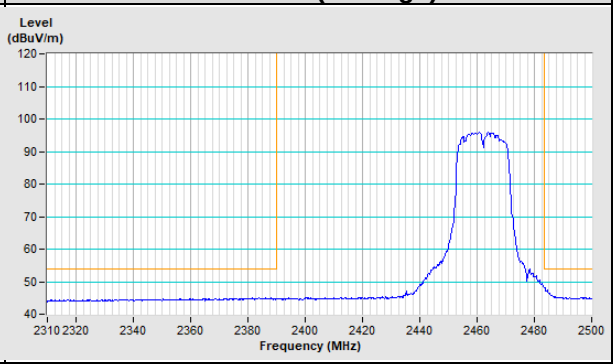


802.11n (VHT20) Channel 11

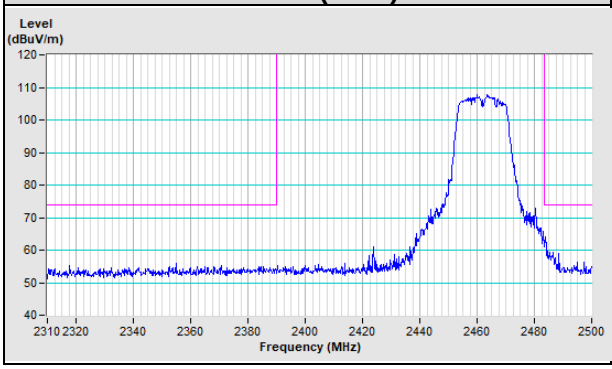
Horizontal (Peak)



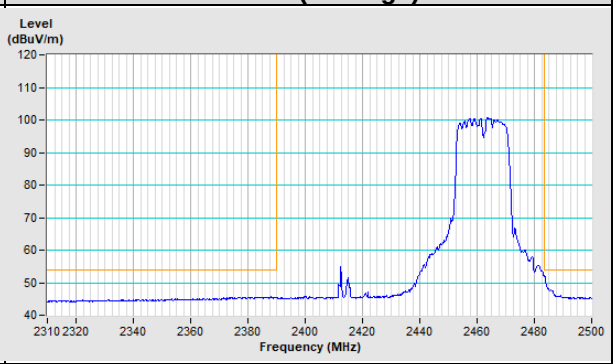
Horizontal (Average)



Vertical (Peak)

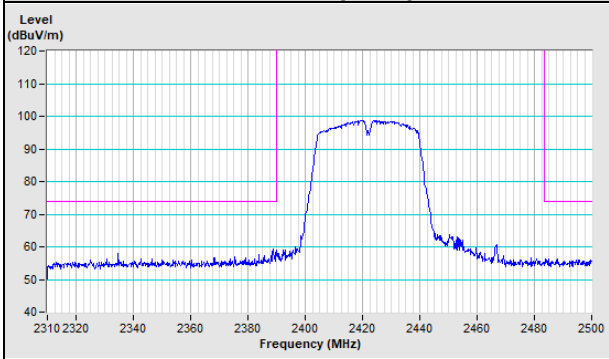


Vertical (Average)

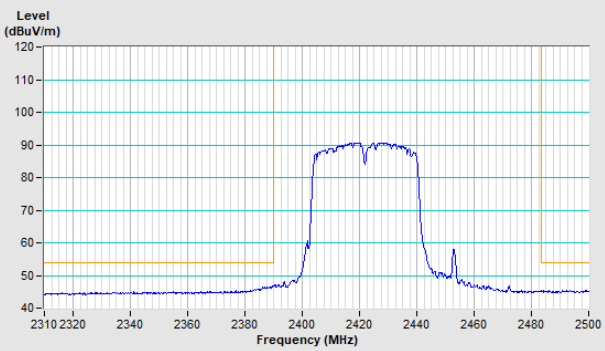


802.11n (VHT40) Channel 3

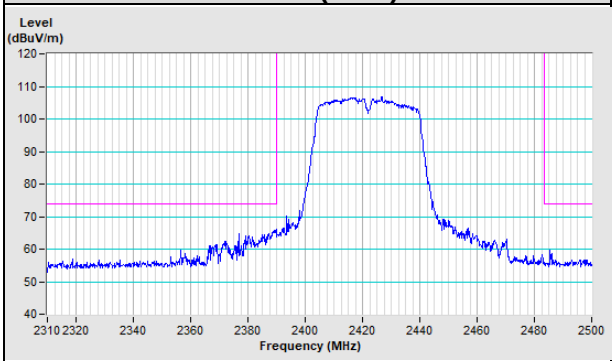
Horizontal (Peak)



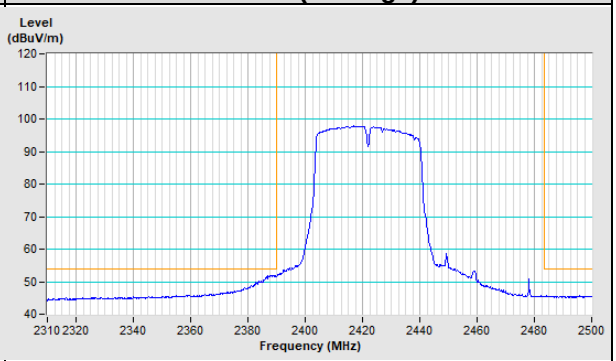
Horizontal (Average)



Vertical (Peak)

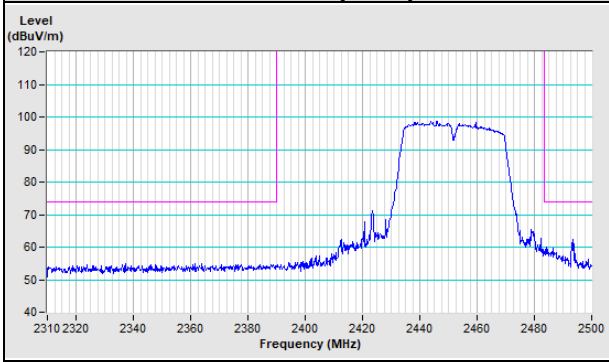


Vertical (Average)

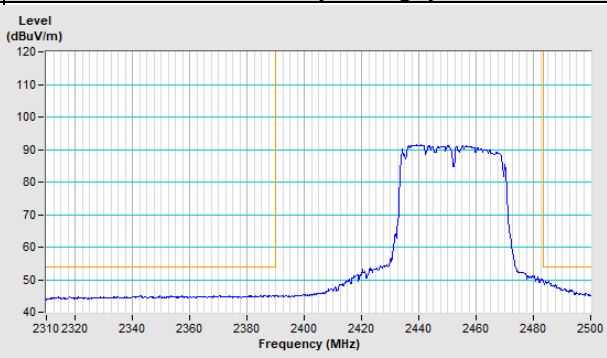


802.11n (VHT40) Channel 9

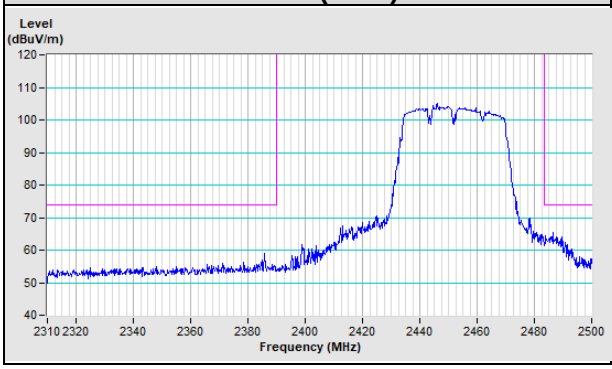
Horizontal (Peak)



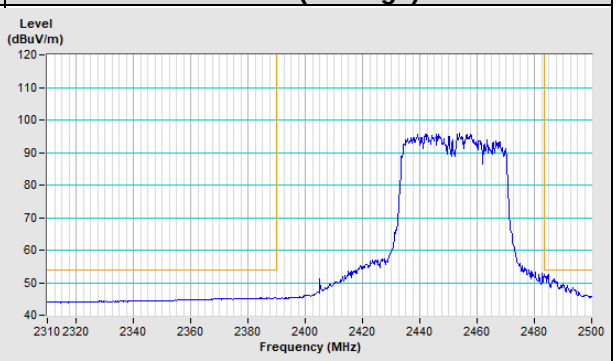
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

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

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Web Site: www.bureauveritas-adt.com

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

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