FCC Test Report

Report No.: RF200407C10

FCC ID: MSQ-RPAX4W00

Test Model: RP-AX56

Received Date: Apr. 07, 2020

Test Date: May 15, 2020 ~ Jul. 16, 2020

Issued Date: Jul. 22, 2020

Applicant: ASUSTek COMPUTER INC.

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

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Release Control Record

Issue No.	Description	Date Issued
RF200407C10	Original Release	Jul. 22, 2020

1 Certificate of Conformity

Product: Dual-Band Wireless Repeater

Brand: ASUS

Test Model: RP-AX56

Sample Status: Engineering Sample

Applicant: ASUSTek COMPUTER INC.

Test Date: May 15, 2020 ~ Jul. 16, 2020

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

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

Prepared by : _____ , **Date:** Jul. 22, 2020

Shelly Hsueh / Specialist

Approved by : _____ , **Date:** Jul. 22, 2020

Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	**Test Item**	**Result**	**Remarks**
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -15.35 dB at 0.43934 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.1 dB at 2390.00 & 2483.5 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Reference only
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note:

1. For 2.4G band compliance with rule 15.247(d)of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
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	150 kHz ~ 30 MHz	2.79 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Dual-Band Wireless Repeater
Brand	ASUS
Test Model	RP-AX56
Status of EUT	Engineering Sample
Power Supply Rating	110 ~ 240 Vac
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b:11/ 5.5/ 2/ 1 Mbps 802.11g: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6 Mbps 802.11n: up to 400 Mbps 802.11ax: up to 573.5 Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20), 802.11n (VHT20), 802.11ax (HE20) 7 for 802.11n (HT40), 802.11n (VHT40), 802.11ax (HE40)
Output Power	CDD Mode : 412.608 mw Beamforming Mode : 358.951 mw
Antenna Type	Omni-directional antenna with 3 dBi gain
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	CDD Mode	Beamforming Mode
802.11b	2TX (MIMO)	-
802.11g	2TX (MIMO)	-
802.11n (HT20)	2TX (MIMO)	2TX (MIMO)
802.11n (HT40)	2TX (MIMO)	2TX (MIMO)
802.11n (VHT20)	2TX (MIMO)	2TX (MIMO)
802.11n (VHT40)	2TX (MIMO)	2TX (MIMO)
802.11ax (HE20)	2TX (MIMO)	2TX (MIMO)
802.11ax (HE40)	2TX (MIMO)	2TX (MIMO)

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

2. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

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

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

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1 GHz **RE<1G:** Radiated Emission below 1 GHz
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**.
NOTE: "-"means no effect.

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	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

Bandedge Measurement:

☒ 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 13	1, 7, 13	DSSS	DBPSK	1.0
-	802.11g	1 to 13	1, 7, 13	OFDM	BPSK	6.0
-	802.11ax (HE20)	1 to 13	1, 7, 13	OFDM	BPSK	MCS0
-	802.11ax (HE40)	3 to 11	3, 7, 11	OFDM	BPSK	MCS0

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 13	1, 7, 13	DSSS	DBPSK	1.0
-	802.11g	1 to 13	1, 7, 13	OFDM	BPSK	6.0
-	802.11ax (HE20)	1 to 13	1, 7, 13	OFDM	BPSK	MCS0
-	802.11ax (HE40)	3 to 11	3, 7, 11	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	David Huang
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	David Huang
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Anson Lin
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Luke Chen

3.3 Duty Cycle of Test Signal

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

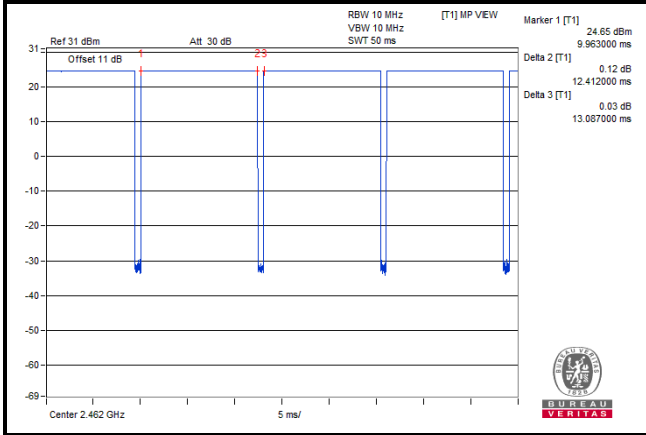
802.11b: Duty cycle = 12.412/13.087 = 0.948, Duty factor = 10 * log(1/0.948) = 0.23

802.11g: Duty cycle = 2.058/2.173 = 0.947, Duty factor = 10 * log(1/0.947) = 0.24

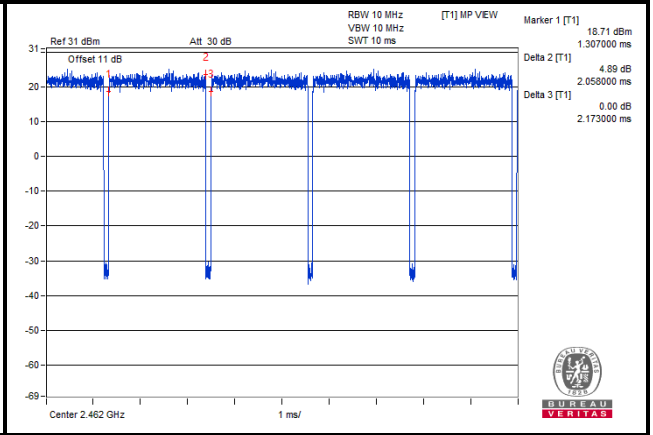
802.11ax (HE20): Duty cycle = 1.482/1.52 = 0.975, Duty factor = 10 * log(1/0.975) = 0.11

802.11ax (HE40): Duty cycle = 0.775/0.812 = 0.954, Duty factor = 10 * log(1/0.954) = 0.20

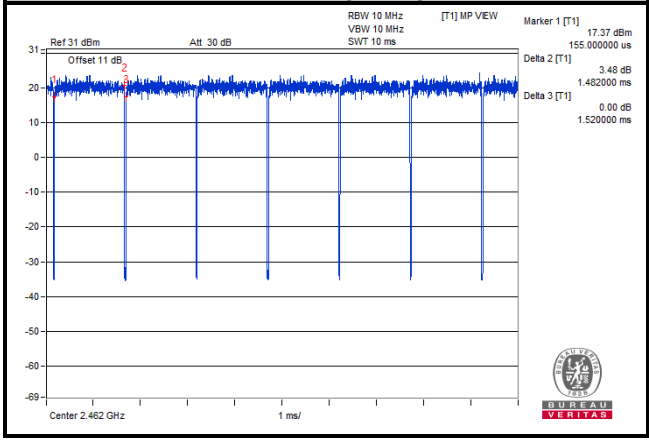
802.11b



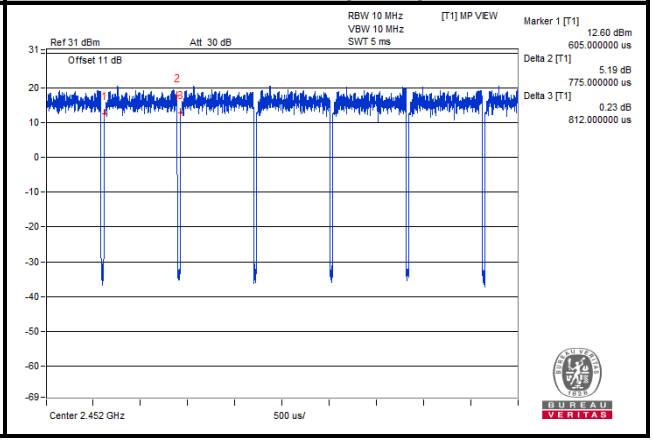
802.11g



802.11ax (HE20)



802.11ax (HE40)



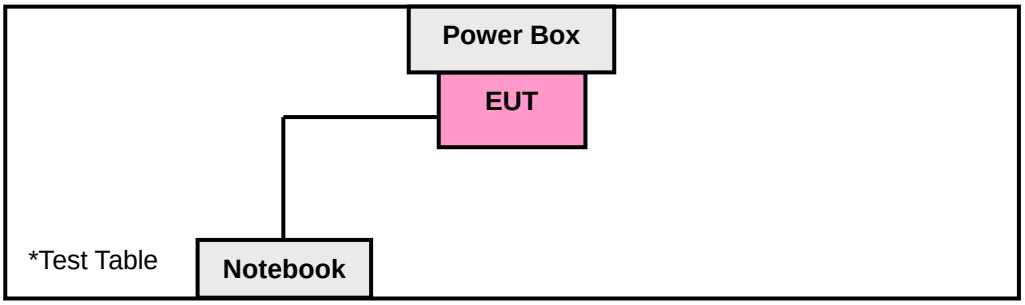
3.4 Description of Support Units

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

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook	DELL	E5410	1HC2XM1	N/A

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

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 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 20 dB below the highest level of the desired power:

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

NOTE:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 30, 2019	May 29, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2019	Nov. 10, 2020
HORN Antenna SCHWARZBECK	9120D	209	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna EMCI	EM-6879	269	Sep. 16, 2019	Sep. 15, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 20, 2019	Aug. 19, 2020
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 20, 2019	Aug. 19, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 20, 2019	Aug. 19, 2020
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3-03 (309224+170907)	Aug. 20, 2019	Aug. 19, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55 190004/MY551900 07/MY55210005	Jul. 15, 2019	Jul. 14, 2020

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

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

Note:

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

For Radiated Emission above 30 MHz

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

Note:

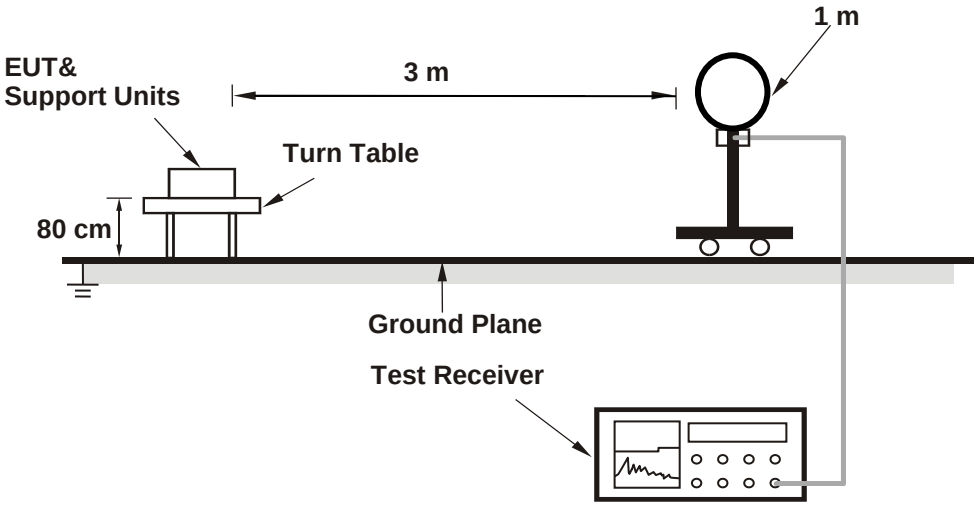
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
   (11b: RBW = 1 MHz, VBW =10 Hz ; 11g: RBW = 1 MHz, VBW = 10 Hz ;
   11ax (HE20): RBW = 1 MHz, VBW = 10 Hz ; 11ax (HE40): RBW = 1 MHz, VBW = 10 Hz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

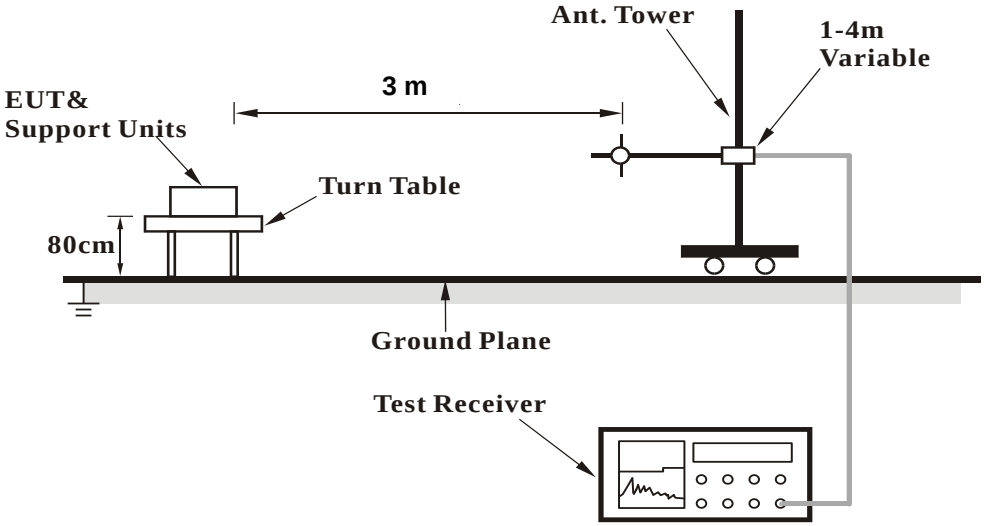
No deviation.

4.1.5 Test Set Up

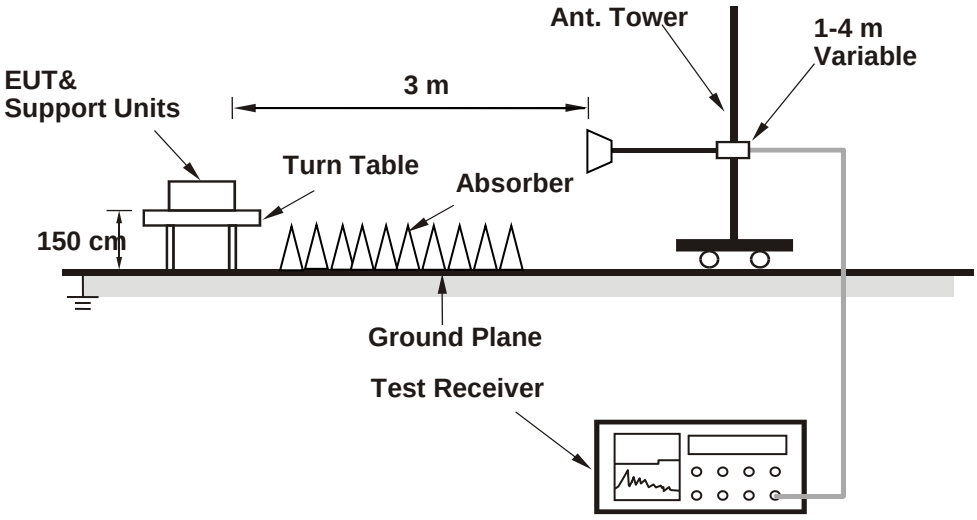
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1 GHz Data：

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.1 PK	74.0	-13.9	2.81 H	134	27.8	32.3
2	2390.00	48.0 AV	54.0	-6.0	2.81 H	134	15.7	32.3
3	*2412.00	107.3 PK			2.81 H	134	75.0	32.3
4	*2412.00	103.6 AV			2.81 H	134	71.3	32.3
5	4824.00	56.0 PK	74.0	-18.0	3.25 H	177	52.6	3.4
6	4824.00	52.7 AV	54.0	-1.3	3.25 H	177	49.3	3.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.3 PK	74.0	-10.7	2.55 V	280	31.0	32.3
2	2390.00	51.6 AV	54.0	-2.4	2.55 V	280	19.3	32.3
3	*2412.00	113.6 PK			2.55 V	280	81.3	32.3
4	*2412.00	110.0 AV			2.55 V	280	77.7	32.3
5	4824.00	54.2 PK	74.0	-19.8	2.16 V	330	50.8	3.4
6	4824.00	50.5 AV	54.0	-3.5	2.16 V	330	47.1	3.4

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.8 PK			3.13 H	134	72.5	32.3
2	*2437.00	101.3 AV			3.13 H	134	69.0	32.3
3	4874.00	56.3 PK	74.0	-17.7	3.18 H	165	52.6	3.7
4	4874.00	52.7 AV	54.0	-1.3	3.18 H	165	49.0	3.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	111.2 PK			2.58 V	282	78.9	32.3
2	*2437.00	107.8 AV			2.58 V	282	75.5	32.3
3	4874.00	54.5 PK	74.0	-19.5	2.20 V	325	50.8	3.7
4	4874.00	50.7 AV	54.0	-3.3	2.20 V	325	47.0	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.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.6 PK			3.32 H	189	73.2	32.4
2	*2462.00	102.1 AV			3.32 H	189	69.7	32.4
3	2483.50	60.2 PK	74.0	-13.8	3.32 H	189	27.8	32.4
4	2483.50	47.6 AV	54.0	-6.4	3.32 H	189	15.2	32.4
5	4924.00	56.0 PK	74.0	-18.0	3.16 H	164	52.2	3.8
6	4924.00	52.8 AV	54.0	-1.2	3.16 H	164	49.0	3.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.0 PK			2.34 V	272	80.6	32.4
2	*2462.00	109.3 AV			2.34 V	272	76.9	32.4
3	2483.50	61.6 PK	74.0	-12.4	2.34 V	272	29.2	32.4
4	2483.50	49.1 AV	54.0	-4.9	2.34 V	272	16.7	32.4
5	4924.00	54.2 PK	74.0	-19.8	2.31 V	330	50.4	3.8
6	4924.00	50.7 AV	54.0	-3.3	2.31 V	330	46.9	3.8

REMARKS:

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

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.8 PK	74.0	-10.2	2.32 H	341	31.5	32.3
2	2390.00	47.4 AV	54.0	-6.6	2.32 H	341	15.1	32.3
3	*2412.00	103.5 PK			2.32 H	341	71.2	32.3
4	*2412.00	94.2 AV			2.32 H	341	61.9	32.3
5	4824.00	48.6 PK	74.0	-25.4	1.87 H	297	45.2	3.4
6	4824.00	34.9 AV	54.0	-19.1	1.87 H	297	31.5	3.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.9 PK	74.0	-1.1	3.51 V	333	40.6	32.3
2	2390.00	50.5 AV	54.0	-3.5	3.51 V	333	18.2	32.3
3	*2412.00	109.8 PK			3.51 V	333	77.5	32.3
4	*2412.00	100.5 AV			3.51 V	333	68.2	32.3
5	4824.00	45.9 PK	74.0	-28.1	2.22 V	320	42.5	3.4
6	4824.00	32.7 AV	54.0	-21.3	2.22 V	320	29.3	3.4

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.5 PK	74.0	-12.5	2.05 H	342	29.2	32.3
2	2390.00	48.3 AV	54.0	-5.7	2.05 H	342	16.0	32.3
3	*2437.00	108.1 PK			2.06 H	342	75.8	32.3
4	*2437.00	97.9 AV			2.06 H	342	65.6	32.3
5	2483.50	61.8 PK	74.0	-12.2	2.05 H	342	29.4	32.4
6	2483.50	48.2 AV	54.0	-5.8	2.05 H	342	15.8	32.4
7	4874.00	57.4 PK	74.0	-16.6	1.56 H	312	53.7	3.7
8	4874.00	45.0 AV	54.0	-9.0	1.56 H	312	41.3	3.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.8 PK	74.0	-2.2	2.31 V	350	39.5	32.3
2	2390.00	52.5 AV	54.0	-1.5	2.31 V	350	20.2	32.3
3	*2437.00	115.4 PK			2.13 V	350	83.1	32.3
4	*2437.00	105.3 AV			2.13 V	350	73.0	32.3
5	2483.50	71.0 PK	74.0	-3.0	2.13 V	350	38.6	32.4
6	2483.50	51.1 AV	54.0	-2.9	2.13 V	350	18.7	32.4
7	4874.00	55.2 PK	74.0	-18.8	2.01 V	330	51.5	3.7
8	4874.00	42.0 AV	54.0	-12.0	2.01 V	330	38.3	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.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.7 PK			2.35 H	350	72.3	32.4
2	*2462.00	95.2 AV			2.35 H	350	62.8	32.4
3	2483.50	66.1 PK	74.0	-7.9	2.35 H	350	33.7	32.4
4	2483.50	47.2 AV	54.0	-6.8	2.35 H	350	14.8	32.4
5	4924.00	50.6 PK	74.0	-23.4	1.75 H	309	46.8	3.8
6	4924.00	37.2 AV	54.0	-16.8	1.75 H	309	33.4	3.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	111.0 PK			2.34 V	343	78.6	32.4
2	*2462.00	101.6 AV			2.34 V	343	69.2	32.4
3	2483.50	72.7 PK	74.0	-1.3	2.34 V	343	40.3	32.4
4	2483.50	49.3 AV	54.0	-4.7	2.34 V	343	16.9	32.4
5	4924.00	47.9 PK	74.0	-26.1	2.22 V	326	44.1	3.8
6	4924.00	34.5 AV	54.0	-19.5	2.22 V	326	30.7	3.8

REMARKS:

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

802.11ax (HE20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.0 PK	74.0	-9.0	2.41 H	353	32.7	32.3
2	2390.00	47.1 AV	54.0	-6.9	2.41 H	353	14.8	32.3
3	*2412.00	104.8 PK			2.41 H	353	72.5	32.3
4	*2412.00	93.2 AV			2.41 H	353	60.9	32.3
5	4824.00	48.1 PK	74.0	-25.9	1.63 H	321	44.7	3.4
6	4824.00	34.7 AV	54.0	-19.3	1.63 H	321	31.3	3.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.4 PK	74.0	-1.6	2.41 V	357	40.1	32.3
2	2390.00	49.4 AV	54.0	-4.6	2.41 V	357	17.1	32.3
3	*2412.00	111.3 PK			2.41 V	357	79.0	32.3
4	*2412.00	99.7 AV			2.41 V	357	67.4	32.3
5	4824.00	45.3 PK	74.0	-28.7	2.30 V	331	41.9	3.4
6	4824.00	32.3 AV	54.0	-21.7	2.30 V	331	28.9	3.4

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.0 PK	74.0	-11.0	2.22 H	345	30.7	32.3
2	2390.00	48.8 AV	54.0	-5.2	2.22 H	345	16.5	32.3
3	*2437.00	109.4 PK			2.22 H	345	77.1	32.3
4	*2437.00	97.3 AV			2.22 H	345	65.0	32.3
5	2483.50	62.9 PK	74.0	-11.1	2.22 H	345	30.5	32.4
6	2483.50	48.5 AV	54.0	-5.5	2.22 H	345	16.1	32.4
7	4874.00	55.5 PK	74.0	-18.5	1.69 H	320	51.8	3.7
8	4874.00	42.7 AV	54.0	-11.3	1.69 H	320	39.0	3.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.0 PK	74.0	-4.0	2.64 V	340	37.7	32.3
2	2390.00	52.5 AV	54.0	-1.5	2.64 V	340	20.2	32.3
3	*2437.00	115.6 PK			2.64 V	340	83.3	32.3
4	*2437.00	103.5 AV			2.64 V	340	71.2	32.3
5	2483.50	66.4 PK	74.0	-7.6	2.64 V	340	34.0	32.4
6	2483.50	51.6 AV	54.0	-2.4	2.64 V	340	19.2	32.4
7	4874.00	53.0 PK	74.0	-21.0	2.02 V	329	49.3	3.7
8	4874.00	39.6 AV	54.0	-14.4	2.02 V	329	35.9	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.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.6 PK			2.53 H	357	74.2	32.4
2	*2462.00	93.5 AV			2.53 H	357	61.1	32.4
3	2483.50	65.1 PK	74.0	-8.9	2.53 H	357	32.7	32.4
4	2483.50	47.1 AV	54.0	-6.9	2.53 H	357	14.7	32.4
5	4924.00	49.6 PK	74.0	-24.4	1.75 H	330	45.8	3.8
6	4924.00	35.8 AV	54.0	-18.2	1.75 H	330	32.0	3.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.8 PK			2.30 V	343	80.4	32.4
2	*2462.00	99.6 AV			2.30 V	343	67.2	32.4
3	**2483.50**	**72.9 PK**	**74.0**	**-1.1**	**2.30 V**	**343**	**40.5**	**32.4**
4	2483.50	49.8 AV	54.0	-4.2	2.30 V	343	17.4	32.4
5	4924.00	46.9 PK	74.0	-27.1	2.17 V	327	43.1	3.8
6	4924.00	33.3 AV	54.0	-20.7	2.17 V	327	29.5	3.8

REMARKS:

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

802.11ax (HE40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.0 PK	74.0	-13.0	2.57 H	339	28.7	32.3
2	2390.00	47.0 AV	54.0	-7.0	2.57 H	339	14.7	32.3
3	*2422.00	102.4 PK			2.57 H	339	70.1	32.3
4	*2422.00	90.5 AV			2.57 H	339	58.2	32.3
5	4844.00	48.5 PK	74.0	-25.5	1.63 H	310	45.0	3.5
6	4844.00	35.0 AV	54.0	-19.0	1.63 H	310	31.5	3.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.8 PK	74.0	-1.2	2.38 V	350	40.5	32.3
2	2390.00	50.5 AV	54.0	-3.5	2.38 V	350	18.2	32.3
3	*2422.00	108.6 PK			2.38 V	350	76.3	32.3
4	*2422.00	96.8 AV			2.38 V	350	64.5	32.3
5	4844.00	45.7 PK	74.0	-28.3	2.15 V	322	42.2	3.5
6	4844.00	32.5 AV	54.0	-21.5	2.15 V	322	29.0	3.5

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.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.3 PK	74.0	-9.7	2.36 H	350	32.0	32.3
2	2390.00	48.2 AV	54.0	-5.8	2.36 H	350	15.9	32.3
3	*2437.00	103.5 PK			2.36 H	350	71.2	32.3
4	*2437.00	91.5 AV			2.36 H	350	59.2	32.3
5	2483.50	63.1 PK	74.0	-10.9	2.36 H	350	30.7	32.4
6	2483.50	47.9 AV	54.0	-6.1	2.36 H	350	15.5	32.4
7	4874.00	48.8 PK	74.0	-25.2	1.71 H	304	45.1	3.7
8	4874.00	35.1 AV	54.0	-18.9	1.71 H	304	31.4	3.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	72.0 PK	74.0	-2.0	2.38 V	357	39.7	32.3
2	2390.00	51.8 AV	54.0	-2.2	2.38 V	357	19.5	32.3
3	*2437.00	109.8 PK			2.38 V	357	77.5	32.3
4	*2437.00	97.7 AV			2.38 V	357	65.4	32.3
5	2483.50	72.6 PK	74.0	-1.4	2.38 V	357	40.2	32.4
6	2483.50	50.9 AV	54.0	-3.1	2.38 V	357	18.5	32.4
7	4874.00	46.3 PK	74.0	-27.7	2.11 V	321	42.6	3.7
8	4874.00	32.5 AV	54.0	-21.5	2.11 V	321	28.8	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.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	101.1 PK			2.29 H	167	68.7	32.4
2	*2452.00	89.1 AV			2.29 H	167	56.7	32.4
3	2483.50	61.3 PK	74.0	-12.7	2.29 H	167	28.9	32.4
4	2483.50	47.0 AV	54.0	-7.0	2.29 H	167	14.6	32.4
5	4904.00	48.8 PK	74.0	-25.2	1.65 H	311	45.1	3.7
6	4904.00	35.0 AV	54.0	-19.0	1.65 H	311	31.3	3.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	108.2 PK			2.32 V	346	75.8	32.4
2	*2452.00	96.1 AV			2.32 V	346	63.7	32.4
3	2483.50	72.6 PK	74.0	-1.4	3.23 V	346	40.2	32.4
4	2483.50	49.2 AV	54.0	-4.8	3.23 V	346	16.8	32.4
5	4904.00	46.3 PK	74.0	-27.7	2.15 V	323	42.6	3.7
6	4904.00	32.6 AV	54.0	-21.4	2.15 V	323	28.9	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.

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

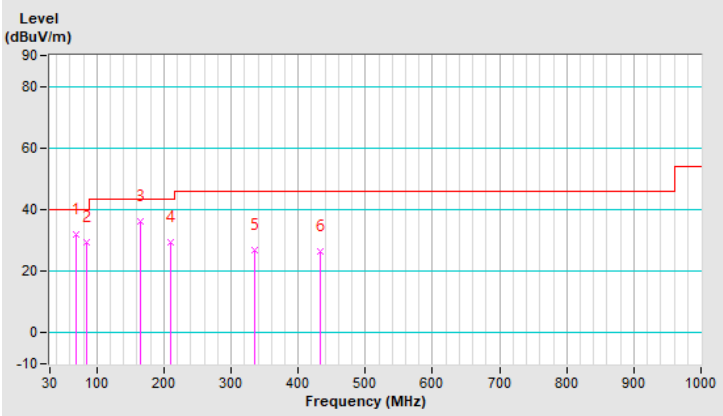
802.11g

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	69.36	32.0 QP	40.0	-8.0	1.49 H	108	42.8	-10.8
2	84.83	29.5 QP	40.0	-10.5	1.49 H	108	43.4	-13.9
3	164.96	36.0 QP	43.5	-7.5	1.49 H	226	44.7	-8.7
4	209.94	29.5 QP	43.5	-14.0	1.00 H	132	41.0	-11.5
5	335.06	26.8 QP	46.0	-19.2	1.00 H	163	33.1	-6.3
6	433.46	26.6 QP	46.0	-19.4	1.49 H	336	29.6	-3.0

REMARKS:

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

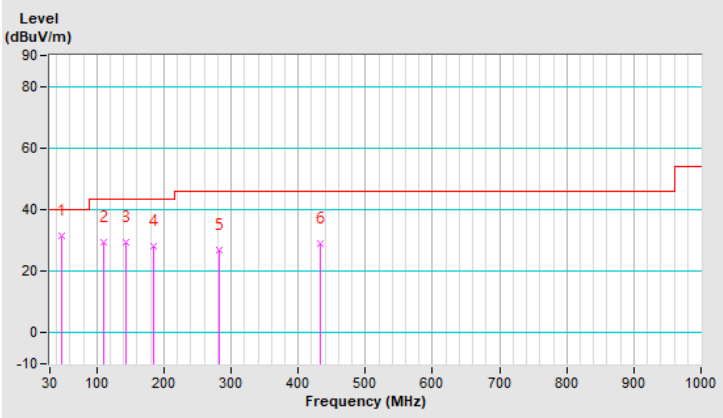


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	46.87	31.4 QP	40.0	-8.6	1.01 V	16	40.3	-8.9
2	110.13	29.5 QP	43.5	-14.0	1.01 V	258	41.3	-11.8
3	143.87	29.3 QP	43.5	-14.2	1.01 V	299	38.1	-8.8
4	184.64	28.2 QP	43.5	-15.3	1.01 V	171	38.7	-10.5
5	283.04	26.9 QP	46.0	-19.1	1.50 V	40	34.8	-7.9
6	432.06	28.9 QP	46.0	-17.1	1.01 V	357	32.0	-3.1

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit 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 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 20, 2021
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	Apr. 20, 2020	Apr. 19, 2021
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

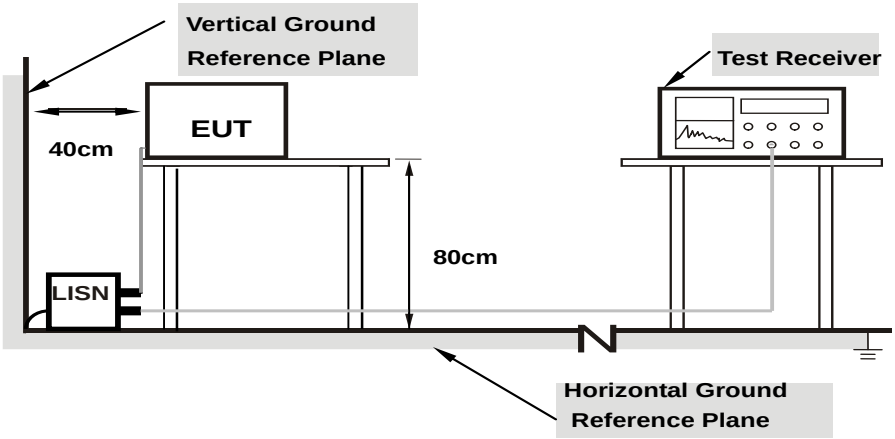
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

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

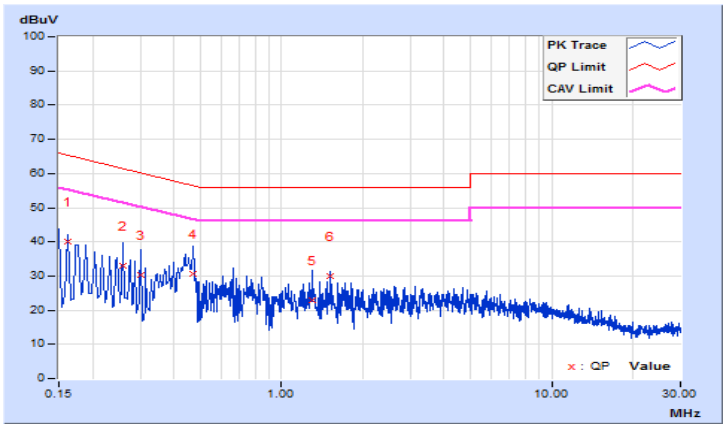
4.2.7 Test Results

Phase	Line (L)	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV)

No	Frequency	Correction Factor	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
	(MHz)	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16173	9.63	30.50	17.81	40.13	27.44	65.37	55.37	-25.24	-27.93
2	0.25948	9.63	23.36	11.65	32.99	21.28	61.45	51.45	-28.46	-30.17
3	0.30249	9.64	20.83	6.19	30.47	15.83	60.17	50.17	-29.70	-34.34
4	0.47062	9.65	20.87	14.77	30.52	24.42	56.50	46.50	-25.98	-22.08
5	1.29563	9.69	13.23	6.85	22.92	16.54	56.00	46.00	-33.08	-29.46
6	1.52241	9.71	20.37	13.30	30.08	23.01	56.00	46.00	-25.92	-22.99

Remarks:

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

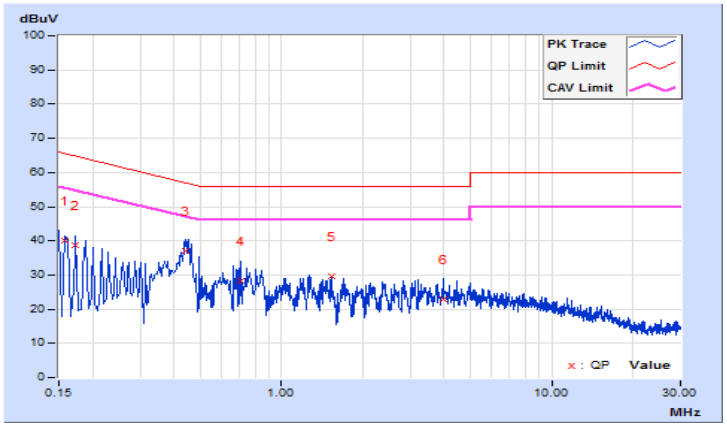


Phase	Neutral (N)	Detector Function & Bandwidth	Quasi-Peak (QP) / Average (AV)

No	Frequency	Correction Factor	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
	(MHz)	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	9.66	30.30	15.83	39.96	25.49	65.58	55.58	-25.62	-30.09
2	0.17346	9.65	29.05	15.22	38.70	24.87	64.79	54.79	-26.09	-29.92
3	**0.43934**	**9.67**	**27.48**	**22.05**	**37.15**	**31.72**	**57.07**	**47.07**	**-19.92**	**-15.35**
4	0.70913	9.69	18.69	9.35	28.38	19.04	56.00	46.00	-27.62	-26.96
5	1.52632	9.73	19.97	14.10	29.70	23.83	56.00	46.00	-26.30	-22.17
6	3.98567	9.82	13.14	6.05	22.96	15.87	56.00	46.00	-33.04	-30.13

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

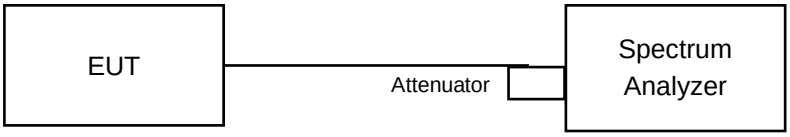


4.3 6 dB Bandwidth Measurement

4.3.1 Limits of 6 dB Bandwidth Measurement

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Results

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	7.09	7.09	0.5	Pass
6	2437	7.12	7.11	0.5	Pass
11	2462	7.08	7.11	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.41	16.42	0.5	Pass
6	2437	16.38	16.39	0.5	Pass
11	2462	16.43	16.45	0.5	Pass

802.11ax (HE20)

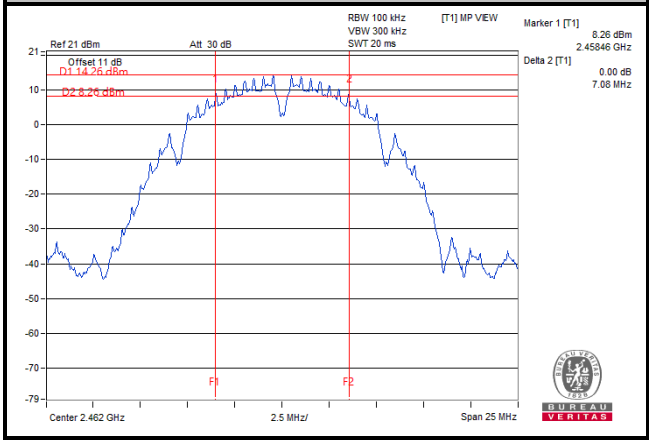
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	19.05	19.05	0.5	Pass
6	2437	18.98	18.83	0.5	Pass
11	2462	19.07	19.08	0.5	Pass

802.11ax (HE40)

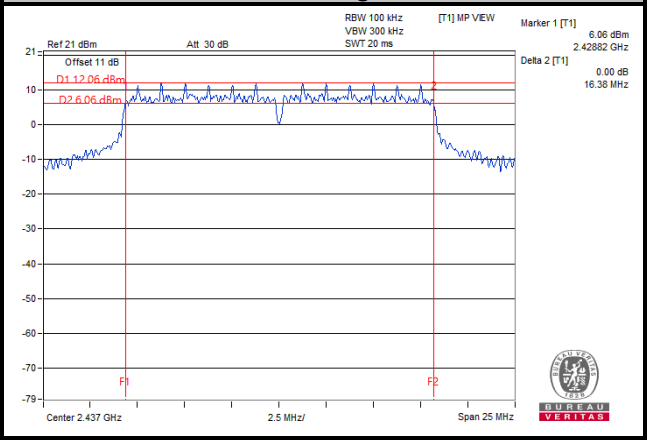
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	37.81	37.71	0.5	Pass
6	2437	37.80	37.40	0.5	Pass
9	2452	37.78	37.40	0.5	Pass

Spectrum Plot of Worst Value

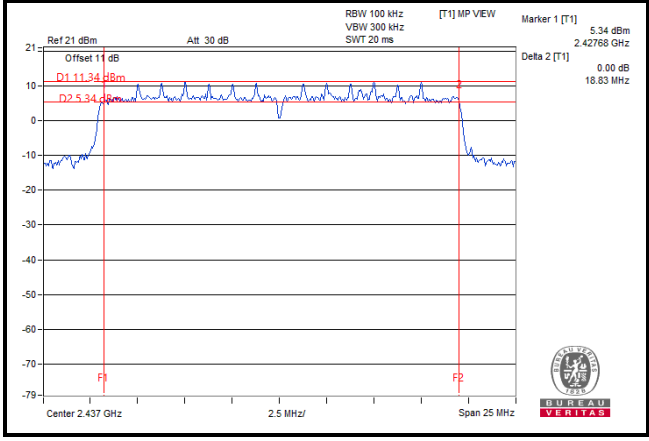
802.11b



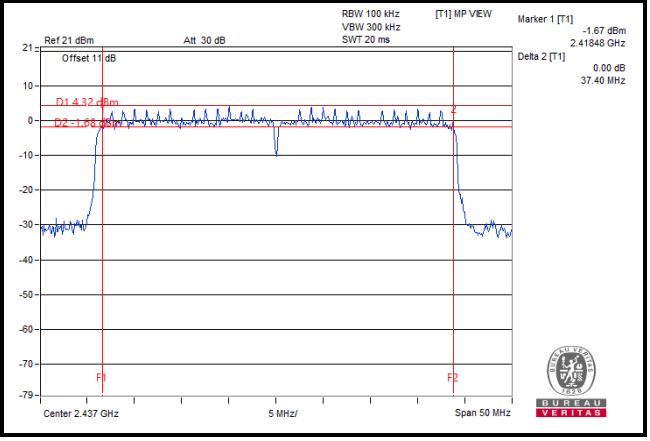
802.11g



802.11ax (HE20)

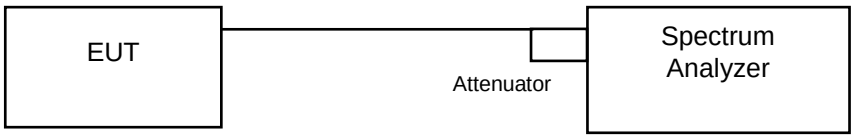


802.11ax (HE40)



4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Deviation from Test Standard

No deviation.

4.4.5 EUT Operating Conditions

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

4.4.6 Test Results

802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	10.44	10.26	Pass
6	2437	10.56	10.44	Pass
11	2462	10.32	10.68	Pass

802.11g

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	17.16	17.04	Pass
6	2437	22.92	26.16	Pass
11	2462	17.16	16.92	Pass

802.11ax (HE20)

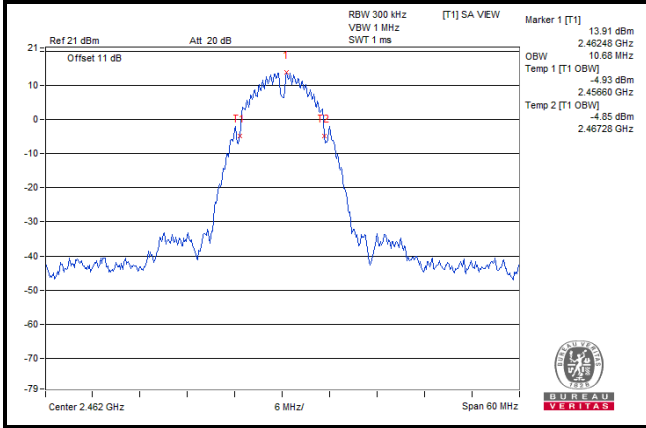
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	19.08	19.20	Pass
6	2437	20.16	21.36	Pass
11	2462	19.08	19.20	Pass

802.11ax (HE40)

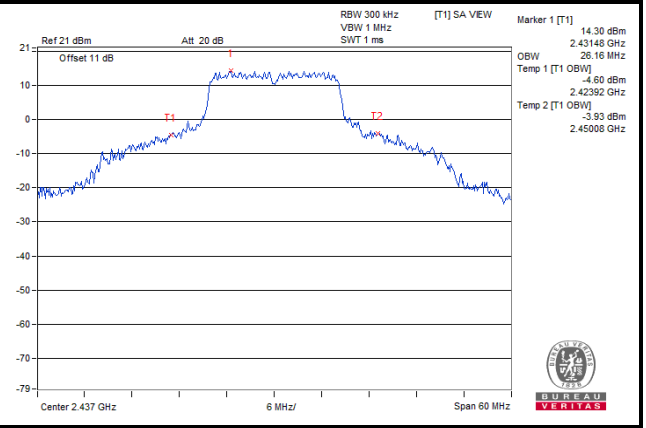
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
3	2422	37.80	37.68	Pass
6	2437	37.80	37.80	Pass
9	2452	37.80	37.68	Pass

Spectrum Plot of Worst Value

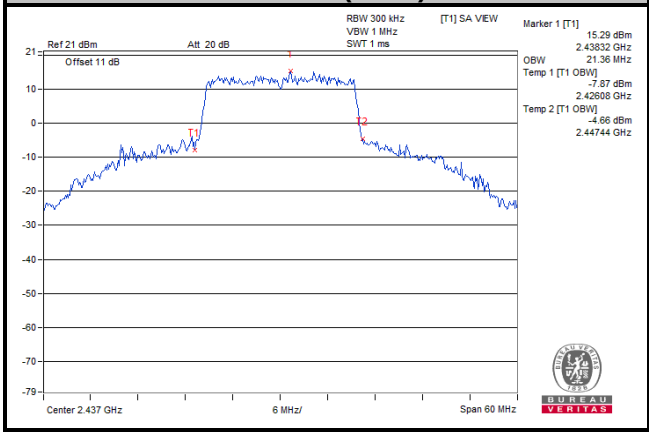
802.11b



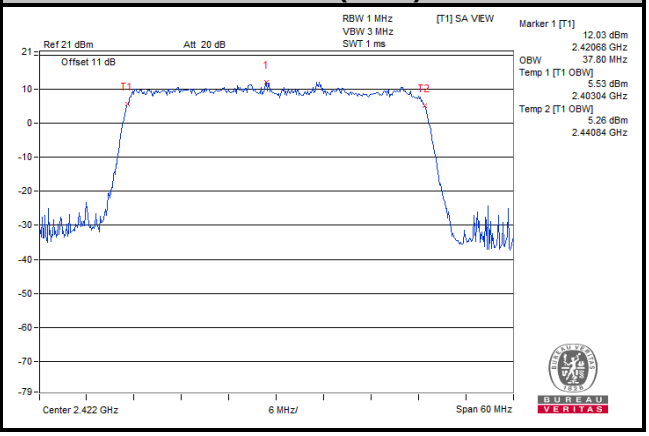
802.11g



802.11ax (HE20)



802.11ax (HE40)



4.5 Conducted Output Power Measurement

4.5.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30 dBm)
Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

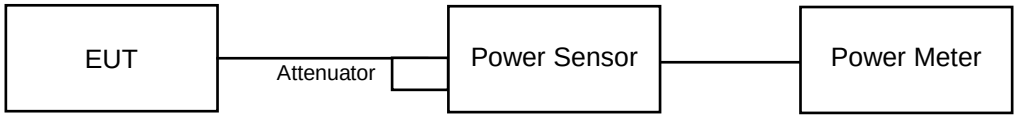
Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

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

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20 MHz channel widths with NANT ≥ 5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

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 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

CDD Mode

802.11b

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.14	22.67	348.609	25.42	30	Pass
6	2437	22.71	22.09	348.446	25.42	30	Pass
11	2462	22.23	22.19	332.686	25.22	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.42	18.58	159.609	22.03	30	Pass
6	2437	23.17	23.12	412.608	26.16	30	Pass
11	2462	18.72	18.11	139.187	21.44	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.20	17.49	108.586	20.36	30	Pass
6	2437	22.43	22.43	349.969	25.44	30	Pass
11	2462	17.11	17.75	110.971	20.45	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.03	16.43	94.42	19.75	30	Pass
6	2437	18.75	19.11	156.46	21.94	30	Pass
9	2452	16.97	16.32	92.629	19.67	30	Pass

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.23	17.55	109.73	20.40	30	Pass
6	2437	22.48	22.49	354.43	25.50	30	Pass
11	2462	17.14	17.80	112.017	20.49	30	Pass

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.08	16.48	95.514	19.80	30	Pass
6	2437	18.79	19.16	158.097	21.99	30	Pass
9	2452	17.00	16.37	93.47	19.71	30	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.27	17.61	111.01	20.45	30	Pass
6	2437	22.52	22.56	358.951	25.55	30	Pass
11	2462	17.19	17.85	113.314	20.54	30	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.15	16.53	96.858	19.86	30	Pass
6	2437	18.83	19.23	160.137	22.04	30	Pass
9	2452	17.05	16.43	94.653	19.76	30	Pass

Beamforming Mode

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.20	17.49	108.586	20.36	29.99	Pass
6	2437	22.43	22.43	349.969	25.44	29.99	Pass
11	2462	17.11	17.75	110.971	20.45	29.99	Pass

NOTE:

Directional gain = 6.01 dBi > 6dBi, so the power limit shall be reduced to 30-(6.01-6) = 29.99dBm.

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.03	16.43	94.42	19.75	29.99	Pass
6	2437	18.75	19.11	156.46	21.94	29.99	Pass
9	2452	16.97	16.32	92.629	19.67	29.99	Pass

NOTE:

Directional gain = 6.01 dBi > 6dBi, so the power limit shall be reduced to 30-(6.01-6) = 29.99dBm.

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.23	17.55	109.73	20.40	29.99	Pass
6	2437	22.48	22.49	354.43	25.50	29.99	Pass
11	2462	17.14	17.80	112.017	20.49	29.99	Pass

NOTE:

Directional gain = 6.01 dBi > 6dBi, so the power limit shall be reduced to 30-(6.01-6) = 29.99dBm.

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.08	16.48	95.514	19.80	29.99	Pass
6	2437	18.79	19.16	158.097	21.99	29.99	Pass
9	2452	17.00	16.37	93.47	19.71	29.99	Pass

NOTE:

Directional gain = 6.01 dBi > 6dBi, so the power limit shall be reduced to 30-(6.01-6) = 29.99dBm.

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.27	17.61	111.01	20.45	29.99	Pass
6	2437	22.52	22.56	358.951	25.55	29.99	Pass
11	2462	17.19	17.85	113.314	20.54	29.99	Pass

NOTE:

Directional gain = 6.01 dBi > 6dBi, so the power limit shall be reduced to 30-(6.01-6) = 29.99dBm.

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	17.15	16.53	96.858	19.86	29.99	Pass
6	2437	18.83	19.23	160.137	22.04	29.99	Pass
9	2452	17.05	16.43	94.653	19.76	29.99	Pass

NOTE:

Directional gain = 6.01 dBi > 6dBi, so the power limit shall be reduced to 30-(6.01-6) = 29.99dBm.

4.6 Power Spectral Density Measurement

4.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm in any 3 kHz band during any time interval of continuous transmission.

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

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.

For Average Power (Duty cycle < 98%)

a. Measure the duty cycle (x).
b. Set instrument center frequency to DTS channel center frequency.
c. Set span to at least 1.5 times the OBW.
d. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e. Set VBW ≥3 x RBW.
f. Detector = power averaging (RMS) or sample detector (when RMS not available).
g. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h. Sweep time = auto couple.
i. Do not use sweep triggering. Allow sweep to “free run”.
j. Employ trace averaging (RMS) mode over a minimum of 100 traces.
k. Use the peak marker function to determine the maximum amplitude level.
l. Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

802.11b

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Duty Factor (dB)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-8.83	3.01	0.23	0.23	7.99	Pass
	6	2437	-9.53	3.01	0.23	0.23	7.99	Pass
	11	2462	-9.79	3.01	0.23	0.23	7.99	Pass
1	1	2412	-9.42	3.01	0.23	0.23	7.99	Pass
	6	2437	-9.92	3.01	0.23	0.23	7.99	Pass
	11	2462	-10.41	3.01	0.23	0.23	7.99	Pass

NOTE:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. Directional gain = 6.01 dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm/3kHz.

802.11g

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Duty Factor (dB)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-14.37	3.01	0.24	-11.12	7.99	Pass
	6	2437	-10.82	3.01	0.24	-7.57	7.99	Pass
	11	2462	-14.77	3.01	0.24	-11.52	7.99	Pass
1	1	2412	-15.06	3.01	0.24	-11.81	7.99	Pass
	6	2437	-10.37	3.01	0.24	-7.12	7.99	Pass
	11	2462	-14.35	3.01	0.24	-11.1	7.99	Pass

NOTE:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. Directional gain = 6.01 dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm/3kHz.

802.11ax (HE20)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Duty Factor (dB)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-16.55	3.01	0.11	-13.43	7.99	Pass
	6	2437	-11.13	3.01	0.11	-8.01	7.99	Pass
	11	2462	-16.38	3.01	0.11	-13.26	7.99	Pass
1	1	2412	-16.48	3.01	0.11	-13.36	7.99	Pass
	6	2437	-11.19	3.01	0.11	-8.07	7.99	Pass
	11	2462	-16.28	3.01	0.11	-13.16	7.99	Pass

NOTE:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. Directional gain = 6.01 dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm/3kHz..

802.11ax (HE40)

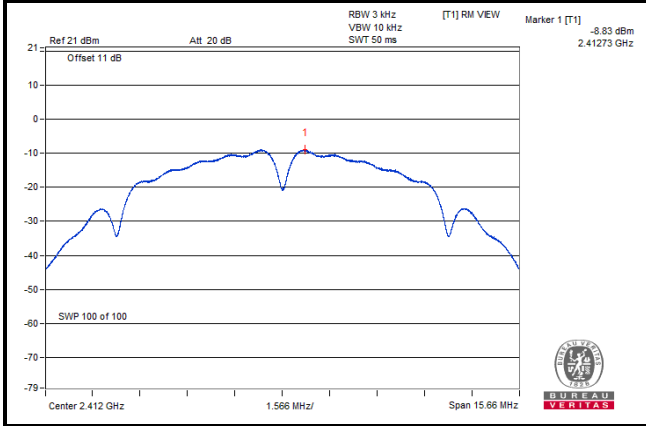
TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Duty Factor (dB)	Limit (dBm/3 kHz)	Pass / Fail
0	3	2422	-20.58	3.01	0.2	-17.37	7.99	Pass
	6	2437	-18.38	3.01	0.2	-15.17	7.99	Pass
	9	2452	-20.57	3.01	0.2	-17.36	7.99	Pass
1	3	2422	-20.67	3.01	0.2	-17.46	7.99	Pass
	6	2437	-18.89	3.01	0.2	-15.68	7.99	Pass
	9	2452	-20.93	3.01	0.2	-17.72	7.99	Pass

NOTE:

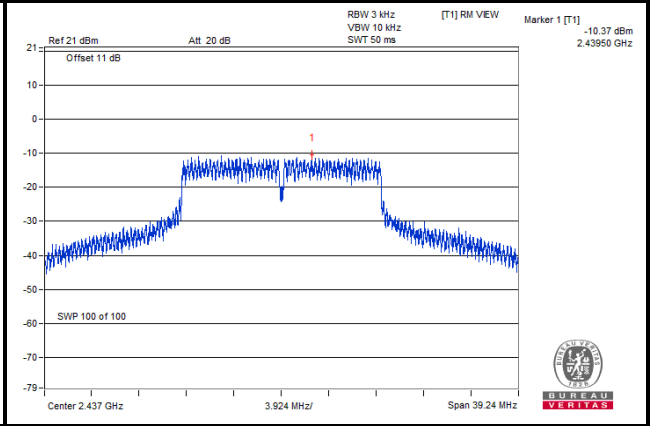
1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. Directional gain = 6.01 dBi > 6dBi, so the power density limit shall be reduced to 8-(6.01-6) = 7.99dBm/3kHz.

Spectrum Plot of Worst Value

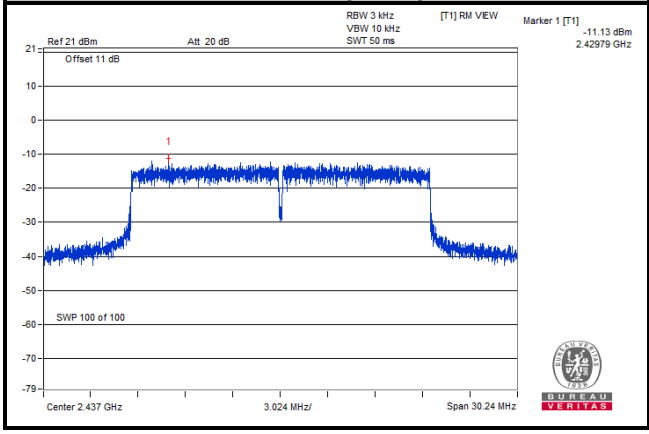
802.11b



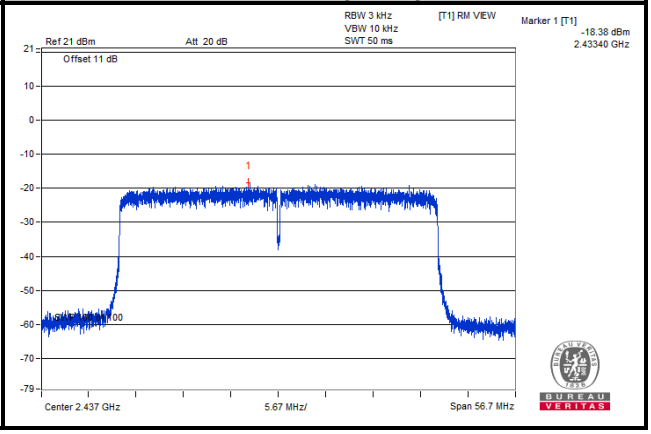
802.11g



802.11ax (HE20)



802.11ax (HE40)

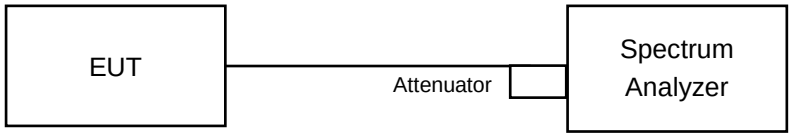


4.7 Conducted Out of Band Emission Measurement

4.7.1 Limits of Conducted Out of Band Emission Measurement

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

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 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.

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

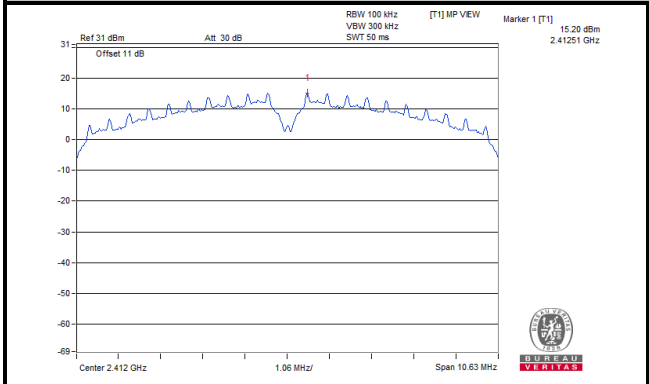
4.7.7 Test Results

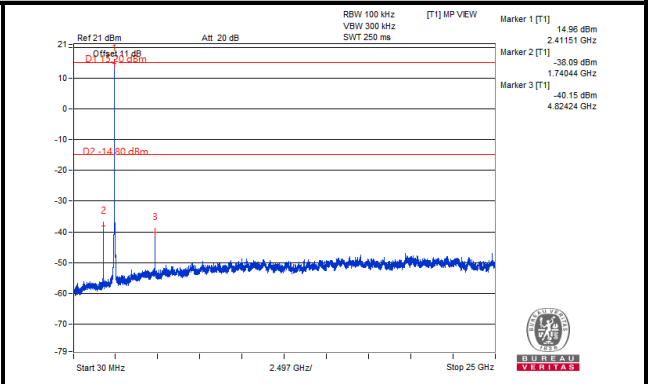
The spectrum plots are attached on the following images. D1 line indicates the highest level, and D2 line indicates the 30 dB offset below D1. It shows compliance with the requirement.

802.11b

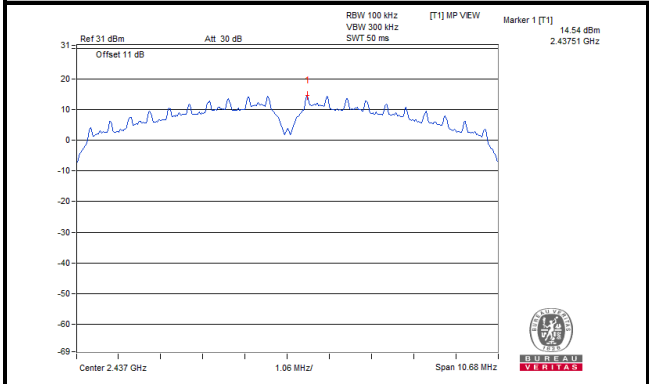
CHAIN 0

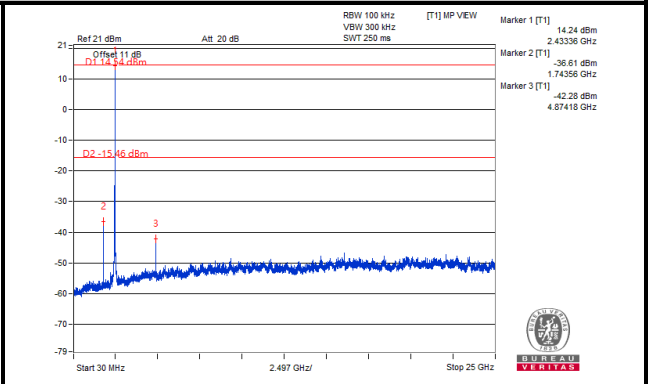
Ch 1



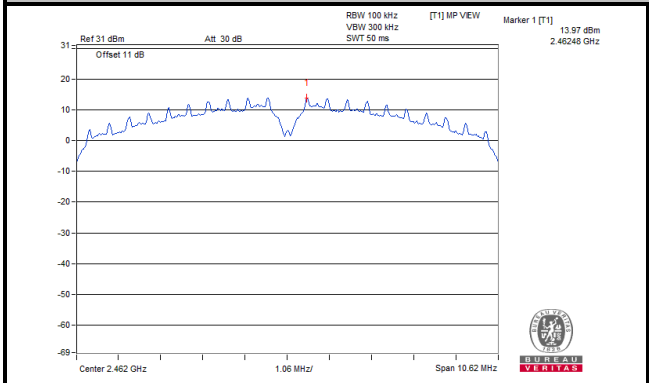


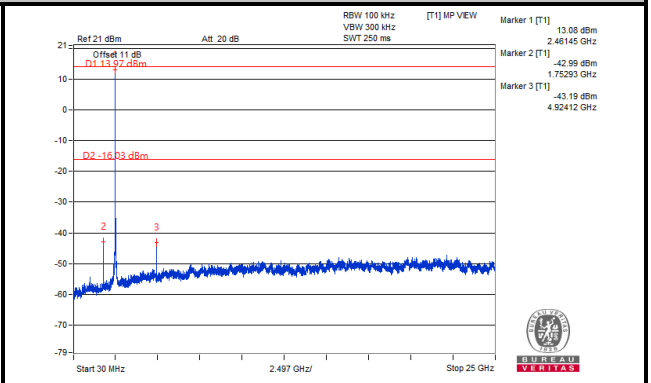
Ch 6



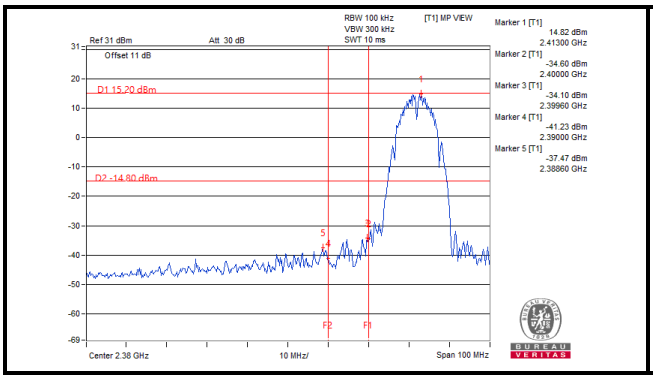


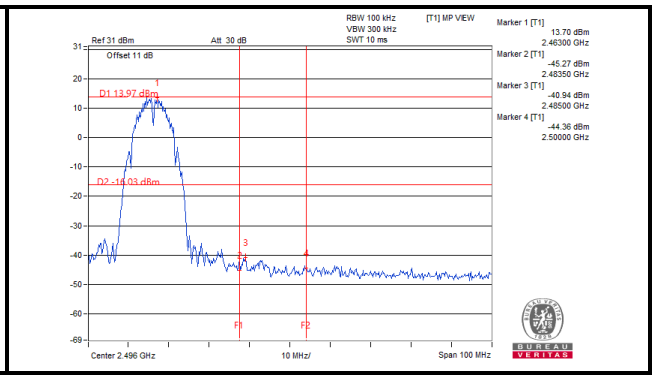
Ch 11





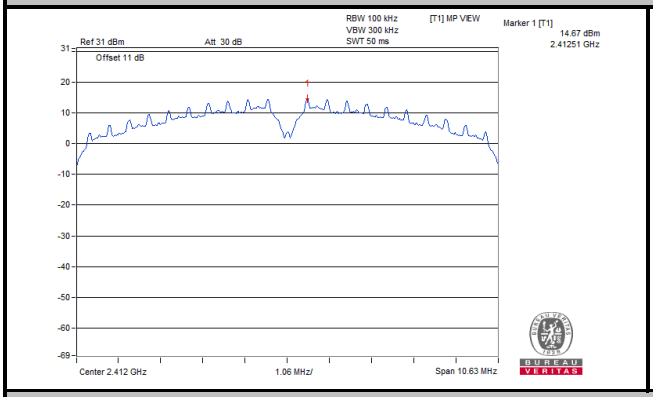
Ch 1 Band Edge	Ch 11 Band Edge

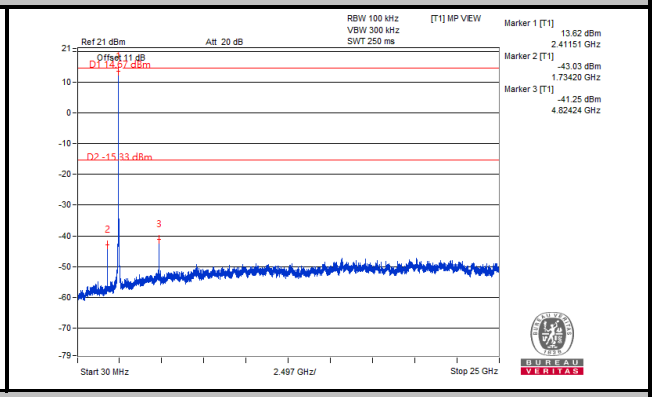




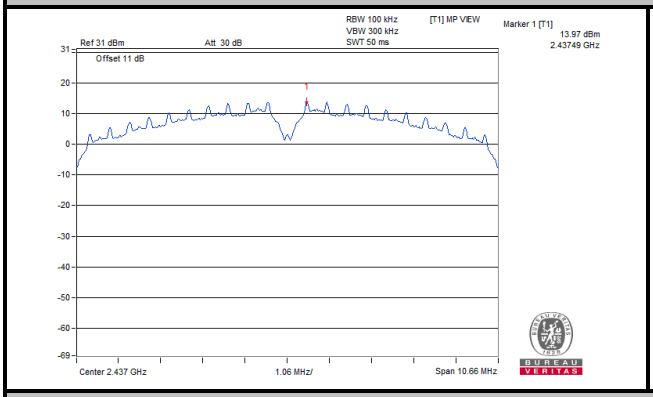
CHAIN 1

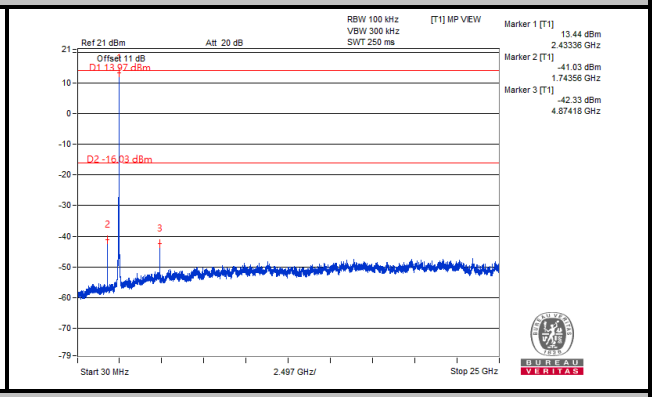
Ch 1



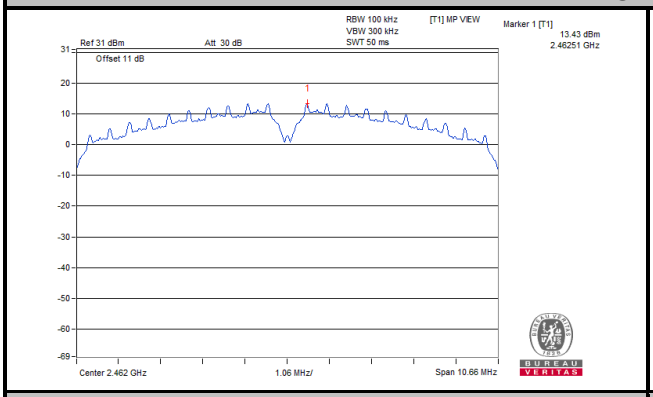


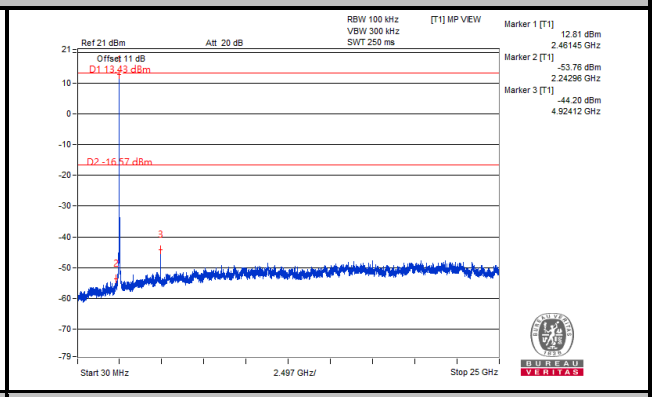
Ch 6



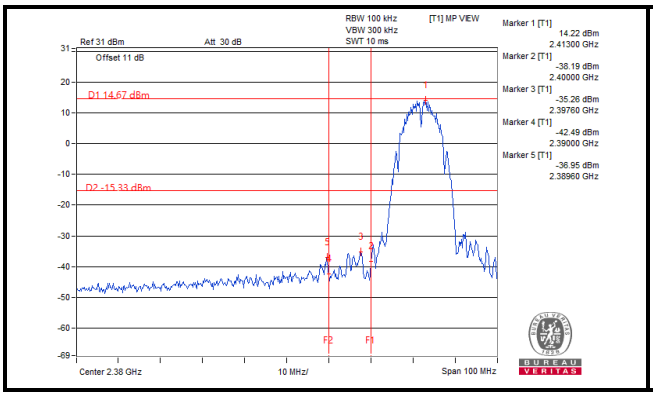


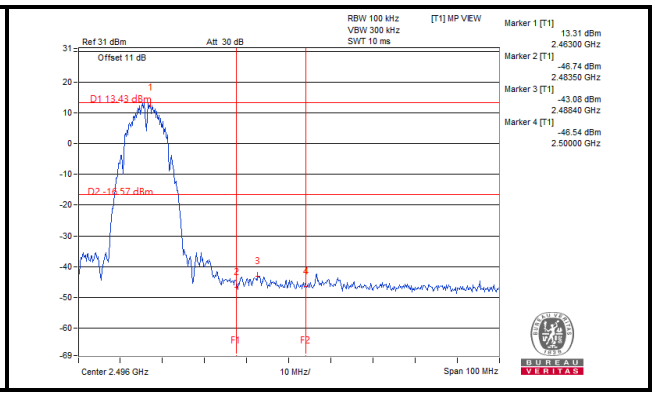
Ch 11





Ch 1 Band Edge	Ch 11 Band Edge

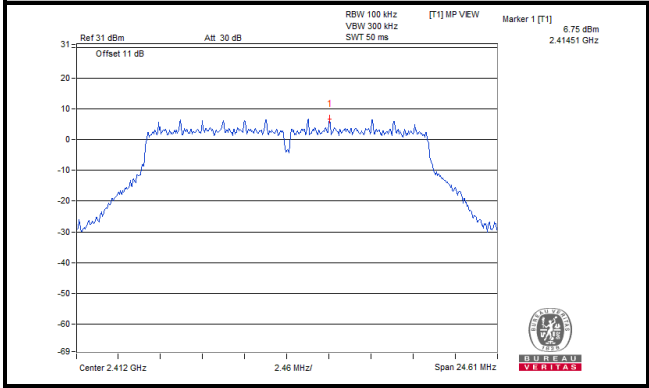

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MP VIEW
Ref 31 dBm
Att 30 dB
Offset 11 dB
D1 14.67 dBm
D2 -15.33 dBm
Marker 1 [T1]
14.22 dBm
2.41300 GHz
Marker 2 [T1]
-38.19 dBm
2.40000 GHz
Marker 3 [T1]
-35.26 dBm
2.39760 GHz
Marker 4 [T1]
-42.49 dBm
2.39000 GHz
Marker 5 [T1]
-36.95 dBm
2.38960 GHz
Center 2.38 GHz
10 MHz/
Span 100 MHz

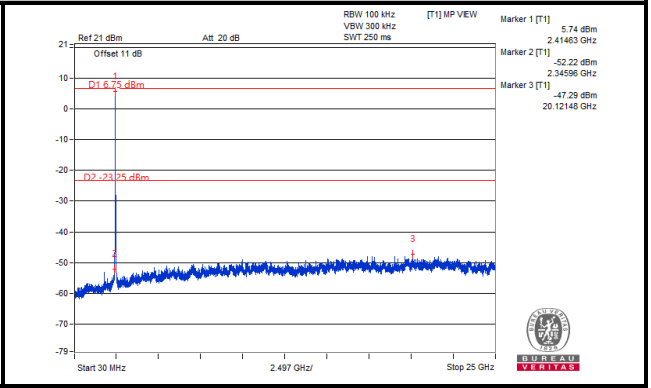

RBW 100 kHz
VBW 300 kHz
SWT 10 ms
[T1] MP VIEW
Ref 31 dBm
Att 30 dB
Offset 11 dB
D1 13.43 dBm
D2 -16.57 dBm
Marker 1 [T1]
13.31 dBm
2.46300 GHz
Marker 2 [T1]
-46.74 dBm
2.48350 GHz
Marker 3 [T1]
-43.08 dBm
2.48840 GHz
Marker 4 [T1]
-46.54 dBm
2.50000 GHz
Center 2.496 GHz
10 MHz/
Span 100 MHz

802.11g

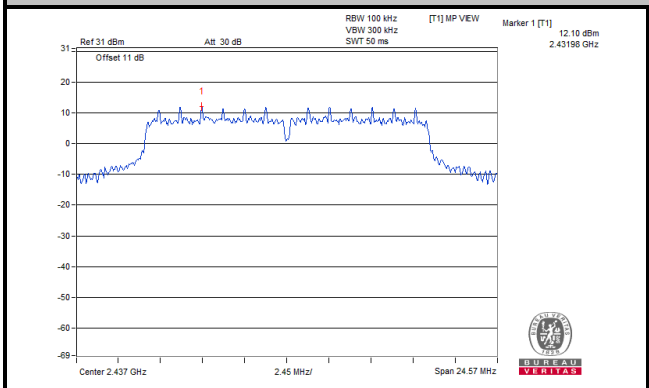
CHAIN 0

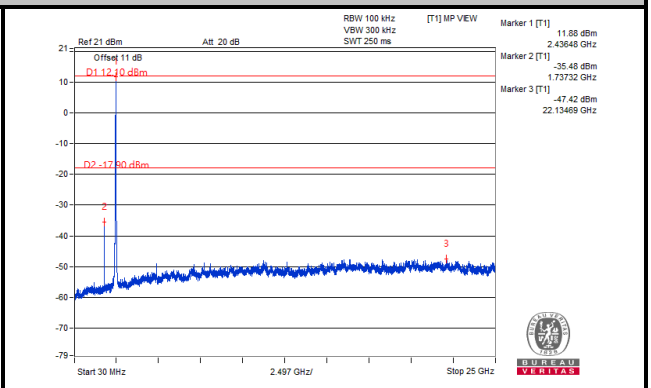
Ch 1



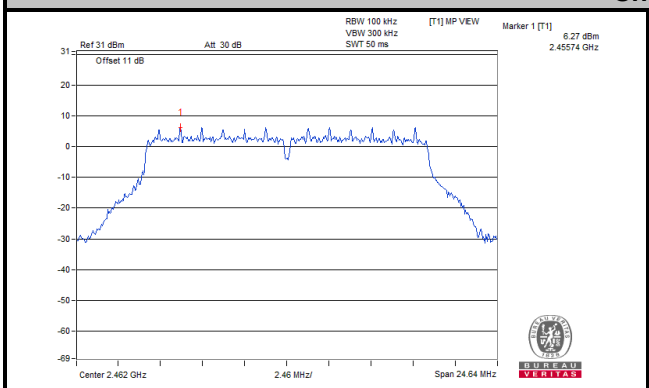


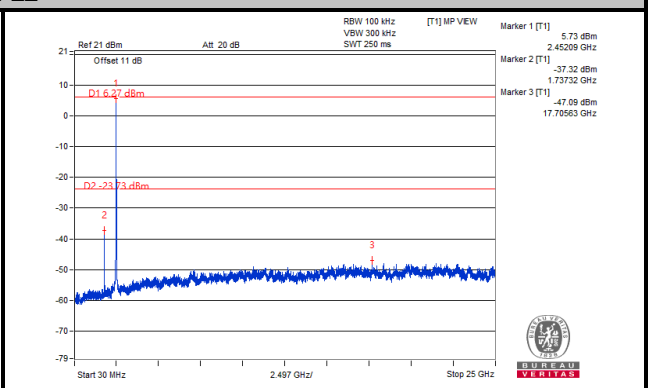
Ch 6



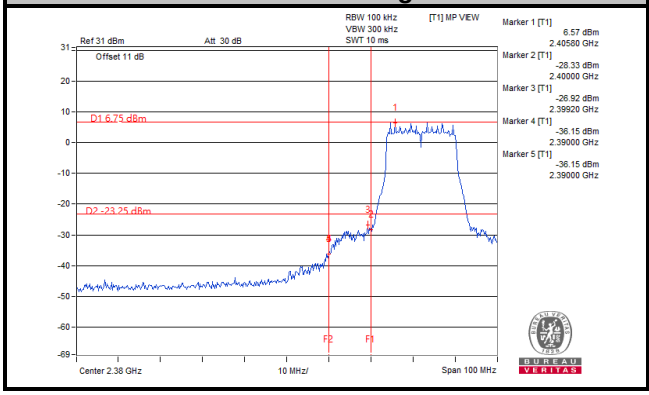


Ch 11

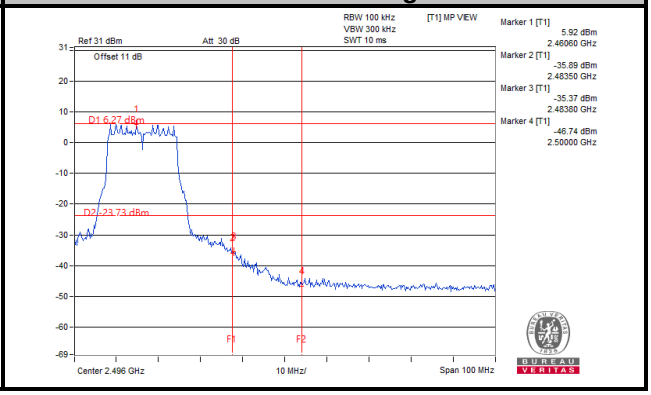




Ch 1 Band Edge

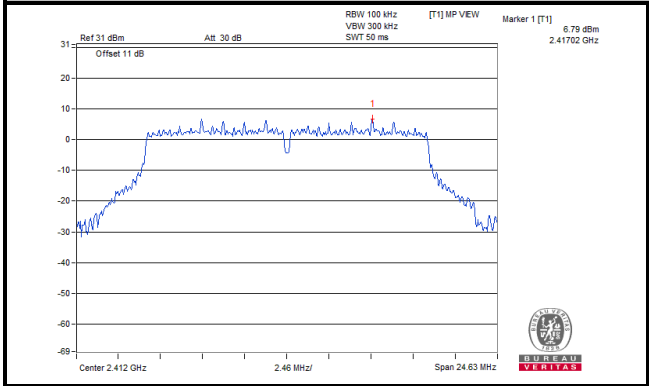


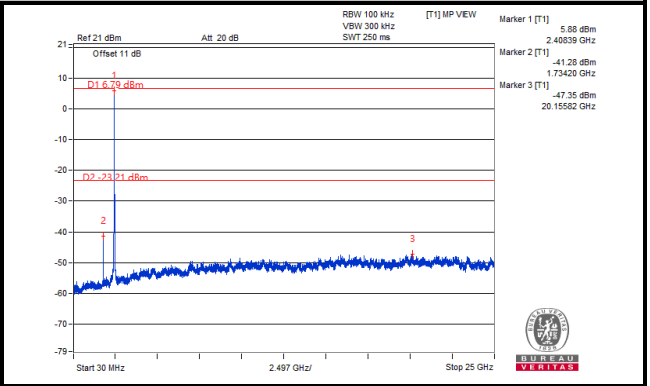
Ch 11 Band Edge



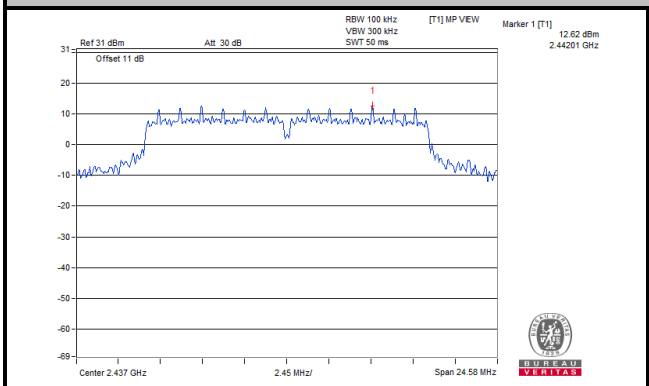
CHAIN 1

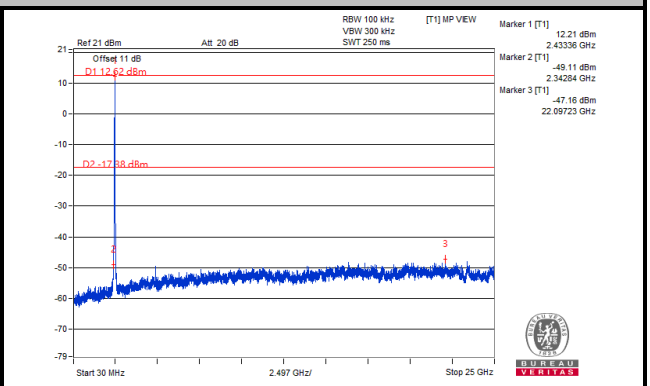
Ch 1



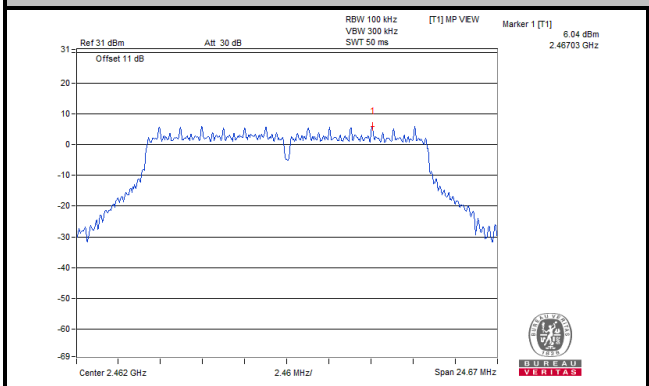


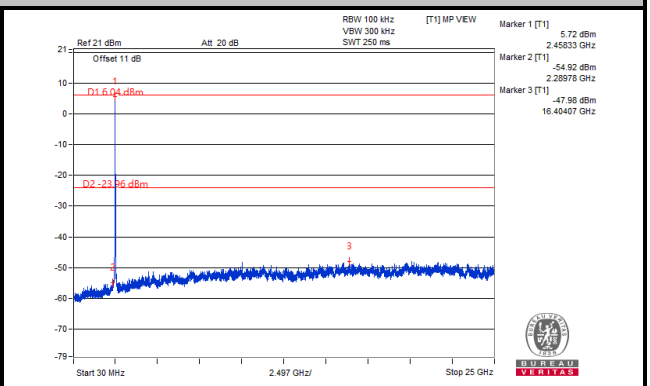
Ch 6



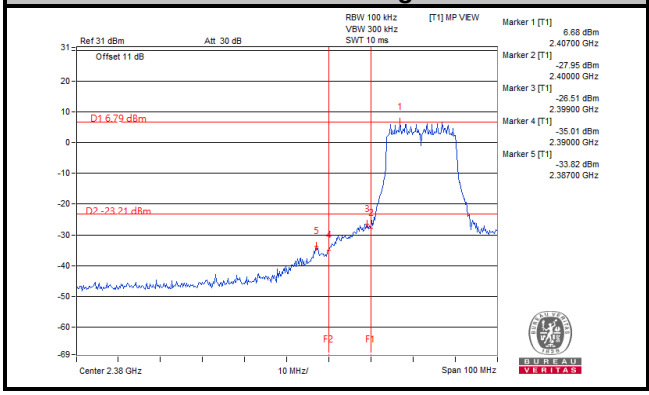


Ch 11

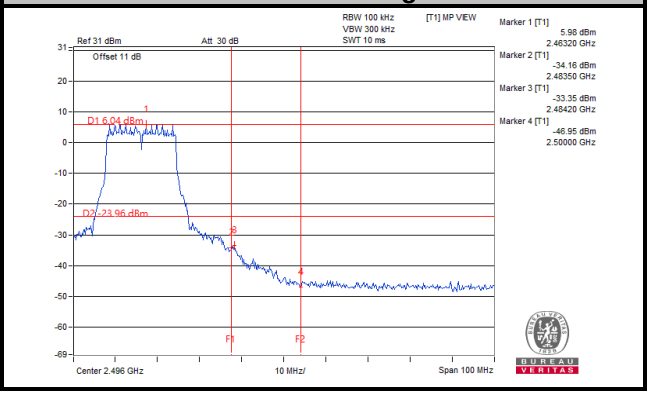




Ch 1 Band Edge



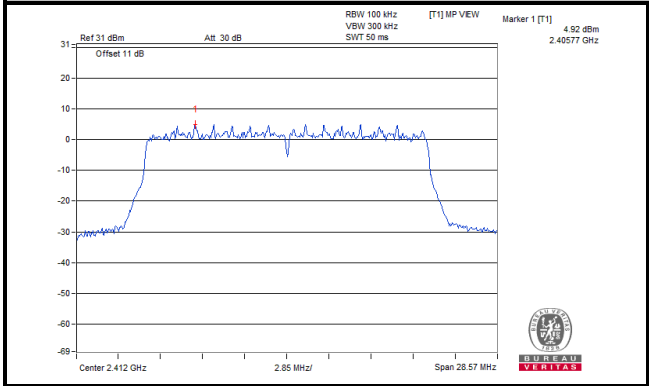
Ch 11 Band Edge

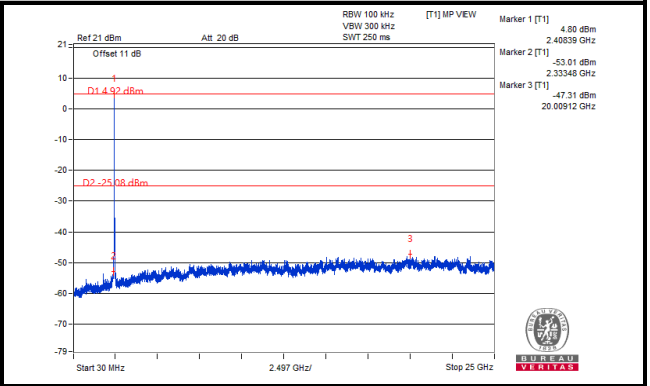


802.11ax (HE20)

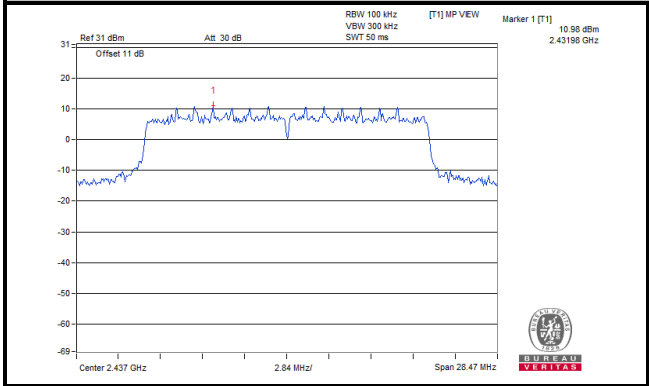
CHAIN 0

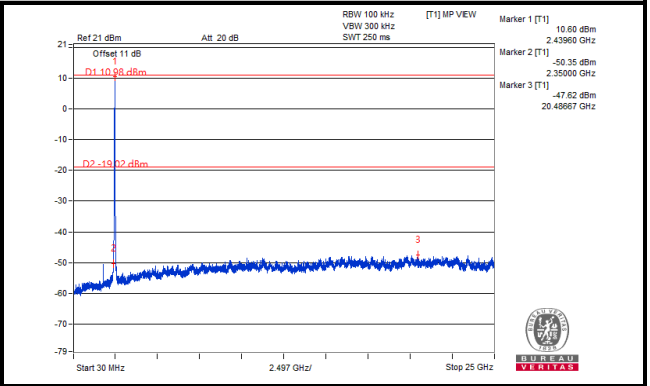
Ch 1



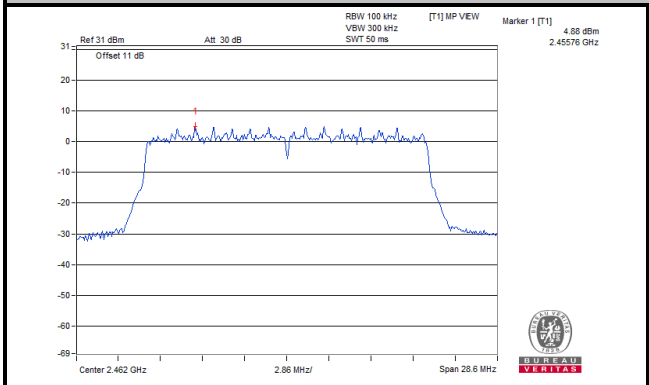


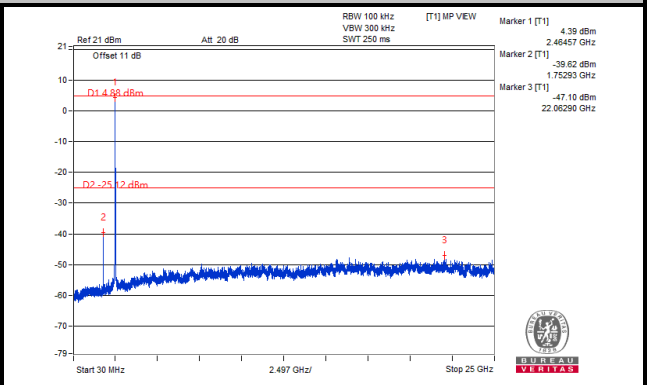
Ch 6



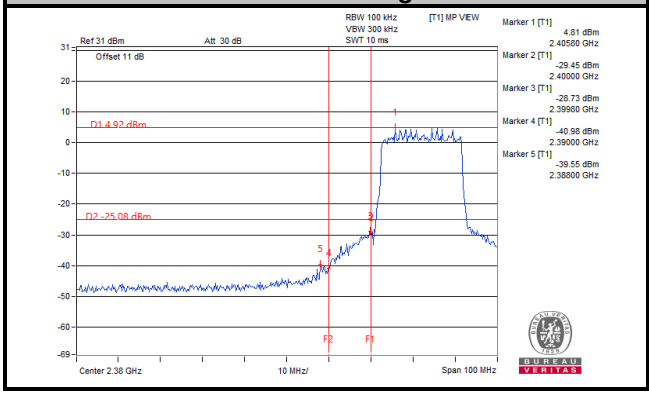


Ch 11





Ch 1 Band Edge



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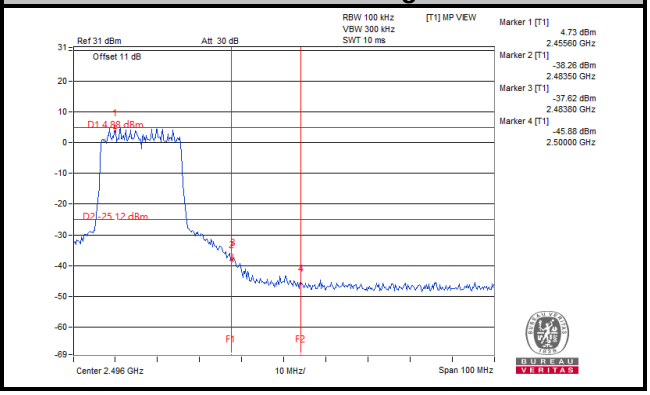
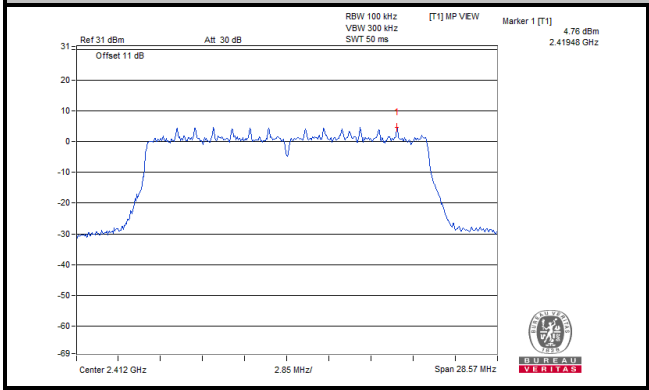
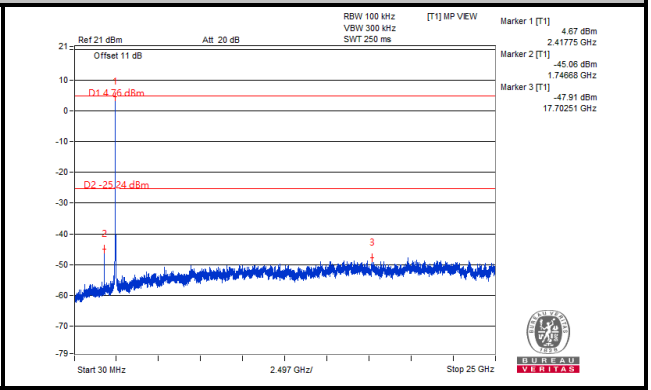


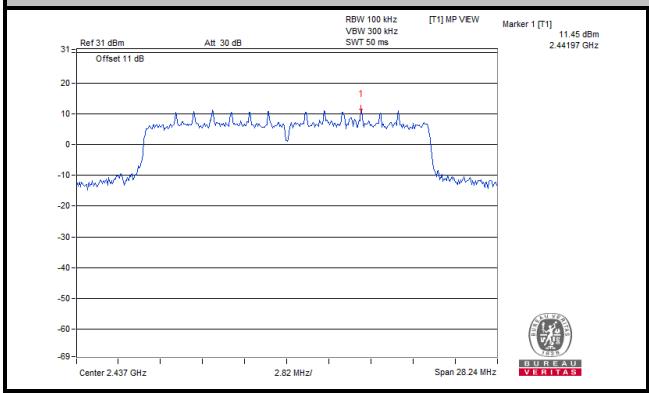
CHAIN 1

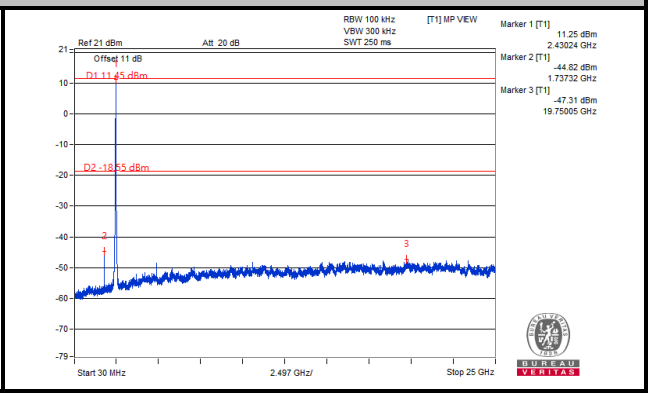
Ch 1



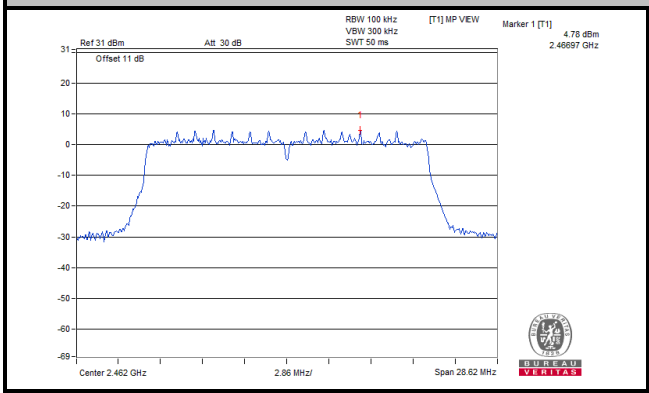


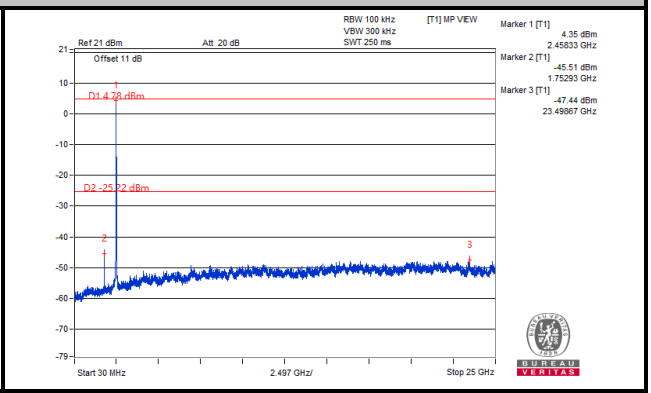
Ch 6



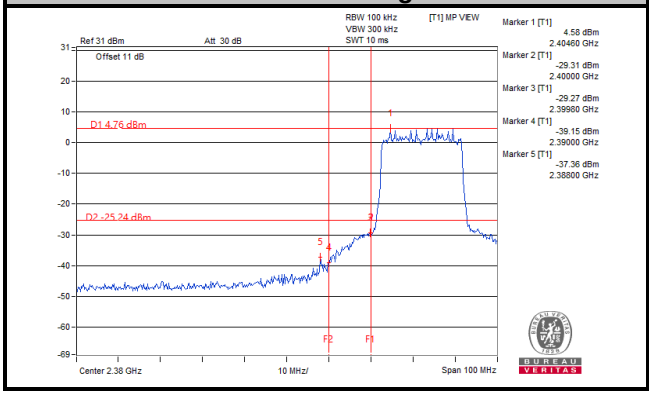


Ch 11

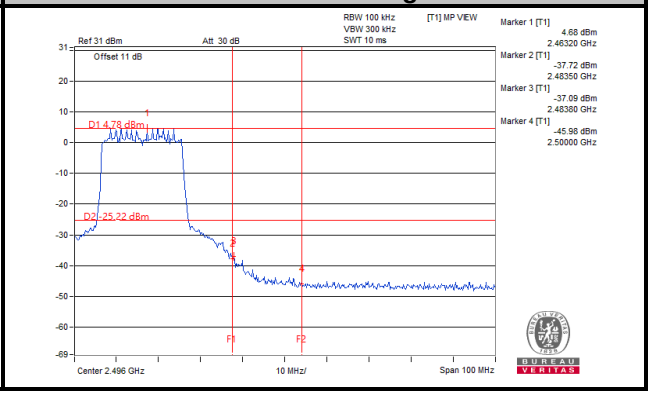




Ch 1 Band Edge



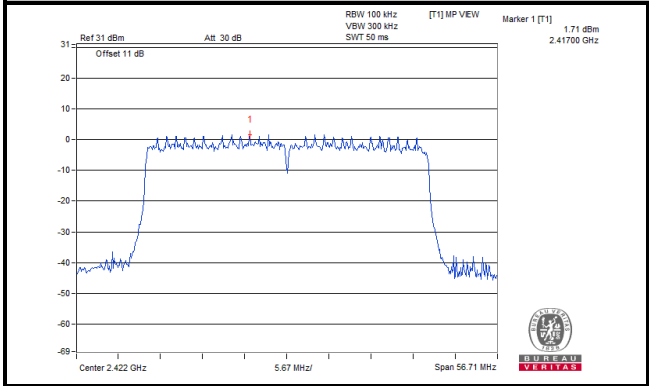
Ch 11 Band Edge

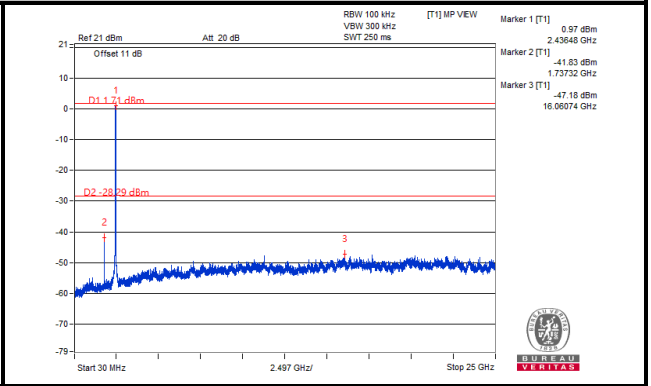


802.11ax (HE40)

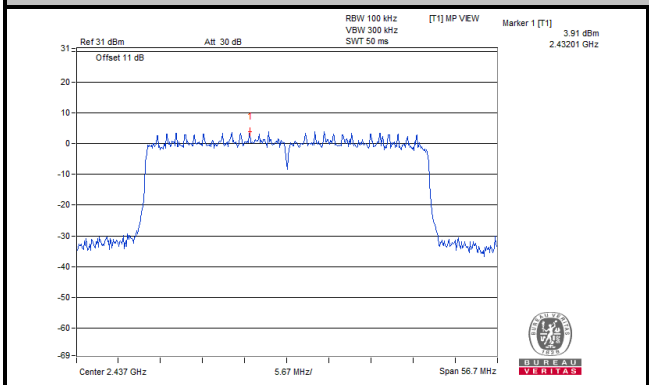
CHAIN 0

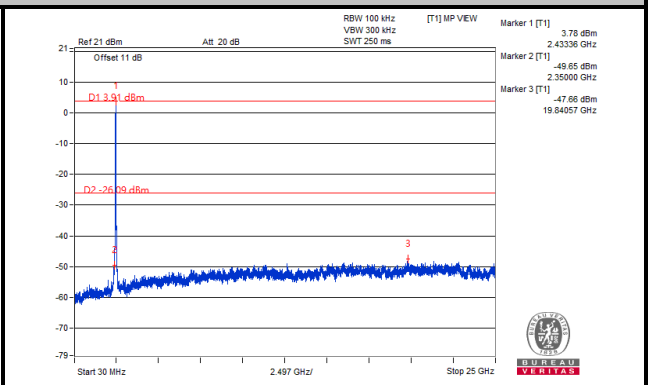
Ch 3



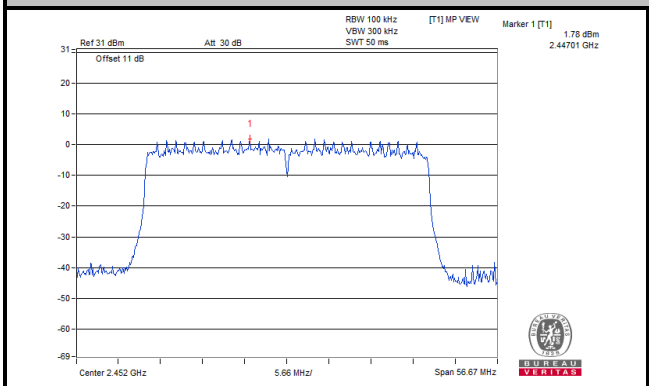


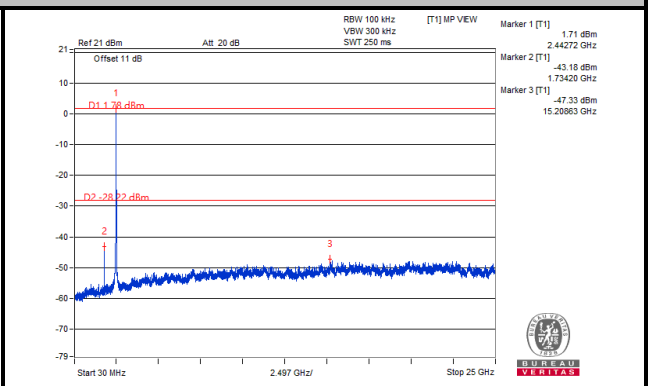
Ch 6



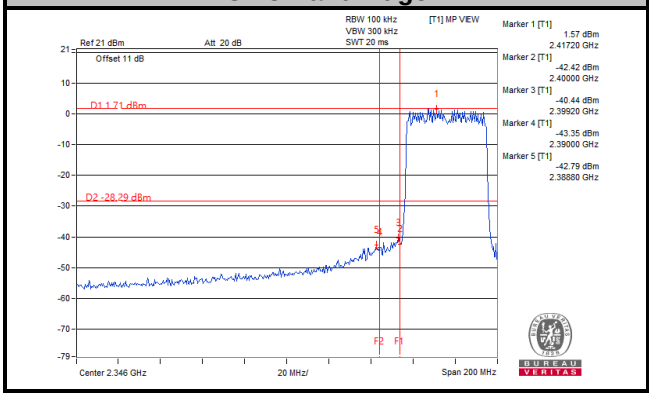


Ch 9

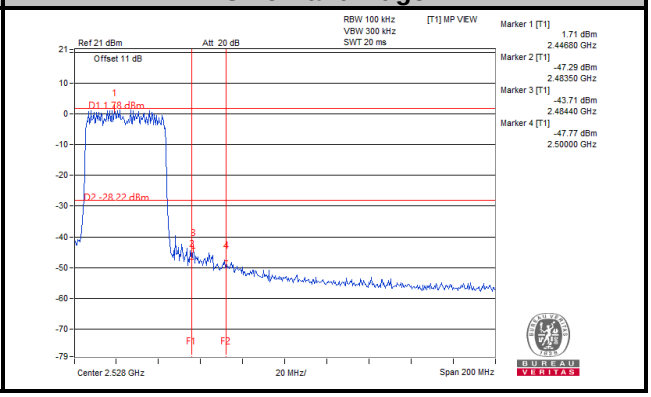




Ch 3 Band Edge

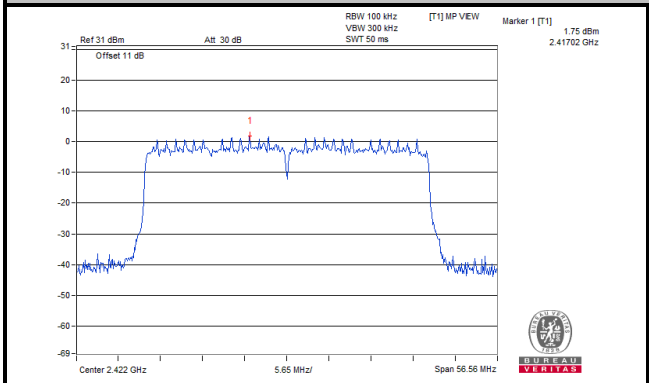


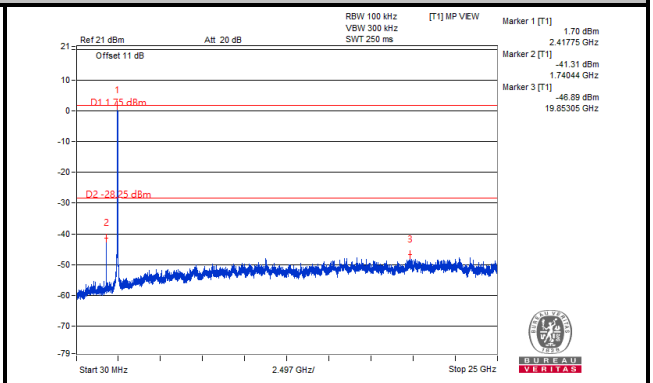
Ch 9 Band Edge



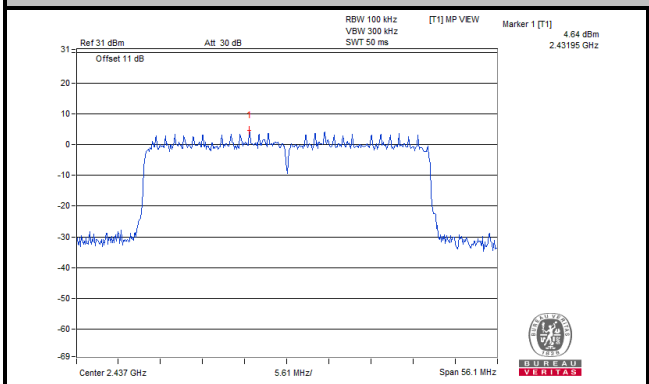
CHAIN 1

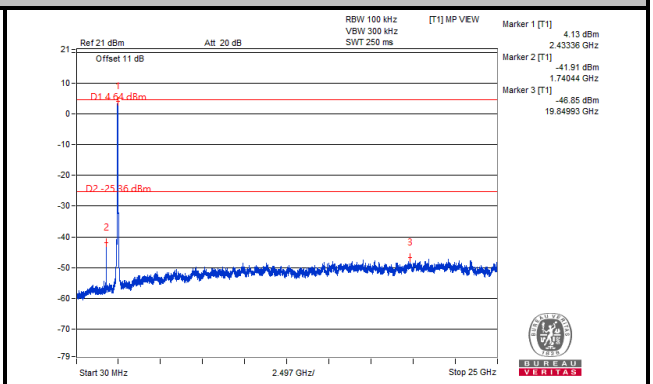
Ch 3



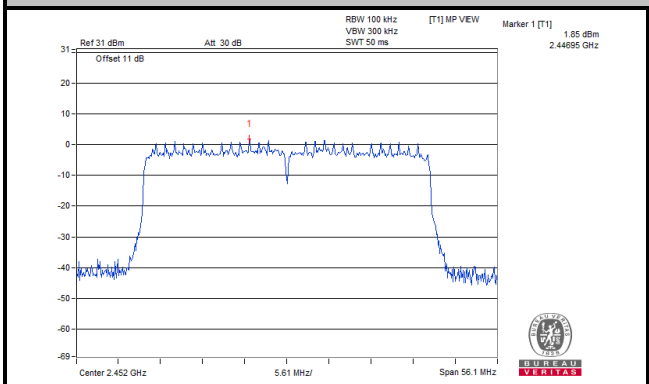


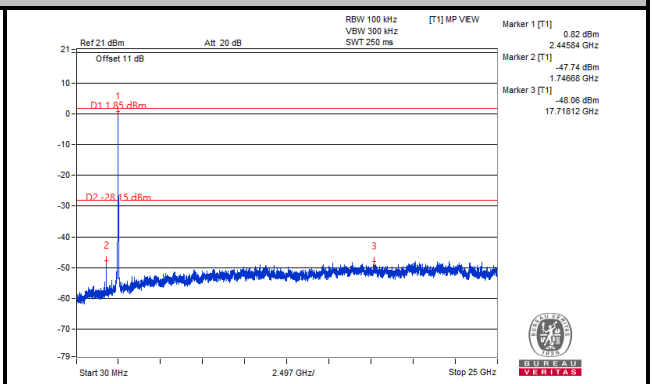
Ch 6



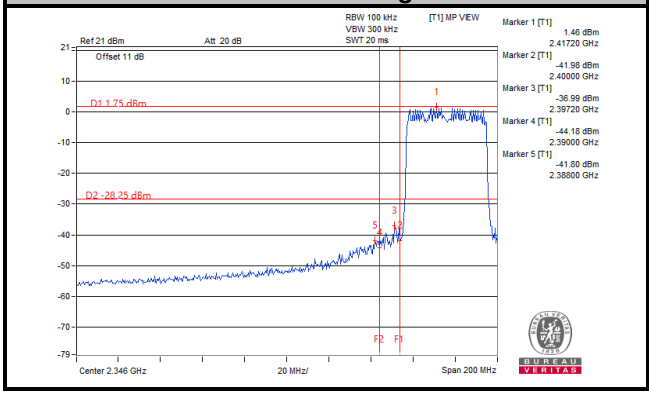


Ch 9

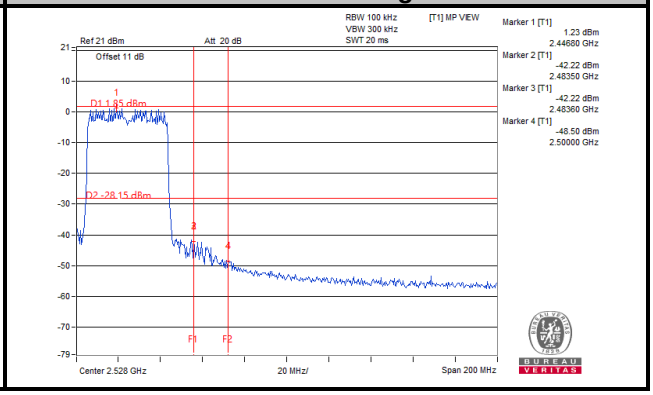




Ch 3 Band Edge



Ch 9 Band Edge



5 Pictures of Test Arrangements

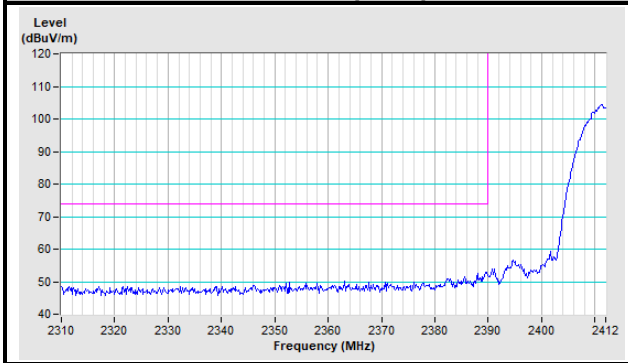
Please refer to the attached file (Test Setup Photo).

Annex A- Band-edge measurement

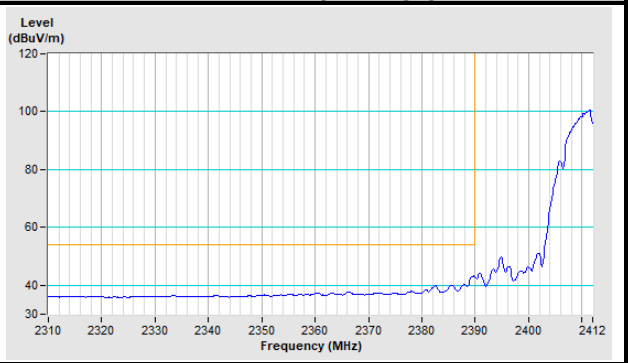
802.11b

Channel 1

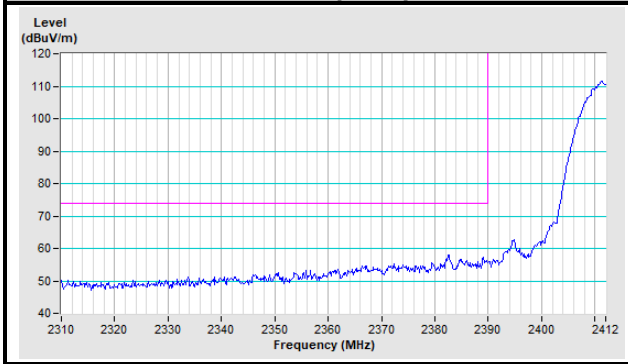
Horizontal (Peak)



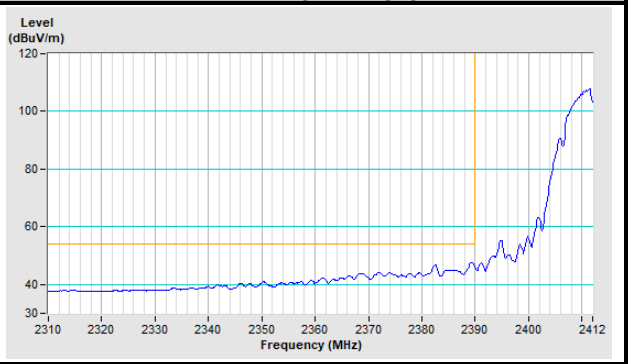
Horizontal (Average)



Vertical (Peak)

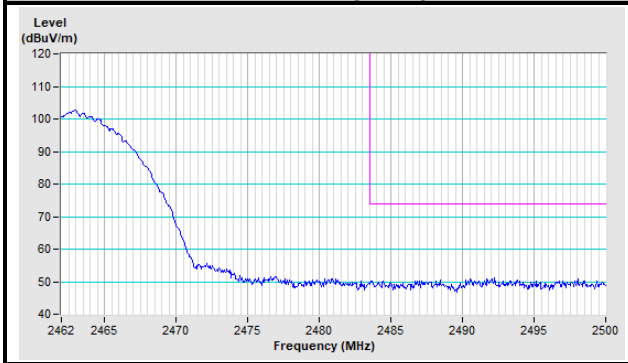


Vertical (Average)

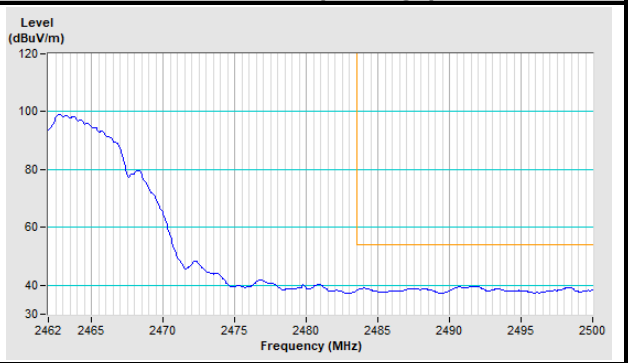


Channel 11

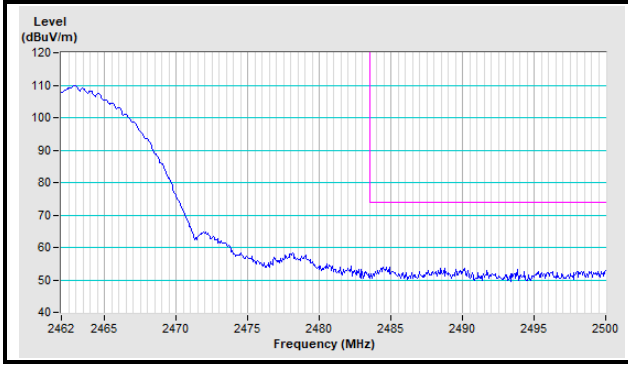
Horizontal (Peak)



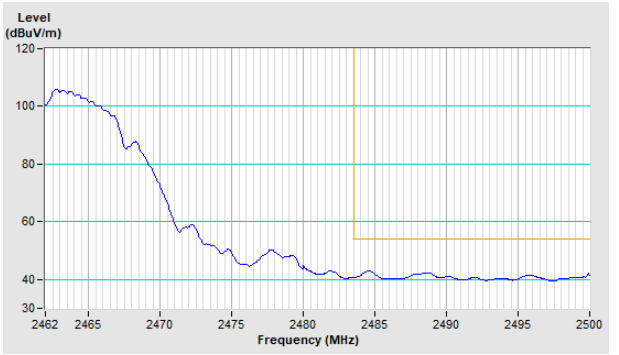
Horizontal (Average)



Vertical (Peak)



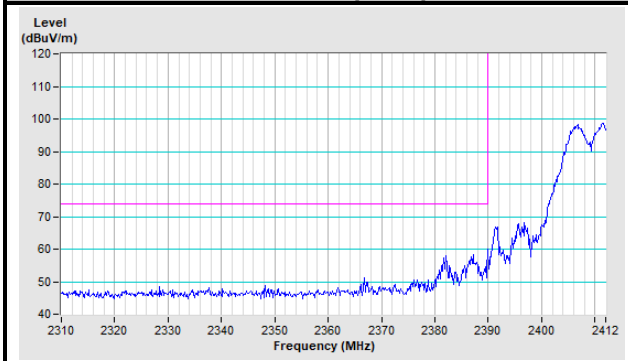
Vertical (Average)



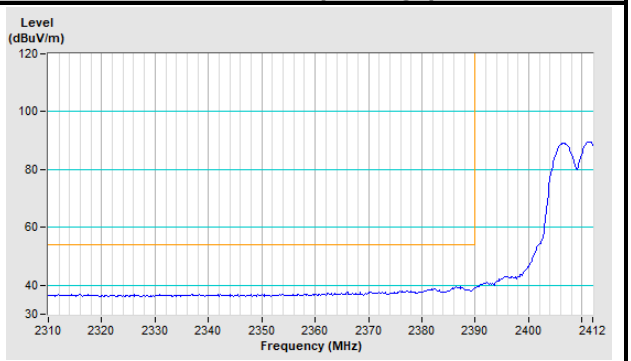
802.11g

Channel 1

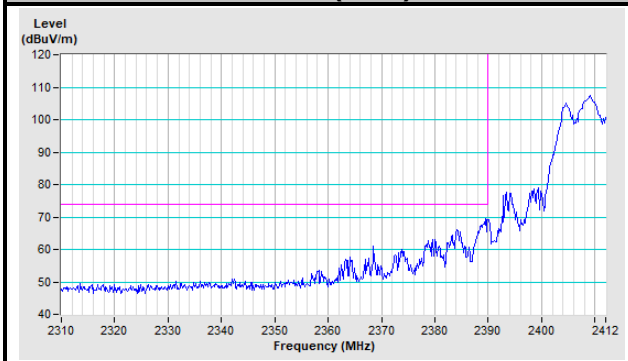
Horizontal (Peak)



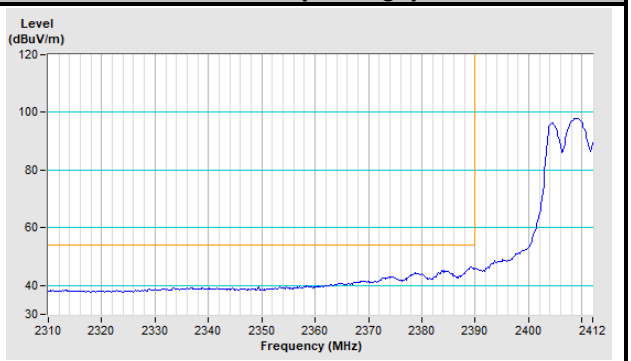
Horizontal (Average)



Vertical (Peak)

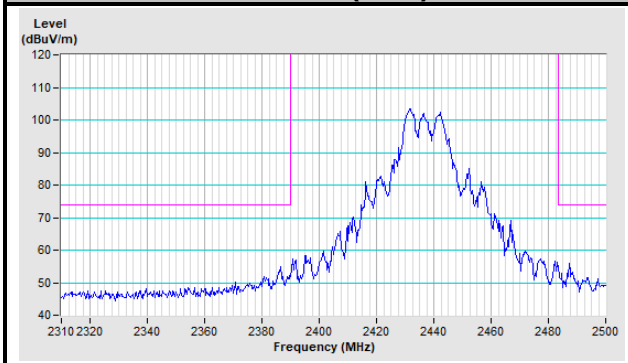


Vertical (Average)

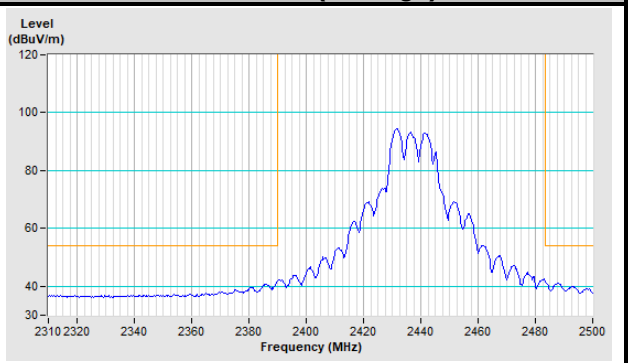


Channel 6

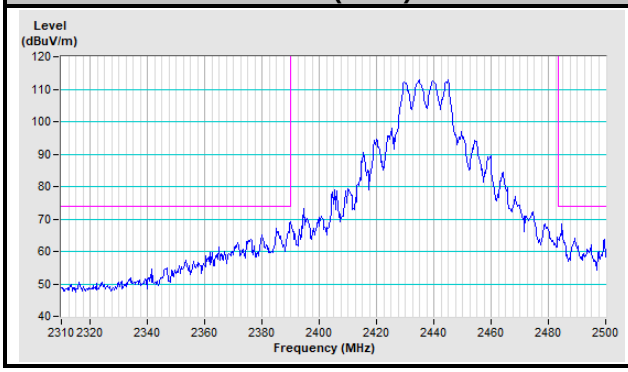
Horizontal (Peak)



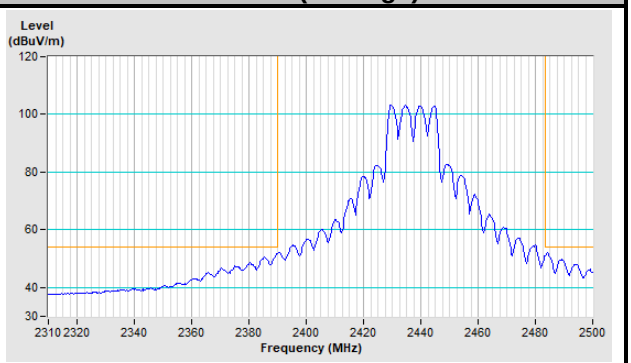
Horizontal (Average)

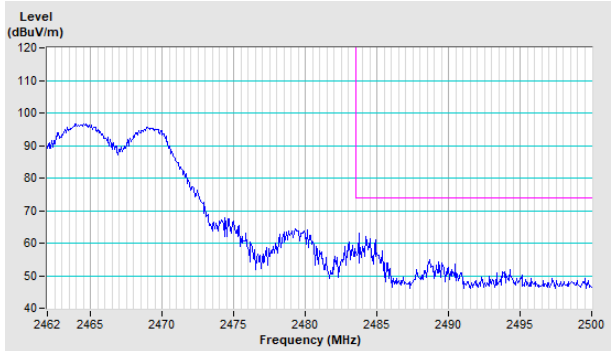
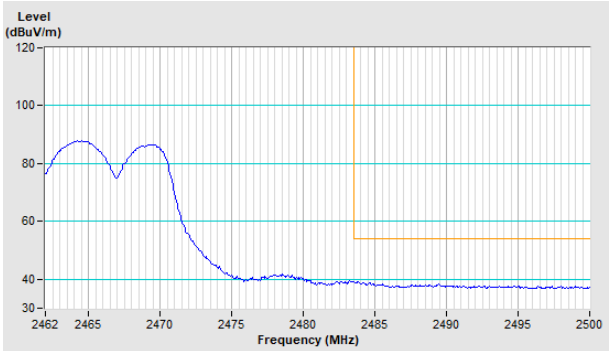
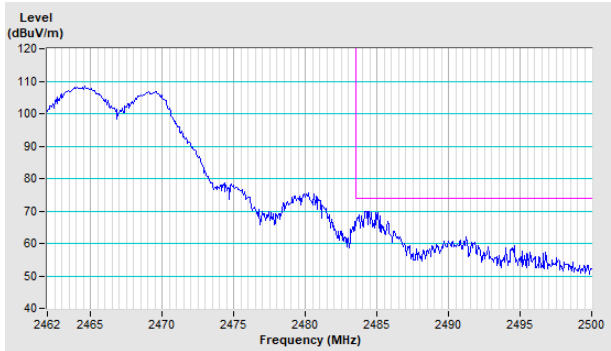
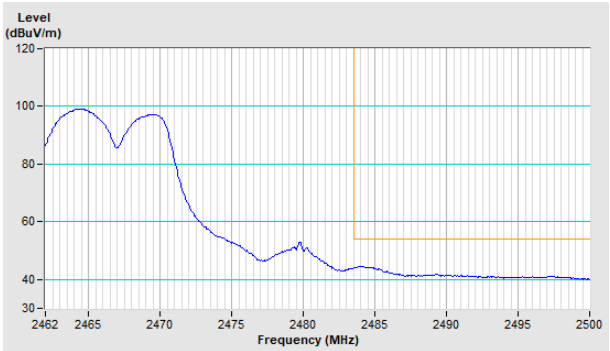


Vertical (Peak)



Vertical (Average)

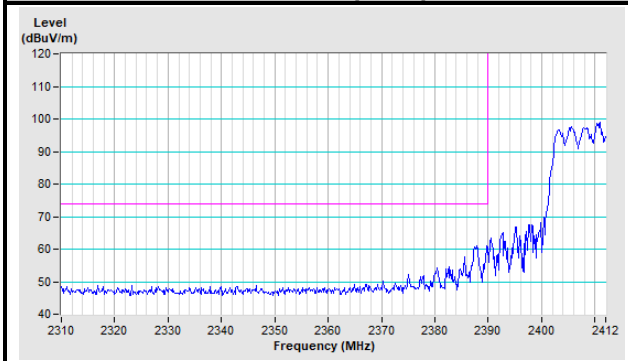


Channel 11	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

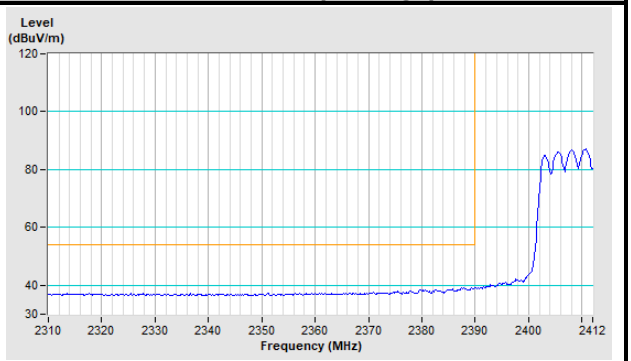
802.11ax (HE20)

Channel 1

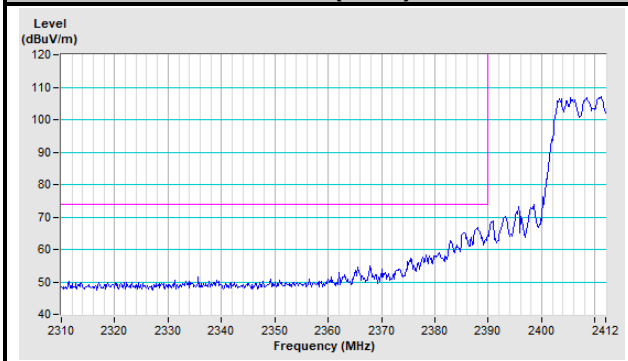
Horizontal (Peak)



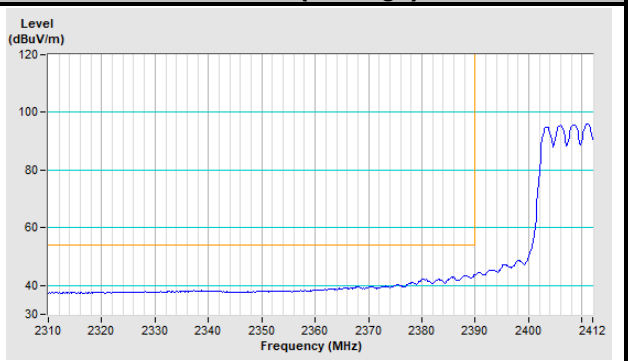
Horizontal (Average)



Vertical (Peak)

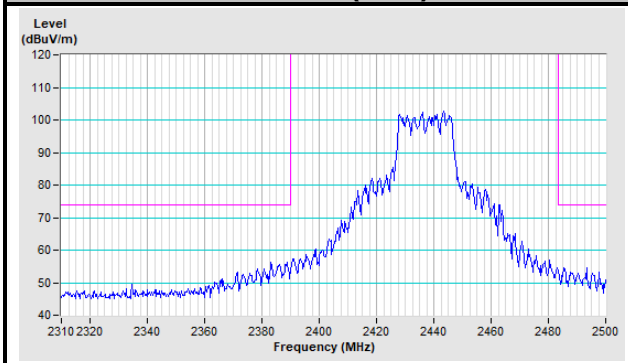


Vertical (Average)

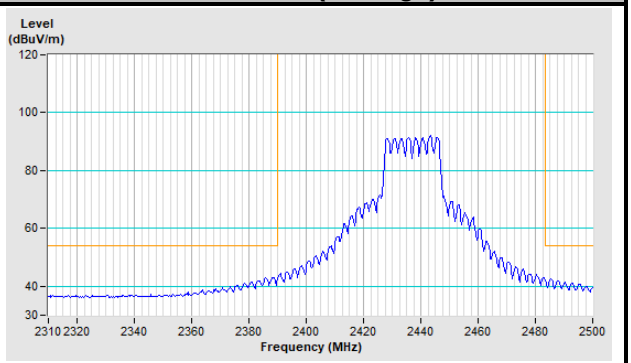


Channel 6

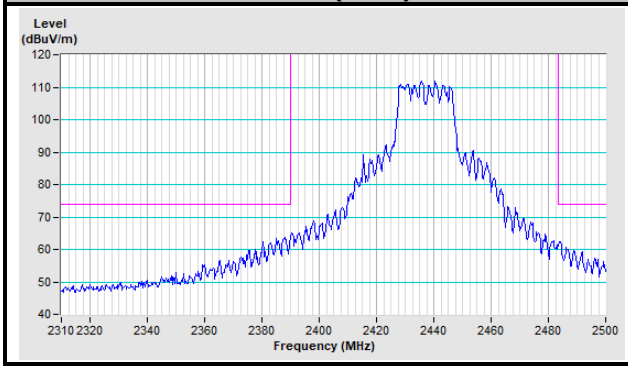
Horizontal (Peak)



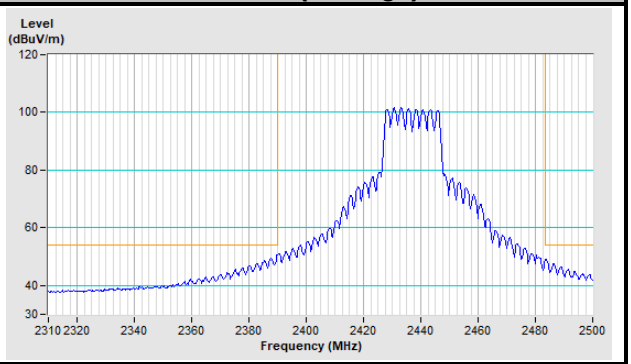
Horizontal (Average)

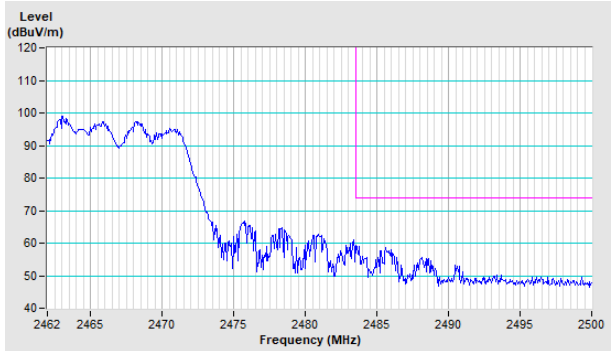
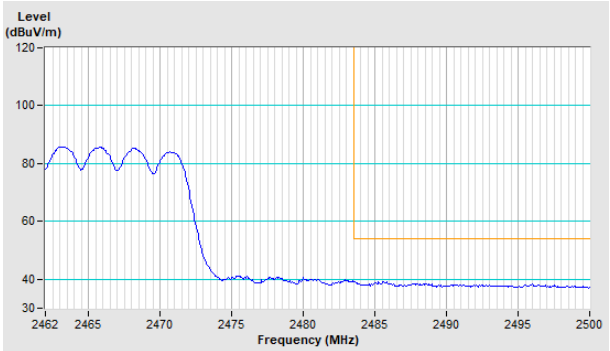
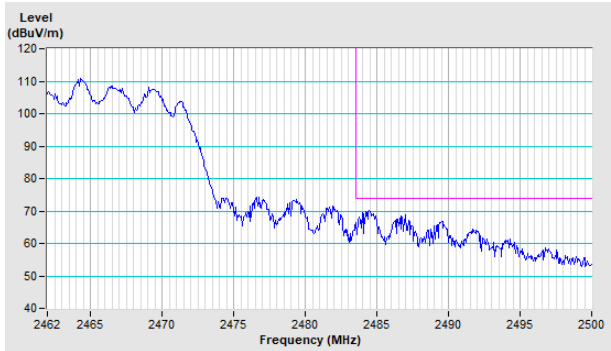
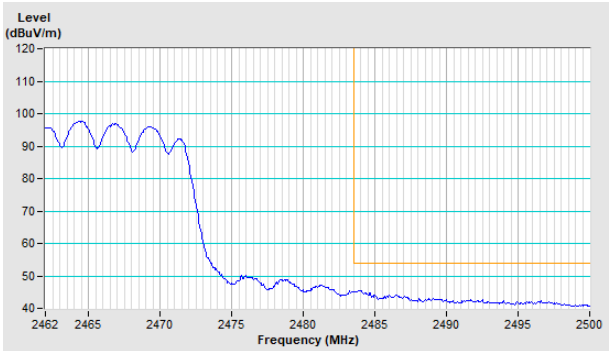


Vertical (Peak)



Vertical (Average)

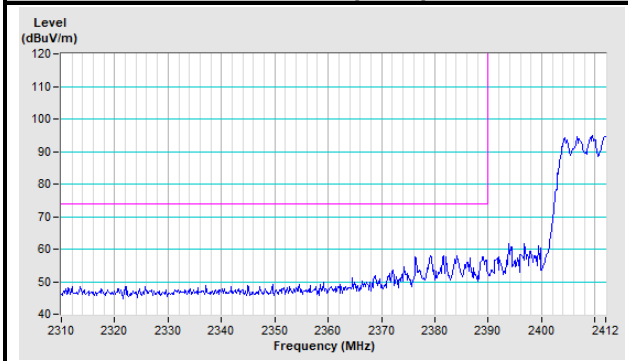


Channel 11	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

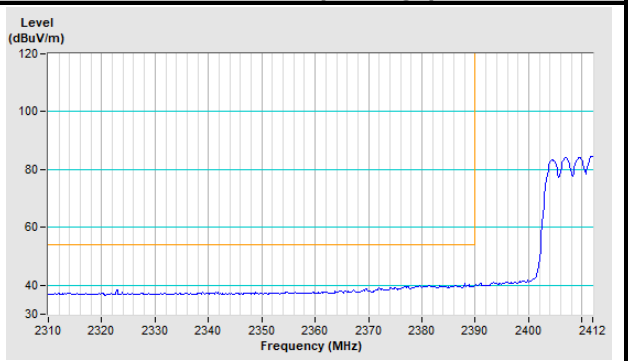
802.11ax (HE40)

Channel 3

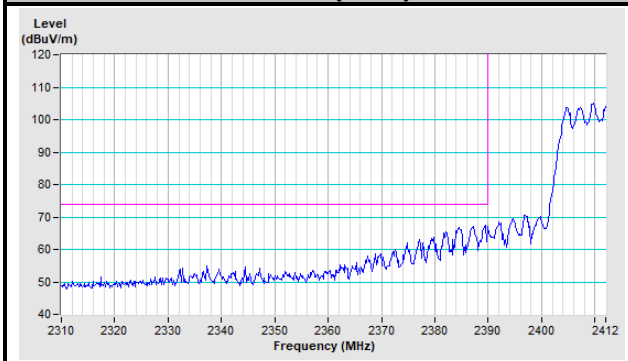
Horizontal (Peak)



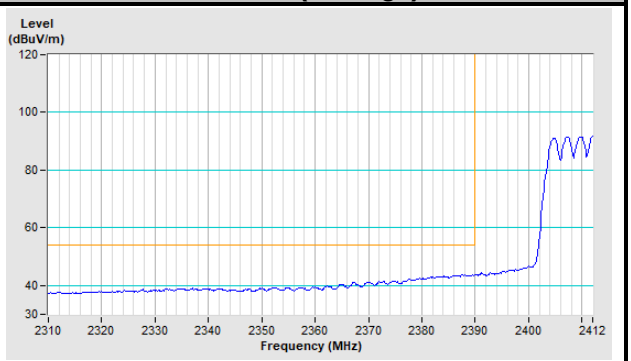
Horizontal (Average)



Vertical (Peak)

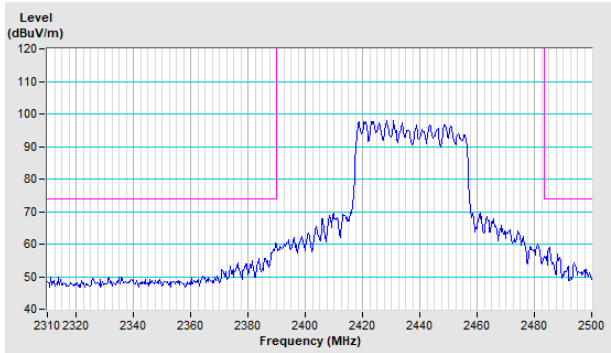


Vertical (Average)

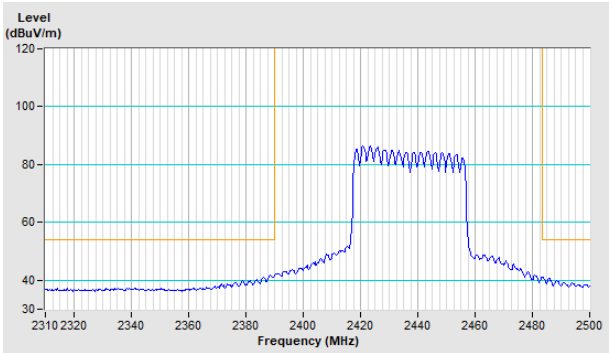


Channel 6

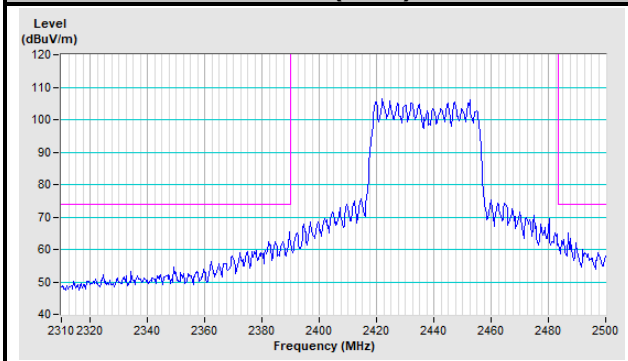
Horizontal (Peak)



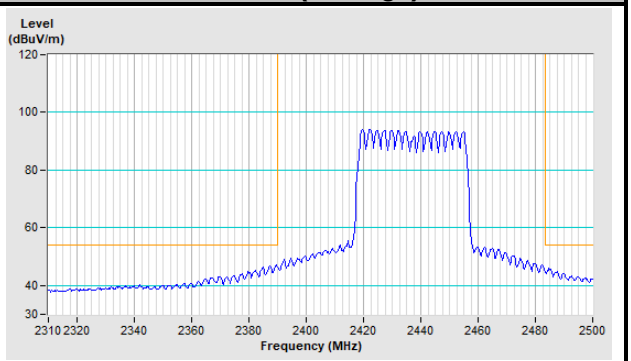
Horizontal (Average)

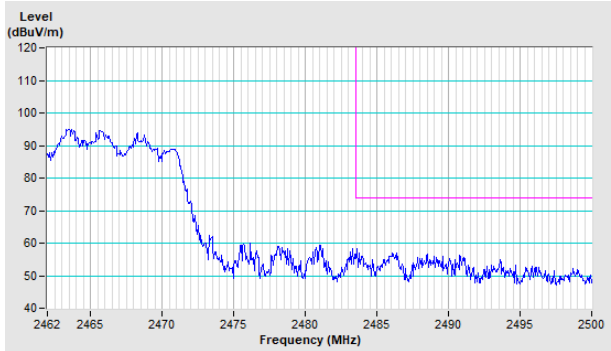
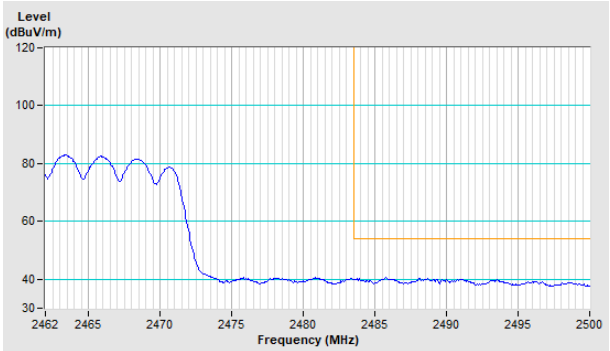
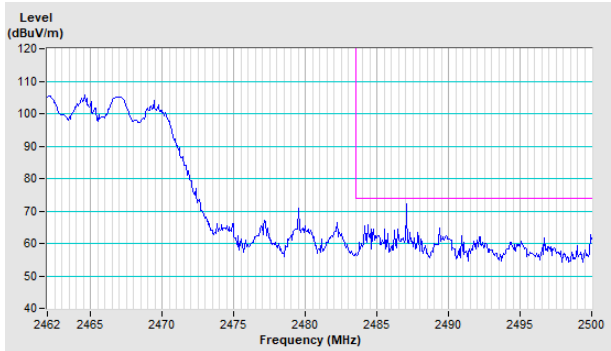
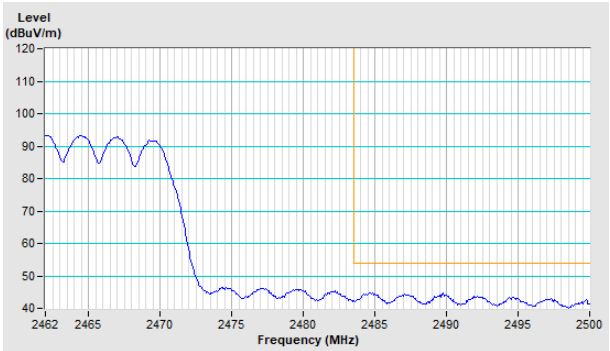


Vertical (Peak)



Vertical (Average)



Channel 9	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

Appendix – Information of the Testing Laboratories

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

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

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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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