

FCC Test Report

Report No.: RFBEBW-WTW-P21020566

FCC ID: KA2WAX1850A1

Test Model: DWA-X1850

Received Date: Feb. 25, 2021

Test Date: Mar. 09 ~ Jun. 18, 2021

Issued Date: Jul. 01, 2021

Applicant: D-Link Corporation

Address: 14420 Myford Road Suite 100 Irvine, California United States 92606

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

**FCC Registration /
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	8
3.2.1 Test Mode Applicability and Tested Channel Detail	9
3.3 Duty Cycle of Test Signal	11
3.4 Description of Support Units	12
3.4.1 Configuration of System under Test	12
3.5 General Description of Applied Standards and References	12
4 Test Types and Results	13
4.1 Radiated Emission and Bandedge Measurement	13
4.1.1 Limits of Radiated Emission and Bandedge Measurement	13
4.1.2 Test Instruments	14
4.1.3 Test Procedures	15
4.1.4 Deviation from Test Standard	16
4.1.5 Test Set Up	16
4.1.6 EUT Operating Conditions	17
4.1.7 Test Results	18
4.2 Conducted Emission Measurement	32
4.2.1 Limits of Conducted Emission Measurement	32
4.2.2 Test Instruments	32
4.2.3 Test Procedures	33
4.2.4 Deviation from Test Standard	33
4.2.5 Test Setup	33
4.2.6 EUT Operating Conditions	33
4.2.7 Test Results	34
4.3 6 dB Bandwidth Measurement	36
4.3.1 Limits of 6 dB Bandwidth Measurement	36
4.3.2 Test Setup	36
4.3.3 Test Instruments	36
4.3.4 Test Procedure	36
4.3.5 Deviation from Test Standard	36
4.3.6 EUT Operating Conditions	36
4.3.7 Test Results	37
4.4 Occupied Bandwidth Measurement	39
4.4.1 Test Setup	39
4.4.2 Test Instruments	39
4.4.3 Test Procedure	39
4.4.4 Deviation from Test Standard	39
4.4.5 EUT Operating Conditions	39
4.4.6 Test Results	40
4.5 Conducted Output Power Measurement	42
4.5.1 Limits of Conducted Output Power Measurement	42
4.5.2 Test Setup	42
4.5.3 Test Instruments	42
4.5.4 Test Procedures	42
4.5.5 Deviation from Test Standard	42
4.5.6 EUT Operating Conditions	42
4.5.7 Test Results	43

4.6	Power Spectral Density Measurement	47
4.6.1	Limits of Power Spectral Density Measurement.....	47
4.6.2	Test Setup.....	47
4.6.3	Test Instruments	47
4.6.4	Test Procedure	47
4.6.5	Deviation from Test Standard	47
4.6.6	EUT Operating Condition	47
4.6.7	Test Results	48
4.7	Conducted Out of Band Emission Measurement	51
4.7.1	Limits of Conducted Out of Band Emission Measurement.....	51
4.7.2	Test Setup.....	51
4.7.3	Test Instruments	51
4.7.4	Test Procedure	51
4.7.5	Deviation from Test Standard	51
4.7.6	EUT Operating Condition	51
4.7.7	Test Results	52
5	Pictures of Test Arrangements.....	68
	Annex A- Band Edge Measurement	69
	Appendix – Information of the Testing Laboratories	74

Release Control Record

Issue No.	Description	Date Issued
RFBEBW-WTW-P21020566	Original Release	Jul. 01, 2021

1 Certificate of Conformity

Product: AX1800 Wi-Fi 6 USB Adapter

Brand: D-Link

Test Model: DWA-X1850

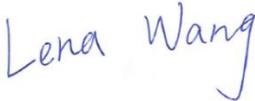
Sample Status: Engineering Sample

Applicant: D-Link Corporation

Test Date: Mar. 09 ~ Jun. 18, 2021

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

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

Prepared by :  , Date: Jul. 01, 2021
Lena Wang / Specialist

Approved by :  , Date: Jul. 01, 2021
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 -11.05 dB at 0.37800 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.2 dB at 4874.00 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:

- 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.
- 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	AX1800 Wi-Fi 6 USB Adapter
Brand	D-Link
Test Model	DWA-X1850
Status of EUT	Engineering Sample
Power Supply Rating	5.0 Vdc (host equipment)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to 400 Mbps 802.11ax: up to 574 Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20), (VHT20), 802.11ax (HE20) 7 for 802.11n (HT40), (VHT40), 802.11ax (HE40)
Output Power	CDD Mode: 71.031 mW Beamforming: 33.544 mW
Antenna Type	PIFA antenna with 1.2 dBi gain (Chain 0) PCB antenna with 0.6 dBi gain (Chain 1)
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

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

Modulation Mode	CDD	Beamforming	TX Function
802.11b	Support	Not Support	2TX (MIMO)
802.11g	Support	Not Support	2TX (MIMO)
802.11n (HT20/VHT20)	Support	Support	2TX (MIMO)
802.11n (HT40/VHT40)	Support	Support	2TX (MIMO)
802.11ax (HE20)	Support	Support	2TX (MIMO)
802.11ax (HE40)	Support	Support	2TX (MIMO)

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11n mode for VHT20 / VHT40 and 802.11ax mode for HE20 / HE40, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

*For 802.11n and 802.11ac and 802.11ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Cradle	Nienyi	NA	I/P: +5 Vdc, 0.9 A O/P: 5 Vdc, 0.9 A Power code:0.91m, non-shielded cable, with w/o ferrite core

3. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
4. 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.
5. The difference between Main and second sources is changing flash. The EUT has been pre-tested and the worst case is the main source.
6. 2.4 and 5GHz WLAN cannot transmit simultaneously

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20), (VHT20), 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), (VHT40), 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 \geq 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE \geq 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 **X-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)
-	802.11b	1 to 11	6	DSSS	DBPSK	1.0

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)
-	802.11b	1 to 11	6	DSSS	DBPSK	1.0

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 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11ax (HE20)	1 to 11	1, 11	OFDMA	BPSK	MCS0
-	802.11ax (HE40)	3 to 9	3, 9	OFDMA	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 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

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Adair Peng
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Noah Chang
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Edison Lee
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Wayne Lin

3.3 Duty Cycle of Test Signal

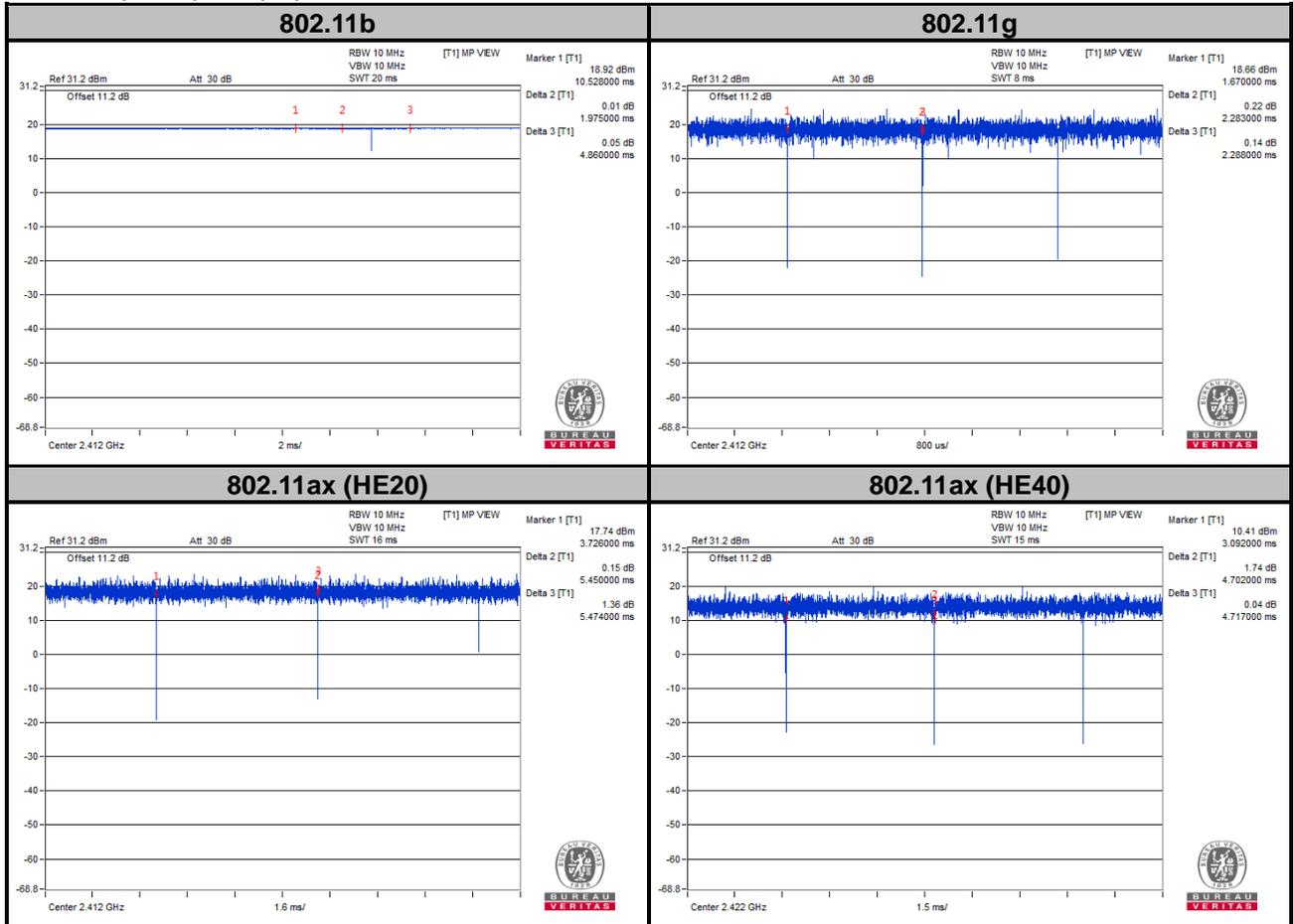
802.11b: Duty cycle of test signal is 100 %, duty factor is not required.

Duty cycle of test signal is $\geq 98 \%$, duty factor is not required.

802.11g: Duty cycle = $2.283/2.288 = 0.998$

802.11ax (HE20): Duty cycle = $5.45/5.474 = 0.996$

802.11ax (HE40): Duty cycle = $4.702/4.717 = 0.997$



3.4 Description of Support Units

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

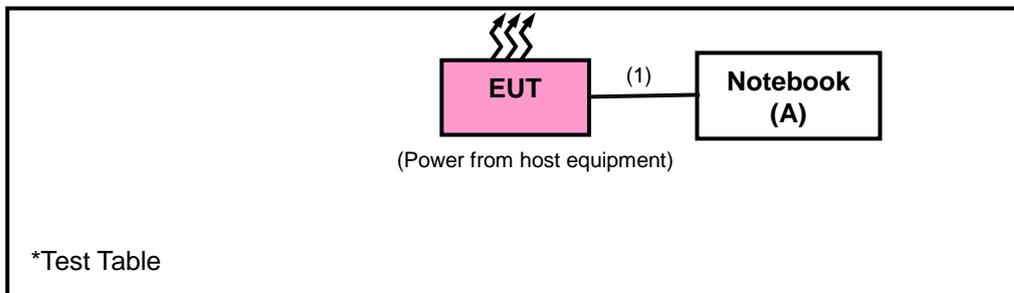
No.	Product	Brand	Model No.	Serial No.	FCC ID
A	Notebook	DELL	E5410	1HC2XM1	N/A

No.	Signal Cable Description of The Above Support Units
1.	USB Extension cord: 0.9m

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items A acted as communication partners to transfer data.

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 30 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	ESCI	100424	Dec. 31, 2020	Dec. 30, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 16, 2020	Sep. 15, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Nov. 03, 2020	Nov. 02, 2021
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Jun. 08, 2020	Jun. 07, 2021
			Jun. 05, 2021	Jun. 04, 2022
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jun. 08, 2020	Jun. 07, 2021
			Jun. 05, 2021	Jun. 04, 2022
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH4-01	Aug. 16, 2020	Aug. 15, 2021
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	Aug. 16, 2020	Aug. 15, 2021
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	Aug. 16, 2020	Aug. 15, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Jun. 08, 2020	Jun. 07, 2021
			Jun. 05, 2021	Jun. 04, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Jun. 08, 2020	Jun. 07, 2021
			Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 04, 2020	Sep. 03, 2021
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 13, 2020	Jul. 12, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Feb. 03, 2021	Feb. 02, 2022

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 4.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

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

Note:

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

For Radiated Emission above 30 MHz

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

Note:

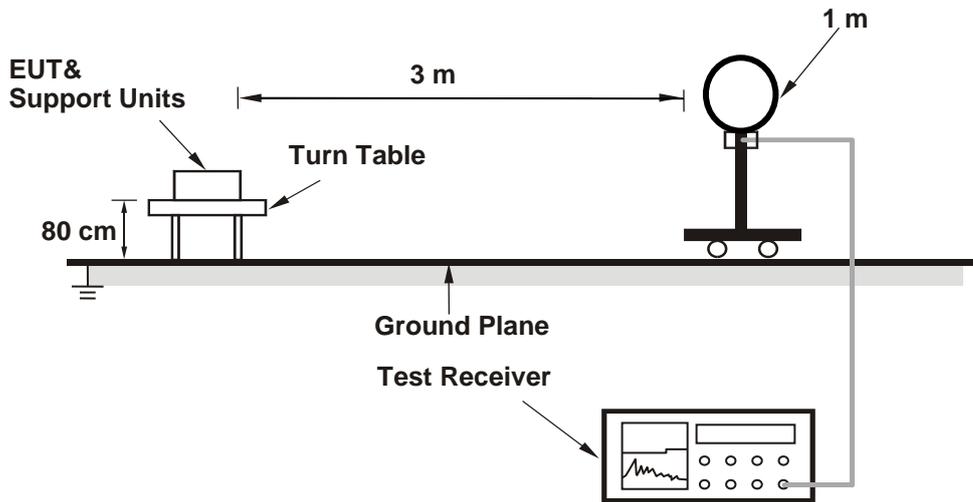
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK)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

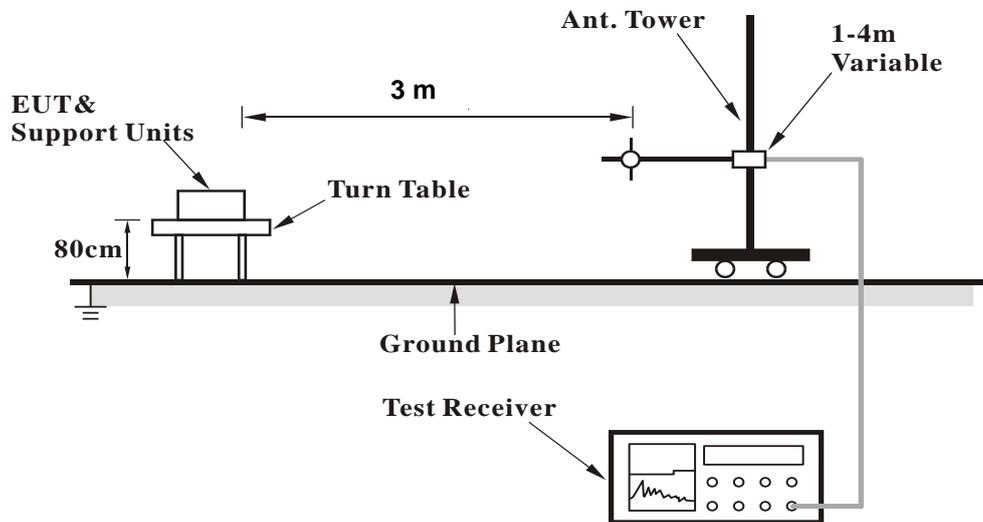
No deviation.

4.1.5 Test Set Up

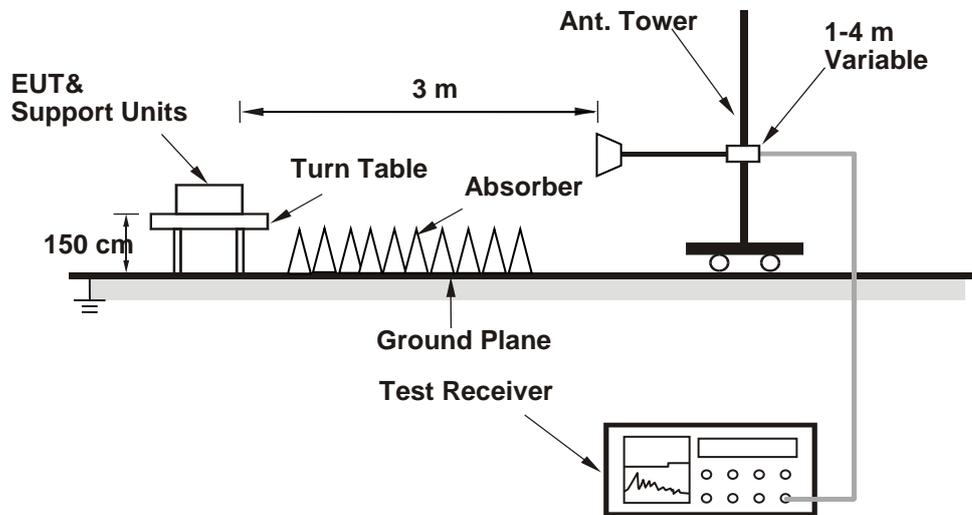
<Radiated Emission below 30 MHz>



<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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2385.00	59.4 PK	74.0	-14.6	1.16 H	128	26.8	32.6
2	2385.00	48.7 AV	54.0	-5.3	1.16 H	128	16.1	32.6
3	*2412.00	112.8 PK			1.16 H	128	80.2	32.6
4	*2412.00	110.0 AV			1.16 H	128	77.4	32.6
5	4824.00	54.5 PK	74.0	-19.5	1.19 H	39	53.2	1.3
6	4824.00	53.5 AV	54.0	-0.5	1.19 H	39	52.2	1.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2385.00	58.0 PK	74.0	-16.0	3.32 V	58	25.4	32.6
2	2385.00	46.8 AV	54.0	-7.2	3.32 V	58	14.2	32.6
3	*2412.00	107.6 PK			3.32 V	58	75.0	32.6
4	*2412.00	104.8 AV			3.32 V	58	72.2	32.6
5	4824.00	54.3 PK	74.0	-19.7	3.15 V	352	53.0	1.3
6	4824.00	53.1 AV	54.0	-0.9	3.15 V	352	51.8	1.3

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	112.2 PK			1.13 H	128	79.6	32.6
2	*2437.00	109.9 AV			1.13 H	128	77.3	32.6
3	4874.00	55.7 PK	74.0	-18.3	1.12 H	38	54.4	1.3
4	4874.00	53.8 AV	54.0	-0.2	1.12 H	38	52.5	1.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	107.2 PK			3.41 V	52	74.6	32.6
2	*2437.00	104.8 AV			3.41 V	52	72.2	32.6
3	4874.00	55.5 PK	74.0	-18.5	3.27 V	350	54.2	1.3
4	4874.00	53.3 AV	54.0	-0.7	3.27 V	350	52.0	1.3

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	109.8 PK			1.10 H	137	77.3	32.5
2	*2462.00	107.0 AV			1.10 H	137	74.5	32.5
3	2487.00	62.3 PK	74.0	-11.7	1.10 H	137	29.7	32.6
4	2487.00	53.2 AV	54.0	-0.8	1.10 H	137	20.6	32.6
5	4924.00	52.2 PK	74.0	-21.8	1.18 H	41	51.0	1.2
6	4924.00	50.5 AV	54.0	-3.5	1.18 H	41	49.3	1.2

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	102.1 PK			3.13 V	89	69.6	32.5
2	*2462.00	99.5 AV			3.13 V	89	67.0	32.5
3	2487.00	58.9 PK	74.0	-15.1	3.13 V	89	26.3	32.6
4	2487.00	46.6 AV	54.0	-7.4	3.13 V	89	14.0	32.6
5	4924.00	52.0 PK	74.0	-22.0	3.19 V	357	50.8	1.2
6	4924.00	50.0 AV	54.0	-4.0	3.19 V	357	48.8	1.2

Remarks:

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

802.11g

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	73.4 PK	74.0	-0.6	1.19 H	139	40.8	32.6
2	2390.00	53.2 AV	54.0	-0.8	1.19 H	139	20.6	32.6
3	*2412.00	114.3 PK			1.19 H	139	81.7	32.6
4	*2412.00	104.1 AV			1.19 H	139	71.5	32.6
5	4824.00	49.2 PK	74.0	-24.8	1.20 H	44	47.9	1.3
6	4824.00	37.8 AV	54.0	-16.2	1.20 H	44	36.5	1.3

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	67.9 PK	74.0	-6.1	3.43 V	2	35.3	32.6
2	2390.00	49.7 AV	54.0	-4.3	3.43 V	2	17.1	32.6
3	*2412.00	108.1 PK			3.43 V	2	75.5	32.6
4	*2412.00	98.4 AV			3.43 V	2	65.8	32.6
5	4824.00	48.7 PK	74.0	-25.3	3.21 V	347	47.4	1.3
6	4824.00	37.3 AV	54.0	-16.7	3.21 V	347	36.0	1.3

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	119.6 PK			1.44 H	140	87.0	32.6
2	*2437.00	109.9 AV			1.44 H	140	77.3	32.6
3	4874.00	51.3 PK	74.0	-22.7	1.25 H	39	50.0	1.3
4	4874.00	40.1 AV	54.0	-13.9	1.25 H	39	38.8	1.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	114.1 PK			3.51 V	12	81.5	32.6
2	*2437.00	104.3 AV			3.51 V	12	71.7	32.6
3	4874.00	50.9 PK	74.0	-23.1	3.20 V	355	49.6	1.3
4	4874.00	39.5 AV	54.0	-14.5	3.20 V	355	38.2	1.3

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	111.8 PK			1.16 H	138	79.3	32.5
2	*2462.00	102.5 AV			1.16 H	138	70.0	32.5
3	2483.50	69.2 PK	74.0	-4.8	1.16 H	138	36.6	32.6
4	2483.50	53.0 AV	54.0	-1.0	1.16 H	138	20.4	32.6
5	4924.00	48.9 PK	74.0	-25.1	1.27 H	41	47.7	1.2
6	4924.00	37.5 AV	54.0	-16.5	1.27 H	41	36.3	1.2

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	105.7 PK			3.47 V	86	73.2	32.5
2	*2462.00	95.5 AV			3.47 V	86	63.0	32.5
3	2483.50	66.2 PK	74.0	-7.8	1.00 V	86	33.6	32.6
4	2483.50	49.1 AV	54.0	-4.9	1.00 V	86	16.5	32.6
5	4924.00	48.5 PK	74.0	-25.5	3.25 V	358	47.3	1.2
6	4924.00	37.0 AV	54.0	-17.0	3.25 V	358	35.8	1.2

Remarks:

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

802.11ax (HE20)

RF Mode	TX 802.11ax (HE20)	Channel	CH 1 : 2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	67.7 PK	74.0	-6.3	1.16 H	128	35.1	32.6
2	2390.00	52.8 AV	54.0	-1.2	1.16 H	128	20.2	32.6
3	*2412.00	113.0 PK			1.16 H	128	80.4	32.6
4	*2412.00	100.7 AV			1.16 H	128	68.1	32.6
5	4824.00	49.3 PK	74.0	-24.7	1.29 H	42	48.0	1.3
6	4824.00	37.8 AV	54.0	-16.2	1.29 H	42	36.5	1.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.6 PK	74.0	-10.4	3.78 V	58	31.0	32.6
2	2390.00	47.8 AV	54.0	-6.2	3.78 V	58	15.2	32.6
3	*2412.00	108.5 PK			3.78 V	58	75.9	32.6
4	*2412.00	96.6 AV			3.78 V	58	64.0	32.6
5	4824.00	48.8 PK	74.0	-25.2	3.35 V	357	47.5	1.3
6	4824.00	37.4 AV	54.0	-16.6	3.35 V	357	36.1	1.3

Remarks:

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

RF Mode	TX 802.11ax (HE20)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	120.6 PK			1.21 H	132	88.0	32.6
2	*2437.00	108.0 AV			1.21 H	132	75.4	32.6
3	4874.00	51.5 PK	74.0	-22.5	1.20 H	33	50.2	1.3
4	4874.00	40.5 AV	54.0	-13.5	1.20 H	33	39.2	1.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	114.9 PK			3.65 V	54	82.3	32.6
2	*2437.00	102.3 AV			3.65 V	54	69.7	32.6
3	4874.00	51.0 PK	74.0	-23.0	3.12 V	353	49.7	1.3
4	4874.00	40.1 AV	54.0	-13.9	3.12 V	353	38.8	1.3

Remarks:

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

RF Mode	TX 802.11ax (HE20)	Channel	CH 11 : 2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	112.9 PK			1.31 H	143	80.4	32.5
2	*2462.00	100.1 AV			1.31 H	143	67.6	32.5
3	2483.50	69.9 PK	74.0	-4.1	1.31 H	143	37.3	32.6
4	2483.50	53.0 AV	54.0	-1.0	1.31 H	143	20.4	32.6
5	4924.00	49.1 PK	74.0	-24.9	1.34 H	39	47.9	1.2
6	4924.00	37.2 AV	54.0	-16.8	1.34 H	39	36.0	1.2

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	105.6 PK			2.95 V	1	73.1	32.5
2	*2462.00	93.9 AV			2.95 V	1	61.4	32.5
3	2483.50	64.2 PK	74.0	-9.8	2.95 V	1	31.6	32.6
4	2483.50	48.9 AV	54.0	-5.1	2.95 V	1	16.3	32.6
5	4924.00	48.4 PK	74.0	-25.6	3.28 V	349	47.2	1.2
6	4924.00	36.7 AV	54.0	-17.3	3.28 V	349	35.5	1.2

Remarks:

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

802.11ax (HE40)

RF Mode	TX 802.11ax (HE40)	Channel	CH 3 : 2422 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	68.5 PK	74.0	-5.5	1.28 H	135	35.9	32.6
2	2390.00	53.3 AV	54.0	-0.7	1.28 H	135	20.7	32.6
3	*2422.00	109.0 PK			1.28 H	135	76.4	32.6
4	*2422.00	97.0 AV			1.28 H	135	64.4	32.6
5	4844.00	44.7 PK	74.0	-29.3	1.31 H	38	43.4	1.3
6	4844.00	34.8 AV	54.0	-19.2	1.31 H	38	33.5	1.3

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.8 PK	74.0	-11.2	3.32 V	58	30.2	32.6
2	2390.00	47.1 AV	54.0	-6.9	3.32 V	58	14.5	32.6
3	*2422.00	104.5 PK			3.32 V	58	71.9	32.6
4	*2422.00	92.3 AV			3.32 V	58	59.7	32.6
5	4844.00	44.3 PK	74.0	-29.7	3.33 V	345	43.0	1.3
6	4844.00	34.6 AV	54.0	-19.4	3.33 V	345	33.3	1.3

Remarks:

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

RF Mode	TX 802.11ax (HE40)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	110.0 PK			1.13 H	131	77.4	32.6
2	*2437.00	98.2 AV			1.13 H	131	65.6	32.6
3	2483.50	69.2 PK	74.0	-4.8	1.13 H	131	36.6	32.6
4	2483.50	53.4 AV	54.0	-0.6	1.13 H	131	20.8	32.6
5	4874.00	45.3 PK	74.0	-28.7	1.27 H	42	44.0	1.3
6	4874.00	35.2 AV	54.0	-18.8	1.27 H	42	33.9	1.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	108.0 PK			3.33 V	5	75.4	32.6
2	*2437.00	95.3 AV			3.33 V	5	62.7	32.6
3	2483.50	68.1 PK	74.0	-5.9	3.33 V	5	35.5	32.6
4	2483.50	53.3 AV	54.0	-0.7	3.33 V	5	20.7	32.6
5	4874.00	44.9 PK	74.0	-29.1	3.12 V	354	43.6	1.3
6	4874.00	34.8 AV	54.0	-19.2	3.12 V	354	33.5	1.3

Remarks:

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

RF Mode	TX 802.11ax (HE40)	Channel	CH 9 : 2452 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	107.6 PK			1.17 H	143	75.1	32.5
2	*2452.00	95.3 AV			1.17 H	143	62.8	32.5
3	2483.50	64.8 PK	74.0	-9.2	1.17 H	143	32.2	32.6
4	2483.50	52.8 AV	54.0	-1.2	1.17 H	143	20.2	32.6
5	4904.00	44.3 PK	74.0	-29.7	1.28 H	35	43.1	1.2
6	4904.00	34.5 AV	54.0	-19.5	1.28 H	35	33.3	1.2

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	101.5 PK			3.64 V	2	69.0	32.5
2	*2452.00	89.9 AV			3.64 V	2	57.4	32.5
3	2483.50	62.8 PK	74.0	-11.2	3.64 V	2	30.2	32.6
4	2483.50	50.0 AV	54.0	-4.0	3.64 V	2	17.4	32.6
5	4904.00	44.1 PK	74.0	-29.9	3.09 V	350	42.9	1.2
6	4904.00	34.5 AV	54.0	-19.5	3.09 V	350	33.3	1.2

Remarks:

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

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:

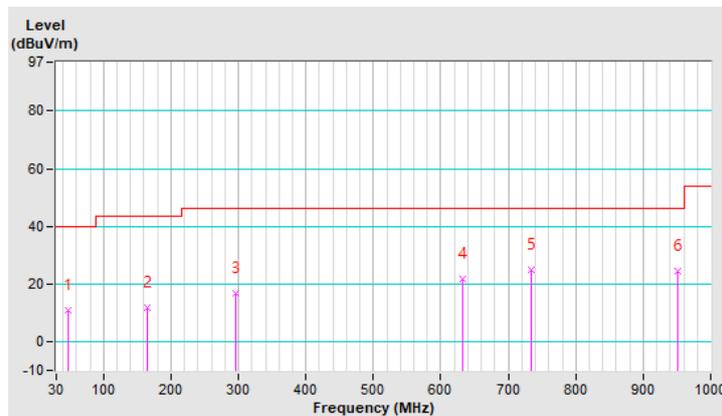
802.11b

RF Mode	TX 802.11b	Channel	CH 6 : 2437 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	48.43	10.7 QP	40.0	-29.3	2.00 H	330	28.9	-18.2
2	165.80	11.6 QP	43.5	-31.9	1.00 H	212	30.1	-18.5
3	296.75	16.8 QP	46.0	-29.2	1.00 H	190	35.1	-18.3
4	632.37	21.6 QP	46.0	-24.4	1.00 H	185	32.2	-10.6
5	734.22	25.0 QP	46.0	-21.0	1.50 H	20	34.0	-9.0
6	951.50	24.3 QP	46.0	-21.7	1.00 H	187	30.7	-6.4

Remarks:

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

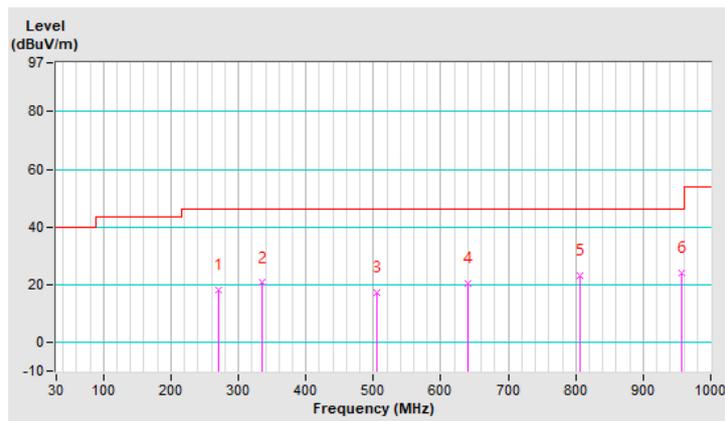


RF Mode	TX 802.11b	Channel	CH 6 : 2437 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	269.59	18.2 QP	46.0	-27.8	1.50 V	232	37.4	-19.2
2	334.58	20.6 QP	46.0	-25.4	1.00 V	2	37.7	-17.1
3	505.30	17.2 QP	46.0	-28.8	1.00 V	17	30.5	-13.3
4	640.13	20.4 QP	46.0	-25.6	1.00 V	295	30.9	-10.5
5	806.97	23.1 QP	46.0	-22.9	1.50 V	173	31.2	-8.1
6	957.32	24.0 QP	46.0	-22.0	1.00 V	201	30.3	-6.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit 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	ESR3	102783	Dec. 21, 2020	Dec. 20, 2021
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2020	Sep. 03, 2021
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 28, 2021	Jan. 27, 2022
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 18, 2020	Aug. 17, 2021
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

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

4.2.3 Test Procedures

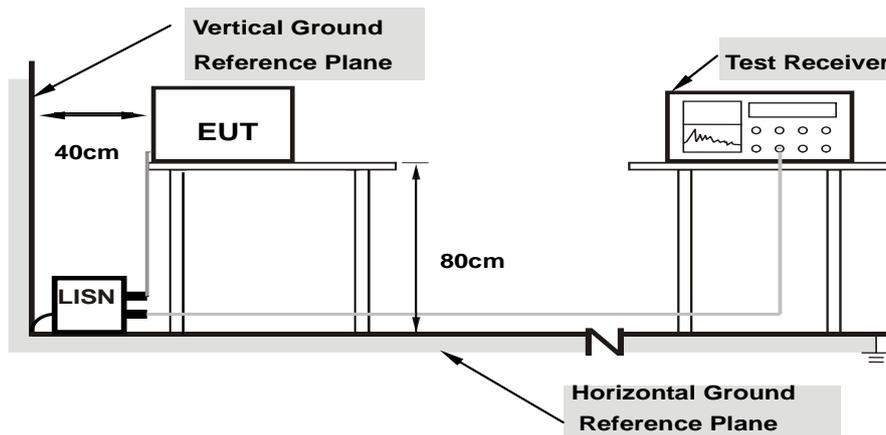
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling 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.

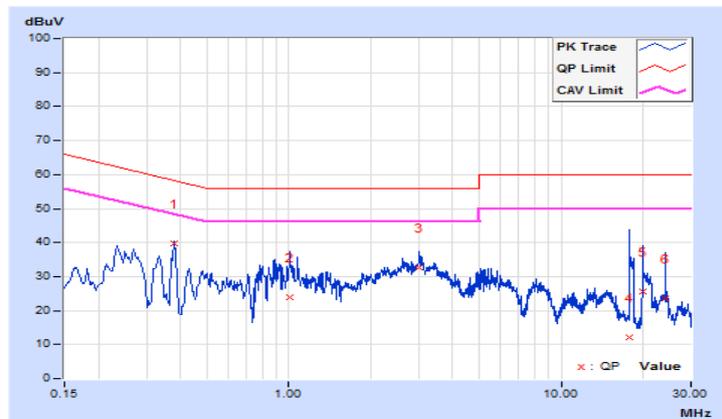
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23°C, 69%RH
Tested by	Edison Lee	Test Date	2021/3/25

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.37800	10.09	29.58	27.18	39.67	37.27	58.32	48.32	-18.65	-11.05
2	1.00600	10.14	13.67	8.00	23.81	18.14	56.00	46.00	-32.19	-27.86
3	3.01400	10.19	22.50	14.68	32.69	24.87	56.00	46.00	-23.31	-21.13
4	17.83800	10.42	1.61	0.88	12.03	11.30	60.00	50.00	-47.97	-38.70
5	19.90200	10.45	15.23	5.13	25.68	15.58	60.00	50.00	-34.32	-34.42
6	24.21800	10.34	13.15	2.24	23.49	12.58	60.00	50.00	-36.51	-37.42

Remarks:

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

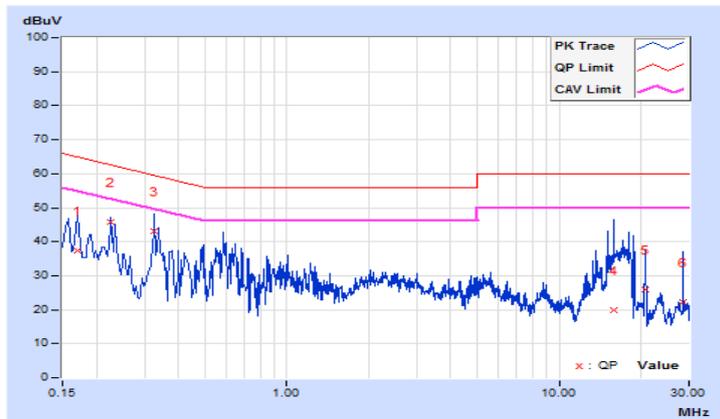


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23°C, 69%RH
Tested by	Edison Lee	Test Date	2021/3/25

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17000	10.08	27.22	23.13	37.30	33.21	64.96	54.96	-27.66	-21.75
2	0.22600	10.08	35.62	18.27	45.70	28.35	62.60	52.60	-16.90	-24.25
3	0.32600	10.09	32.88	20.04	42.97	30.13	59.55	49.55	-16.58	-19.42
4	15.82600	10.55	9.29	3.44	19.84	13.99	60.00	50.00	-40.16	-36.01
5	20.62600	10.63	15.27	4.97	25.90	15.60	60.00	50.00	-34.10	-34.40
6	28.54200	10.42	11.81	0.18	22.23	10.60	60.00	50.00	-37.77	-39.40

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

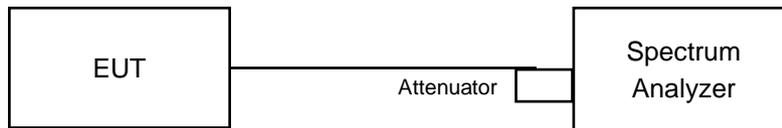


4.3 6 dB Bandwidth Measurement

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

- Set resolution bandwidth (RBW) = 100 kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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	7.05	7.09	0.5	Pass
6	2437	7.56	7.11	0.5	Pass
11	2462	7.12	7.54	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.78	15.76	0.5	Pass
6	2437	16.35	16.35	0.5	Pass
11	2462	15.95	16.07	0.5	Pass

802.11ax (HE20)

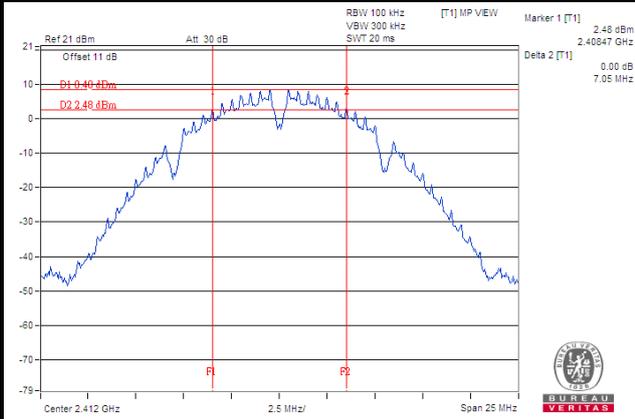
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.74	16.12	0.5	Pass
6	2437	16.68	16.97	0.5	Pass
11	2462	16.72	16.03	0.5	Pass

802.11ax (HE40)

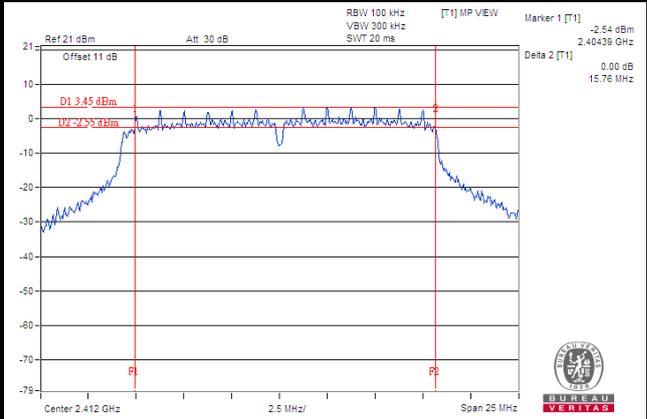
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	36.63	36.05	0.5	Pass
6	2437	35.61	36.66	0.5	Pass
9	2452	35.30	35.31	0.5	Pass

Spectrum Plot of Worst Value

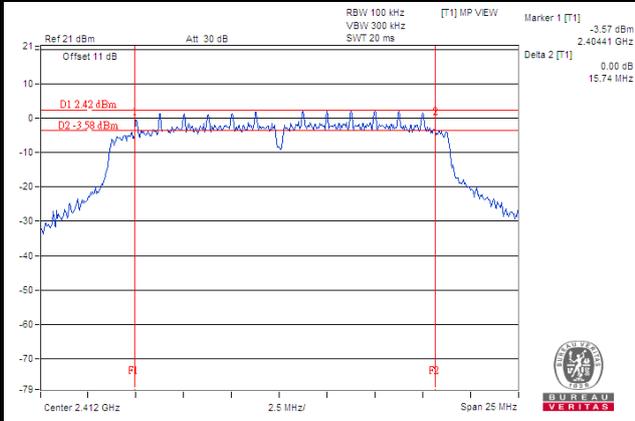
802.11b



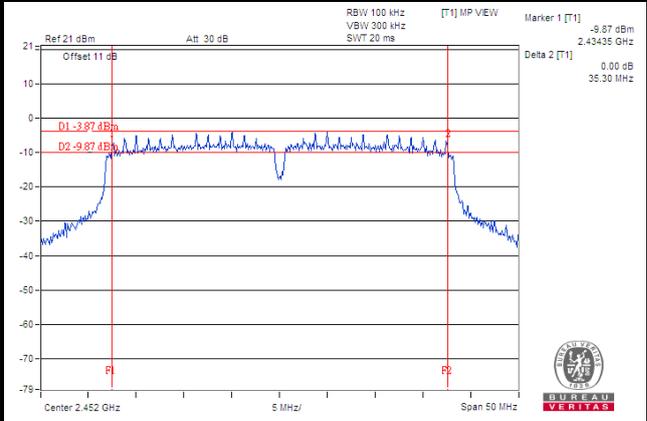
802.11g



802.11ax (HE20)

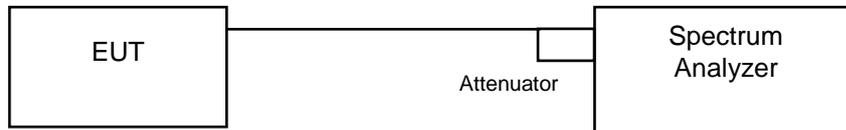


802.11ax (HE40)



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	11.30	11.21	Pass
6	2437	11.76	11.76	Pass
11	2462	11.88	11.88	Pass

802.11g

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	16.68	16.68	Pass
6	2437	17.04	16.92	Pass
11	2462	16.92	16.92	Pass

802.11ax (HE20)

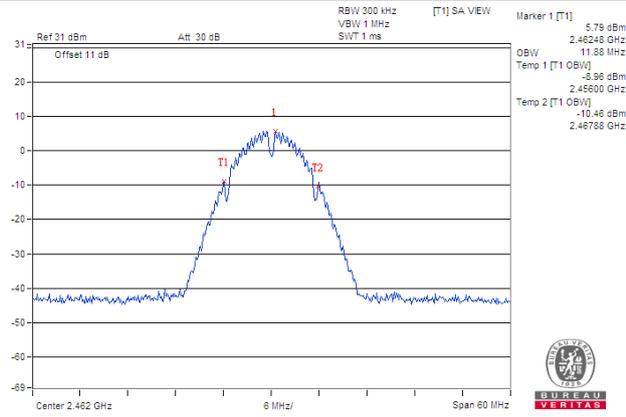
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
1	2412	17.88	17.88	Pass
6	2437	18.00	18.12	Pass
11	2462	18.00	18.00	Pass

802.11ax (HE40)

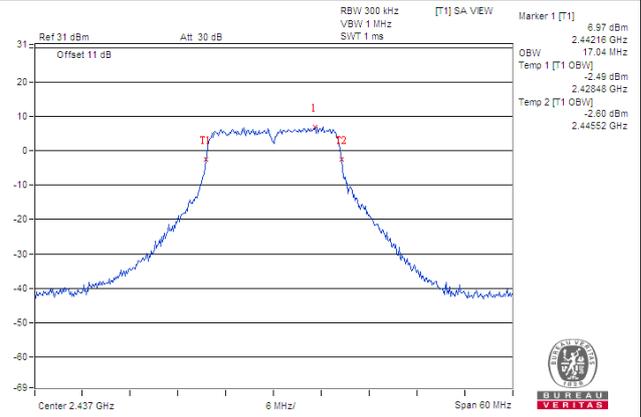
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)		Pass / Fail
		Chain 0	Chain 1	
3	2422	37.08	37.20	Pass
6	2437	37.32	37.20	Pass
9	2452	36.84	37.20	Pass

Spectrum Plot of Worst Value

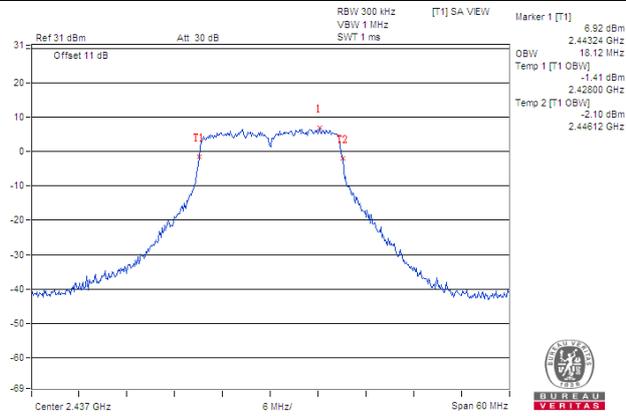
802.11b



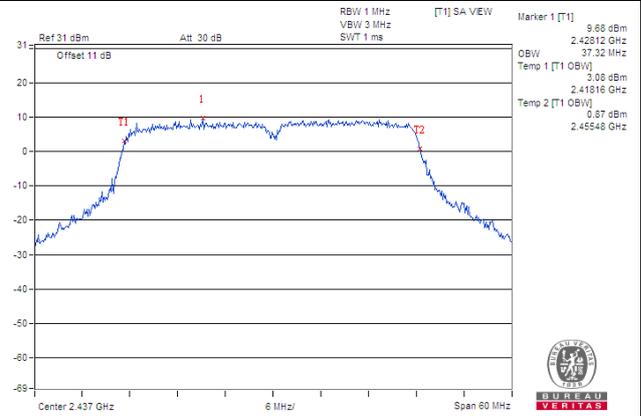
802.11g



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,

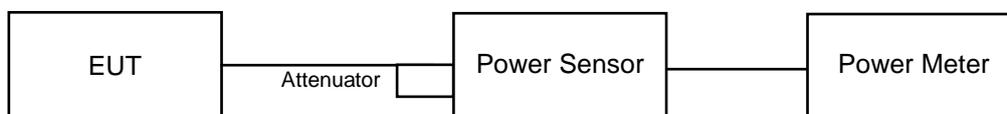
Array Gain = 0 dB (i.e., no array gain) for NANT \leq 4;

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

Array Gain = $5 \log(\text{NANT}/\text{NSS})$ dB or 3 dB, whichever is less for 20 MHz channel widths with NANT \geq 5.

For power measurements on all other devices: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ 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

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.5.5 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	15.40	15.58	70.815	18.50	30	Pass
6	2437	15.20	15.55	69.024	18.39	30	Pass
11	2462	12.58	13.12	38.625	15.87	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	13.31	13.68	44.763	16.51	30	Pass
6	2437	15.31	15.69	71.031	18.51	30	Pass
11	2462	12.66	12.98	38.311	15.83	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	12.12	12.42	33.751	15.28	30	Pass
6	2437	15.05	15.45	67.064	18.26	30	Pass
11	2462	11.12	11.45	26.906	14.30	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	11.14	11.39	26.774	14.28	30	Pass
6	2437	14.70	14.88	60.273	17.80	30	Pass
9	2452	9.55	9.86	18.698	12.72	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	12.01	12.36	33.104	15.20	30	Pass
6	2437	15.03	15.47	67.079	18.27	30	Pass
11	2462	11.03	11.38	26.417	14.22	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	11.12	11.44	26.874	14.29	30	Pass
6	2437	14.66	14.91	60.216	17.80	30	Pass
9	2452	9.64	9.90	18.977	12.78	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	12.12	12.40	33.671	15.27	30	Pass
6	2437	15.17	15.34	67.083	18.27	30	Pass
11	2462	11.16	11.44	26.993	14.31	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	11.21	11.39	26.985	14.31	30	Pass
6	2437	14.62	14.96	60.306	17.80	30	Pass
9	2452	9.62	9.93	19.002	12.79	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	9.11	9.41	16.877	12.27	30	Pass
6	2437	12.04	12.44	33.534	15.25	30	Pass
11	2462	8.11	8.44	13.454	11.29	30	Pass

NOTE: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.

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	8.13	8.38	13.388	11.27	30	Pass
6	2437	11.69	11.87	30.139	14.79	30	Pass
9	2452	6.54	6.85	9.35	9.71	30	Pass

NOTE: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.

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	9.00	9.35	16.553	12.19	30	Pass
6	2437	12.02	12.46	33.542	15.26	30	Pass
11	2462	8.02	8.37	13.209	11.21	30	Pass

NOTE: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.

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	8.11	8.43	13.438	11.28	30	Pass
6	2437	11.65	11.90	30.11	14.79	30	Pass
9	2452	6.63	6.89	9.489	9.77	30	Pass

NOTE: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.

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	9.11	9.39	16.837	12.26	30	Pass
6	2437	12.16	12.33	33.544	15.26	30	Pass
11	2462	8.15	8.43	13.498	11.30	30	Pass

NOTE: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.

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	8.20	8.38	13.493	11.30	30	Pass
6	2437	11.61	11.95	30.155	14.79	30	Pass
9	2452	6.61	6.92	9.502	9.78	30	Pass

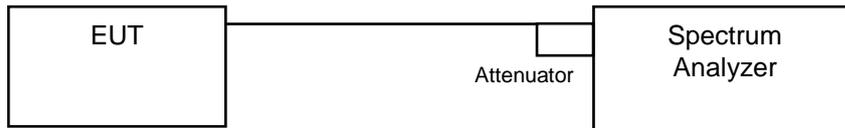
NOTE: Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.

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

For Average Power (Duty cycle $\geq 98\%$)

- a. Set instrument center frequency to DTS channel center frequency.
- b. Set span to at least 1.5 times the OBW.
- c. Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d. Set VBW $\geq 3 \times \text{RBW}$.
- e. Detector = power averaging (RMS) or sample detector (when RMS not available).
- f. Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span}/\text{RBW}$.
- g. Sweep time = auto couple.
- h. Employ trace averaging (RMS) mode over a minimum of 100 traces.
- i. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-16.82	3.01	-13.81	8	Pass
	6	2437	-16.6	3.01	-13.59	8	Pass
	11	2462	-20.79	3.01	-17.78	8	Pass
1	1	2412	-17.88	3.01	-14.87	8	Pass
	6	2437	-16.44	3.01	-13.43	8	Pass
	11	2462	-19.5	3.01	-16.49	8	Pass

NOTE:

1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.
2. Method 2) C) of power density measurement of KDB 662911 is using for calculating total power density.

802.11g

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-24.04	3.01	-21.03	8	Pass
	6	2437	-20.95	3.01	-17.94	8	Pass
	11	2462	-24.74	3.01	-21.73	8	Pass
1	1	2412	-24.72	3.01	-21.71	8	Pass
	6	2437	-21.41	3.01	-18.4	8	Pass
	11	2462	-24.43	3.01	-21.42	8	Pass

NOTE:

1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.
2. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.

802.11ax (HE20)

TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	1	2412	-25.66	3.01	-22.65	8	Pass
	6	2437	-21.98	3.01	-18.97	8	Pass
	11	2462	-26.89	3.01	-23.88	8	Pass
1	1	2412	-25.65	3.01	-22.64	8	Pass
	6	2437	-23.34	3.01	-20.33	8	Pass
	11	2462	-26.09	3.01	-23.08	8	Pass

NOTE:

1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.
2. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.

802.11ax (HE40)

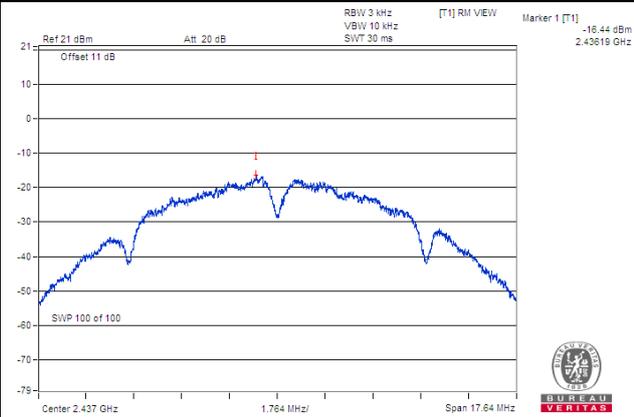
TX Chain	Channel	Freq. (MHz)	PSD (dBm/3 kHz)	10 log (N=2) dB	Total PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
0	3	2422	-30.26	3.01	-27.25	8	Pass
	6	2437	-24.78	3.01	-21.77	8	Pass
	9	2452	-31.28	3.01	-28.27	8	Pass
1	3	2422	-29.79	3.01	-26.78	8	Pass
	6	2437	-25.87	3.01	-22.86	8	Pass
	9	2452	-30.83	3.01	-27.82	8	Pass

NOTE:

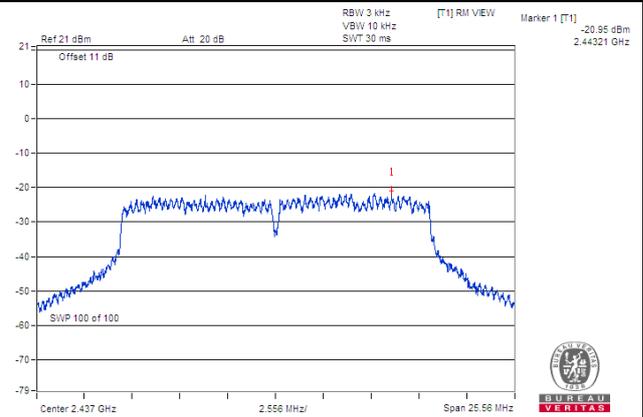
1. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 3.92 \text{ dBi} < 6 \text{ dBi}$, so the limit no need to be reduced.
2. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.

Spectrum Plot of Worst Value

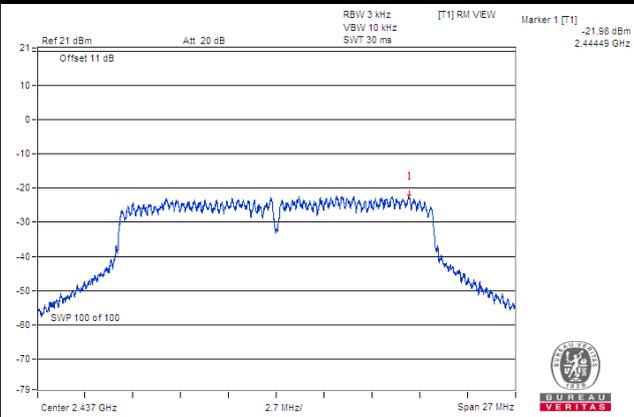
802.11b



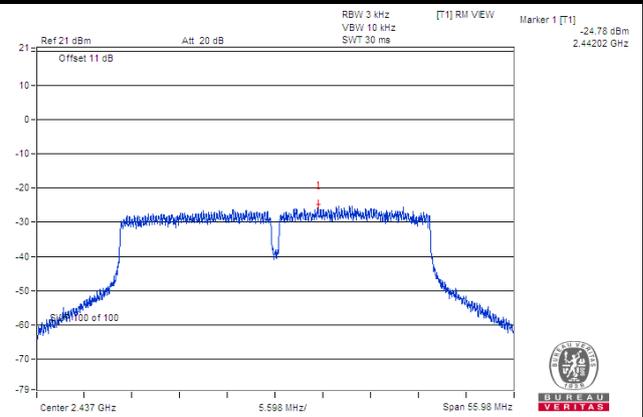
802.11g



802.11ax (HE20)



802.11ax (HE40)

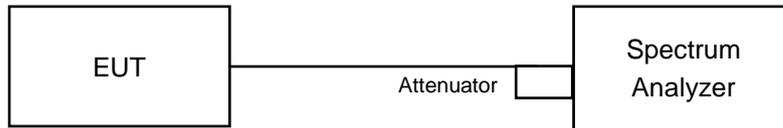


4.7 Conducted Out of Band Emission Measurement

4.7.1 Limits of Conducted Out of Band Emission Measurement

Below -30 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 \geq 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

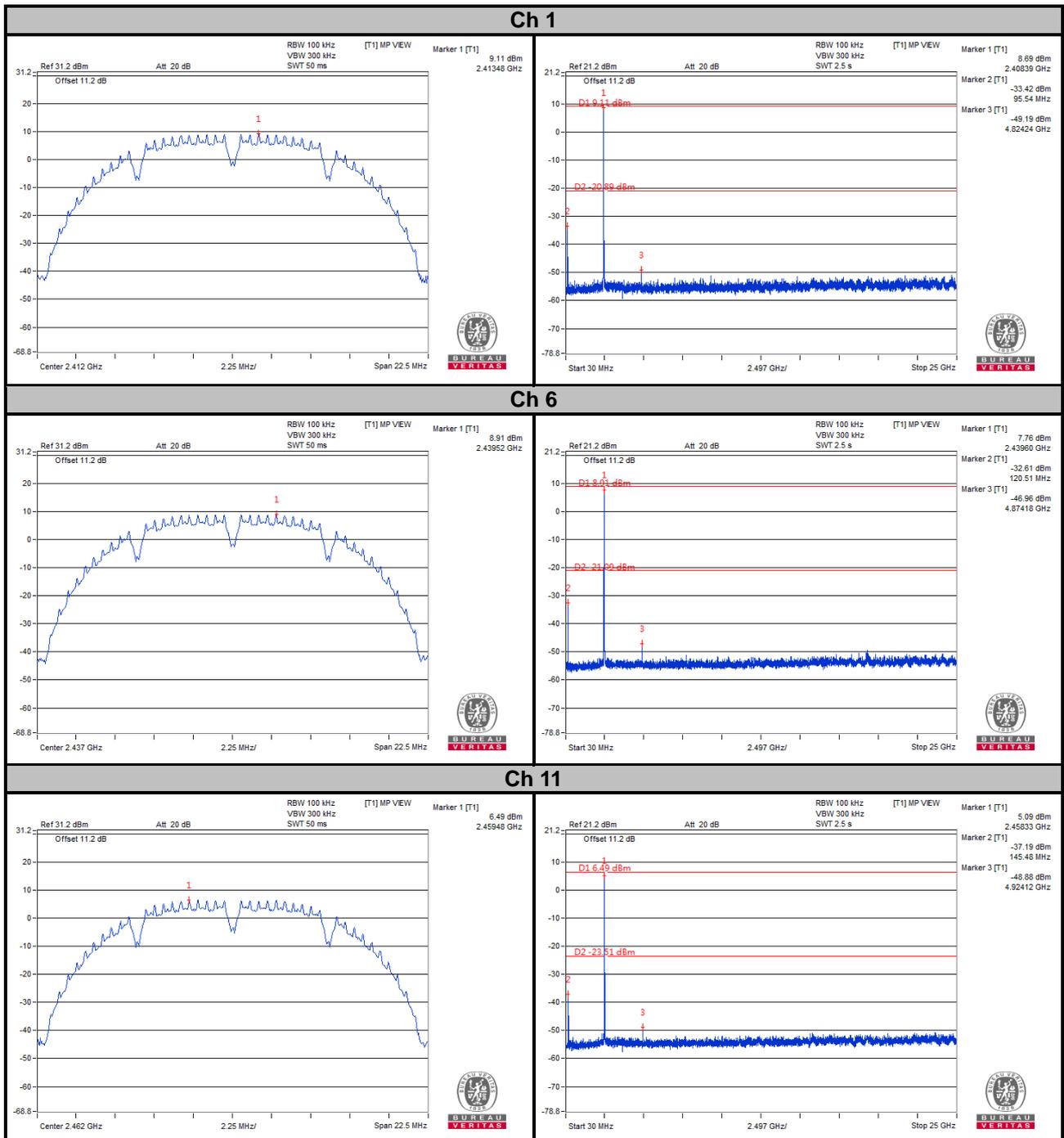
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.7.7 Test Results

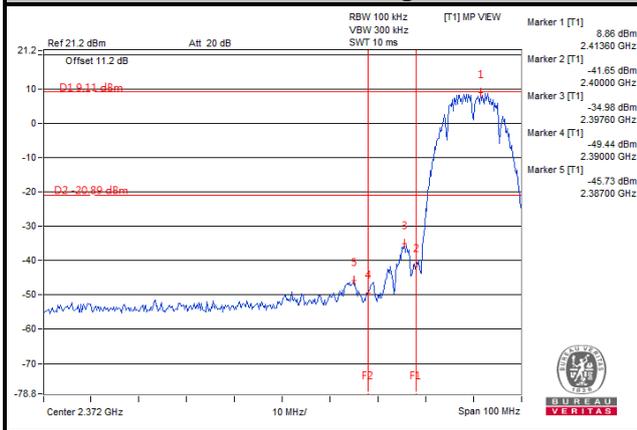
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.

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.

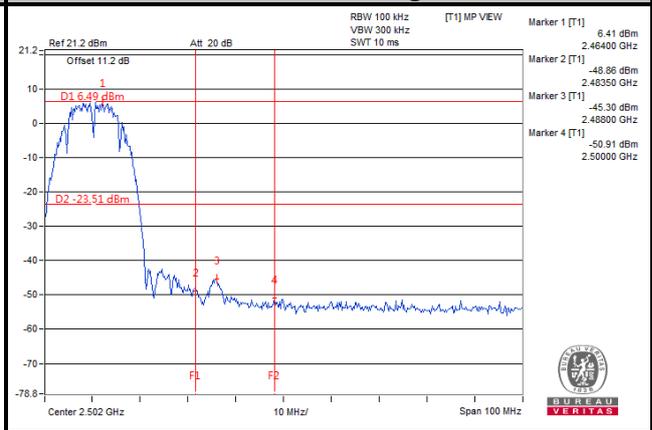
802.11b CHAIN 0



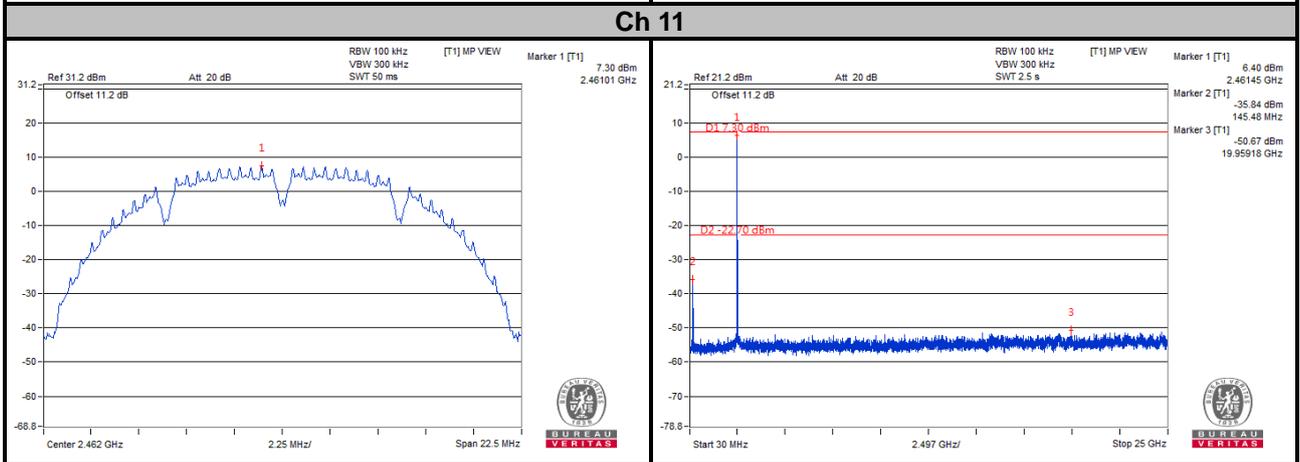
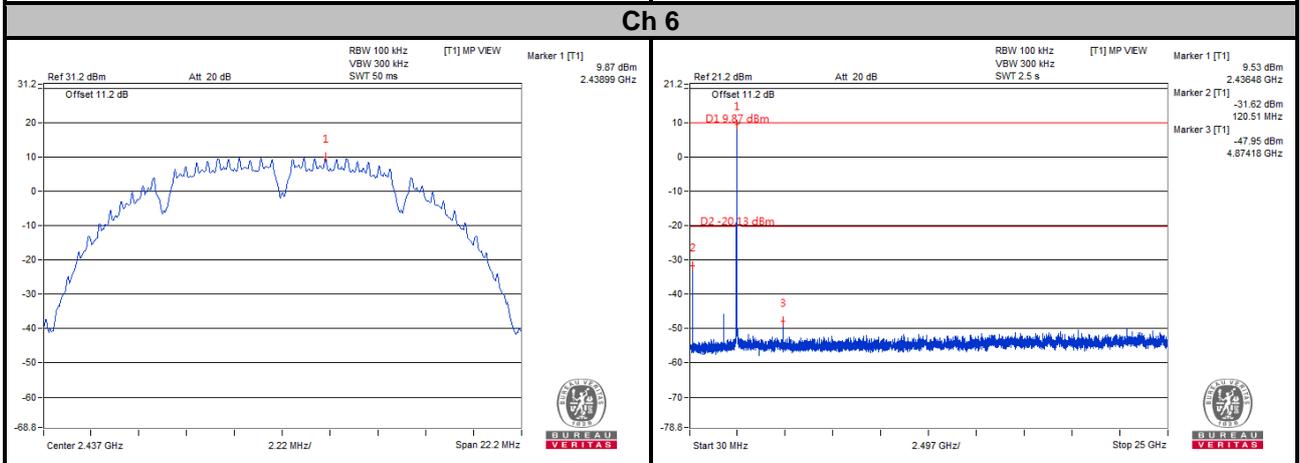
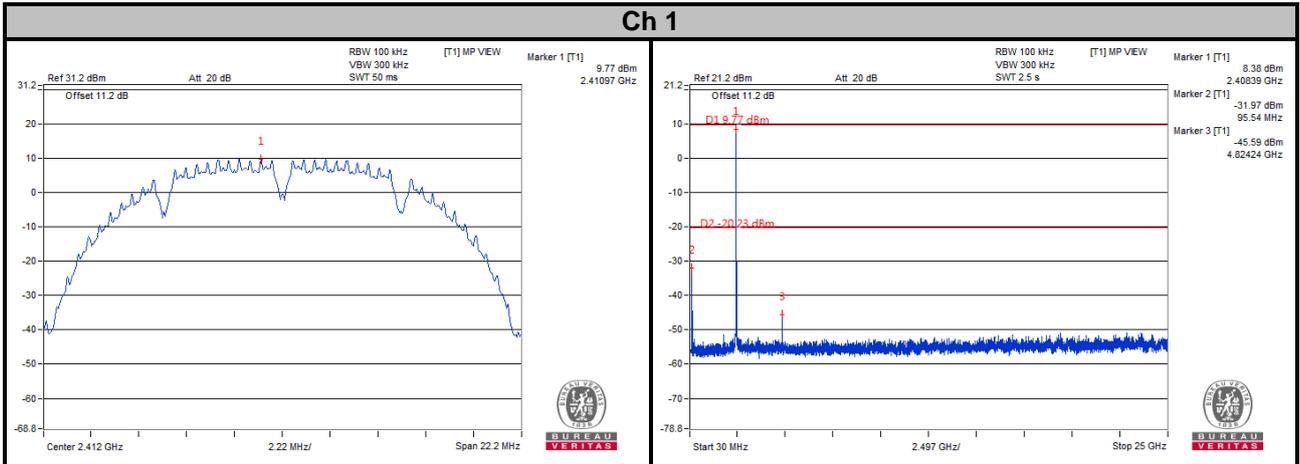
Ch 1 Band Edge



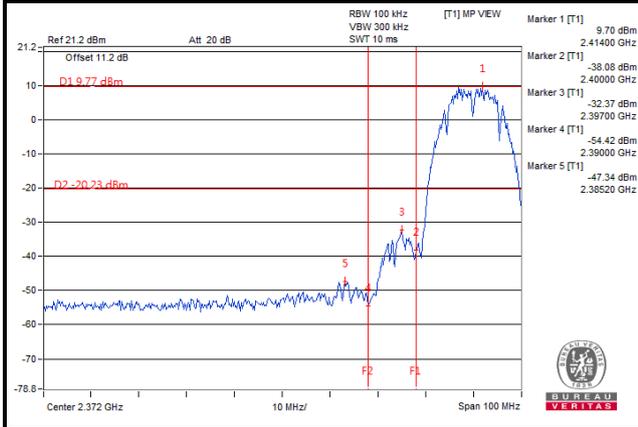
Ch 11 Band Edge



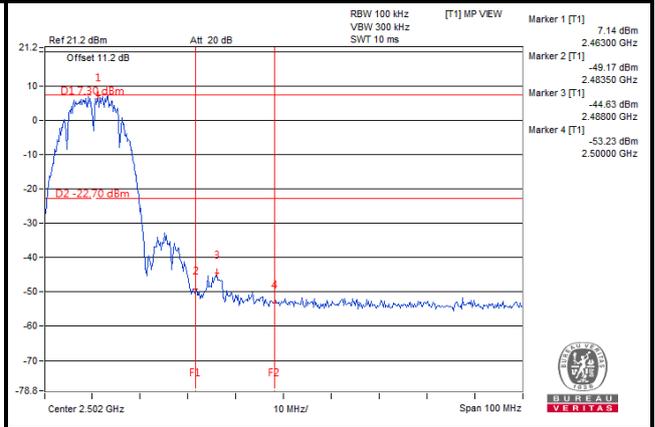
CHAIN 1



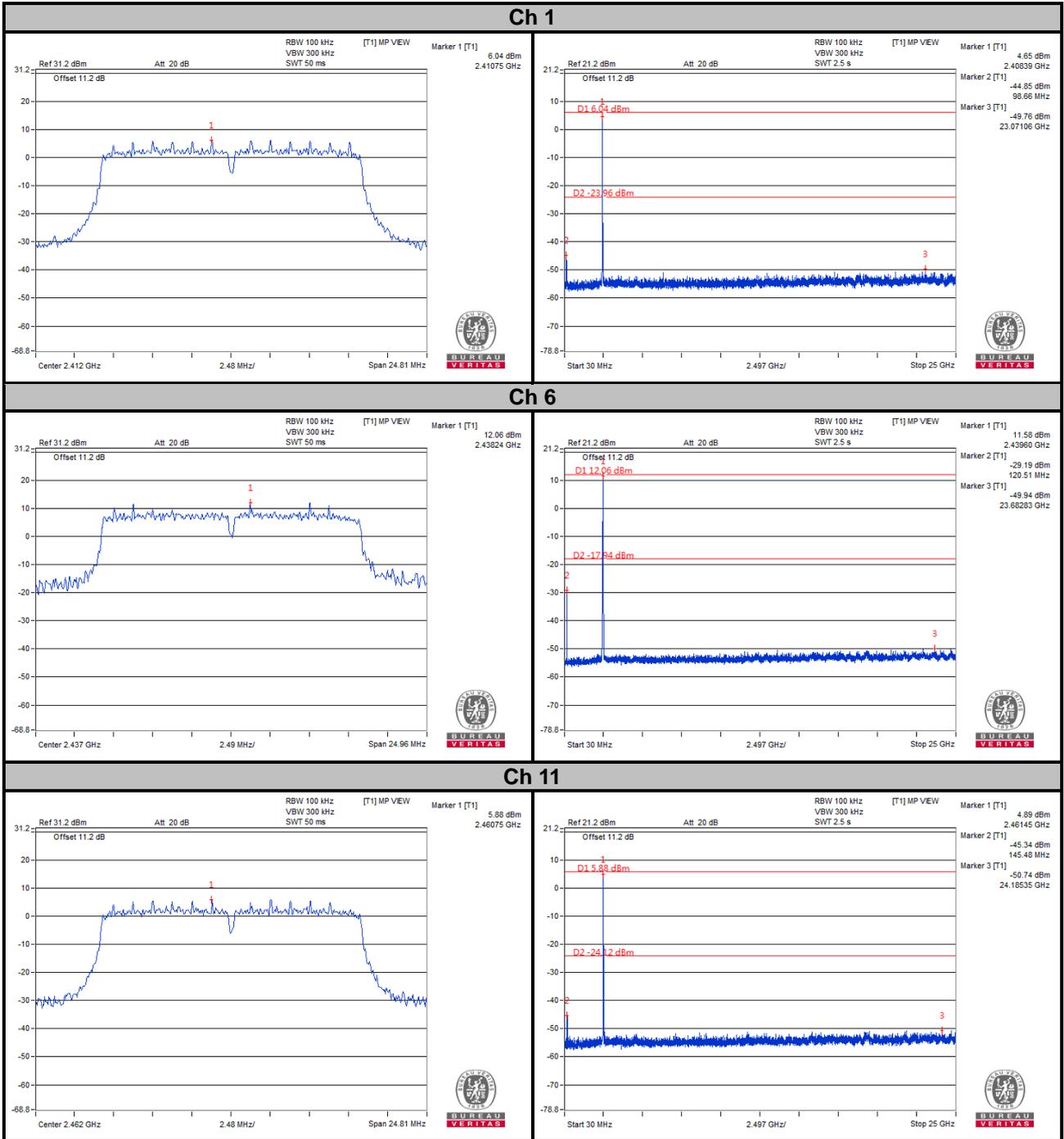
Ch 1 Band Edge



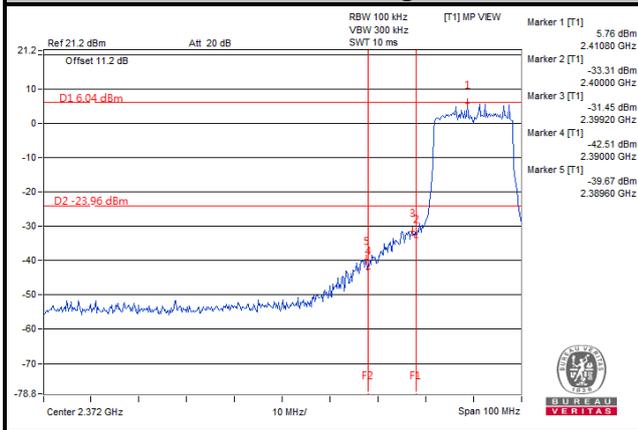
Ch 11 Band Edge



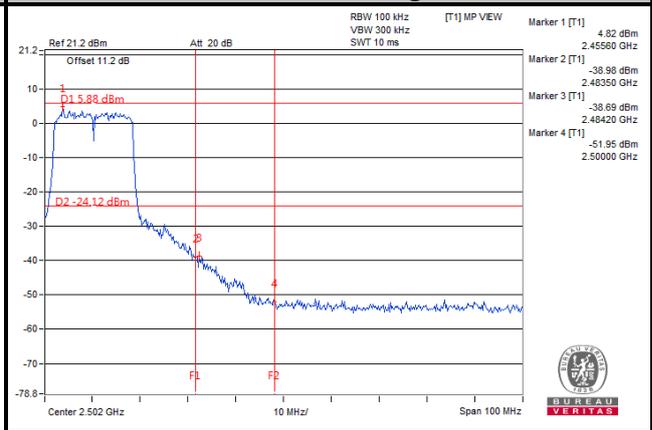
802.11g
CHAIN 0



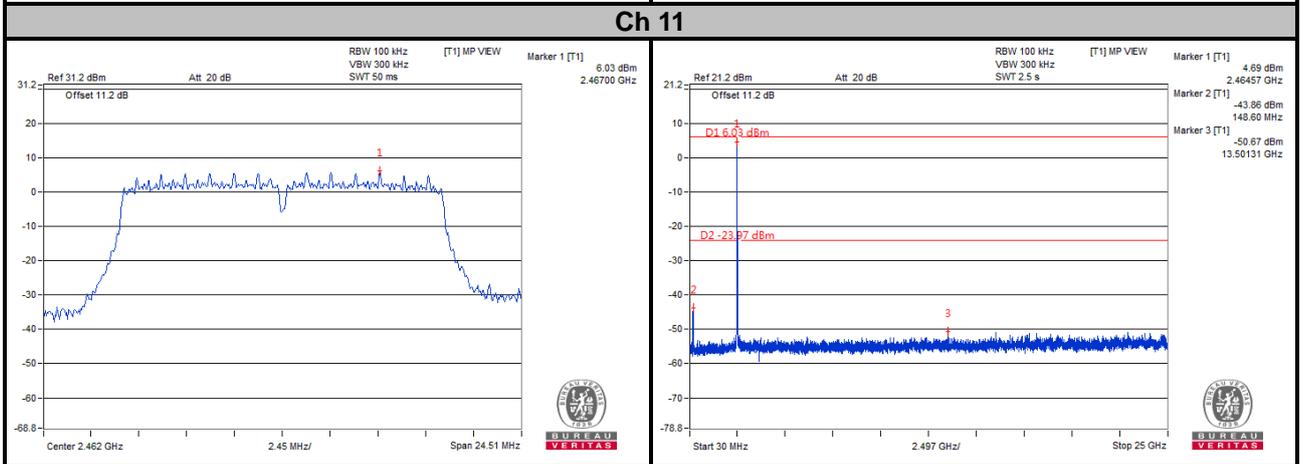
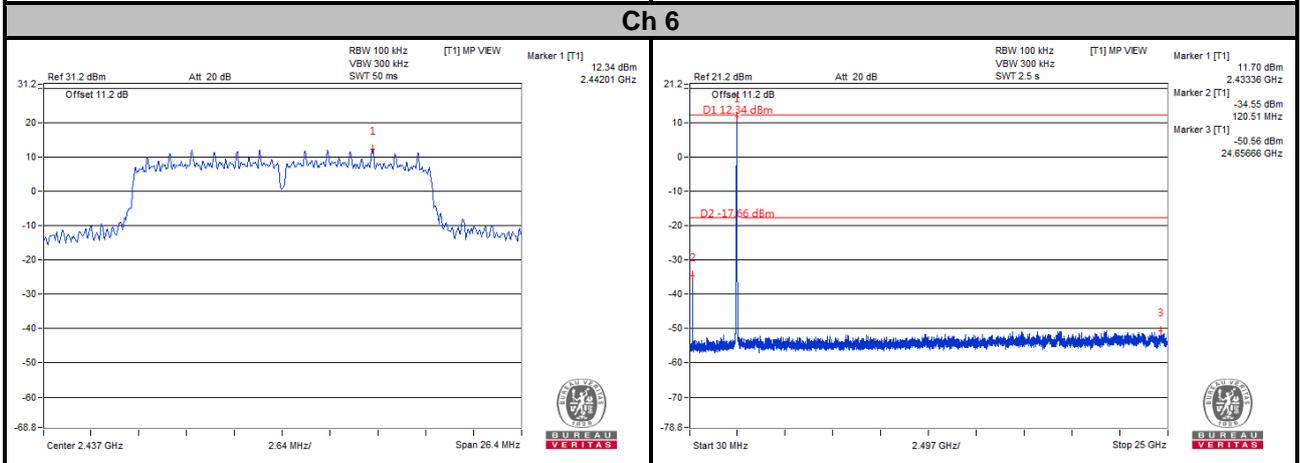
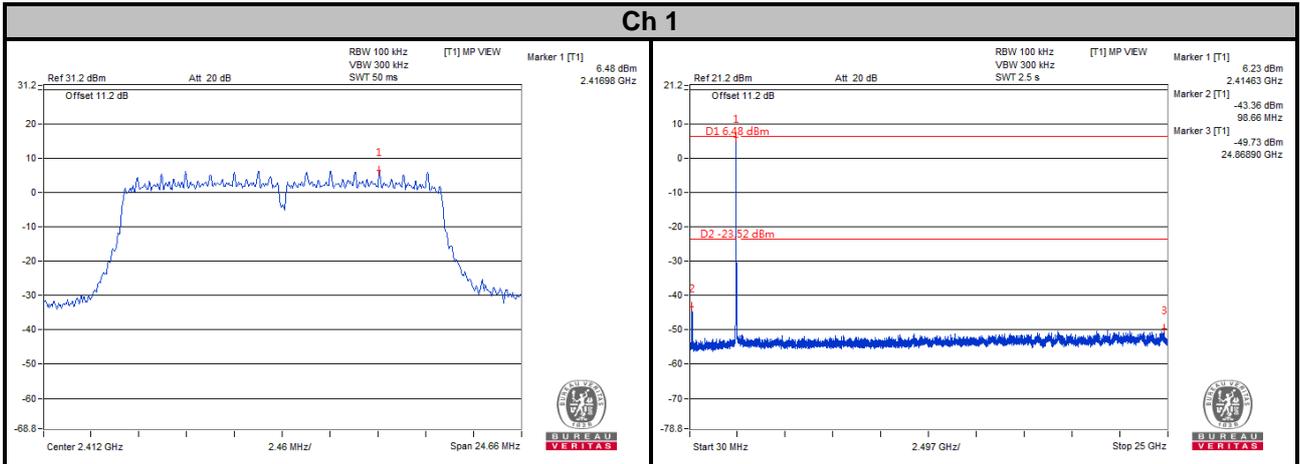
Ch 1 Band Edge

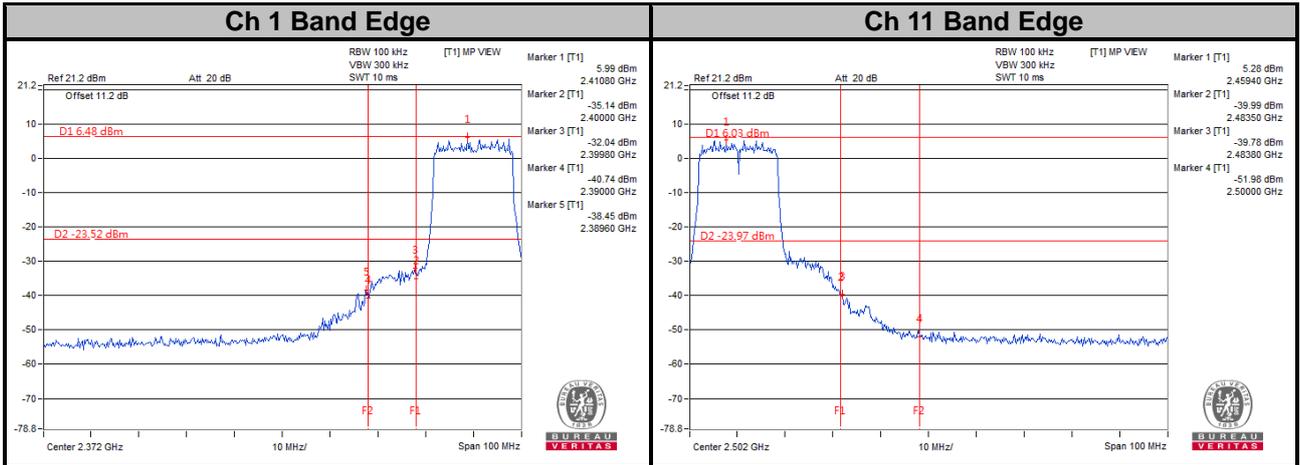


Ch 11 Band Edge

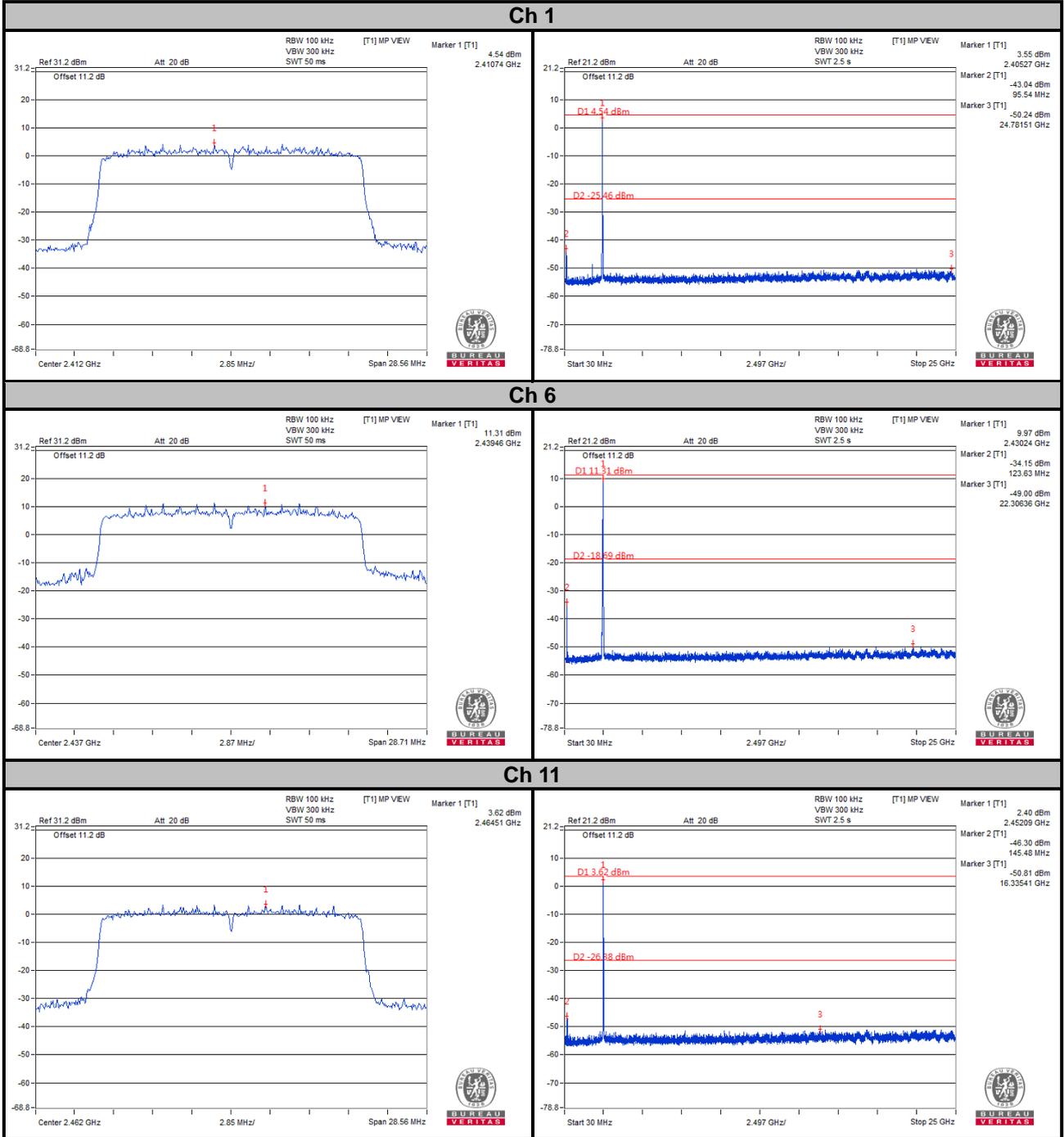


CHAIN 1

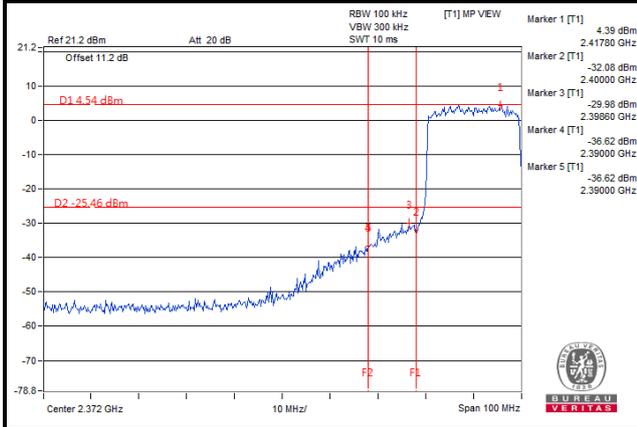




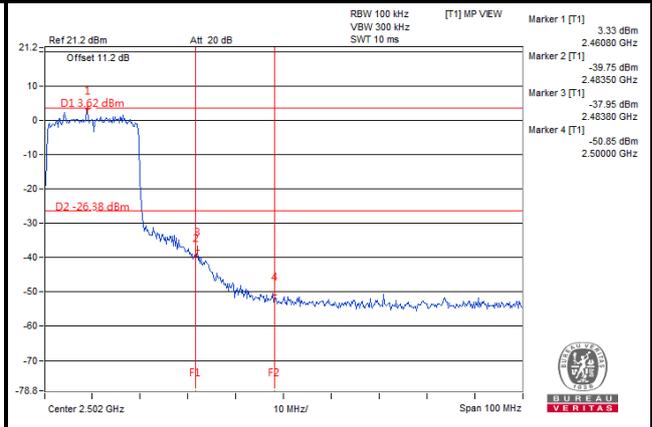
802.11ax (HE20)
CHAIN 0



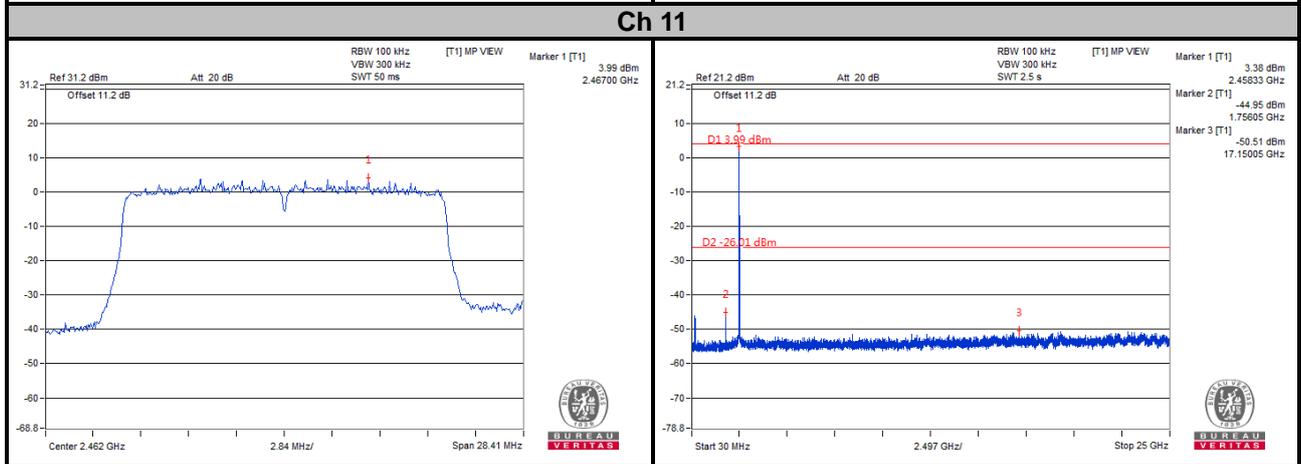
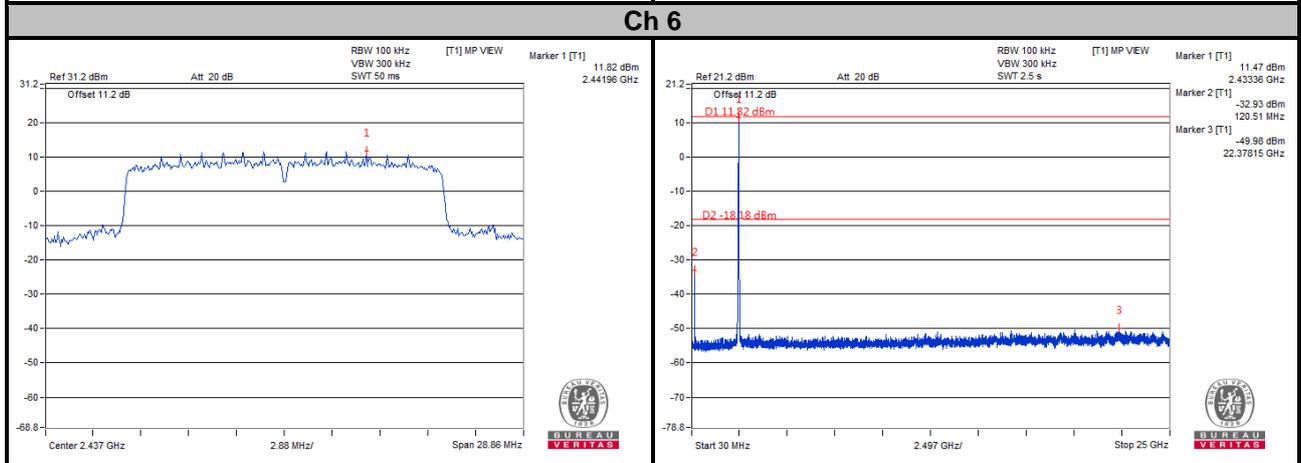
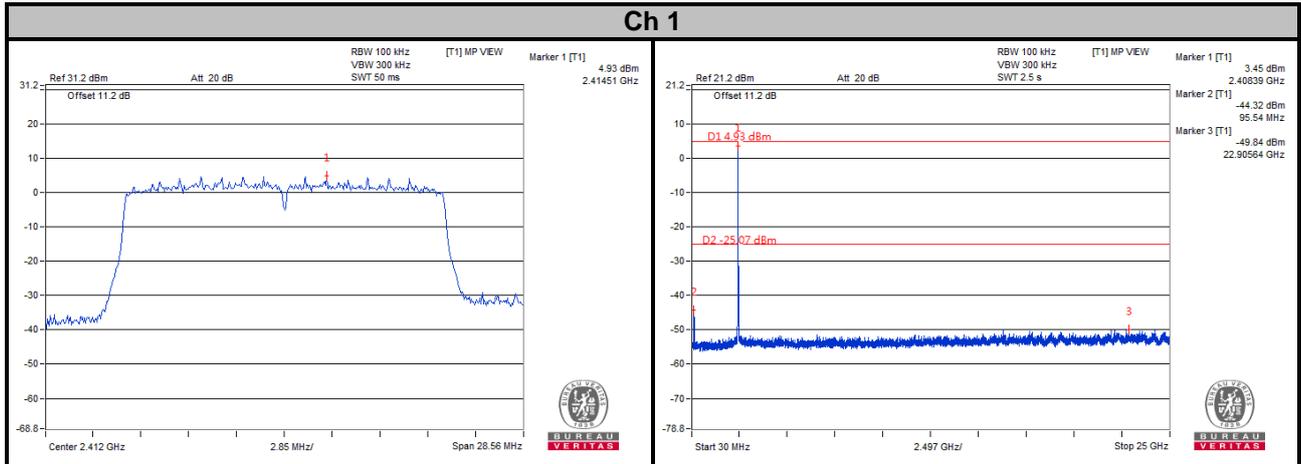
Ch 1 Band Edge



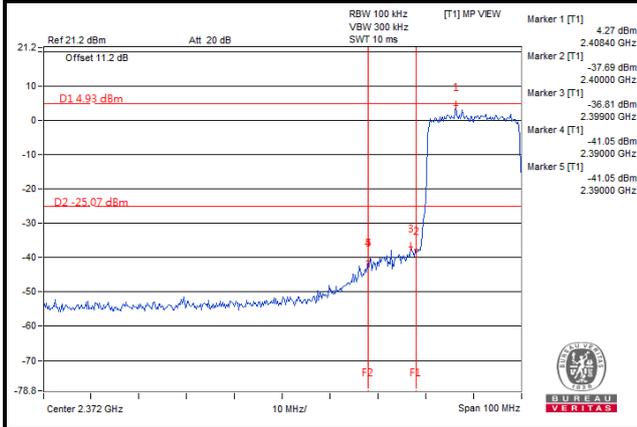
Ch 11 Band Edge



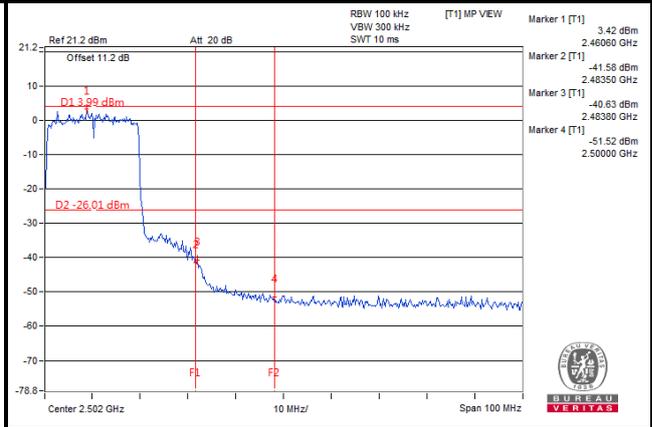
CHAIN 1



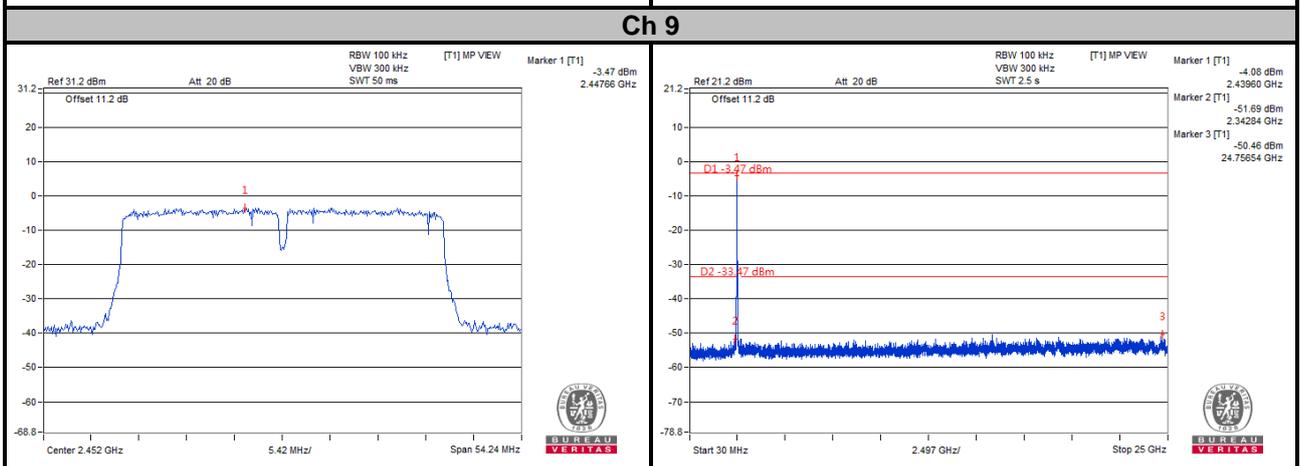
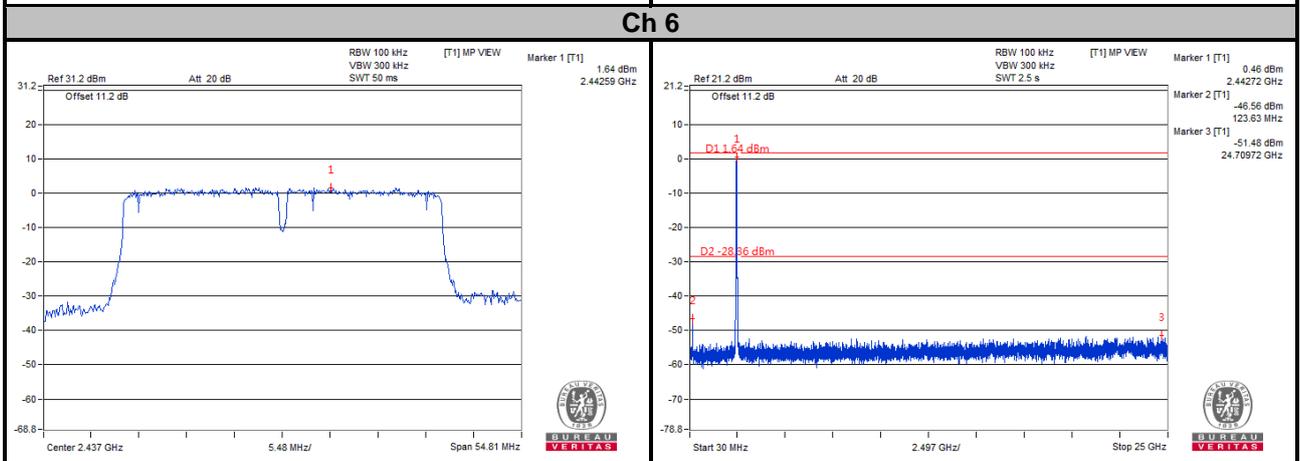
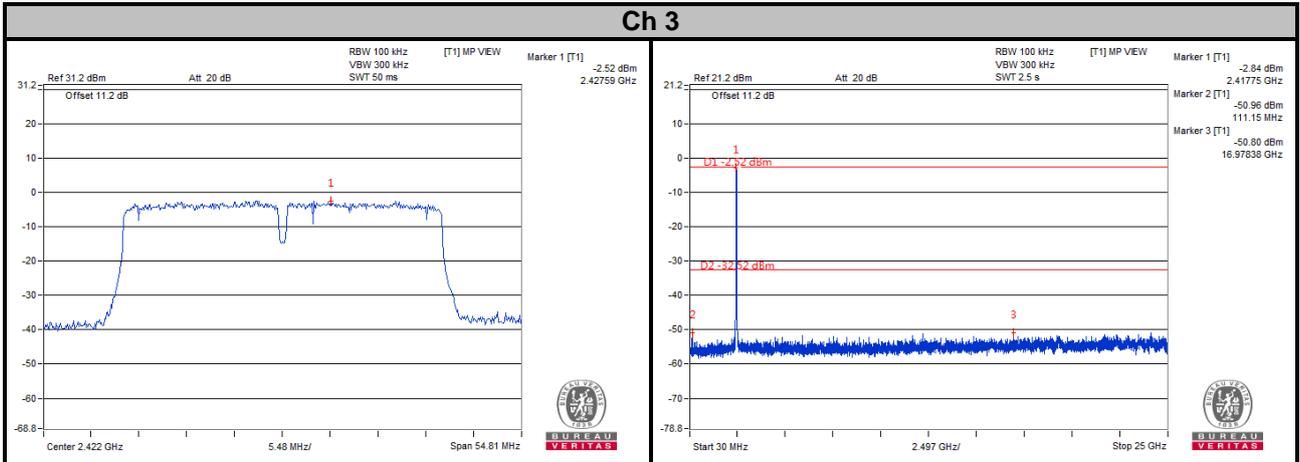
Ch 1 Band Edge



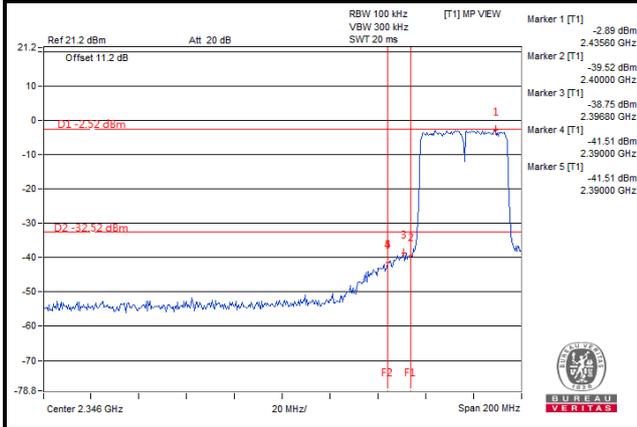
Ch 11 Band Edge



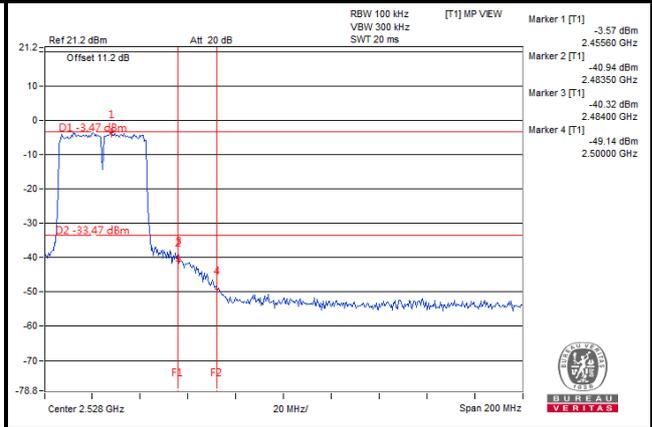
802.11ax (HE40)
CHAIN 0



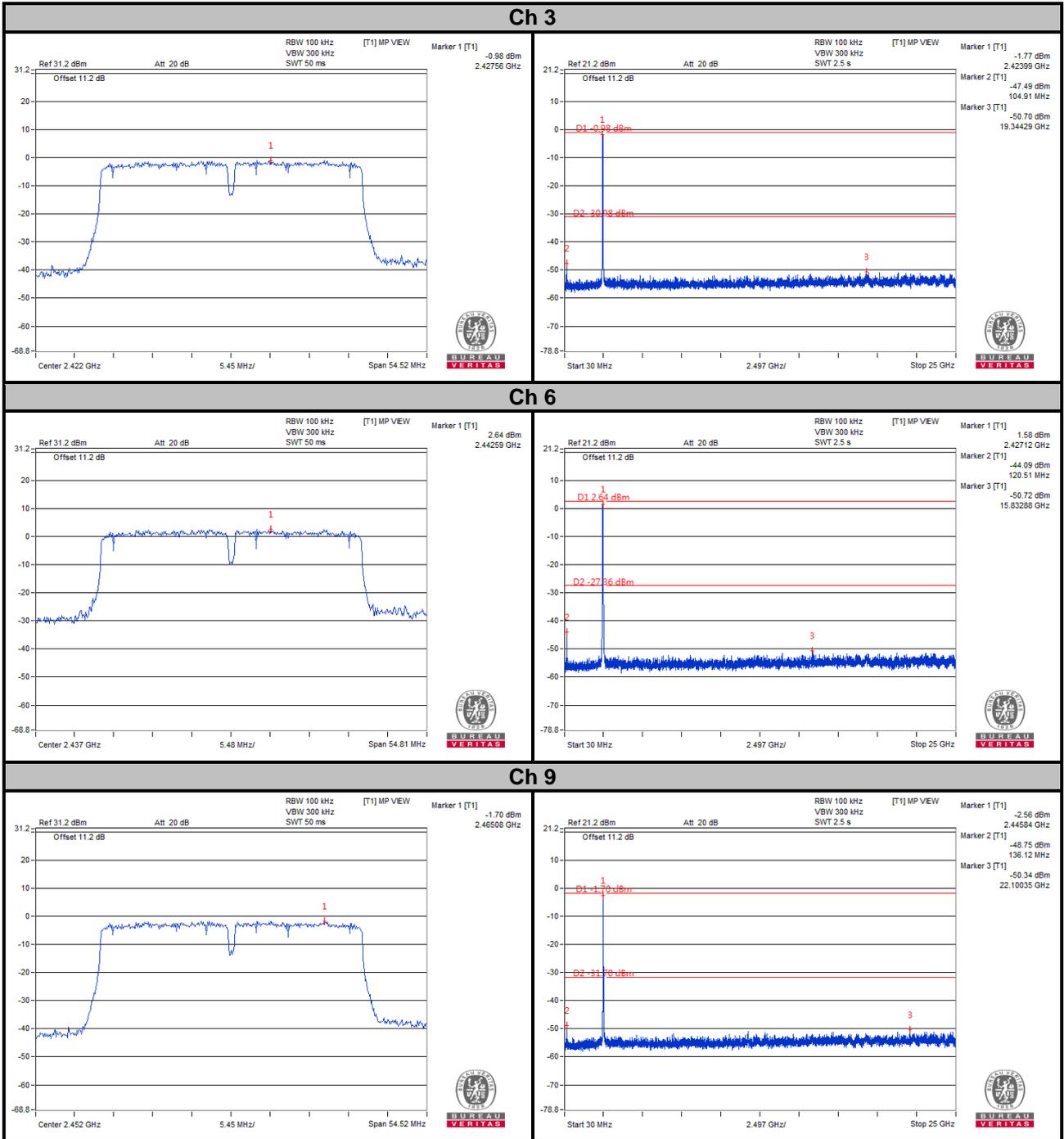
Ch 3 Band Edge

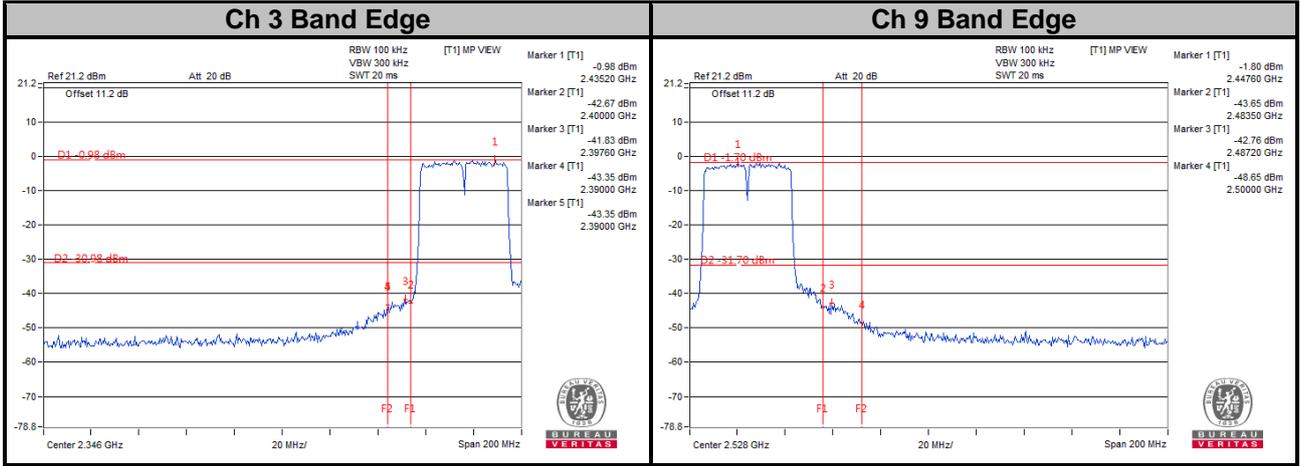


Ch 9 Band Edge



CHAIN 1



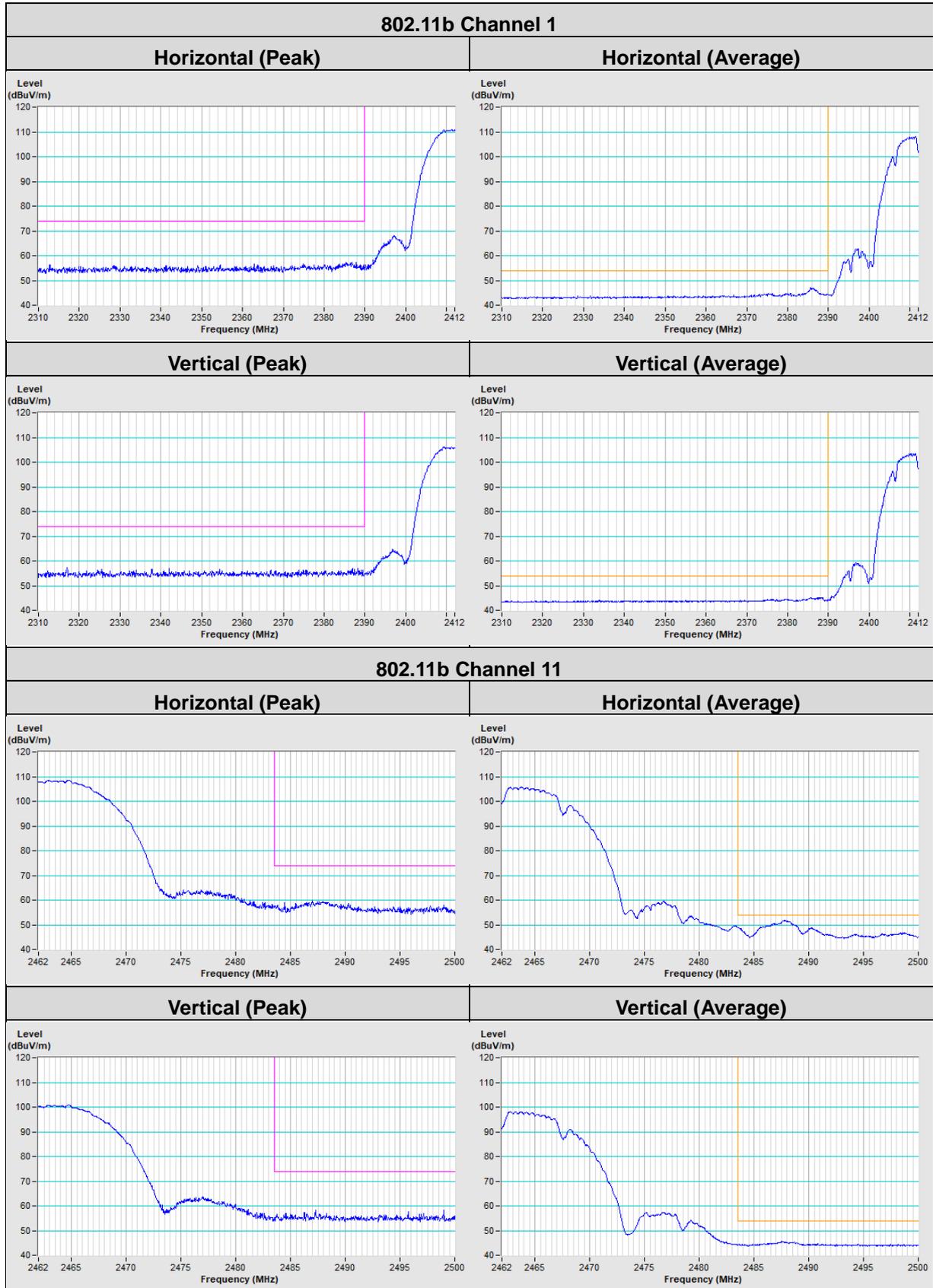


5 Pictures of Test Arrangements

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

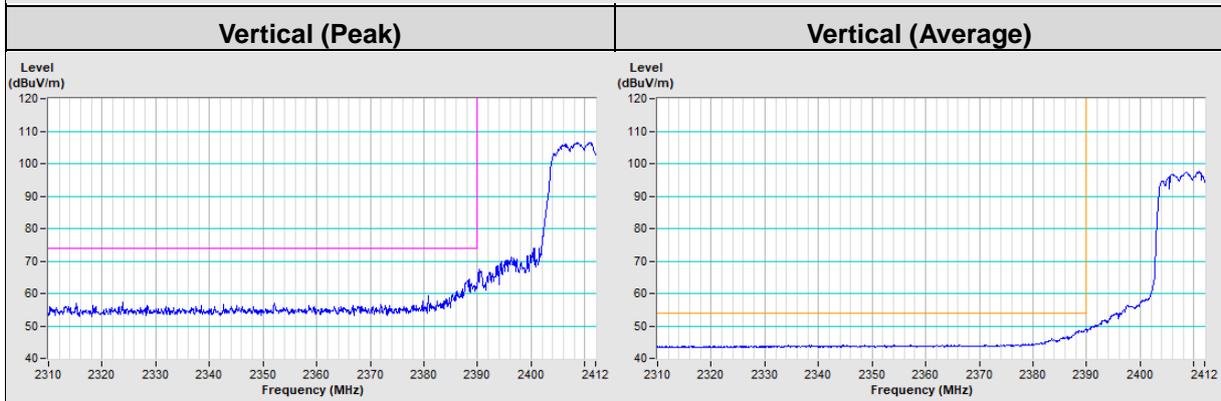
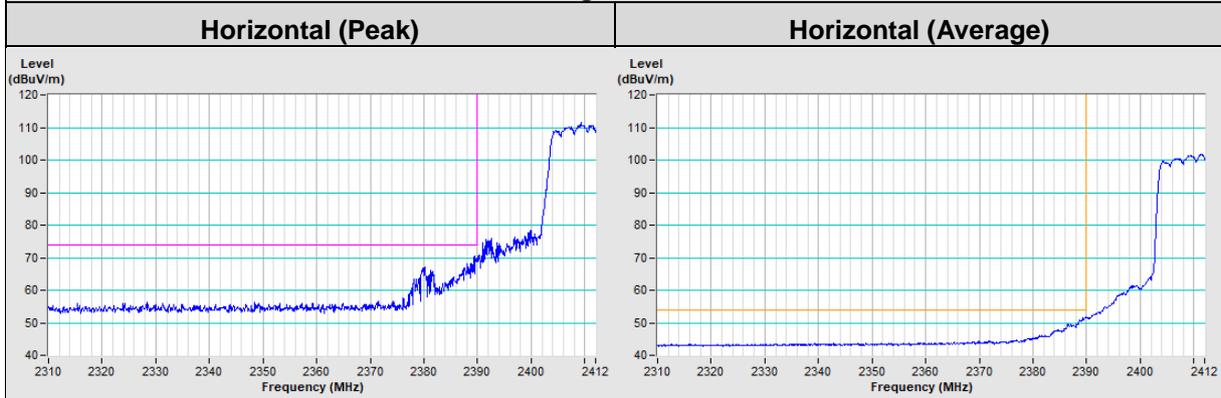
Annex A- Band Edge Measurement

802.11b

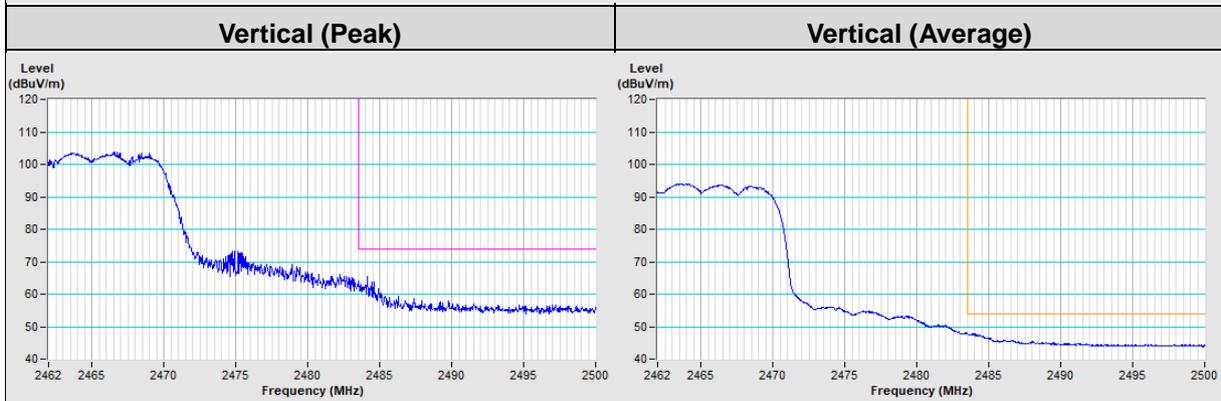
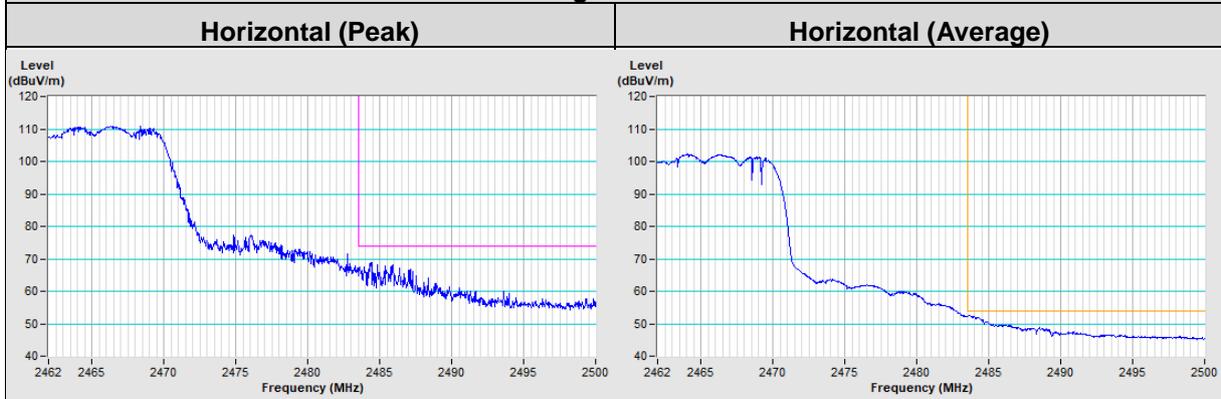


802.11g

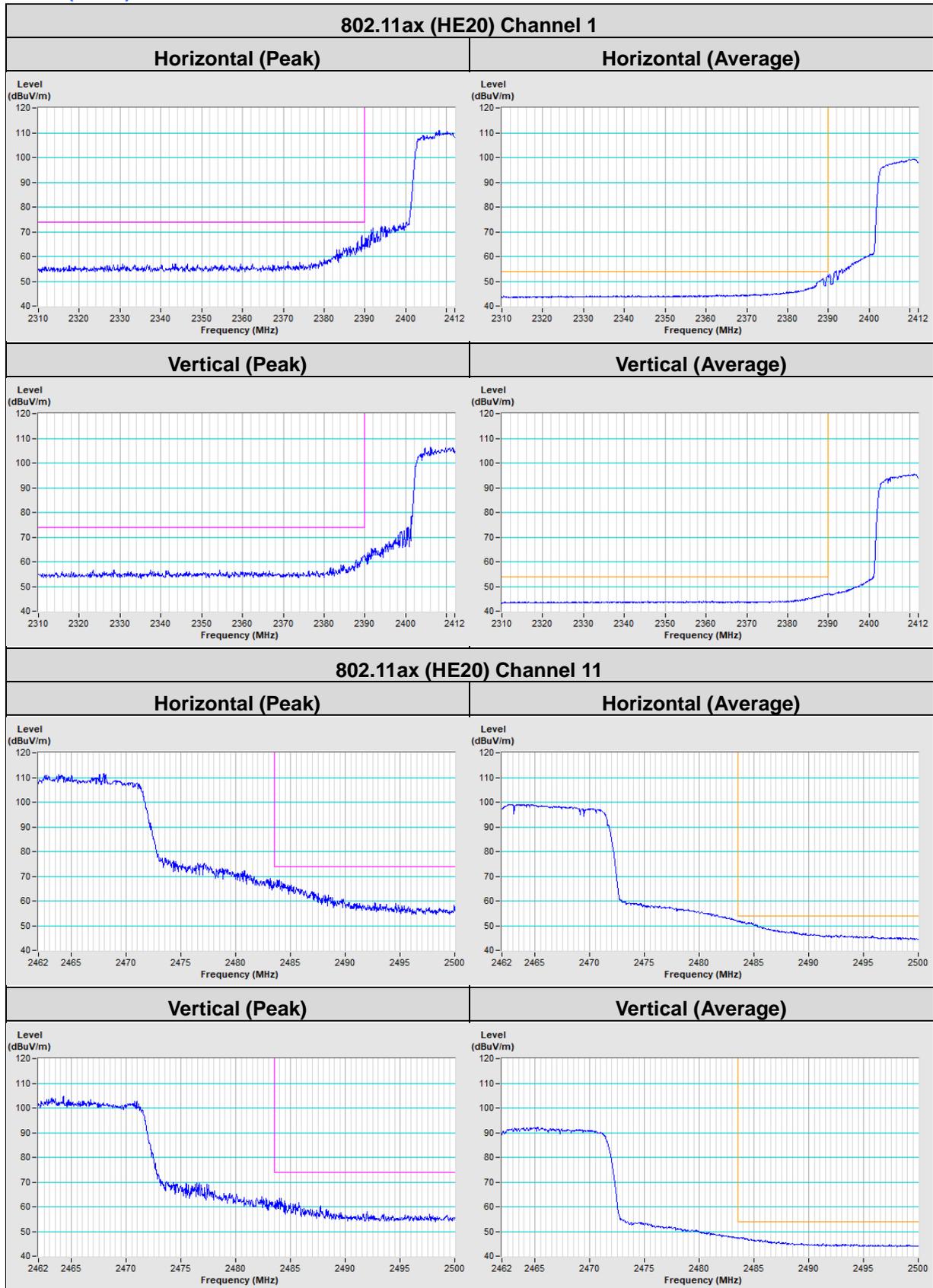
802.11g Channel 1



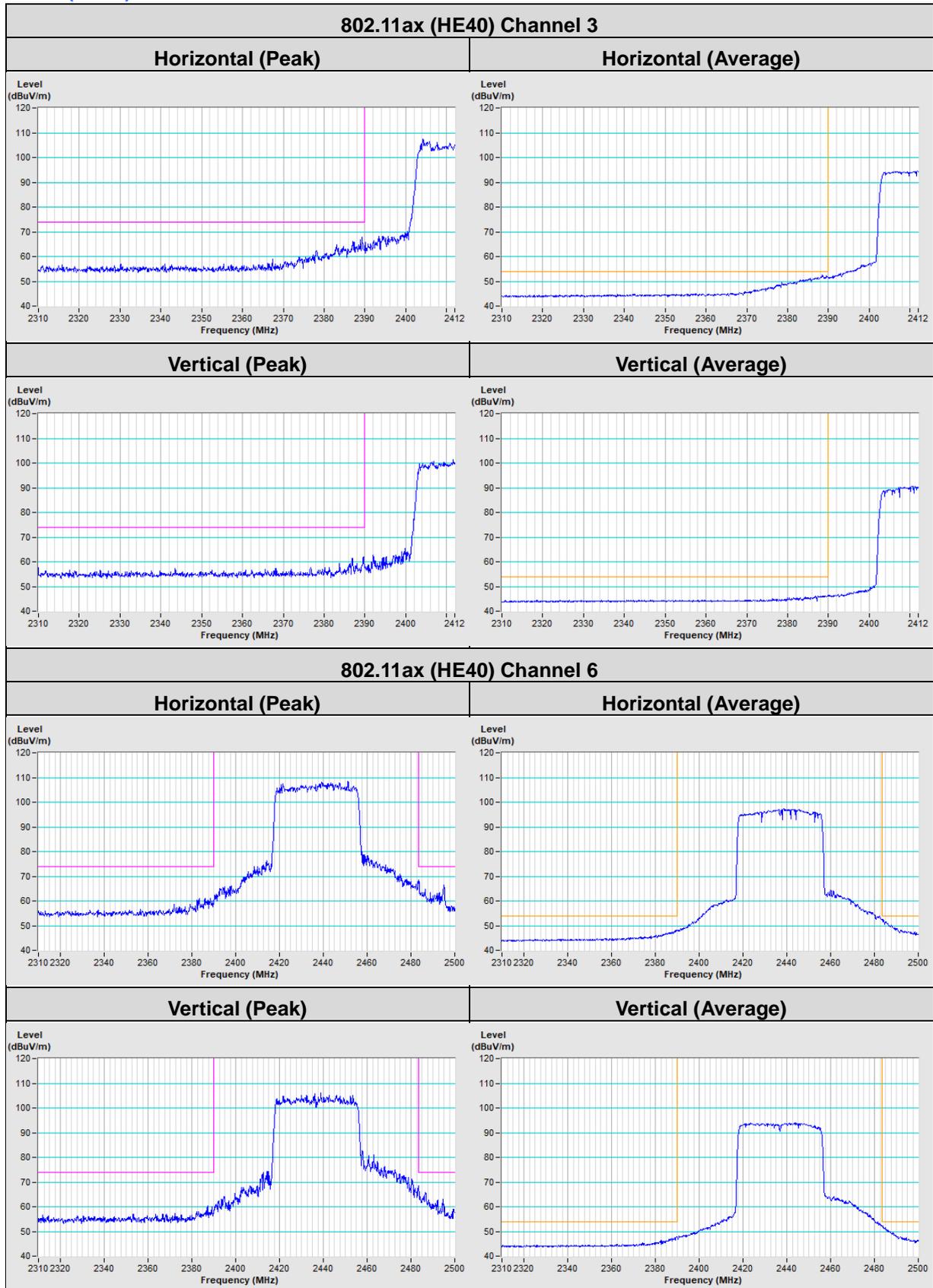
802.11g Channel 11



802.11ax (HE20)

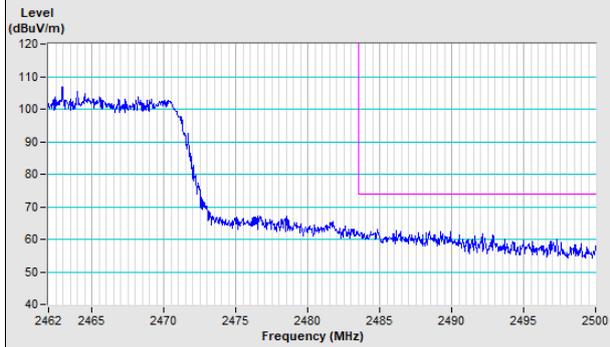


802.11ax (HE40)

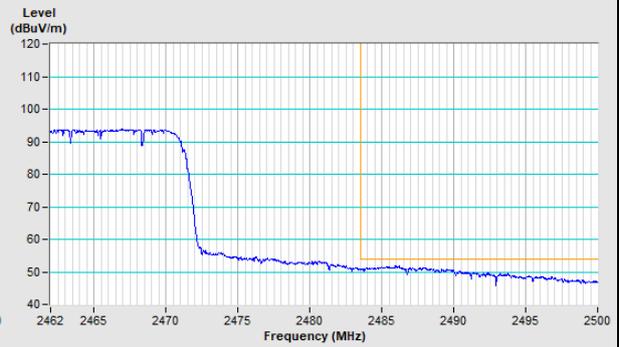


802.11ax (HE40) Channel 9

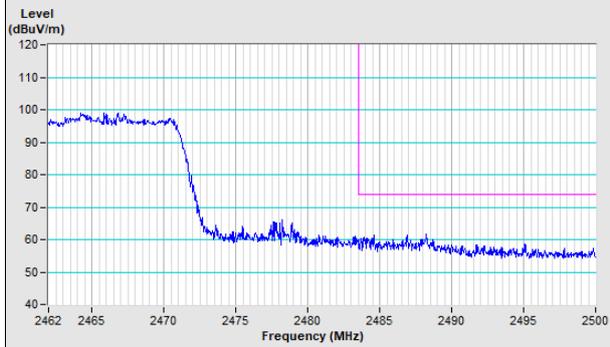
Horizontal (Peak)



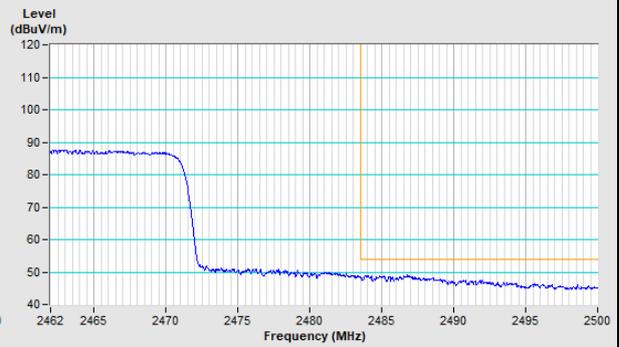
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



Appendix – Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---