TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart C (Section 15.247)**
Report No.:	RFBAOZ-WTW-P22061106
FCC ID:	2ABLK-GS2128G
Product:	GigaSpire BLAST u4g
Brand:	Calix
Model No.:	u4g GS2128G
Received Date:	2022/7/28
Test Date:	2022/7/28 ~ 2022/8/26
Issued Date:	2022/10/27
Applicant:	Calix Inc.
Address:	1035 N. McDowell Blvd. Petaluma, CA94954 U.S.A.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Approved by: _____ , **Date:** **2022/10/27**

May Chen / Manager

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Prepared by : Luna Yu / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBAOZ-WTW-P22061106	Original release.	2022/10/27

1 Certificate

Product:	GigaSpire BLAST u4g
Brand:	Calix
Test Model:	u4g GS2128G
Sample Status:	Engineering sample
Applicant:	Calix Inc.
Test Date:	2022/7/28 ~ 2022/8/26
Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247)
Measurement procedure:	ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02 KDB 662911 D01 Multiple Transmitter Output v02r01

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.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Standard / Clause	Test Item	Result	Remark
15.247(b)	RF Output Power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
15.247(d)	Conducted Out of Band Emissions	Pass	Meet the requirement of limit.
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -8.85 dB at 0.15000 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -4.3 dB at 52.75, 63.03 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.1 dB at 2483.50, 2488.30 MHz
15.203	Antenna Requirement	Pass	Antenna connector is ipex(MHF) not a standard connector.

Note: 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	Specification	Expanded Uncertainty (k=2) (±)
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.5 dB
AC Power Conducted Emissions	150 kHz ~ 30 MHz	1.9 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.4 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.0 dB
	18 GHz ~ 40 GHz	5.3 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	GigaSpire BLAST u4g
Brand	Calix
Test Model	u4g GS2128G
Status of EUT	Engineering sample
Power Supply Rating	Refer to Note
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT mode 1024QAM for OFDMA in 11ax mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 300 Mbps VHT: up to 400 Mbps 802.11ax: up to 573.5 Mbps
Operating Frequency	2.412 GHz ~ 2.462 GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7
Output Power	**CDD Mode:** 763.233 mW (28.83 dBm) **Beamforming Mode:** 482.677 mW (26.84 dBm)

Note:

1. The EUT uses following accessories.

AC Adapter 1		
Brand	Model	Specification
AMIGO	AMS157-1202500FU	AC Input : 100-240V~50/60Hz 1A DC Output : 12V, 2.5A DC Output Cable : 1.5m, unshielded Plug : US
AC Adapter 2		
Brand	Model	Specification
MOSO	MSS-V2500WR120-030E1-US	AC Input : 100-240V~50/60Hz 1A max DC Output : 12V, 2.5A DC Output Cable : 1.5m, unshielded Plug : US

2. There are WLAN (2.4 GHz) and WLAN (5 GHz) technology used for the EUT.
3. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	WLAN 5GHz
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

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.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna NO.	Model	Brand	Antenna Net Gain(dBi)	Frequency range (MHz)	Antenna Type	Connector Type	*Cable Length(cm)
1	290-20509	HONGBO	3.6	2400-2500	Dipole	ipex(MHF)	10
2	290-20510	HONGBO	4.8	2400-2500	Dipole	ipex(MHF)	31.5
3	RFPCA341221IM5B901	PSA	4.45	5150-5925	Monopole	ipex(MHF)	21.5
4	RFPCA341218IM5B901	PSA	4.46	5150-5925	Monopole	ipex(MHF)	18

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a MIMO function:

2.4 GHz Band		
Modulation Mode	**TX & RX Configuration**	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX

Note:
1. All of modulation mode support beamforming function except 802.11b/802.11g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), VHT mode for 20 MHz (40 MHz) and 802.11ax mode for 20 MHz (40 MHz), therefore the manufacturer will control the power for 802.11n/VHT mode is the same as the 802.11ax or more lower than it and investigated worst case to representative mode in test report.

3.3 Channel List

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

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

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

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

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. The AC Adapter has the following models: AMS157-1202500FU/ MSS-V2500WR120-030E1-US. Pre-scan these models of AC Adapters and find the worst case as a representative test condition. 2. EUT can be used in the following ways: Lying/ Wall Mount. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	1. AC Adapter Worst Condition: AMS157-1202500FU 2. Lying/ Wall Mount Worst Condition: Lying 3. 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).

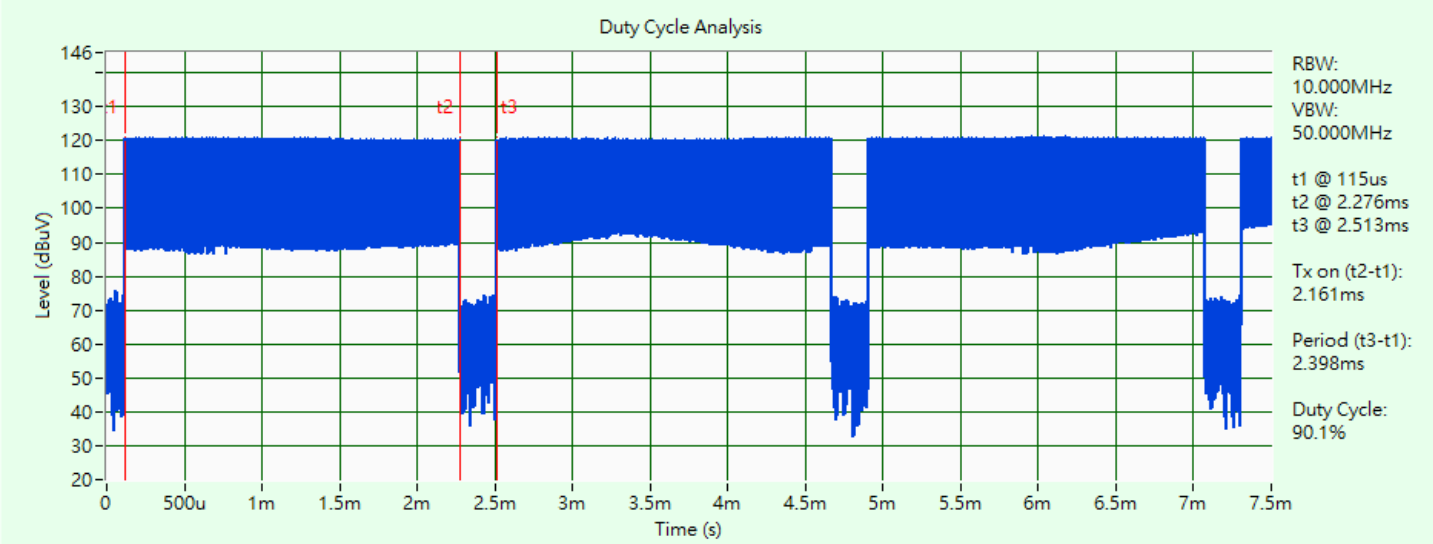
Note: Partial RU (resource unit) configurations not supported.

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

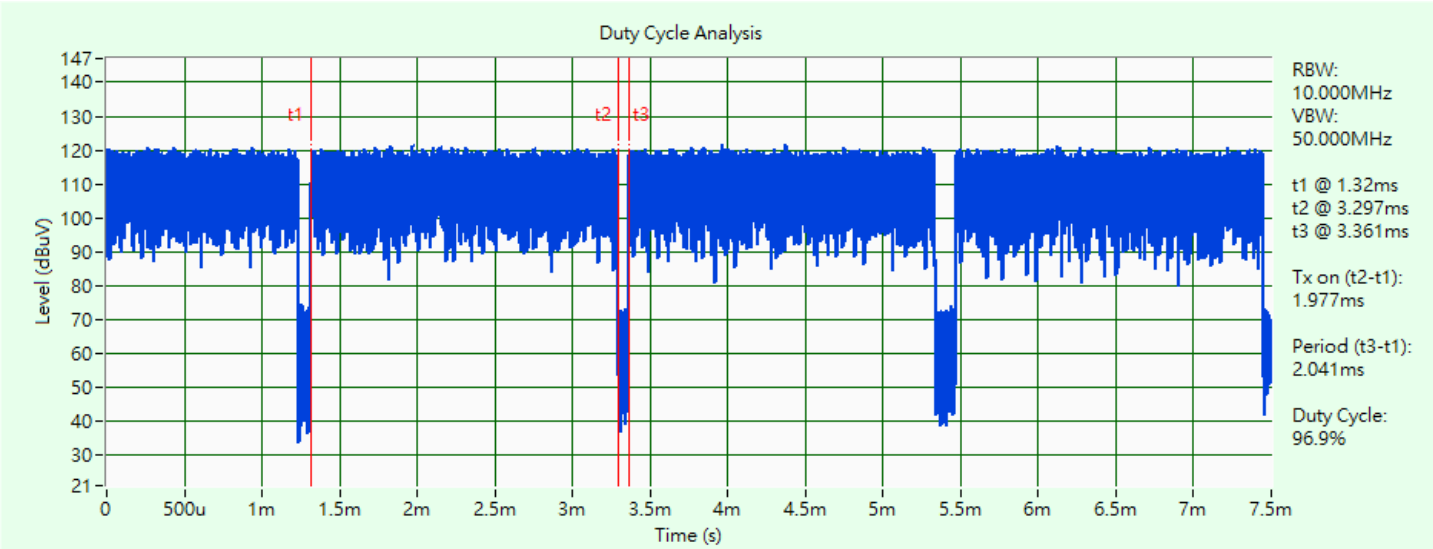
Test Item	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power	802.11b	CDD	1, 6, 11	DBPSK	1Mb/s
	802.11g	CDD	1, 6, 11	BPSK	6Mb/s
	VHT20	CDD & Beamforming	1, 6, 11	BPSK	MCS0
	VHT40	CDD & Beamforming	3, 6, 9	BPSK	MCS0
	802.11ax (HE20)	CDD & Beamforming	1, 6, 11	BPSK	MCS0
	802.11ax (HE40)	CDD & Beamforming	3, 6, 9	BPSK	MCS0
Power Spectral Density / 6 dB Bandwidth / Conducted Out of Band Emissions	802.11b	CDD	1, 6, 11	DBPSK	1Mb/s
	802.11g	CDD	1, 6, 11	BPSK	6Mb/s
	802.11ax (HE20)	CDD	1, 6, 11	BPSK	MCS0
	802.11ax (HE40)	CDD	3, 6, 9	BPSK	MCS0
AC Power Conducted Emissions	802.11ax (HE20)	CDD	6	BPSK	MCS0
Unwanted Emissions below 1 GHz	802.11ax (HE20)	CDD	6	BPSK	MCS0
Unwanted Emissions above 1 GHz	802.11b	CDD	1, 6, 11	DBPSK	1Mb/s
	802.11g	CDD	1, 6, 11	BPSK	6Mb/s
	802.11ax (HE20)	CDD	1, 6, 11	BPSK	MCS0
	802.11ax (HE40)	CDD	3, 6, 9	BPSK	MCS0

3.5 Duty Cycle of Test Signal

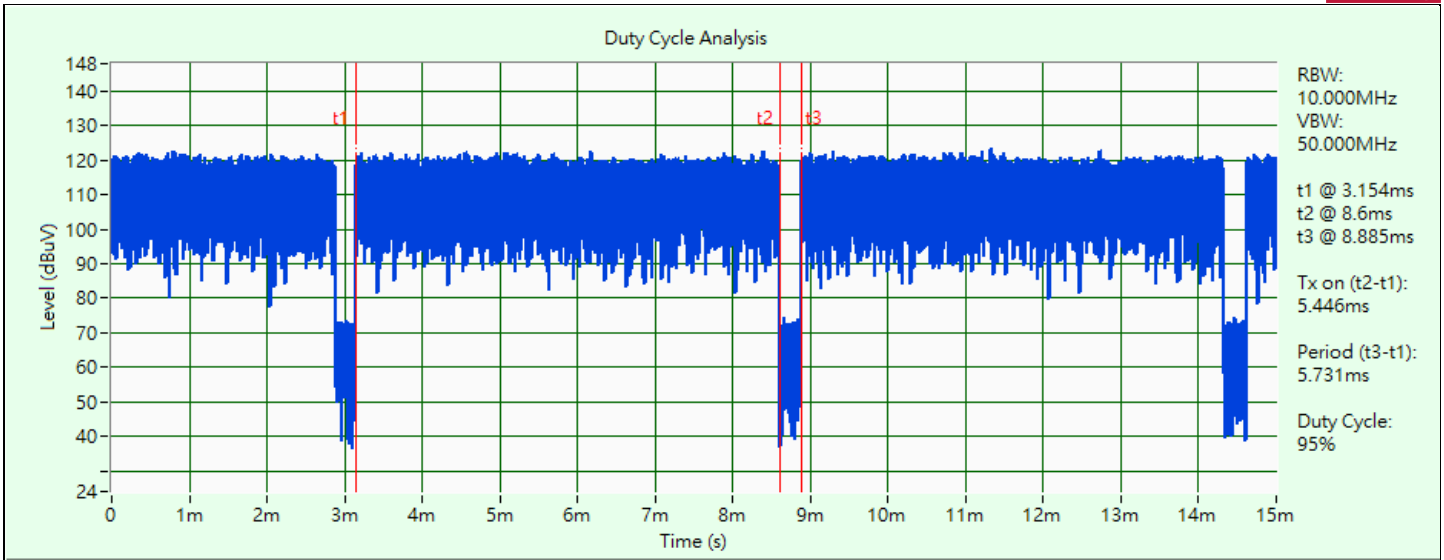
802.11b: Duty cycle = 2.161 ms / 2.398 ms x 100% = 90.1%, duty factor = 10 * log (1/Duty cycle) = 0.45 dB
802.11g: Duty cycle = 1.977 ms / 2.041 ms x 100% = 96.9%, duty factor = 10 * log (1/Duty cycle) = 0.14 dB
802.11ax (HE20): Duty cycle = 5.446 ms / 5.731 ms x 100% = 95.0%, duty factor = 10 * log (1/Duty cycle) = 0.22 dB
802.11ax (HE40): Duty cycle = 5.445 ms / 5.703 ms x 100% = 95.5%, duty factor = 10 * log (1/Duty cycle) = 0.20 dB



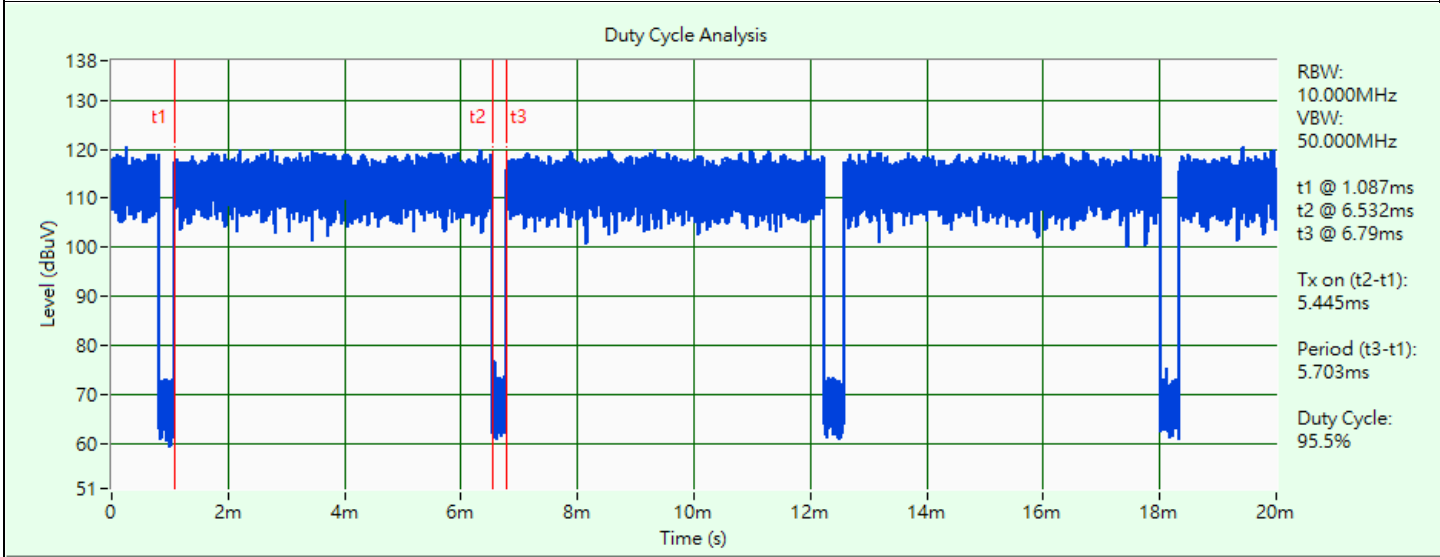
802.11b



802.11g



802.11ax (HE20)

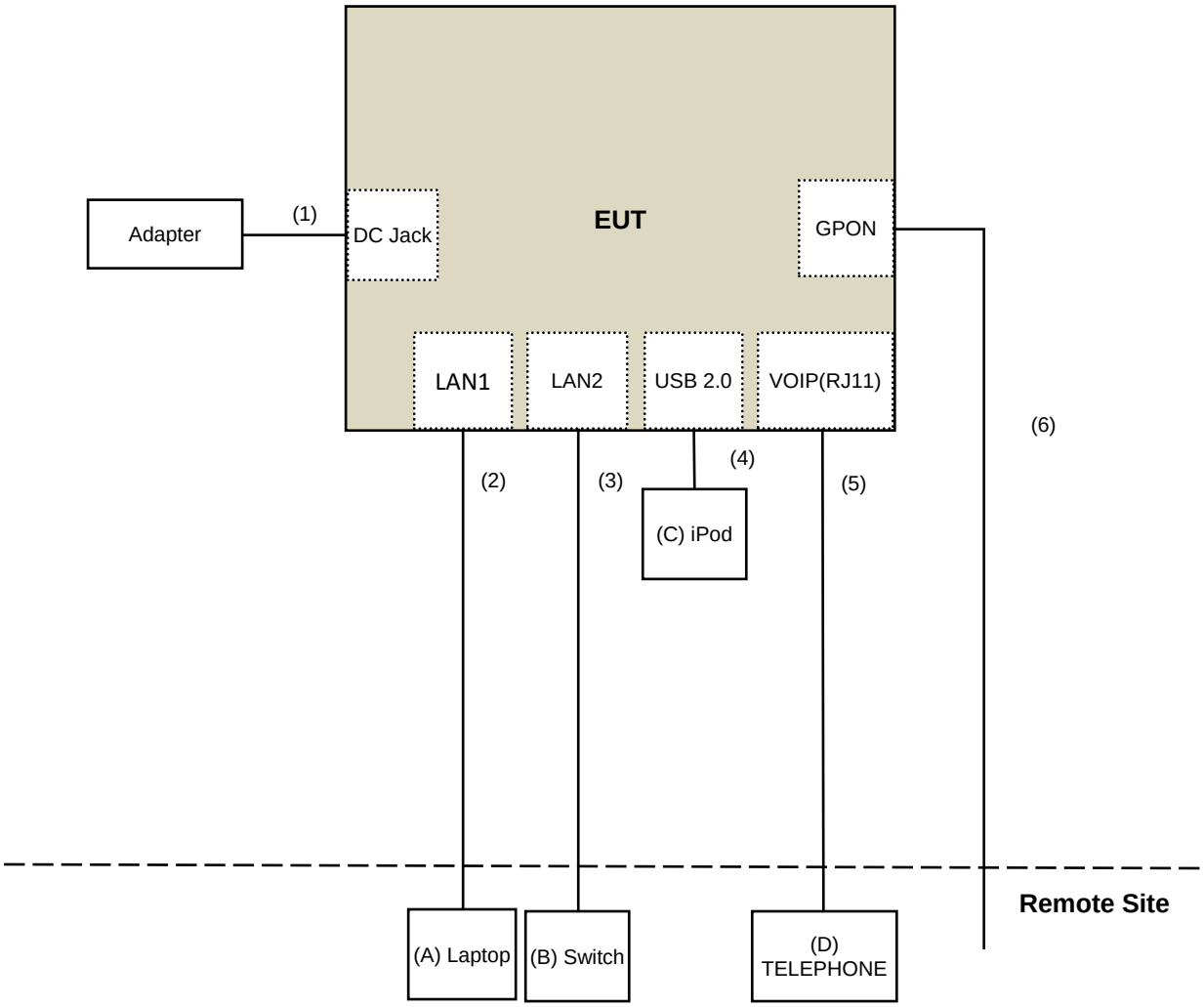


802.11ax (HE40)

3.6 Test Program Used and Operation Descriptions

Controlling software (qdart_conn.win.1.0_installer_00093.1) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	Lenovo	20U5S01X00 L14	PF-28LKK7	N/A	Supplied by applicant
B	Switch	D-Link	DGS-1005D	DR8WC92000523	N/A	Supplied by applicant
C	iPod	Apple	MD778TA/A	CC4JL03FF4T1	N/A	Supplied by applicant
D	TELEPHONE	ROMEO	TE-812	97280903	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.5	No	0	Supplied by applicant
2	RJ45 Cable	1	10	No	0	Provided by Lab
3	RJ45 Cable	1	10	No	0	Provided by Lab
4	USB Cable	1	0.12	Yes	0	Provided by Lab
5	RJ11 Cable	1	10	No	0	Provided by Lab
6	Fiber Cable	1	10	No	0	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
Pulse Power Sensor Anritsu	MA2411B	1726434	2022/6/22	2023/6/21
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2022/8/24

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	101516	2022/3/7	2023/3/6

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2022/8/24

4.3 6 dB Bandwidth

Refer to section 4.2 to get information of the instruments.

4.4 Conducted Out of Band Emissions

Refer to section 4.2 to get information of the instruments.

4.5 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohms Terminator	50	3	2021/10/27	2022/10/26
Fixed attenuator STI	STI02-2200-10	005	2022/8/24	2023/8/23
LISN R&S	ESH3-Z5	848773/004	2021/10/29	2022/10/28
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2022/8/24	2023/8/23
Software BVADT	BVADT_Cond_V7.3.7.4	N/A	N/A	N/A
TEST RECEIVER R&S	ESCS 30	847124/029	2021/10/13	2022/10/12

Notes:

1. The test was performed in Conduction 1
2. Tested Date: 2022/8/26

4.6 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	N/A	N/A
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	2021/9/23	2022/9/22
LOOP ANTENNA Electro-Metrics	EM-6879	264	2022/3/18	2023/3/17
Pre_Amplifier Agilent	8447D	2944A10636	2022/3/19	2023/3/18
Pre_Amplifier Mini-Circuits	ZFL-1000VH2	QA0838008	2021/10/19	2022/10/18
RF Coaxial Cable COMMATE/PEWC	8D	966-3-2	2022/2/26	2023/2/25
		966-3-3	2022/2/26	2023/2/25
		966-4-1	2022/3/8	2023/3/7
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/1/6	2023/1/5
		LOOPCAB-002	2022/1/6	2023/1/5
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-361	2021/10/26	2022/10/25

Notes:

1. The test was performed in 966 Chamber No. 3.
2. Tested Date: 2022/8/26

4.7 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	N/A	N/A
Fix tool for Boresight antenna tower BV	FBA-01	FBA_SIP01	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9170	9170-739	2021/11/14	2022/11/13
	BBHA9120-D	9120D-406	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC12630SE	980384	2022/1/10	2023/1/9
	EMC184045SE	980387	2022/1/10	2023/1/9
RF Cable EMCI	EMC104-SM-SM-6000	210201	2022/5/10	2023/5/9
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10	2023/1/9
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7
	EMC104-SM-SM-1500	180504	2022/4/25	2023/4/24
	EMC104-SM-SM-2000	180601	2022/6/6	2023/6/5
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19

Notes:

1. The test was performed in 966 Chamber No. 3.
2. Tested Date: 2022/7/28 ~ 2022/8/25

5 Limits of Test Items

5.1 RF Output Power

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 $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

5.2 Power Spectral Density

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

5.3 6 dB Bandwidth

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

5.4 Conducted Out of Band Emissions

Below 30 dB of the highest emission level of operating band (in 100 kHz Resolution Bandwidth).

5.5 AC Power Conducted Emissions

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

Notes:

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.

5.6 Unwanted Emissions below 1 GHz

Radiated emissions up to 1 GHz 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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.7 Unwanted Emissions above 1 GHz

Radiated emissions above 1 GHz 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)
Above 960	500	3

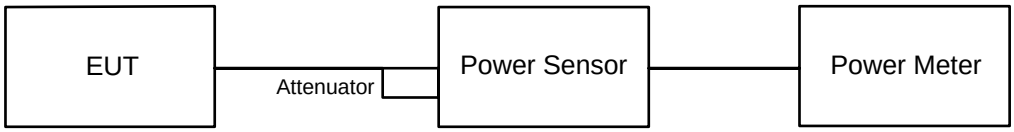
Notes:

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.

6 Test Arrangements

6.1 RF Output Power

6.1.1 Test Setup

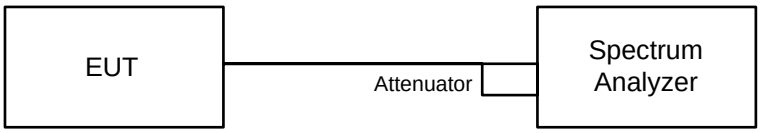


6.1.2 Test Procedure

Average Power:
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.

6.2 Power Spectral Density

6.2.1 Test Setup



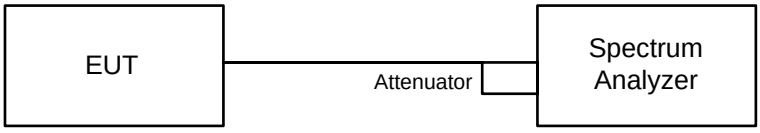
6.2.2 Test Procedure

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.
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.

Note: If Duty cycle < 98%, 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.

6.3 6 dB Bandwidth

6.3.1 Test Setup

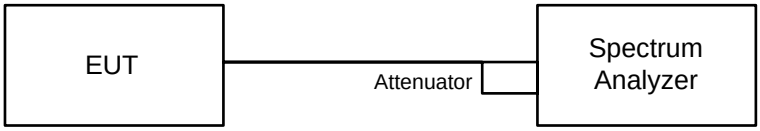


6.3.2 Test Procedure

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.

6.4 Conducted Out of Band Emissions

6.4.1 Test Setup



6.4.2 Test Procedure

MEASUREMENT PROCEDURE REF

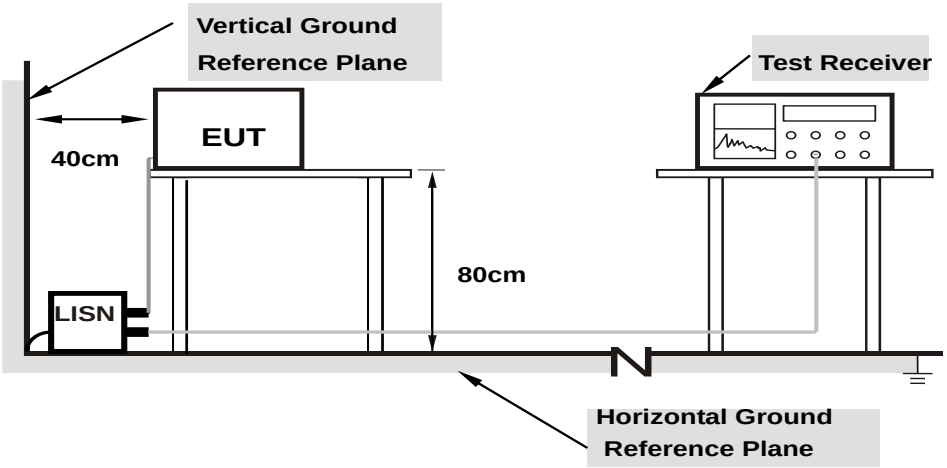
a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

6.5 AC Power Conducted Emissions

6.5.1 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).

6.5.2 Test Procedure

a. The EUT was placed on a 0.8 meter to the top of table and 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.

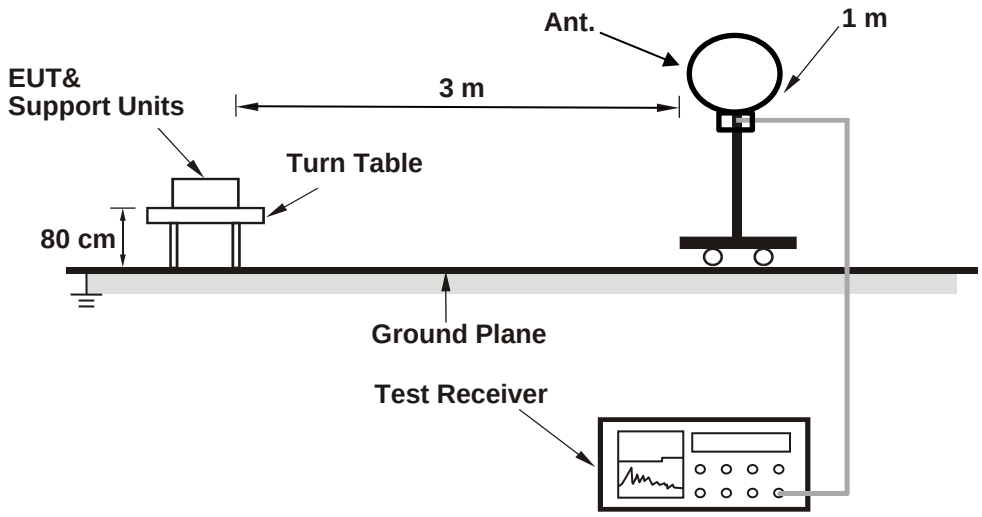
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

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.

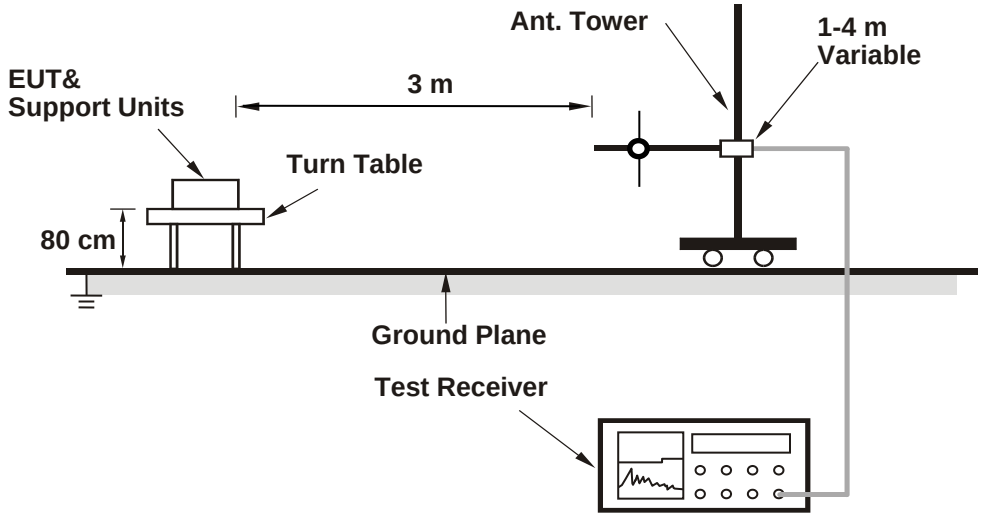
6.6 Unwanted Emissions below 1 GHz

6.6.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



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

6.6.2 Test Procedure

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 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. 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, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters 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.

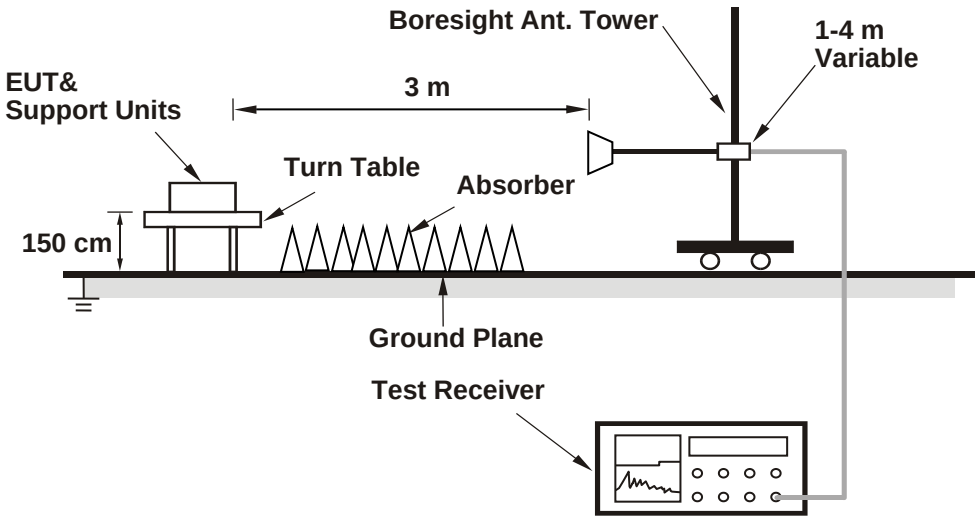
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

6.7 Unwanted Emissions above 1 GHz

6.7.1 Test Setup



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

6.7.2 Test Procedure

a. The EUT was placed on the top of a rotating table 1.5 meters 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 peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Notes:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
2. For fundamental and harmonic signal measurement, 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.
3. All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 RF Output Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko

802.11b CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	25.62	25.54	722.85	28.59	30	Pass
6	2437	25.92	25.71	763.233	28.83	30	Pass
11	2462	25.77	25.82	759.516	28.81	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.8 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11g CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	22.21	22.14	330.023	25.19	30	Pass
6	2437	24.95	24.97	626.659	27.97	30	Pass
11	2462	21.87	21.96	310.852	24.93	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.8 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT20 CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	21.28	21.40	272.315	24.35	30	Pass
6	2437	23.51	23.69	458.272	26.61	30	Pass
11	2462	21.08	21.05	255.583	24.08	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.8 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT40 CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	19.95	19.80	194.355	22.89	30	Pass
6	2437	19.65	19.78	187.318	22.73	30	Pass
9	2452	19.21	19.14	165.403	22.19	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.8 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	21.56	21.67	290.111	24.63	30	Pass
6	2437	23.72	23.93	482.677	26.84	30	Pass
11	2462	21.37	21.28	271.365	24.34	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.8 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	20.16	20.07	205.378	23.13	30	Pass
6	2437	19.88	20.03	197.968	22.97	30	Pass
9	2452	19.49	19.37	175.417	22.44	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.8 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT20 Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	21.28	21.40	272.315	24.35	28.77	Pass
6	2437	23.51	23.69	458.272	26.61	28.77	Pass
11	2462	21.08	21.05	255.583	24.08	28.77	Pass

Notes:

1. Directional gain = $10 \log[(10^{Chain0/20} + 10^{Chain1/20})^2 / 2]$
2. The directional gain is 7.23 dBi > 6 dBi, so the output power limit shall be reduced to 30-(7.23-6) = 28.77 dBm.

VHT40 Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	19.95	19.80	194.355	22.89	28.77	Pass
6	2437	19.65	19.78	187.318	22.73	28.77	Pass
9	2452	19.21	19.14	165.403	22.19	28.77	Pass

Notes:

1. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
2. The directional gain is 7.23 dBi > 6 dBi, so the output power limit shall be reduced to 30-(7.23-6) = 28.77 dBm.

802.11ax (HE20) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	21.56	21.67	290.111	24.63	28.77	Pass
6	2437	23.72	23.93	482.677	26.84	28.77	Pass
11	2462	21.37	21.28	271.365	24.34	28.77	Pass

Notes:

1. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
2. The directional gain is 7.23 dBi > 6 dBi, so the output power limit shall be reduced to 30-(7.23-6) = 28.77 dBm.

802.11ax (HE40) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	20.16	20.07	205.378	23.13	28.77	Pass
6	2437	19.88	20.03	197.968	22.97	28.77	Pass
9	2452	19.49	19.37	175.417	22.44	28.77	Pass

Notes:

1. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
2. The directional gain is 7.23 dBi > 6 dBi, so the output power limit shall be reduced to 30-(7.23-6) = 28.77 dBm.

7.2 Power Spectral Density

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko

802.11b

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1				
1	2412	-6.52	-5.34	0.45	-2.43	6.77	Pass
6	2437	-5.90	-6.67	0.45	-2.81	6.77	Pass
11	2462	-5.58	-5.49	0.45	-2.07	6.77	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. The directional gain is 7.23 dBi > 6 dBi, so the power density limit shall be reduced to 8-(7.23-6) = 6.77 dBm/3kHz.

802.11g

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1				
1	2412	-12.10	-11.85	0.14	-8.82	6.77	Pass
6	2437	-9.29	-9.60	0.14	-6.29	6.77	Pass
11	2462	-12.43	-12.35	0.14	-9.24	6.77	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. The directional gain is 7.23 dBi > 6 dBi, so the power density limit shall be reduced to 8-(7.23-6) = 6.77 dBm/3kHz.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1				
1	2412	-14.72	-14.91	0.22	-11.58	6.77	Pass
6	2437	-12.63	-12.73	0.22	-9.45	6.77	Pass
11	2462	-15.14	-15.35	0.22	-12.01	6.77	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. The directional gain is 7.23 dBi > 6 dBi, so the power density limit shall be reduced to 8-(7.23-6) = 6.77 dBm/3kHz.

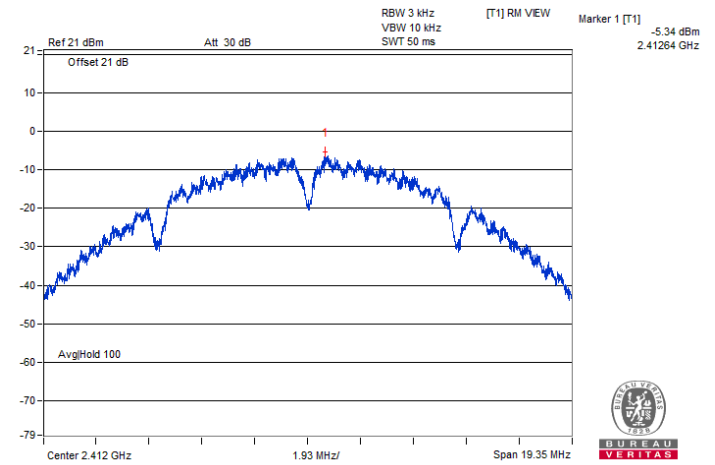
802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1				
3	2422	-19.72	-19.53	0.20	-16.41	6.77	Pass
6	2437	-19.65	-19.78	0.20	-16.50	6.77	Pass
9	2452	-20.35	-20.43	0.20	-17.18	6.77	Pass

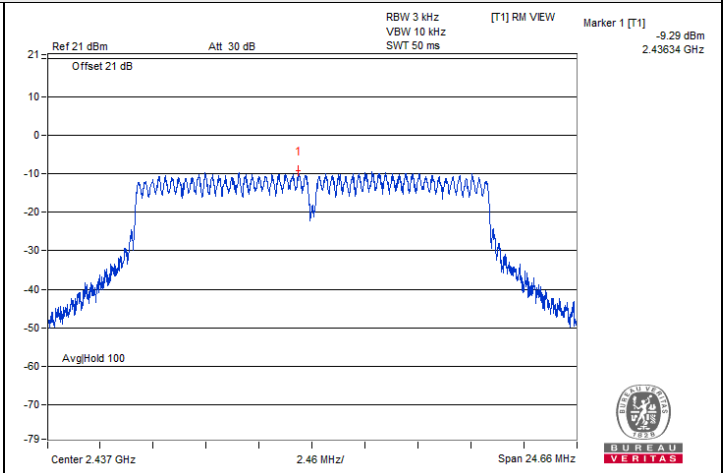
Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. The directional gain is 7.23 dBi > 6 dBi, so the power density limit shall be reduced to 8-(7.23-6) = 6.77 dBm/3kHz.

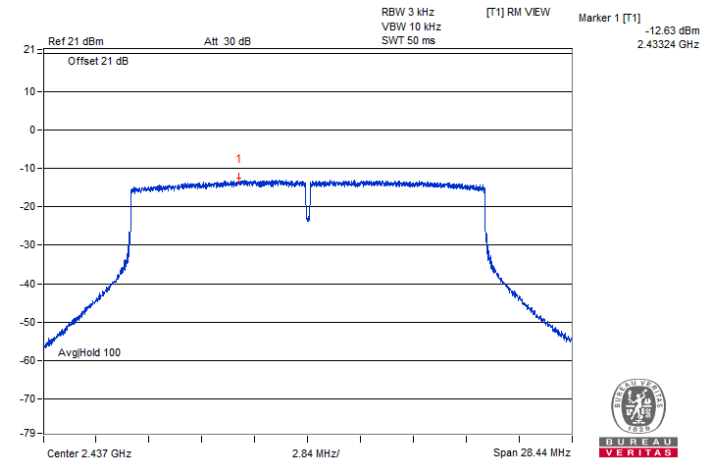
Spectrum Plot of Maximum Value



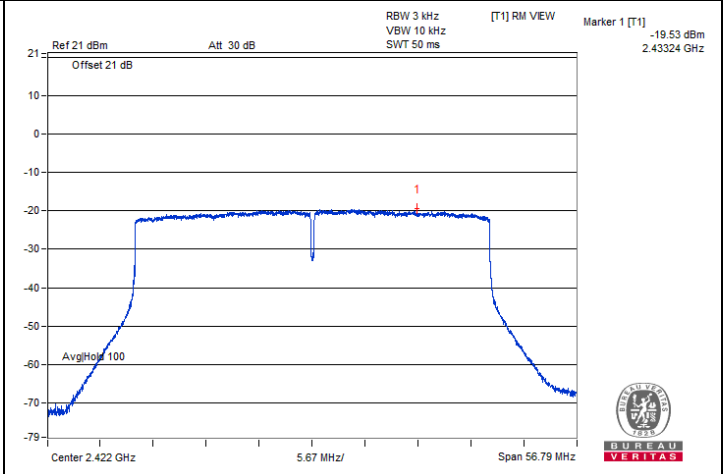
802.11b / Chain1 : CH 1



802.11g / Chain0 : CH 6



802.11ax (HE20) / Chain0 : CH 6



802.11ax (HE40) / Chain1 : CH 3

7.3 6 dB Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	8.04	8.03	0.5	Pass
6	2437	8.05	7.57	0.5	Pass
11	2462	8.02	7.58	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	15.66	16.02	0.5	Pass
6	2437	15.92	15.82	0.5	Pass
11	2462	15.94	16.04	0.5	Pass

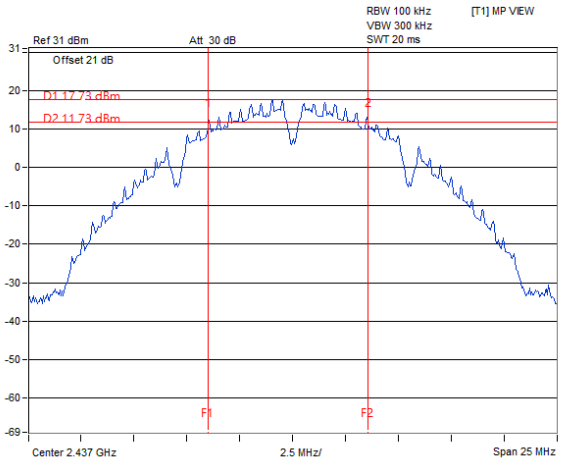
802.11ax (HE20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
1	2412	17.99	18.37	0.5	Pass
6	2437	18.32	18.48	0.5	Pass
11	2462	17.76	18.52	0.5	Pass

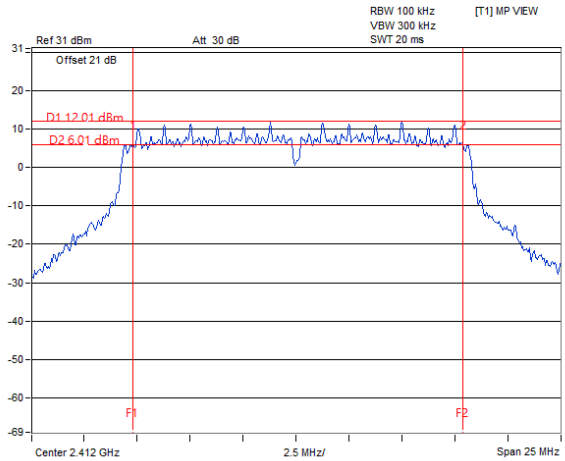
802.11ax (HE40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
3	2422	37.67	37.79	0.5	Pass
6	2437	37.63	37.85	0.5	Pass
9	2452	37.79	37.51	0.5	Pass

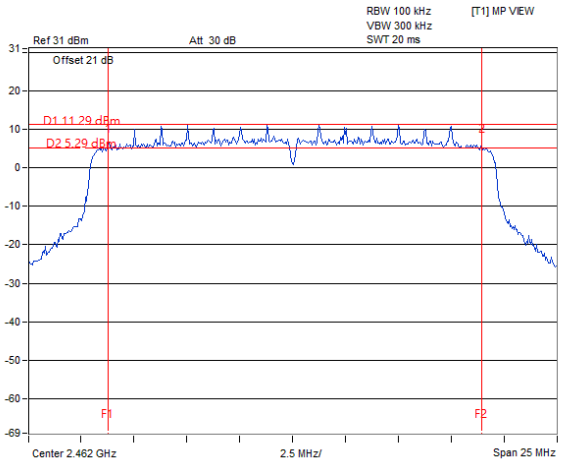
Spectrum Plot of Minimum Value



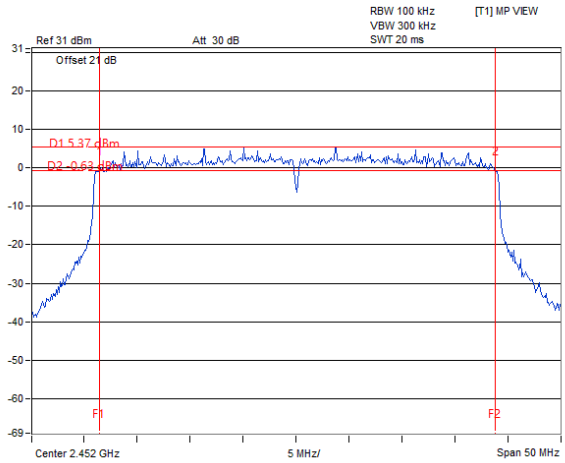
802.11b / Chain1 : CH 6



802.11g / Chain0 : CH 1



802.11ax (HE20) / Chain0 : CH 11

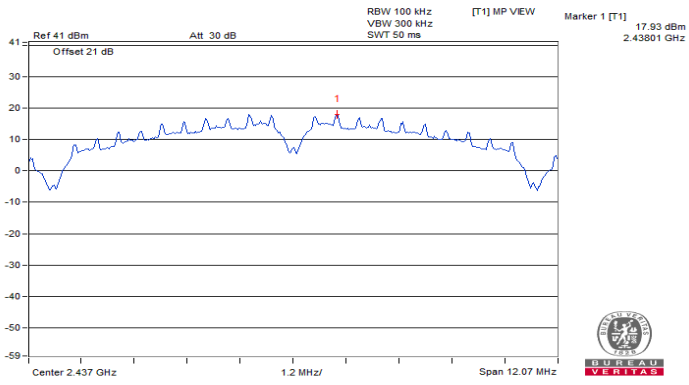


802.11ax (HE40) / Chain1 : CH 9

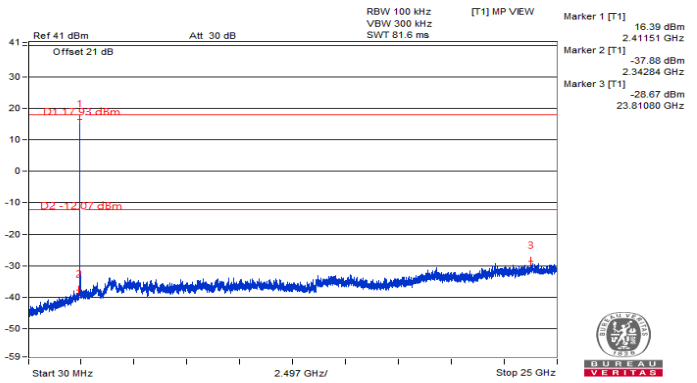
7.4 Conducted Out of Band Emissions

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Kevin Ko

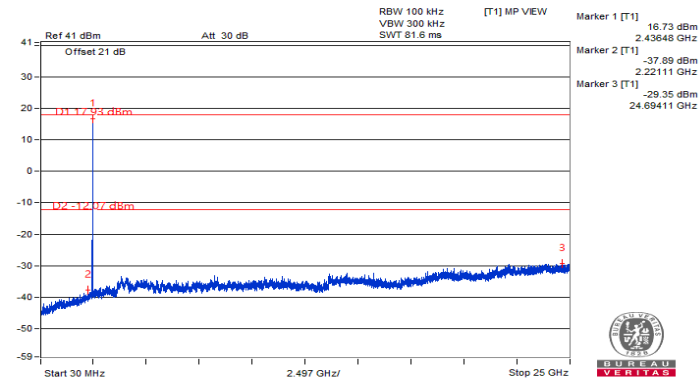
802.11b



Maximum Reference Level



Chain 0 : CH 1



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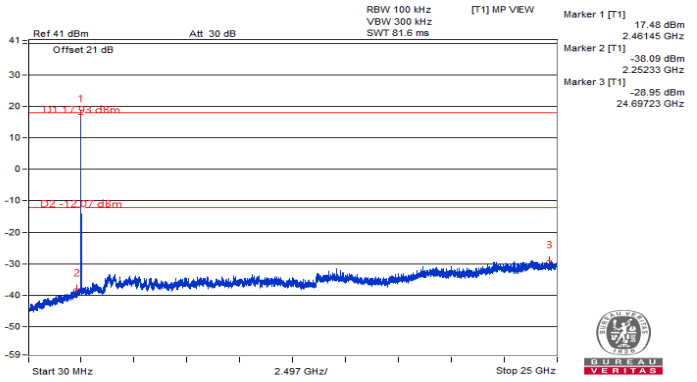
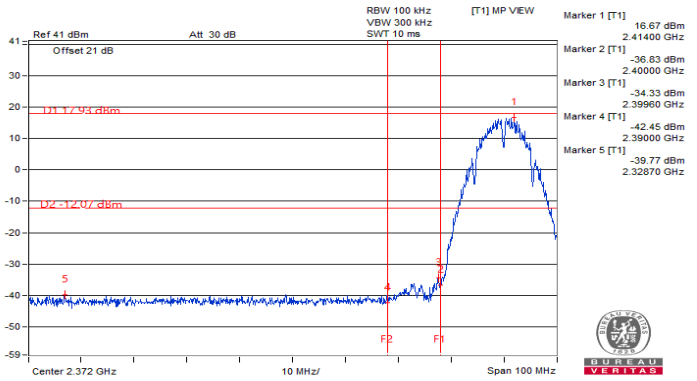
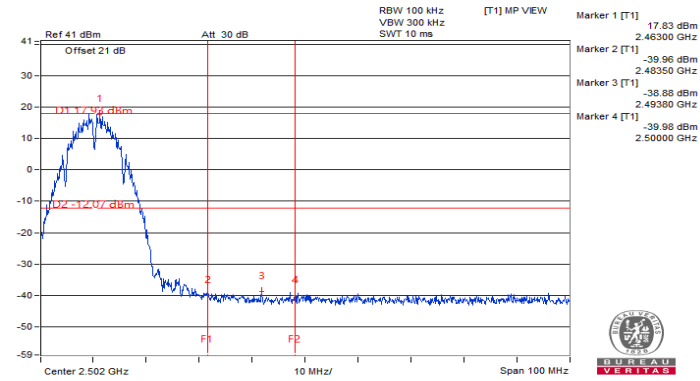


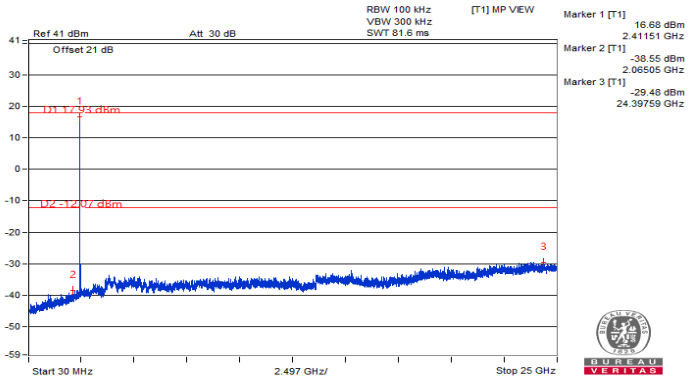
Chain 0 : CH 11



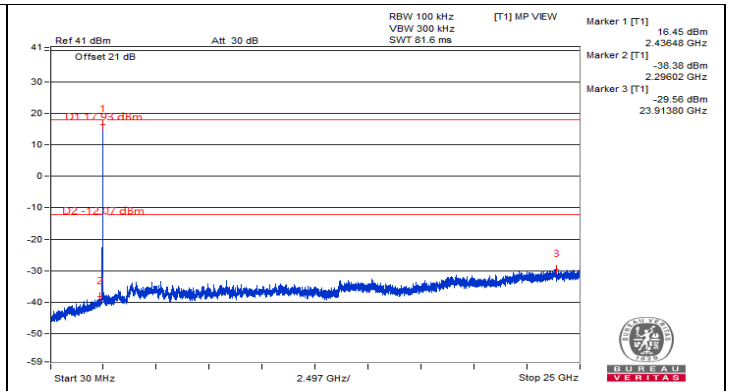
Chain 0 : CH 1 Band edge



Chain 0 : CH 11 Band edge



Chain 1 : CH 1



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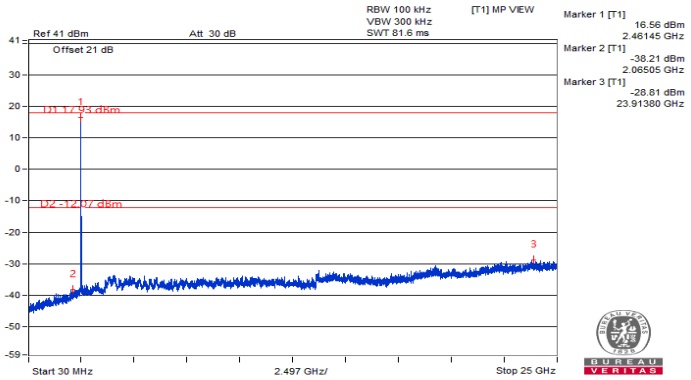

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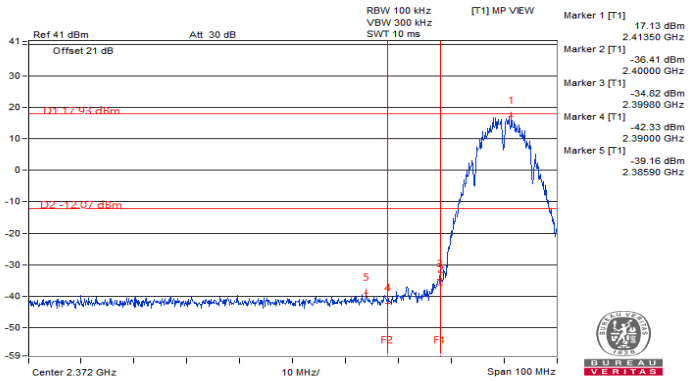
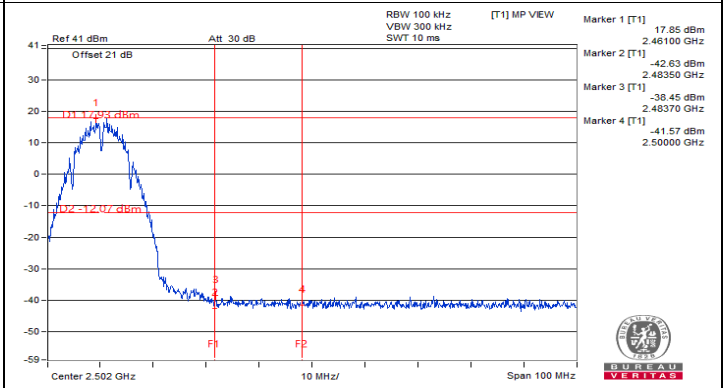
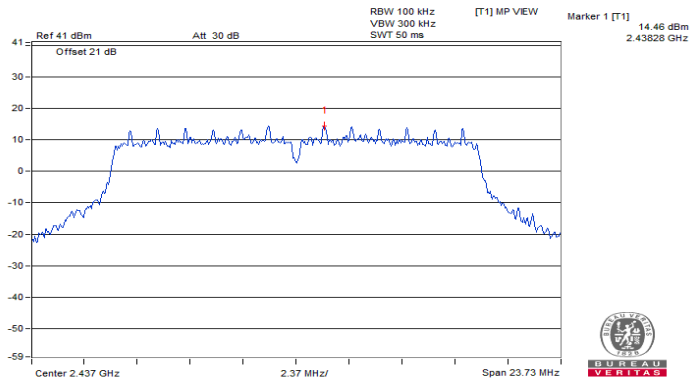


Chain 1 : CH 1 Band edge

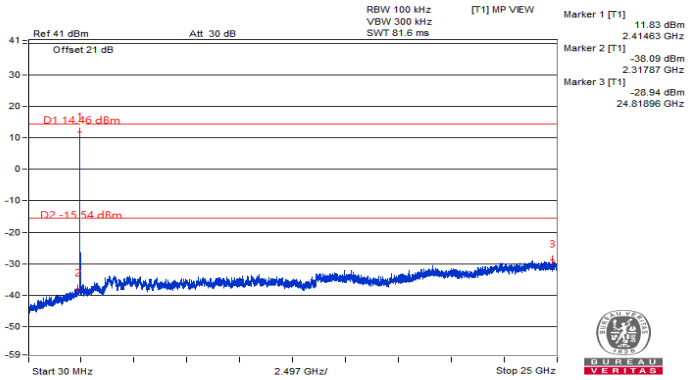


Chain 1 : CH 11 Band edge

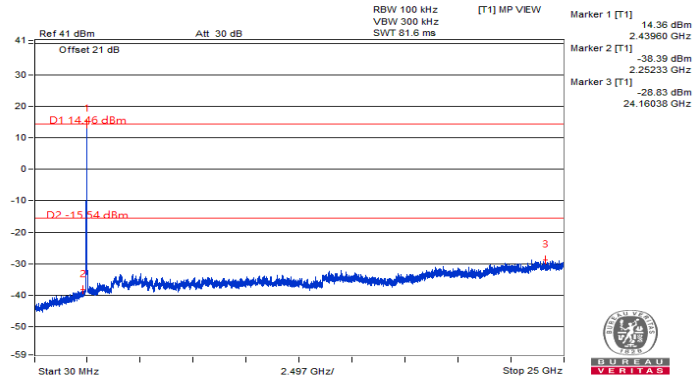
802.11g



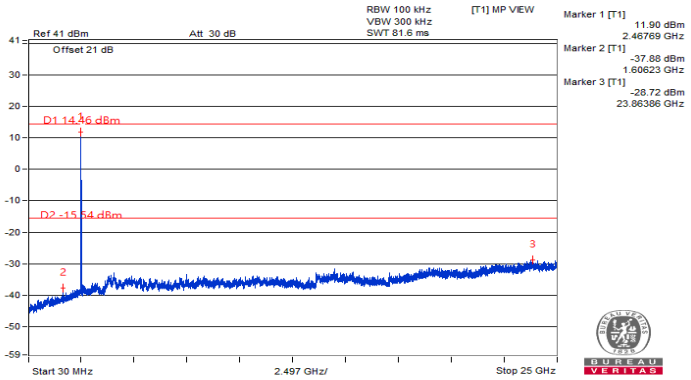
Maximum Reference Level



Chain 0 : CH 1



Chain 0 : CH 6



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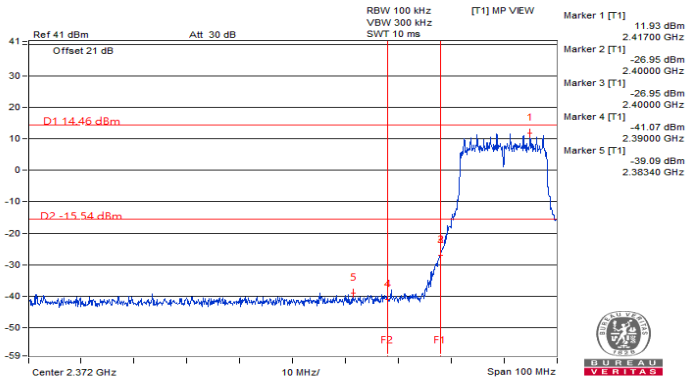
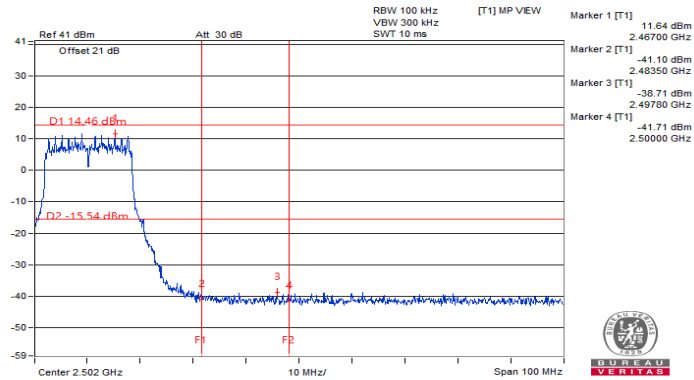


Chain 0 : CH 1 Band edge



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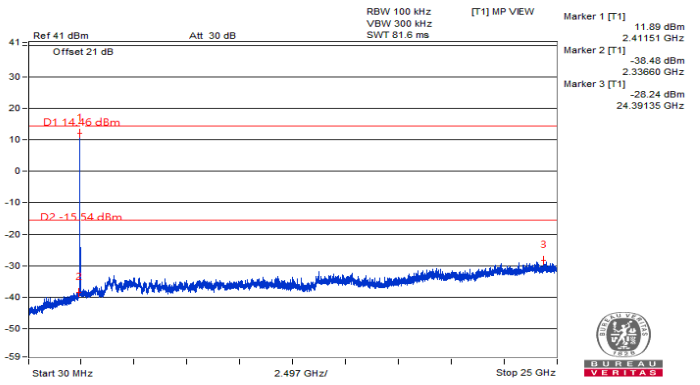
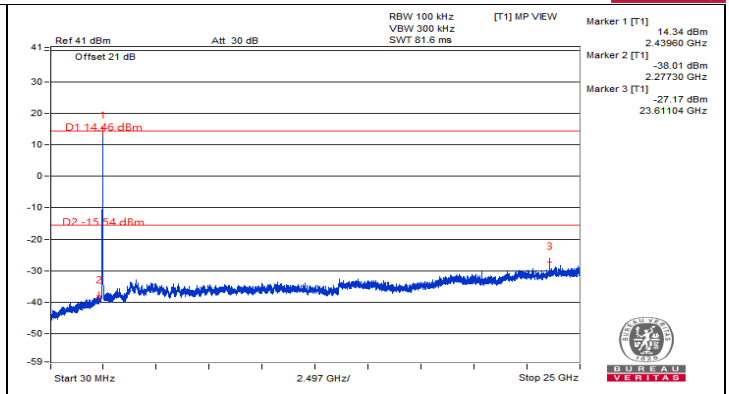


Chain 1 : CH 1



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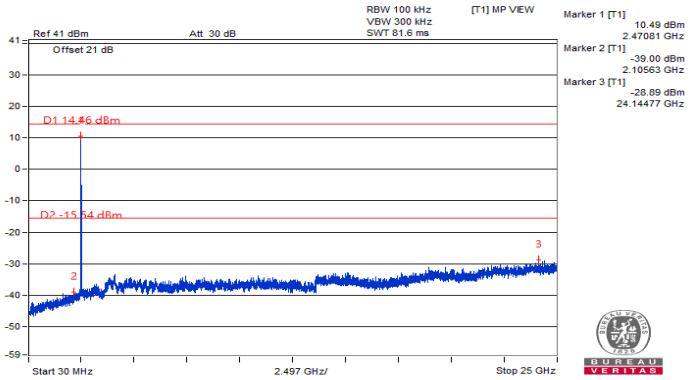

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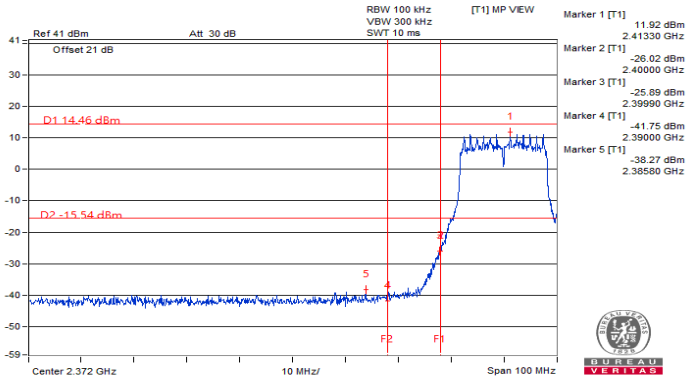
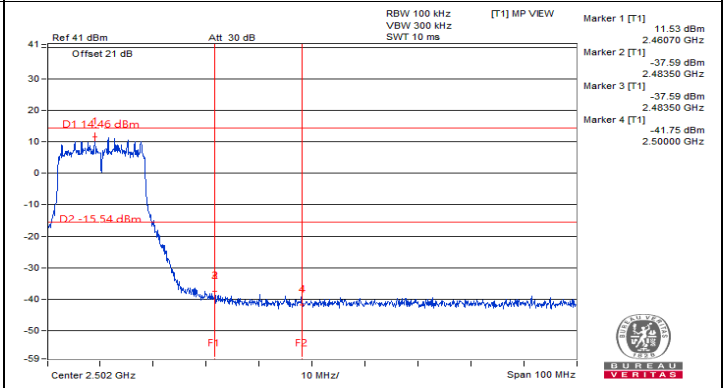


Chain 1 : CH 1 Band edge



Chain 1 : CH 11 Band edge

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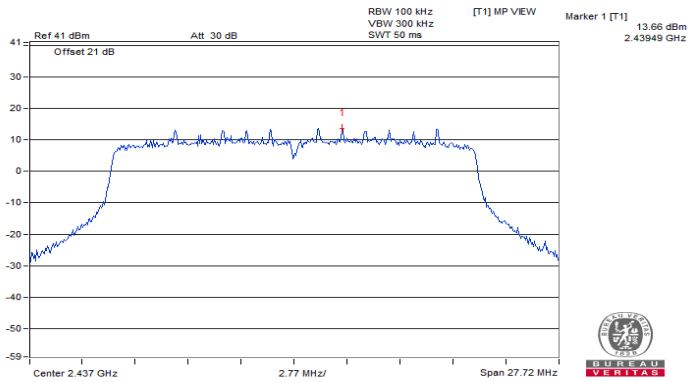
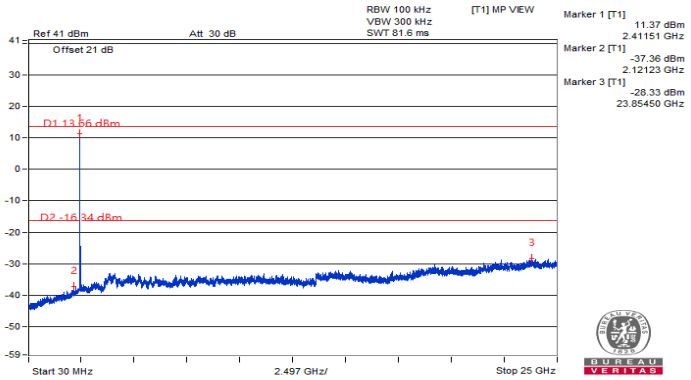
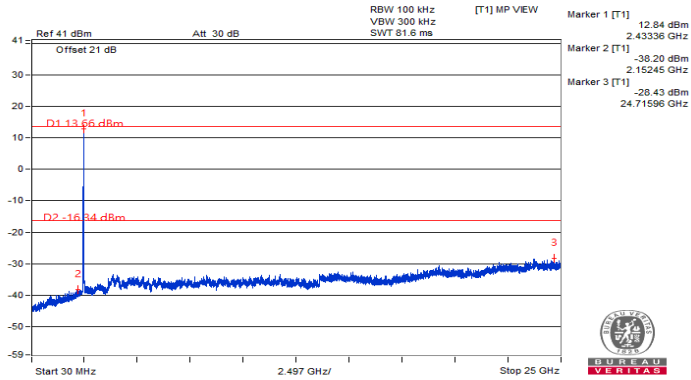


Maximum Reference Level



Chain 0 : CH 1



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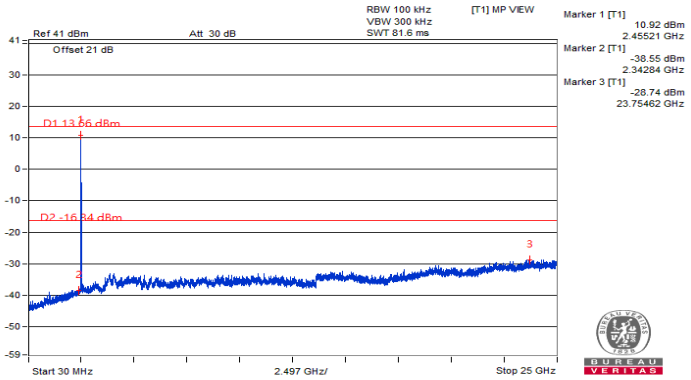

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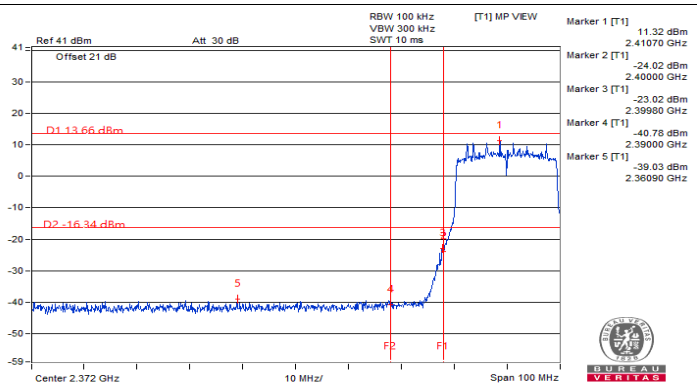
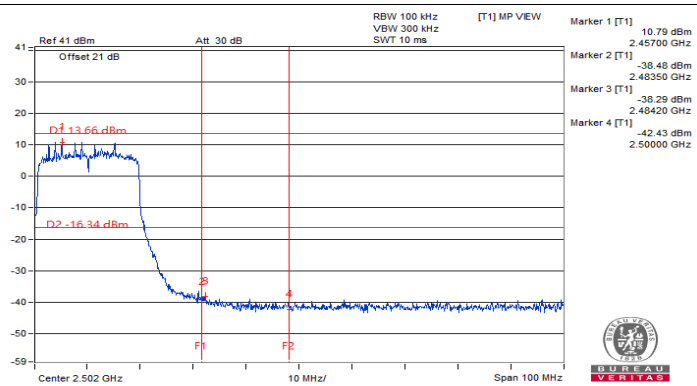


Chain 0 : CH 1 Band edge



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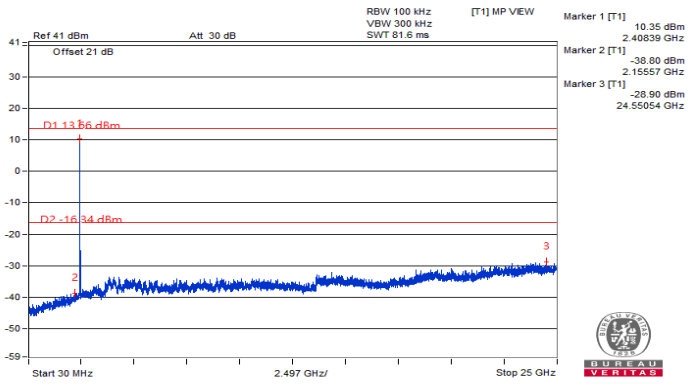
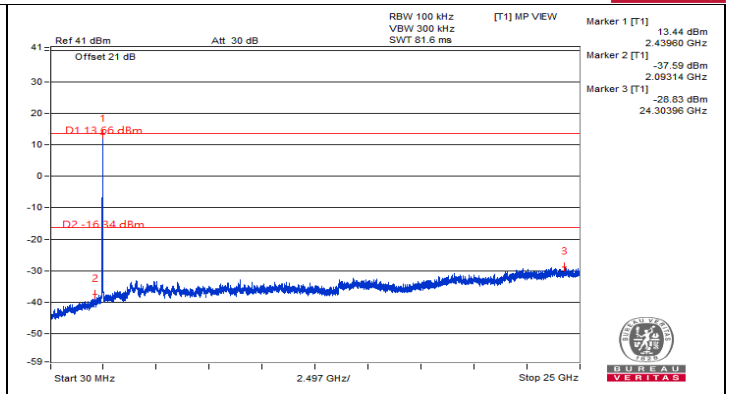


Chain 1 : CH 1



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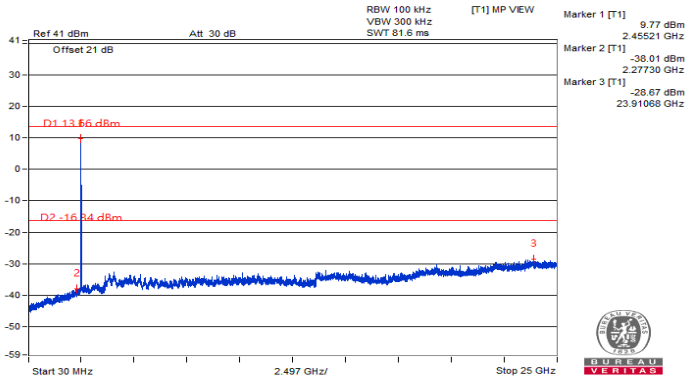

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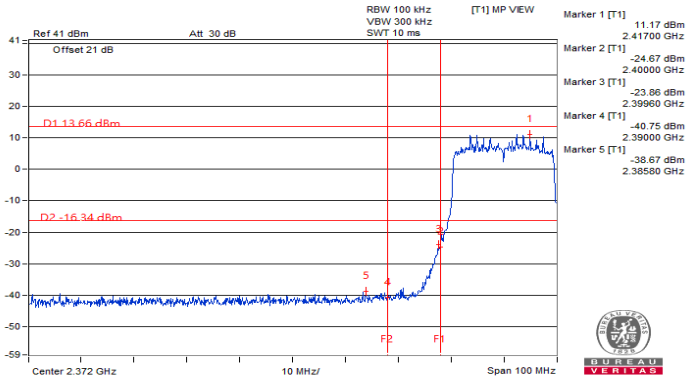
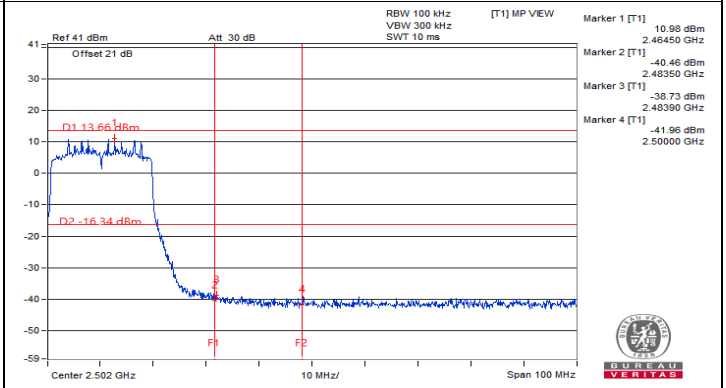


Chain 1 : CH 1 Band edge



Chain 1 : CH 11 Band edge

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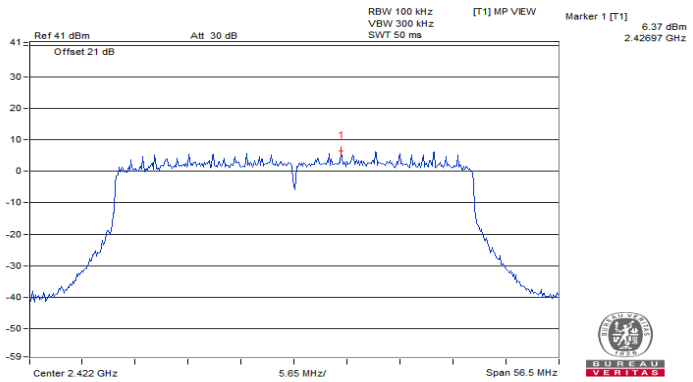
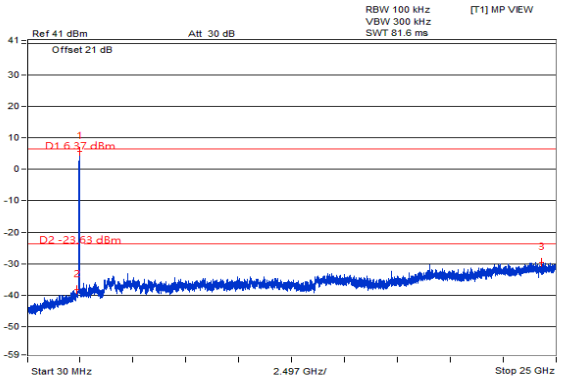


Maximum Reference Level



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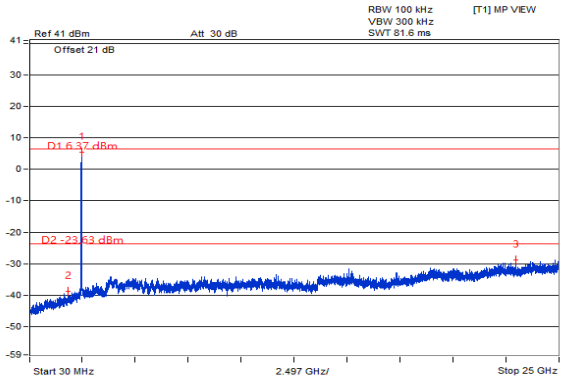
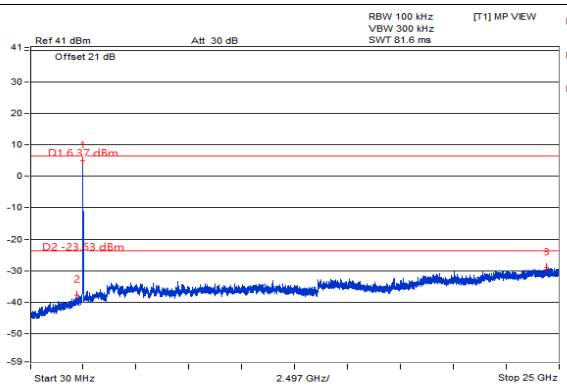
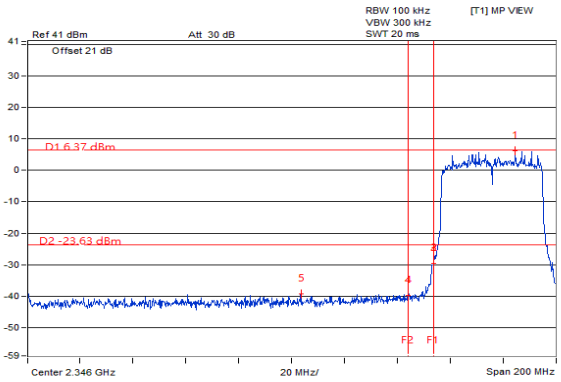


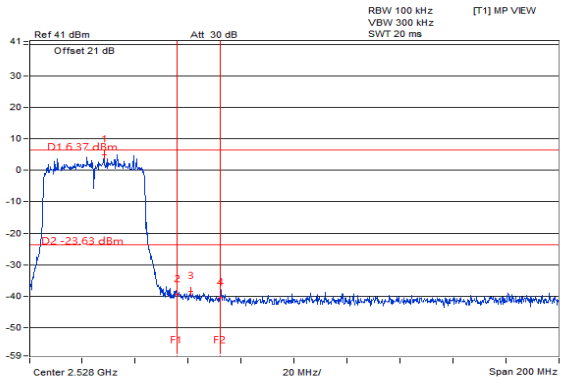
Chain 0 : CH 6



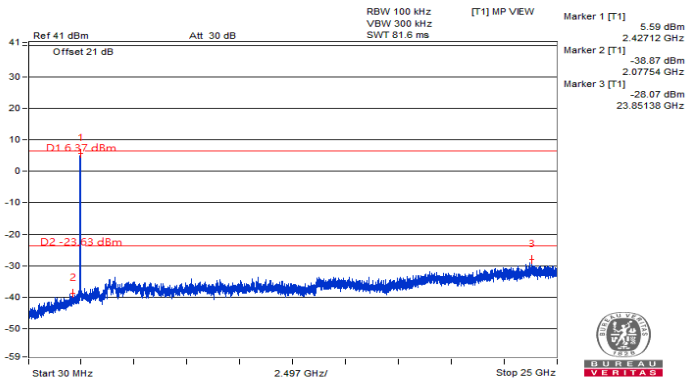
Chain 0 : CH 9



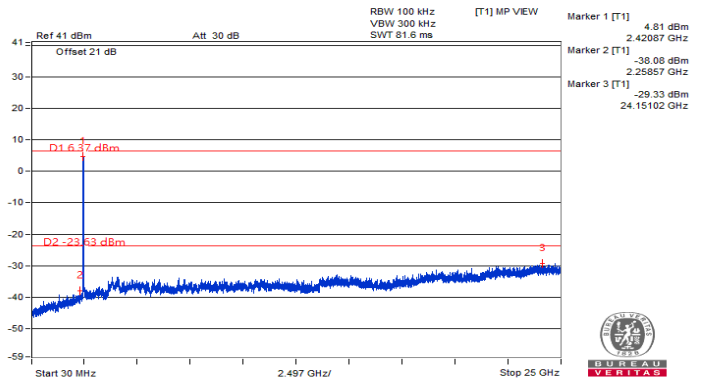
Chain 0 : CH 3 Band edge



Chain 0 : CH 9 Band edge



Chain 1 : CH 3



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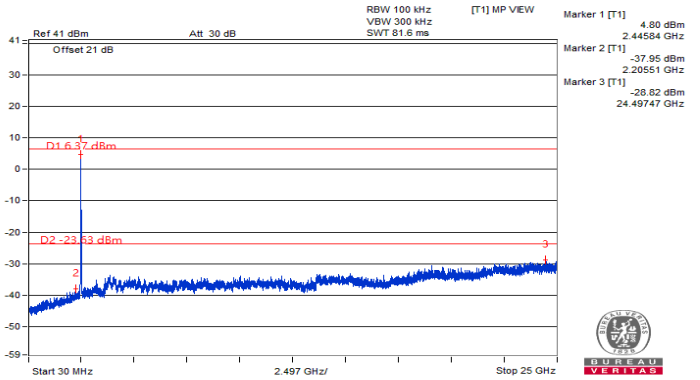
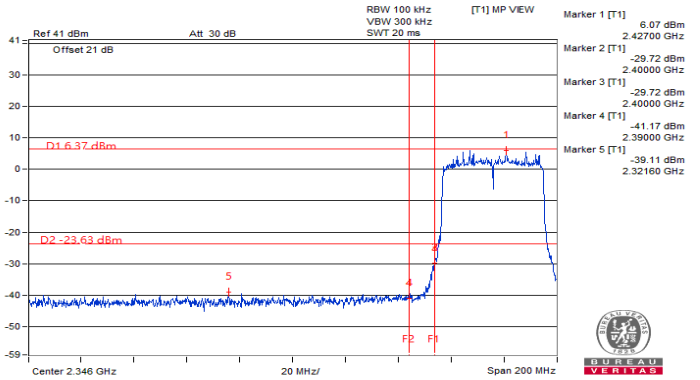
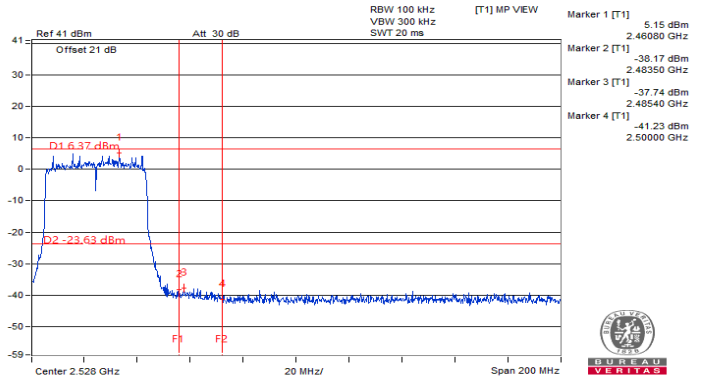


Chain 1 : CH 9



Chain 1 : CH 3 Band edge



Chain 1 : CH 9 Band edge

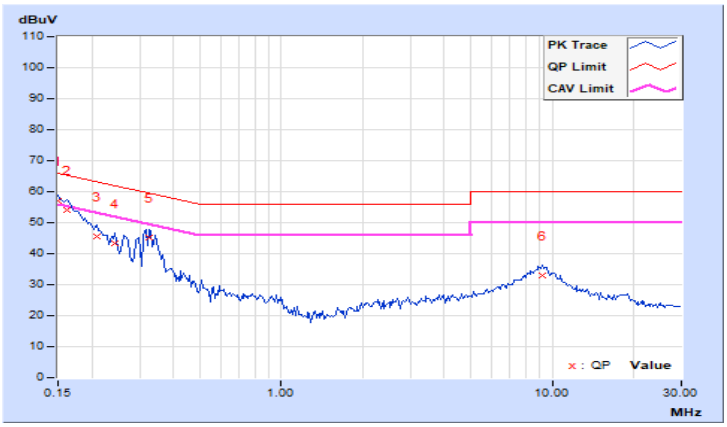
7.5 AC Power Conducted Emissions

RF Mode	TX 802.11ax (HE20)	**Channel**	CH 6：2437 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 75% RH
Tested By	Ryan Du		

Phase Of Power : Line (L)										
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**		**Emission Level (dBuV)**		**Limit (dBuV)**		**Margin (dB)**	
			Q.P.	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**	**Q.P.**	**AV.**
1	**0.15000**	**9.95**	**47.20**	**31.39**	**57.15**	**41.34**	**66.00**	**56.00**	**-8.85**	**-14.66**
2	0.16172	9.95	44.25	27.19	54.20	37.14	65.38	55.38	-11.18	-18.24
3	0.20859	9.96	35.55	21.74	45.51	31.70	63.26	53.26	-17.75	-21.56
4	0.24375	9.96	33.22	21.65	43.18	31.61	61.97	51.97	-18.79	-20.36
5	0.32578	9.96	35.10	24.54	45.06	34.50	59.56	49.56	-14.50	-15.06
6	9.17969	10.55	22.35	16.56	32.90	27.11	60.00	50.00	-27.10	-22.89

Remarks:

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

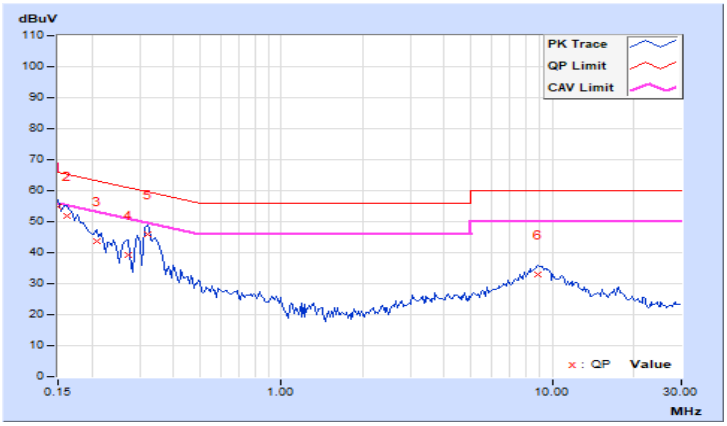


RF Mode	TX 802.11ax (HE20)	**Channel**	CH 6：2437 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 75% RH
Tested By	Ryan Du		

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	0.15000	9.95	44.93	28.89	54.88	38.84	66.00	56.00	-11.12	-17.16
2	0.16172	9.95	41.94	24.74	51.89	34.69	65.38	55.38	-13.49	-20.69
3	0.20859	9.96	33.74	20.68	43.70	30.64	63.26	53.26	-19.56	-22.62
4	0.27109	9.96	29.45	21.92	39.41	31.88	61.08	51.08	-21.67	-19.20
5	0.32188	9.96	36.10	28.92	46.06	38.88	59.66	49.66	-13.60	-10.78
6	8.86328	10.46	22.42	16.82	32.88	27.28	60.00	50.00	-27.12	-22.72

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



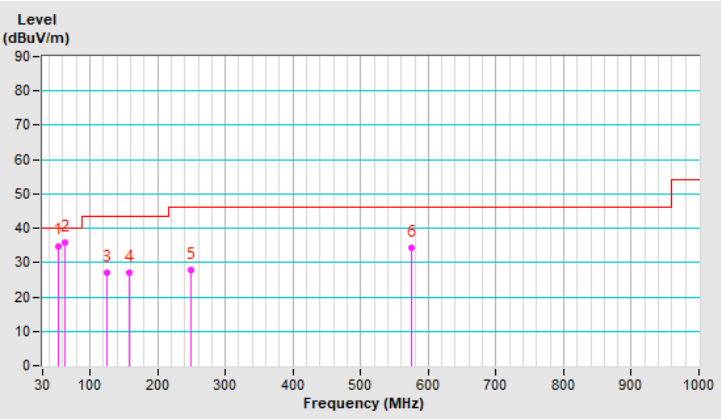
7.6 Unwanted Emissions below 1 GHz

RF Mode	TX 802.11ax (HE20)	**Channel**	CH 6：2437 MHz
Frequency Range	9 kHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	53.43	34.9 QP	40.0	-5.1	1.00 H	41	43.3	-8.4
2	**63.03**	**35.7 QP**	**40.0**	**-4.3**	**1.50 H**	**192**	**45.1**	**-9.4**
3	124.99	26.9 QP	43.5	-16.6	2.00 H	311	36.6	-9.7
4	157.56	27.0 QP	43.5	-16.5	1.50 H	169	35.2	-8.2
5	250.02	27.9 QP	46.0	-18.1	1.50 H	61	37.5	-9.6
6	575.96	34.3 QP	46.0	-11.7	1.50 H	346	35.4	-1.1

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 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

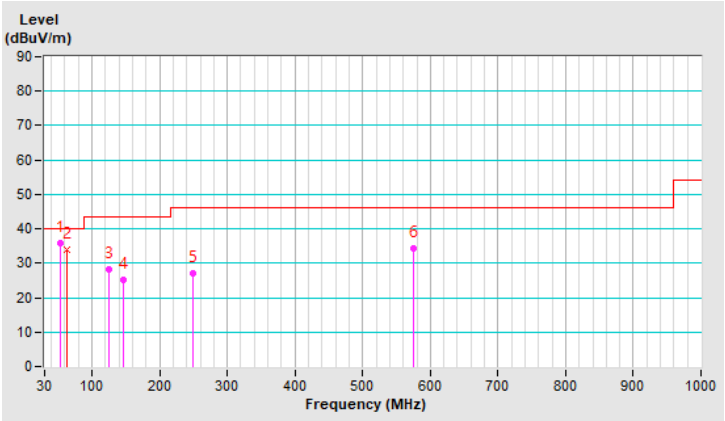


RF Mode	TX 802.11ax (HE20)	**Channel**	CH 6：2437 MHz
Frequency Range	9 kHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	**52.75**	**35.7 QP**	**40.0**	**-4.3**	**1.50 V**	**220**	**44.0**	**-8.3**
2	63.76	34.0 QP	40.0	-6.0	1.01 V	254	43.3	-9.3
3	125.01	28.2 QP	43.5	-15.3	1.50 V	16	37.8	-9.6
4	147.05	25.1 QP	43.5	-18.4	1.00 V	99	33.0	-7.9
5	250.02	27.2 QP	46.0	-18.8	2.00 V	360	36.8	-9.6
6	576.01	34.3 QP	46.0	-11.7	1.50 V	345	35.4	-1.1

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 30 MHz ~ 1 GHz.
5. The emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



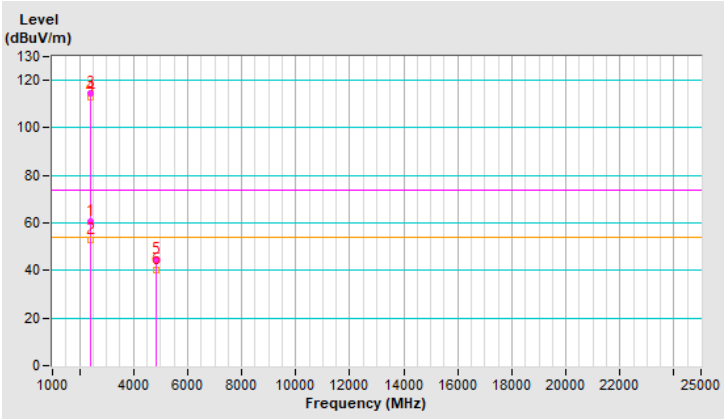
7.7 Unwanted Emissions above 1 GHz

RF Mode	TX 802.11b	**Channel**	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	2386.30	60.6 PK	74.0	-13.4	1.18 H	230	61.4	-0.8
2	2386.30	52.8 AV	54.0	-1.2	1.18 H	230	53.6	-0.8
3	*2412.00	114.8 PK			1.18 H	230	115.6	-0.8
4	*2412.00	112.7 AV			1.18 H	230	113.5	-0.8
5	4824.00	44.7 PK	74.0	-29.3	1.40 H	45	40.8	3.9
6	4824.00	40.1 AV	54.0	-13.9	1.40 H	45	36.2	3.9

Remarks:

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

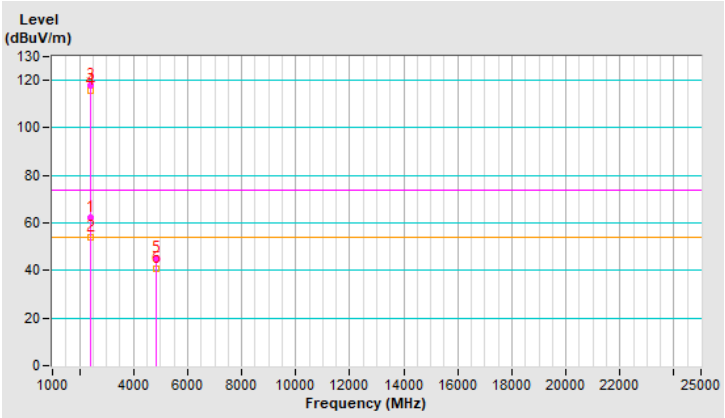


RF Mode	TX 802.11b	Channel	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	2386.72	62.1 PK	74.0	-11.9	1.70 V	213	62.9	-0.8
2	2386.72	53.8 AV	54.0	-0.2	1.70 V	213	54.6	-0.8
3	*2412.00	118.0 PK			1.70 V	213	118.8	-0.8
4	*2412.00	115.6 AV			1.70 V	213	116.4	-0.8
5	4824.00	45.2 PK	74.0	-28.8	1.16 V	134	41.3	3.9
6	4824.00	40.7 AV	54.0	-13.3	1.16 V	134	36.8	3.9

Remarks:

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

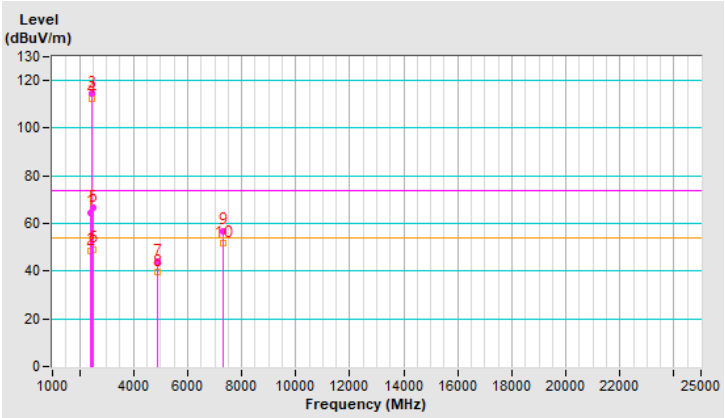


RF Mode	TX 802.11b	**Channel**	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	64.7 PK	74.0	-9.3	1.18 H	217	65.5	-0.8
2	2390.00	48.3 AV	54.0	-5.7	1.18 H	217	49.1	-0.8
3	*2437.00	114.6 PK			1.18 H	217	115.4	-0.8
4	*2437.00	112.6 AV			1.18 H	217	113.4	-0.8
5	2483.50	66.4 PK	74.0	-7.6	1.18 H	217	67.4	-1.0
6	2483.50	49.3 AV	54.0	-4.7	1.18 H	217	50.3	-1.0
7	4874.00	44.3 PK	74.0	-29.7	1.42 H	43	40.3	4.0
8	4874.00	39.7 AV	54.0	-14.3	1.42 H	43	35.7	4.0
9	7311.00	57.0 PK	74.0	-17.0	2.60 H	128	46.9	10.1
10	7311.00	51.8 AV	54.0	-2.2	2.60 H	128	41.7	10.1

Remarks:

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

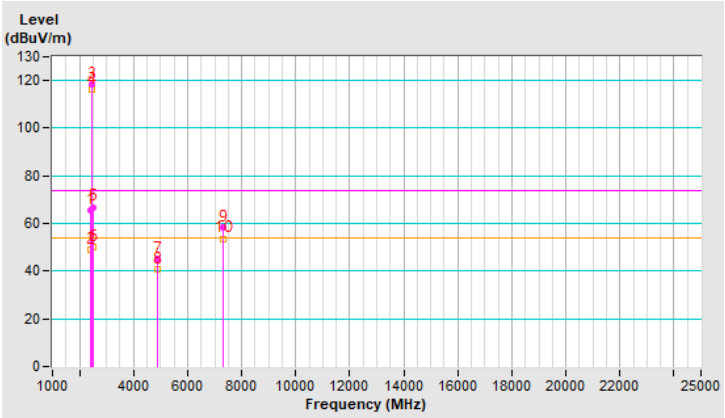


RF Mode	TX 802.11b	Channel	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	65.7 PK	74.0	-8.3	1.73 V	226	66.5	-0.8
2	2390.00	49.0 AV	54.0	-5.0	1.73 V	226	49.8	-0.8
3	*2437.00	118.4 PK			1.73 V	226	119.2	-0.8
4	*2437.00	116.0 AV			1.73 V	226	116.8	-0.8
5	2483.50	66.9 PK	74.0	-7.1	1.73 V	226	67.9	-1.0
6	2483.50	50.0 AV	54.0	-4.0	1.73 V	226	51.0	-1.0
7	4874.00	45.1 PK	74.0	-28.9	1.18 V	126	41.1	4.0
8	4874.00	40.6 AV	54.0	-13.4	1.18 V	126	36.6	4.0
9	7311.00	58.6 PK	74.0	-15.4	1.00 V	59	48.5	10.1
10	7311.00	53.7 AV	54.0	-0.3	1.00 V	59	43.6	10.1

Remarks:

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

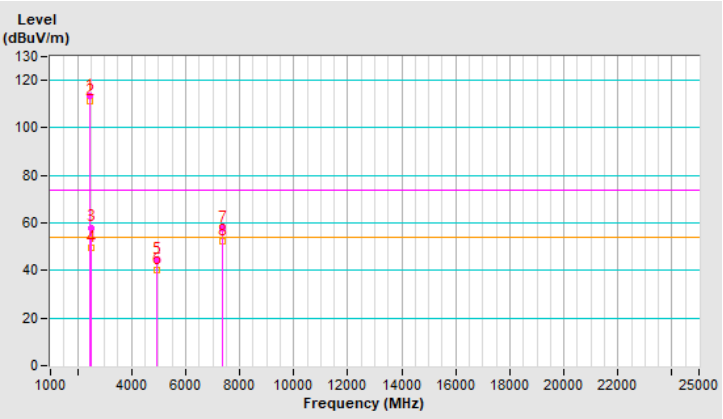


RF Mode	TX 802.11b	Channel	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	113.6 PK			1.04 H	232	114.5	-0.9
2	*2462.00	111.5 AV			1.04 H	232	112.4	-0.9
3	2486.75	58.1 PK	74.0	-15.9	1.04 H	232	59.1	-1.0
4	2486.75	49.8 AV	54.0	-4.2	1.04 H	232	50.8	-1.0
5	4924.00	44.5 PK	74.0	-29.5	1.48 H	57	40.5	4.0
6	4924.00	40.0 AV	54.0	-14.0	1.48 H	57	36.0	4.0
7	7386.00	57.7 PK	74.0	-16.3	2.58 H	133	47.5	10.2
8	7386.00	52.3 AV	54.0	-1.7	2.58 H	133	42.1	10.2

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, the limit was restricted at the RF Output Power.

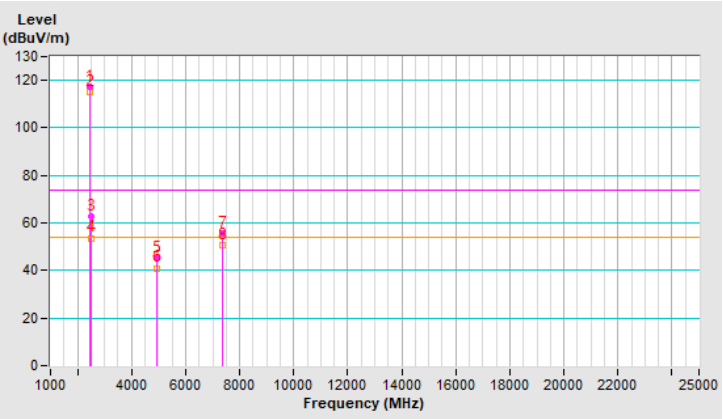


RF Mode	TX 802.11b	Channel	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	117.2 PK			2.88 V	215	118.1	-0.9
2	*2462.00	115.0 AV			2.88 V	215	115.9	-0.9
3	2486.74	62.8 PK	74.0	-11.2	2.88 V	215	63.8	-1.0
4	2486.74	53.7 AV	54.0	-0.3	2.88 V	215	54.7	-1.0
5	4924.00	45.4 PK	74.0	-28.6	1.22 V	138	41.4	4.0
6	4924.00	41.0 AV	54.0	-13.0	1.22 V	138	37.0	4.0
7	7386.00	55.8 PK	74.0	-18.2	1.05 V	60	45.6	10.2
8	7386.00	50.6 AV	54.0	-3.4	1.05 V	60	40.4	10.2

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, the limit was restricted at the RF Output Power.

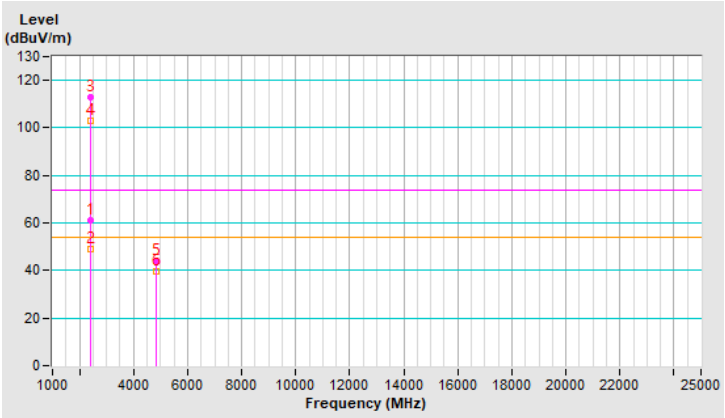


RF Mode	TX 802.11g	Channel	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	2387.56	61.2 PK	74.0	-12.8	1.19 H	232	62.0	-0.8
2	2387.56	49.1 AV	54.0	-4.9	1.19 H	232	49.9	-0.8
3	*2412.00	112.7 PK			1.19 H	232	113.5	-0.8
4	*2412.00	102.9 AV			1.19 H	232	103.7	-0.8
5	4824.00	44.3 PK	74.0	-29.7	1.34 H	41	40.4	3.9
6	4824.00	39.6 AV	54.0	-14.4	1.34 H	41	35.7	3.9

Remarks:

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

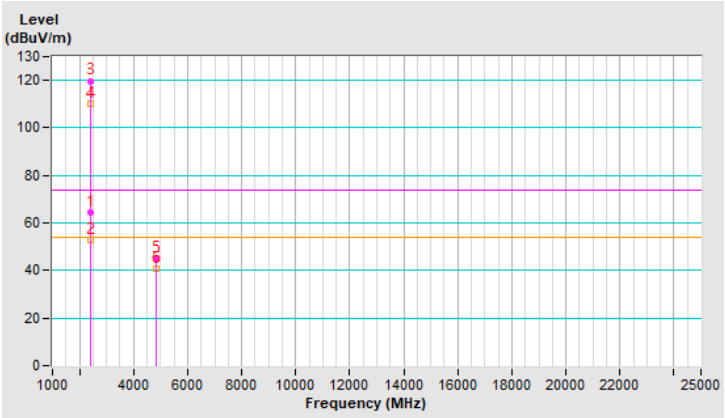


RF Mode	TX 802.11g	**Channel**	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	2388.30	64.3 PK	74.0	-9.7	1.68 V	213	65.1	-0.8
2	2388.30	52.8 AV	54.0	-1.2	1.68 V	213	53.6	-0.8
3	*2412.00	119.8 PK			1.68 V	213	120.6	-0.8
4	*2412.00	110.3 AV			1.68 V	213	111.1	-0.8
5	4824.00	45.1 PK	74.0	-28.9	1.20 V	132	41.2	3.9
6	4824.00	40.7 AV	54.0	-13.3	1.20 V	132	36.8	3.9

Remarks:

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

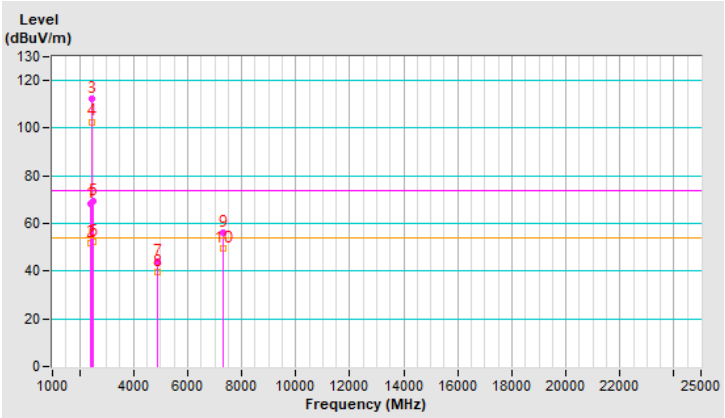


RF Mode	TX 802.11g	Channel	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	68.3 PK	74.0	-5.7	1.24 H	245	69.1	-0.8
2	2390.00	51.7 AV	54.0	-2.3	1.24 H	245	52.5	-0.8
3	*2437.00	112.4 PK			1.24 H	245	113.2	-0.8
4	*2437.00	102.7 AV			1.24 H	245	103.5	-0.8
5	2483.50	69.4 PK	74.0	-4.6	1.24 H	245	70.4	-1.0
6	2483.50	52.2 AV	54.0	-1.8	1.24 H	245	53.2	-1.0
7	4874.00	44.1 PK	74.0	-29.9	1.40 H	35	40.1	4.0
8	4874.00	39.7 AV	54.0	-14.3	1.40 H	35	35.7	4.0
9	7311.00	56.2 PK	74.0	-17.8	2.61 H	137	46.1	10.1
10	7311.00	49.8 AV	54.0	-4.2	2.61 H	137	39.7	10.1

Remarks:

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

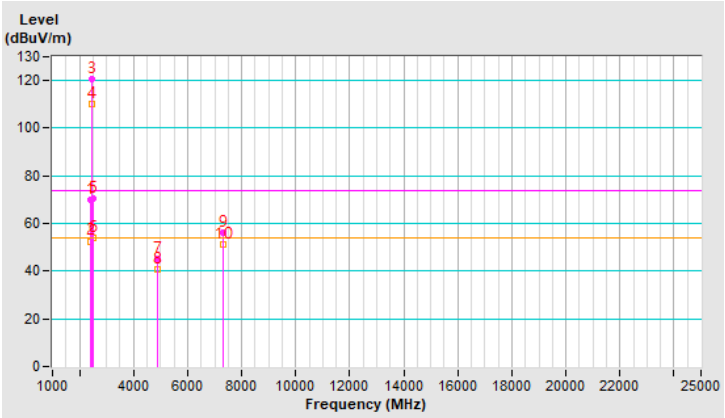


RF Mode	TX 802.11g	**Channel**	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	69.7 PK	74.0	-4.3	1.77 V	145	70.5	-0.8
2	2390.00	52.6 AV	54.0	-1.4	1.77 V	145	53.4	-0.8
3	*2437.00	120.8 PK			1.77 V	145	121.6	-0.8
4	*2437.00	110.2 AV			1.77 V	145	111.0	-0.8
5	2483.50	70.4 PK	74.0	-3.6	1.77 V	145	71.4	-1.0
6	**2483.50**	**53.9 AV**	**54.0**	**-0.1**	**1.77 V**	**145**	**54.9**	**-1.0**
7	4874.00	45.0 PK	74.0	-29.0	1.15 V	113	41.0	4.0
8	4874.00	40.5 AV	54.0	-13.5	1.15 V	113	36.5	4.0
9	7311.00	56.3 PK	74.0	-17.7	1.02 V	61	46.2	10.1
10	7311.00	51.3 AV	54.0	-2.7	1.02 V	61	41.2	10.1

Remarks:

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

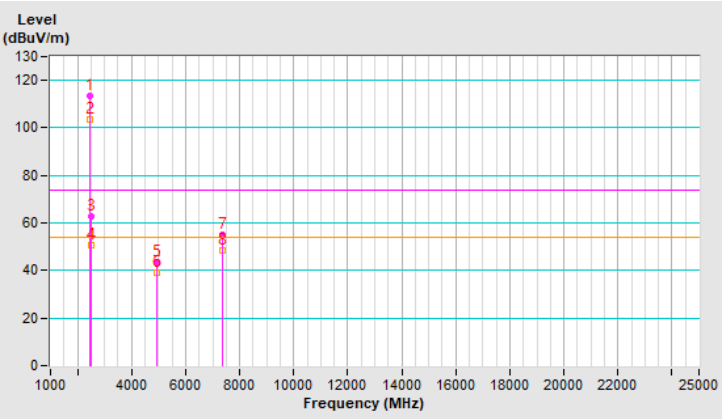


RF Mode	TX 802.11g	**Channel**	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	113.4 PK			3.85 H	221	114.3	-0.9
2	*2462.00	103.7 AV			3.85 H	221	104.6	-0.9
3	2485.50	62.9 PK	74.0	-11.1	3.85 H	221	63.9	-1.0
4	2485.50	50.6 AV	54.0	-3.4	3.85 H	221	51.6	-1.0
5	4924.00	43.7 PK	74.0	-30.3	1.39 H	25	39.7	4.0
6	4924.00	39.3 AV	54.0	-14.7	1.39 H	25	35.3	4.0
7	7386.00	55.3 PK	74.0	-18.7	2.61 H	125	45.1	10.2
8	7386.00	48.2 AV	54.0	-5.8	2.61 H	125	38.0	10.2

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, the limit was restricted at the RF Output Power.

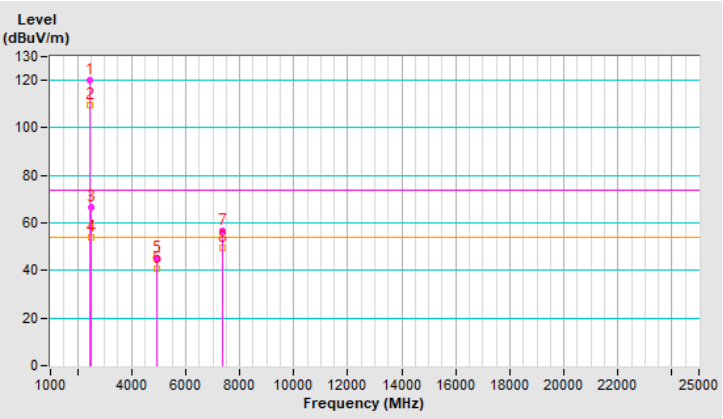


RF Mode	TX 802.11g	**Channel**	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 510 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	119.9 PK			1.91 V	223	120.8	-0.9
2	*2462.00	109.8 AV			1.91 V	223	110.7	-0.9
3	2483.65	66.4 PK	74.0	-7.6	1.91 V	223	67.4	-1.0
4	2483.65	53.8 AV	54.0	-0.2	1.91 V	223	54.8	-1.0
5	4924.00	45.3 PK	74.0	-28.7	1.14 V	117	41.3	4.0
6	4924.00	40.6 AV	54.0	-13.4	1.14 V	117	36.6	4.0
7	7386.00	56.6 PK	74.0	-17.4	1.00 V	75	46.4	10.2
8	7386.00	49.7 AV	54.0	-4.3	1.00 V	75	39.5	10.2

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, the limit was restricted at the RF Output Power.

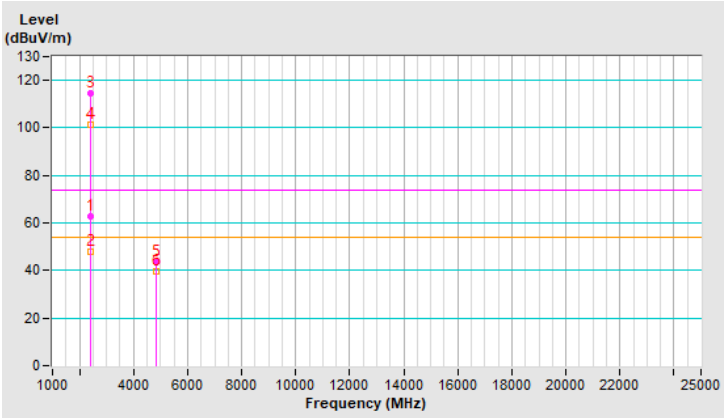


RF Mode	TX 802.11ax (HE20)	**Channel**	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	62.9 PK	74.0	-11.1	1.20 H	233	63.7	-0.8
2	2390.00	47.9 AV	54.0	-6.1	1.20 H	233	48.7	-0.8
3	*2412.00	114.6 PK			1.20 H	233	115.4	-0.8
4	*2412.00	101.5 AV			1.20 H	233	102.3	-0.8
5	4824.00	43.7 PK	74.0	-30.3	1.45 H	31	39.8	3.9
6	4824.00	39.5 AV	54.0	-14.5	1.45 H	31	35.6	3.9

Remarks:

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

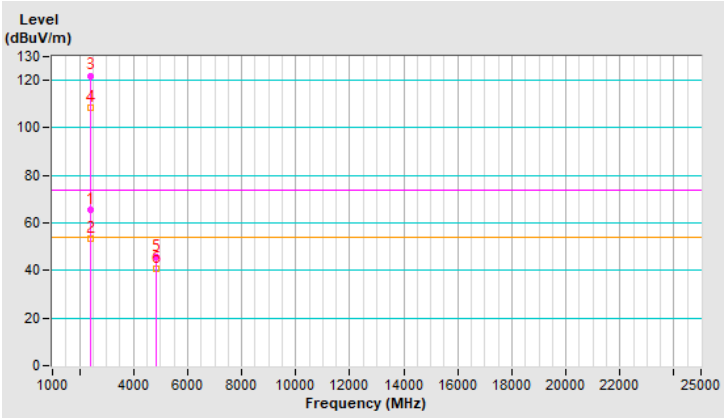


RF Mode	TX 802.11ax (HE20)	Channel	CH 1：2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	2387.77	65.5 PK	74.0	-8.5	1.44 V	220	66.3	-0.8
2	2387.77	53.3 AV	54.0	-0.7	1.44 V	220	54.1	-0.8
3	*2412.00	122.0 PK			1.44 V	220	122.8	-0.8
4	*2412.00	108.7 AV			1.44 V	220	109.5	-0.8
5	4824.00	45.6 PK	74.0	-28.4	1.14 V	103	41.7	3.9
6	4824.00	40.7 AV	54.0	-13.3	1.14 V	103	36.8	3.9

Remarks:

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

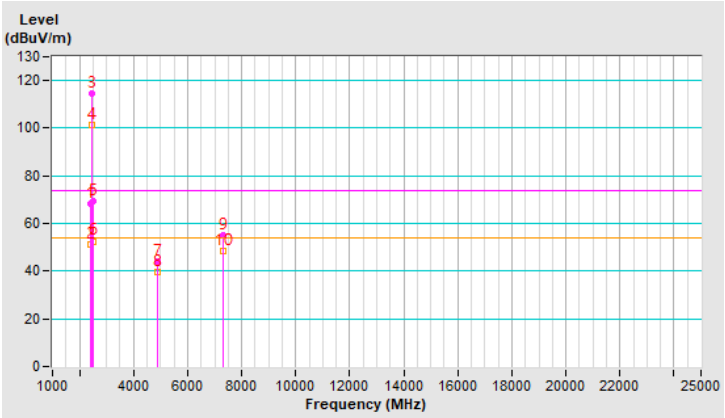


RF Mode	TX 802.11ax (HE20)	**Channel**	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	68.1 PK	74.0	-5.9	1.24 H	246	68.9	-0.8
2	2390.00	51.4 AV	54.0	-2.6	1.24 H	246	52.2	-0.8
3	*2437.00	114.5 PK			1.24 H	246	115.3	-0.8
4	*2437.00	101.3 AV			1.24 H	246	102.1	-0.8
5	2483.50	69.6 PK	74.0	-4.4	1.24 H	246	70.6	-1.0
6	2483.50	52.6 AV	54.0	-1.4	1.24 H	246	53.6	-1.0
7	4874.00	44.1 PK	74.0	-29.9	1.38 H	40	40.1	4.0
8	4874.00	39.7 AV	54.0	-14.3	1.38 H	40	35.7	4.0
9	7311.00	55.1 PK	74.0	-18.9	2.59 H	116	45.0	10.1
10	7311.00	48.2 AV	54.0	-5.8	2.59 H	116	38.1	10.1

Remarks:

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

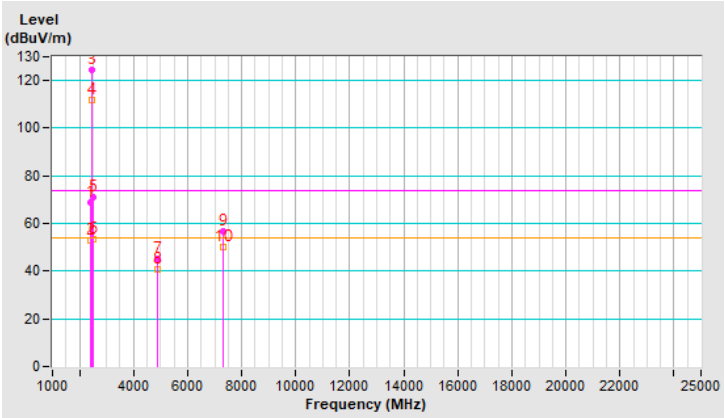


RF Mode	TX 802.11ax (HE20)	**Channel**	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	69.0 PK	74.0	-5.0	1.74 V	146	69.8	-0.8
2	2390.00	53.0 AV	54.0	-1.0	1.74 V	146	53.8	-0.8
3	*2437.00	124.7 PK			1.74 V	146	125.5	-0.8
4	*2437.00	111.6 AV			1.74 V	146	112.4	-0.8
5	2483.50	71.0 PK	74.0	-3.0	1.74 V	146	72.0	-1.0
6	2483.50	53.6 AV	54.0	-0.4	1.74 V	146	54.6	-1.0
7	4874.00	45.3 PK	74.0	-28.7	1.15 V	126	41.3	4.0
8	4874.00	40.6 AV	54.0	-13.4	1.15 V	126	36.6	4.0
9	7311.00	56.7 PK	74.0	-17.3	1.00 V	77	46.6	10.1
10	7311.00	49.9 AV	54.0	-4.1	1.00 V	77	39.8	10.1

Remarks:

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

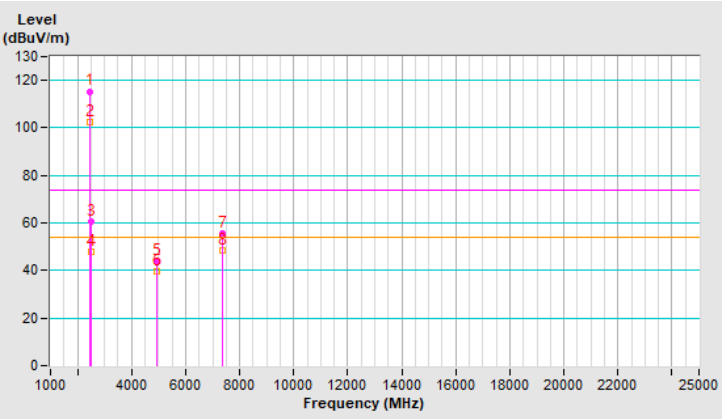


RF Mode	TX 802.11ax (HE20)	**Channel**	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	115.4 PK			3.42 H	222	116.3	-0.9
2	*2462.00	102.4 AV			3.42 H	222	103.3	-0.9
3	2488.20	60.8 PK	74.0	-13.2	3.42 H	222	61.8	-1.0
4	2488.20	47.9 AV	54.0	-6.1	3.42 H	222	48.9	-1.0
5	4924.00	43.8 PK	74.0	-30.2	1.35 H	35	39.8	4.0
6	4924.00	39.4 AV	54.0	-14.6	1.35 H	35	35.4	4.0
7	7386.00	55.7 PK	74.0	-18.3	2.55 H	133	45.5	10.2
8	7386.00	48.5 AV	54.0	-5.5	2.55 H	133	38.3	10.2

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, the limit was restricted at the RF Output Power.

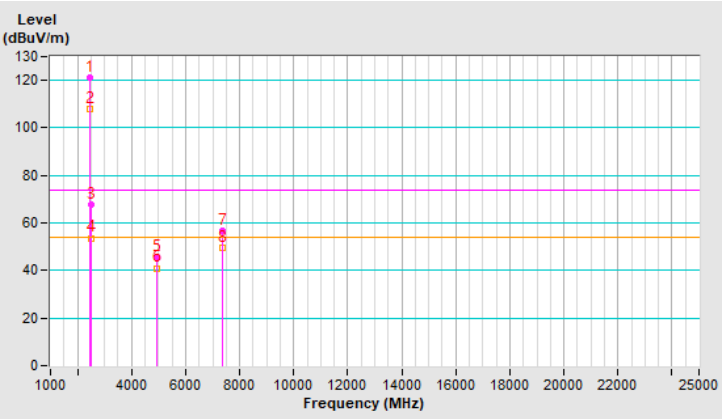


RF Mode	TX 802.11ax (HE20)	Channel	CH 11：2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	121.1 PK			1.70 V	143	122.0	-0.9
2	*2462.00	107.9 AV			1.70 V	143	108.8	-0.9
3	2483.50	67.7 PK	74.0	-6.3	1.70 V	143	68.7	-1.0
4	2483.50	53.7 AV	54.0	-0.3	1.70 V	143	54.7	-1.0
5	4924.00	45.9 PK	74.0	-28.1	1.12 V	118	41.9	4.0
6	4924.00	41.0 AV	54.0	-13.0	1.12 V	118	37.0	4.0
7	7386.00	56.6 PK	74.0	-17.4	1.00 V	64	46.4	10.2
8	7386.00	49.6 AV	54.0	-4.4	1.00 V	64	39.4	10.2

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, the limit was restricted at the RF Output Power.

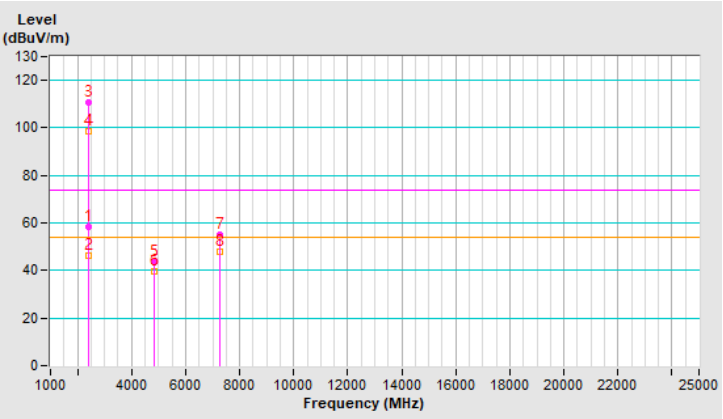


RF Mode	TX 802.11ax (HE40)	**Channel**	CH 3：2422 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	2390.00	58.5 PK	74.0	-15.5	3.55 H	221	59.3	-0.8
2	2390.00	46.3 AV	54.0	-7.7	3.55 H	221	47.1	-0.8
3	*2422.00	110.6 PK			3.55 H	221	111.4	-0.8
4	*2422.00	98.6 AV			3.55 H	221	99.4	-0.8
5	4844.00	43.5 PK	74.0	-30.5	1.34 H	11	39.6	3.9
6	4844.00	39.4 AV	54.0	-14.6	1.34 H	11	35.5	3.9
7	7266.00	55.0 PK	74.0	-19.0	2.61 H	130	45.0	10.0
8	7266.00	48.0 AV	54.0	-6.0	2.61 H	130	38.0	10.0

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

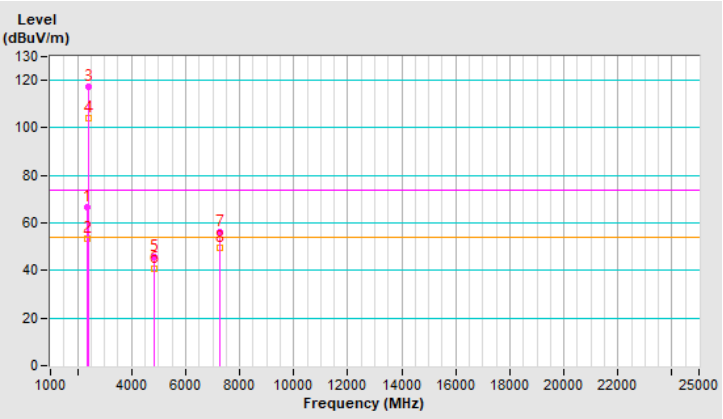


RF Mode	TX 802.11ax (HE40)	Channel	CH 3：2422 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	2382.99	66.6 PK	74.0	-7.4	1.18 V	291	67.4	-0.8
2	2382.99	53.3 AV	54.0	-0.7	1.18 V	291	54.1	-0.8
3	*2422.00	117.2 PK			1.18 V	291	118.0	-0.8
4	*2422.00	104.0 AV			1.18 V	291	104.8	-0.8
5	4844.00	45.5 PK	74.0	-28.5	1.15 V	126	41.6	3.9
6	4844.00	40.5 AV	54.0	-13.5	1.15 V	126	36.6	3.9
7	7266.00	56.2 PK	74.0	-17.8	1.00 V	82	46.2	10.0
8	7266.00	49.4 AV	54.0	-4.6	1.00 V	82	39.4	10.0

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.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

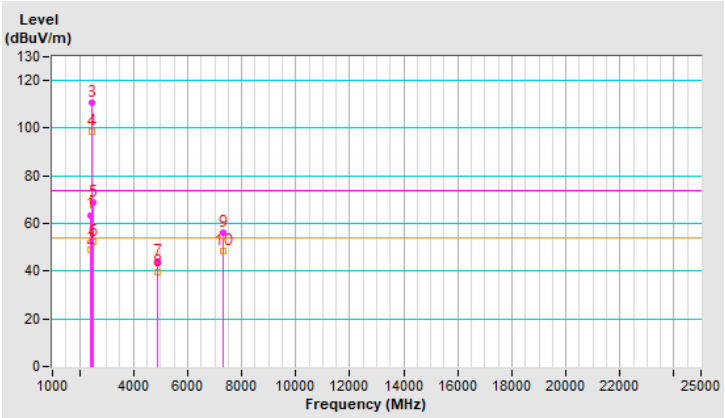


RF Mode	TX 802.11ax (HE40)	Channel	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.6 PK	74.0	-10.4	3.53 H	218	64.4	-0.8
2	2390.00	49.1 AV	54.0	-4.9	3.53 H	218	49.9	-0.8
3	*2437.00	110.7 PK			3.53 H	218	111.5	-0.8
4	*2437.00	98.6 AV			3.53 H	218	99.4	-0.8
5	2483.50	68.7 PK	74.0	-5.3	3.53 H	218	69.7	-1.0
6	2483.50	52.1 AV	54.0	-1.9	3.53 H	218	53.1	-1.0
7	4874.00	44.1 PK	74.0	-29.9	1.34 H	33	40.1	4.0
8	4874.00	39.8 AV	54.0	-14.2	1.34 H	33	35.8	4.0
9	7311.00	56.0 PK	74.0	-18.0	2.61 H	130	45.9	10.1
10	7311.00	48.6 AV	54.0	-5.4	2.61 H	130	38.5	10.1

Remarks:

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

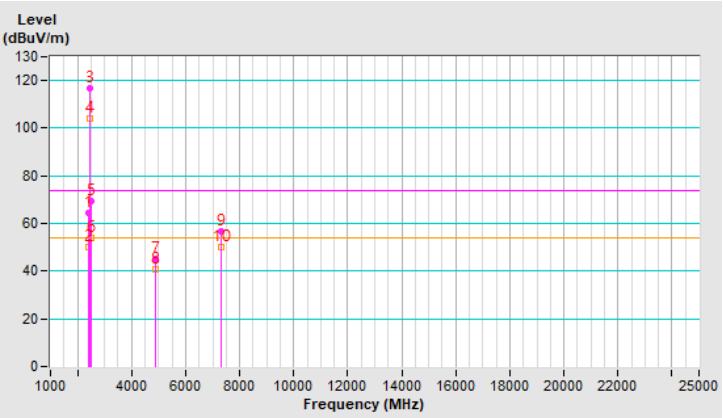


RF Mode	TX 802.11ax (HE40)	**Channel**	CH 6：2437 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	2390.00	64.3 PK	74.0	-9.7	1.03 V	226	65.1	-0.8
2	2390.00	50.2 AV	54.0	-3.8	1.03 V	226	51.0	-0.8
3	*2437.00	117.0 PK			1.03 V	226	117.8	-0.8
4	*2437.00	104.0 AV			1.03 V	226	104.8	-0.8
5	2483.50	69.6 PK	74.0	-4.4	1.03 V	226	70.6	-1.0
6	2483.50	53.8 AV	54.0	-0.2	1.03 V	226	54.8	-1.0
7	4874.00	45.2 PK	74.0	-28.8	1.10 V	103	41.2	4.0
8	4874.00	40.7 AV	54.0	-13.3	1.10 V	103	36.7	4.0
9	7311.00	56.8 PK	74.0	-17.2	1.02 V	74	46.7	10.1
10	7311.00	50.1 AV	54.0	-3.9	1.02 V	74	40.0	10.1

Remarks:

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

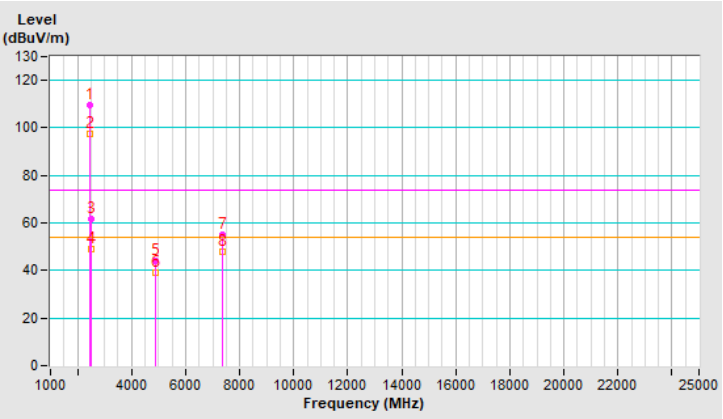


RF Mode	TX 802.11ax (HE40)	**Channel**	CH 9：2452 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	20°C, 70% RH
Tested By	Ryan Du		

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	109.7 PK			3.44 H	224	110.6	-0.9
2	*2452.00	97.5 AV			3.44 H	224	98.4	-0.9
3	2487.80	61.6 PK	74.0	-12.4	3.44 H	224	62.6	-1.0
4	2487.80	49.2 AV	54.0	-4.8	3.44 H	224	50.2	-1.0
5	4904.00	44.0 PK	74.0	-30.0	1.44 H	25	40.1	3.9
6	4904.00	39.3 AV	54.0	-14.7	1.44 H	25	35.4	3.9
7	7356.00	54.9 PK	74.0	-19.1	2.60 H	141	44.8	10.1
8	7356.00	48.1 AV	54.0	-5.9	2.60 H	141	38.0	10.1

Remarks:

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

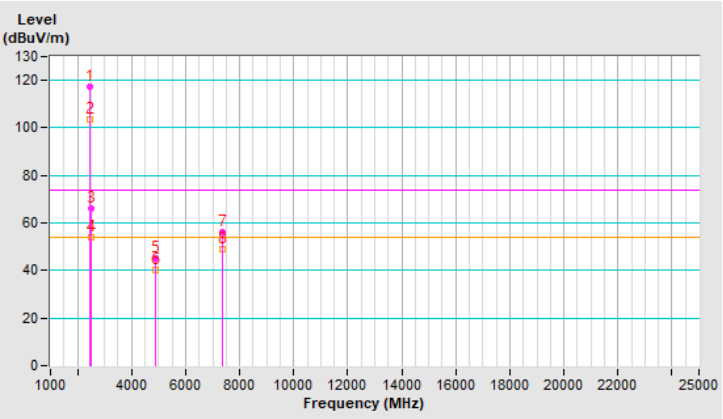


RF Mode	TX 802.11ax (HE40)	Channel	CH 9：2452 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 200 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	20°C, 70% RH
Tested By	Ryan Du		

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	117.1 PK			1.16 V	291	118.0	-0.9
2	*2452.00	103.5 AV			1.16 V	291	104.4	-0.9
3	2488.30	66.3 PK	74.0	-7.7	1.16 V	291	67.3	-1.0
4	**2488.30**	**53.9 AV**	**54.0**	**-0.1**	**1.16 V**	**291**	**54.9**	**-1.0**
5	4904.00	45.2 PK	74.0	-28.8	1.11 V	105	41.3	3.9
6	4904.00	40.3 AV	54.0	-13.7	1.11 V	105	36.4	3.9
7	7356.00	56.0 PK	74.0	-18.0	1.02 V	86	45.9	10.1
8	7356.00	49.2 AV	54.0	-4.8	1.02 V	86	39.1	10.1

Remarks:

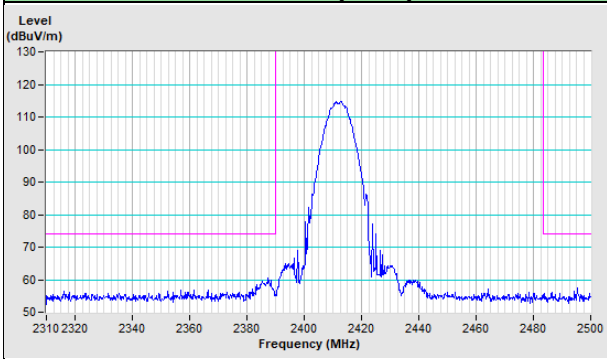
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency,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



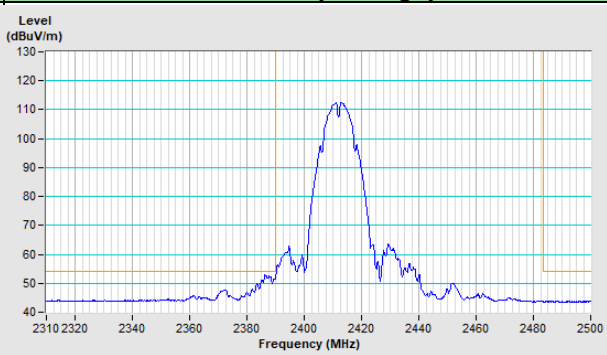
Plot of Band Edge

802.11b Channel 1

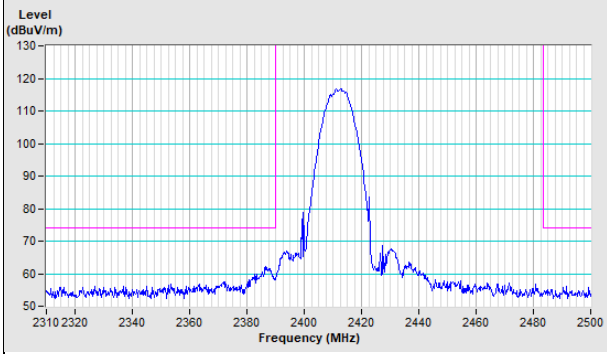
Horizontal (Peak)



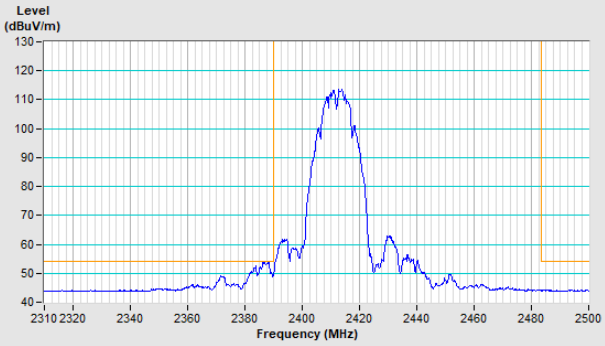
Horizontal (Average)



Vertical (Peak)

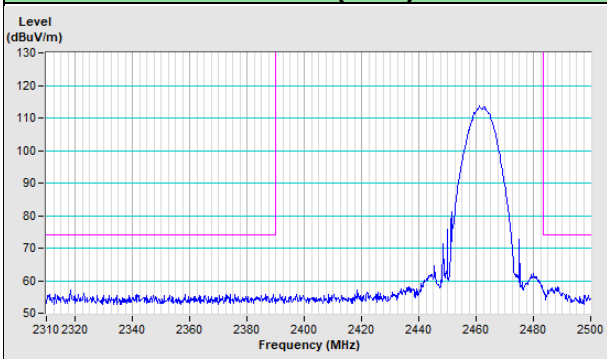


Vertical (Average)

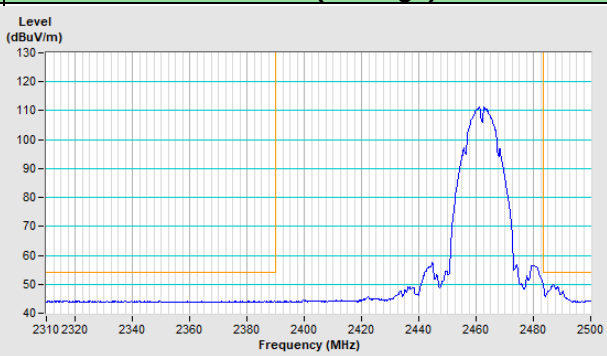


802.11b Channel 11

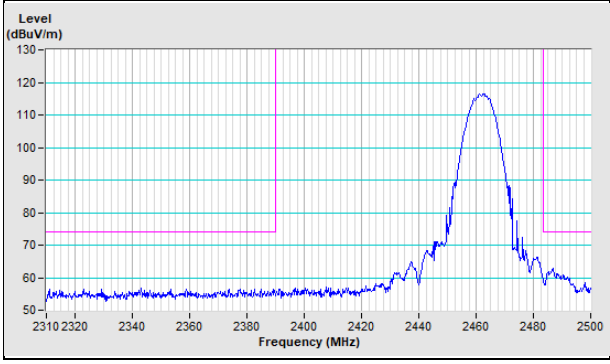
Horizontal (Peak)



Horizontal (Average)



Vertical (Peak)



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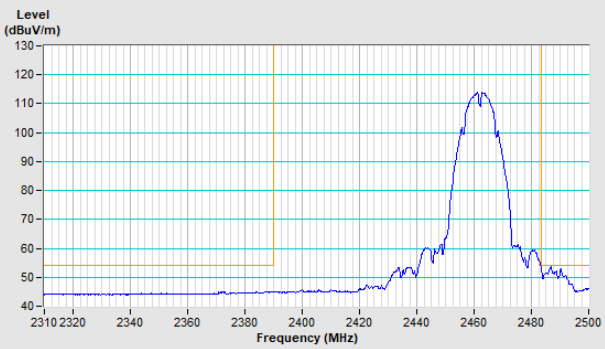
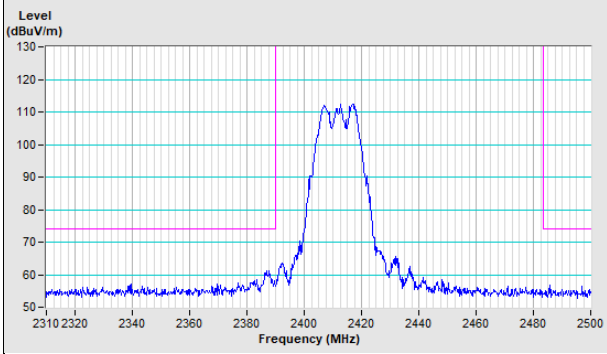
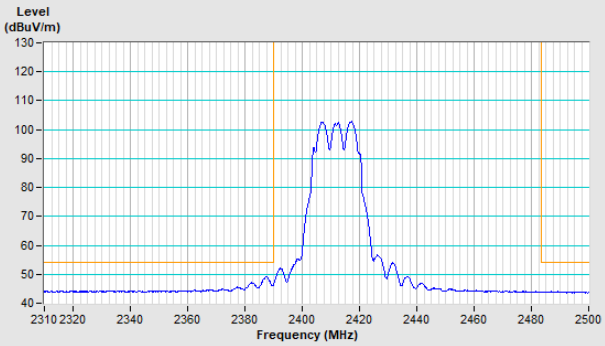


802.11g Channel 1

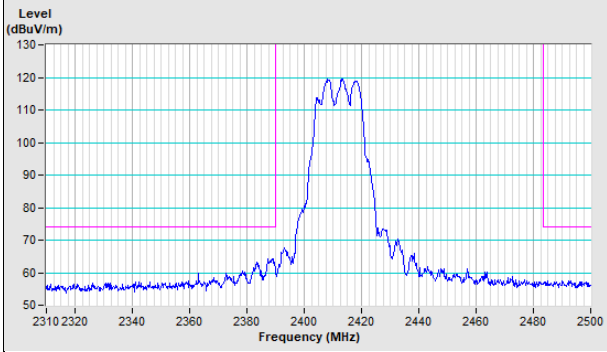
Horizontal (Peak)



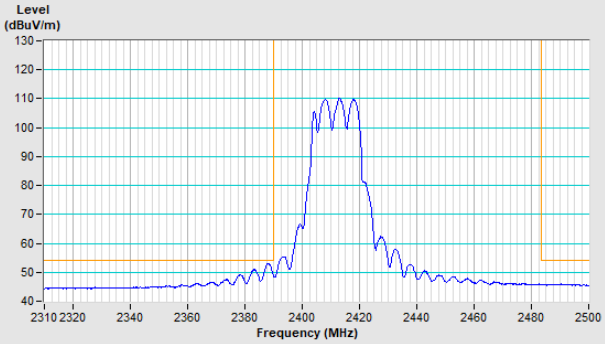
Horizontal (Average)



Vertical (Peak)

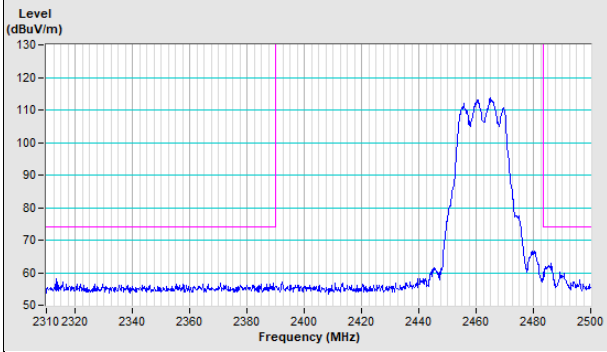


Vertical (Average)

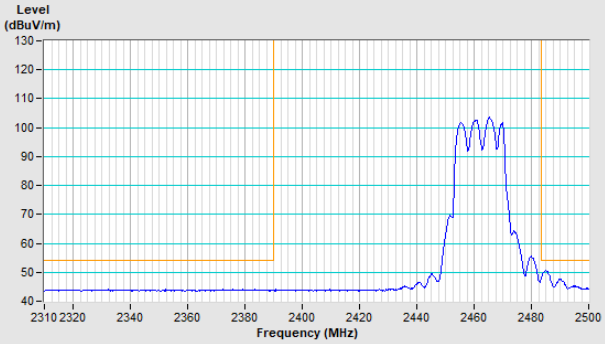


802.11g Channel 11

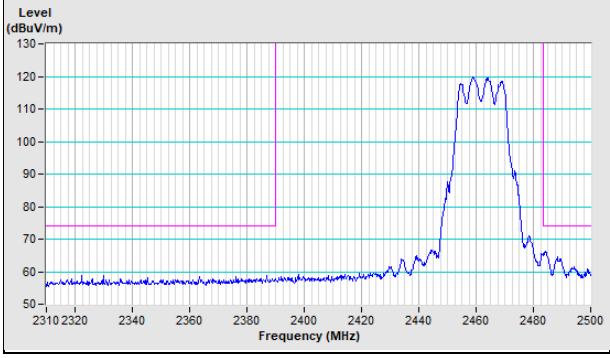
Horizontal (Peak)



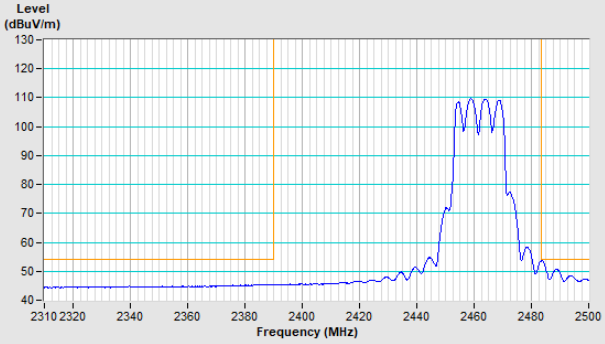
Horizontal (Average)



Vertical (Peak)

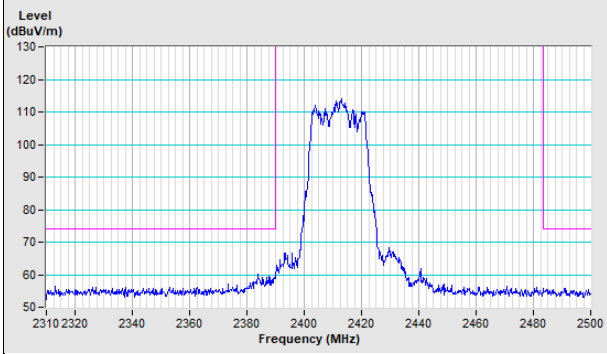


Vertical (Average)



802.11ax (HE20) Channel 1

Horizontal (Peak)



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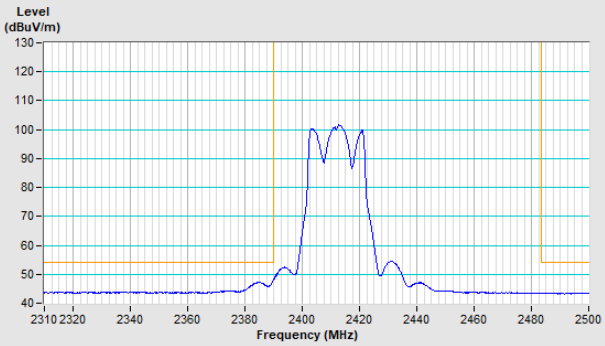
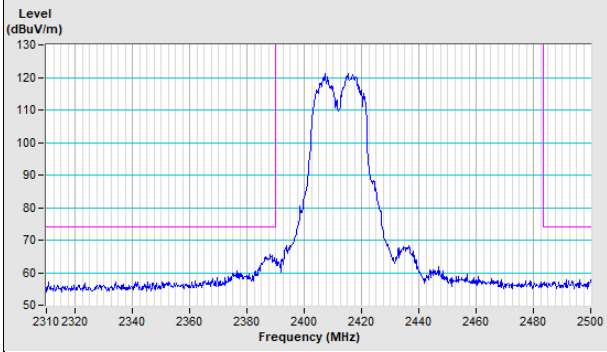
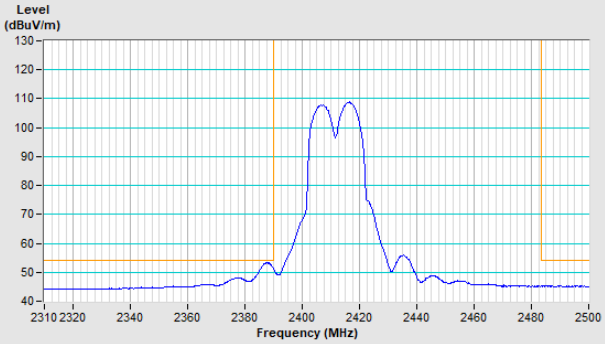


Vertical (Peak)

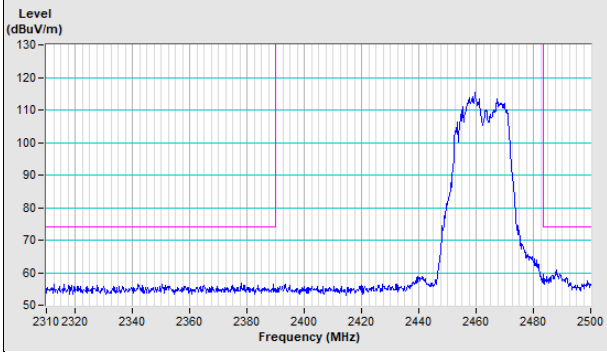


Vertical (Average)



802.11ax (HE20) Channel 11

Horizontal (Peak)



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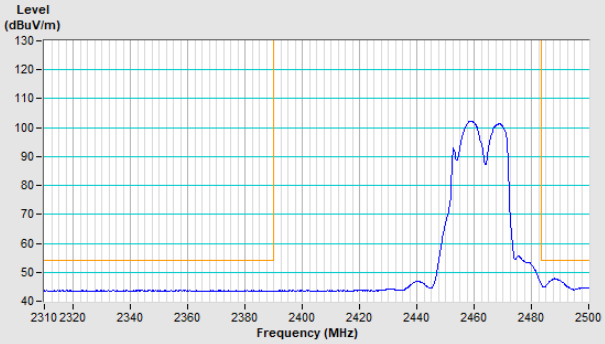
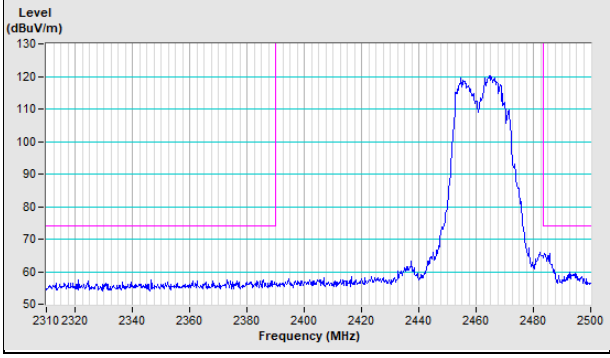


Vertical (Peak)



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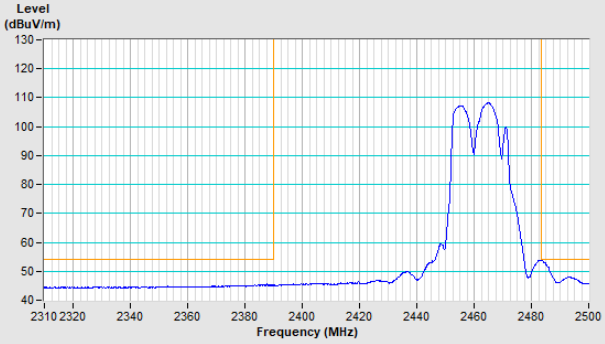
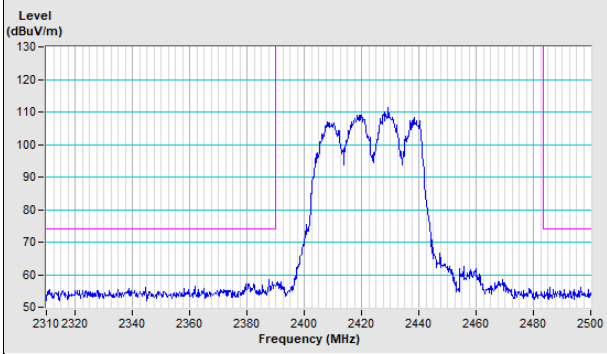


802.11ax (HE40) Channel 3

Horizontal (Peak)



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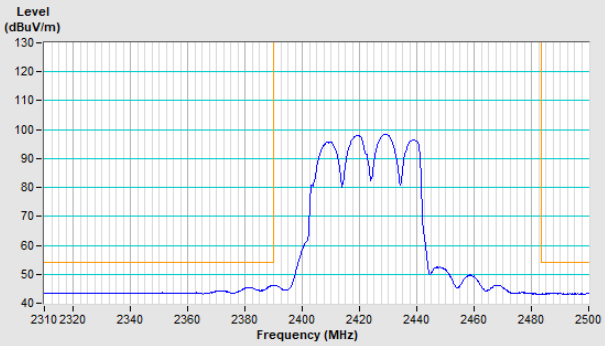
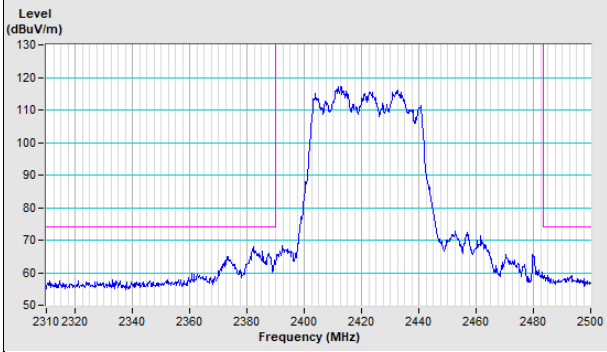


Vertical (Peak)



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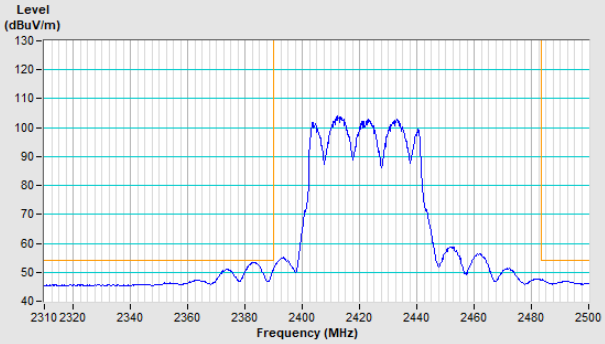
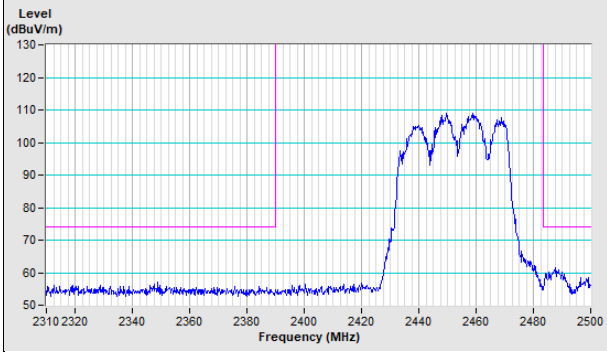
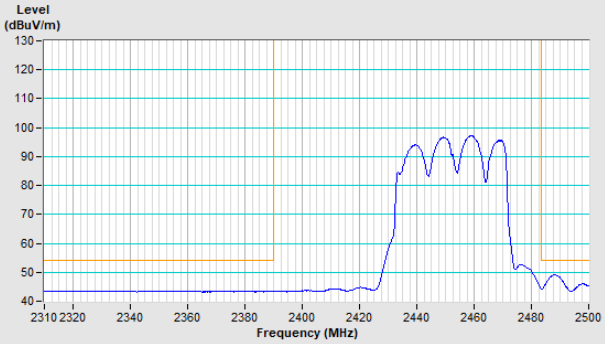


802.11ax (HE40) Channel 9

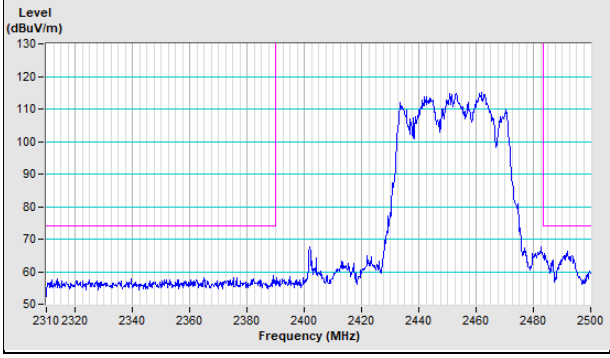
Horizontal (Peak)



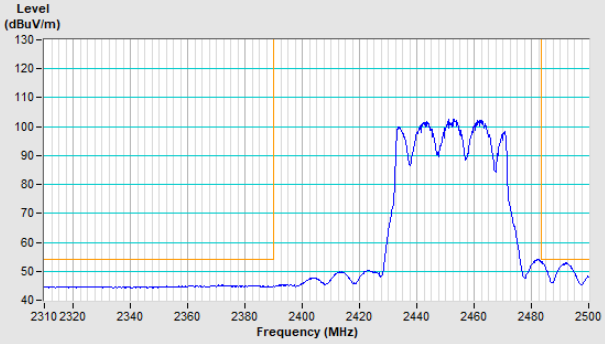
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 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@bureauveritas.com
Web Site: http://ee.bureauveritas.com.tw

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

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