

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)

Report No.: RFBCKS-WTW-P23040515

FCC ID: 2AWHPR231

Product: Starlink Router

Brand: SPACEX



Model No.: UTR-231

Received Date: 2023/1/10

Test Date: 2023/1/10 ~ 2023/6/16

Issued Date: 2023/7/4

Applicant: Space Exploration Technologies Corp. (SPACEX)

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

Designation Number:

Approved by:  , **Date:** 2023/7/4
May Chen / Manager

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Prepared by : Vito Lung / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFBCKS-WTW-P23040515	Original release.	2023/7/4

1 Certificate

Product: Starlink Router

Brand: SPACEX



Test Model: UTR-231

Sample Status: Engineering sample

Applicant: Space Exploration Technologies Corp. (SPACEX)

Test Date: 2023/1/10 ~ 2023/6/16

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)

Measurement ANSI C63.10-2013

procedure: 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 -12.82 dB at 0.49766 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -3.3 dB at 66.64 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.2 dB at 4824.00 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	5.5 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 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	Starlink Router
Brand	SPACEX 
Test Model	UTR-231
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 only
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 600 Mbps VHT: up to 800 Mbps 802.11ax: up to 1147.1 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: 895.764 mW (29.52 dBm) Beamforming Mode: 891.671 mW (29.50 dBm)

Note:

1. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3
WLAN (2.4GHz)	WLAN 5GHz (Low)	WLAN 5GHz (High)

2. Simultaneously transmission condition.

Condition	Technology		
1	WLAN 2.4GHz	WLAN 5GHz (Low)	WLAN 5GHz (High)

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

3. The EUT uses following accessories.

AC Adapter 1		
Brand	Model	Specification
STARLINK	UTP-231L	AC Input : 100-240V~1.6A 50/60Hz DC Output : 30V-2.0A(Total Max 60W)LPS DC Output Cable : 1.5M, No core no shielded Plug : FCC

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

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna NO.	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
2G1	Ant1	SPACEX	UTR-231	4.26	2.4~2.4835GHz	PIFA	ipex(MHF)
2G2	Ant2			4.13	2.4~2.4835GHz	PIFA	ipex(MHF)
2G3	Ant3			3.14	2.4~2.4835GHz	PIFA	ipex(MHF)
2G4	Ant4			3.92	2.4~2.4835GHz	PIFA	ipex(MHF)
5L1	Ant1	SPACEX	UTR-231	2.86	5.15~5.25GHz	PIFA	ipex(MHF)
				4.20	5.25~5.35GHz		
5L2	Ant2			2.28	5.15~5.25GHz	PIFA	ipex(MHF)
				1.04	5.25~5.35GHz		
5L3	Ant3			1.29	5.15~5.25GHz	PIFA	ipex(MHF)
				1.68	5.25~5.35GHz		
5L4	Ant4			1.53	5.15~5.25GHz	PIFA	ipex(MHF)
				1.51	5.25~5.35GHz		
5H1	Ant1	SPACEX	UTR-231	4.02	5.47~5.725GHz	PIFA	ipex(MHF)
				4.23	5.725~5.85GHz		
5H2	Ant2			4.02	5.47~5.725GHz	PIFA	ipex(MHF)
				3.72	5.725~5.85GHz		
5H3	Ant3			3.04	5.47~5.725GHz	PIFA	ipex(MHF)
				3.93	5.725~5.85GHz		
5H4	Ant4			4.90	5.47~5.725GHz	PIFA	ipex(MHF)
				3.27	5.725~5.85GHz		

* 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	4TX	4RX
802.11g	4TX	4RX
802.11n (HT20)	4TX	4RX
802.11n (HT40)	4TX	4RX
VHT20	4TX	4RX
VHT40	4TX	4RX
802.11ax (HE20)	4TX	4RX
802.11ax (HE40)	4TX	4RX

Note:

- All of modulation mode support beamforming function except 802.11b/g modulation mode.
- 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.
- The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), VHT mode for 20 MHz (40 MHz), mode for 20 MHz (40 MHz) therefore the manufacturer will control the power for 802.11n/VHT mode is same as the 802.11ax mode 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, 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, 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. EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. 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).
Worst Case:	1. X-axis/ Y-axis/ Z-axis Worst Condition:Z-axis

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	802.11g	CDD	11	BPSK	MCS0
Unwanted Emissions below 1 GHz	802.11g	CDD	11	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

Note:
Partial RU (resource unit) mechanism is not supported.

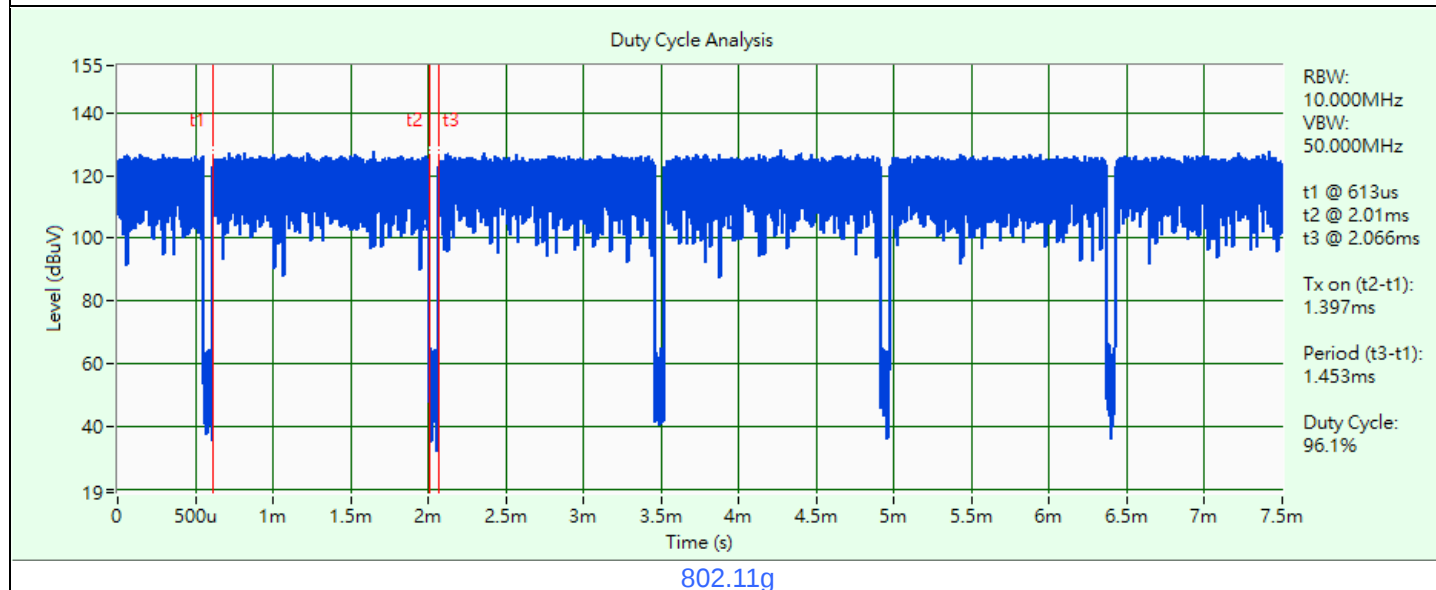
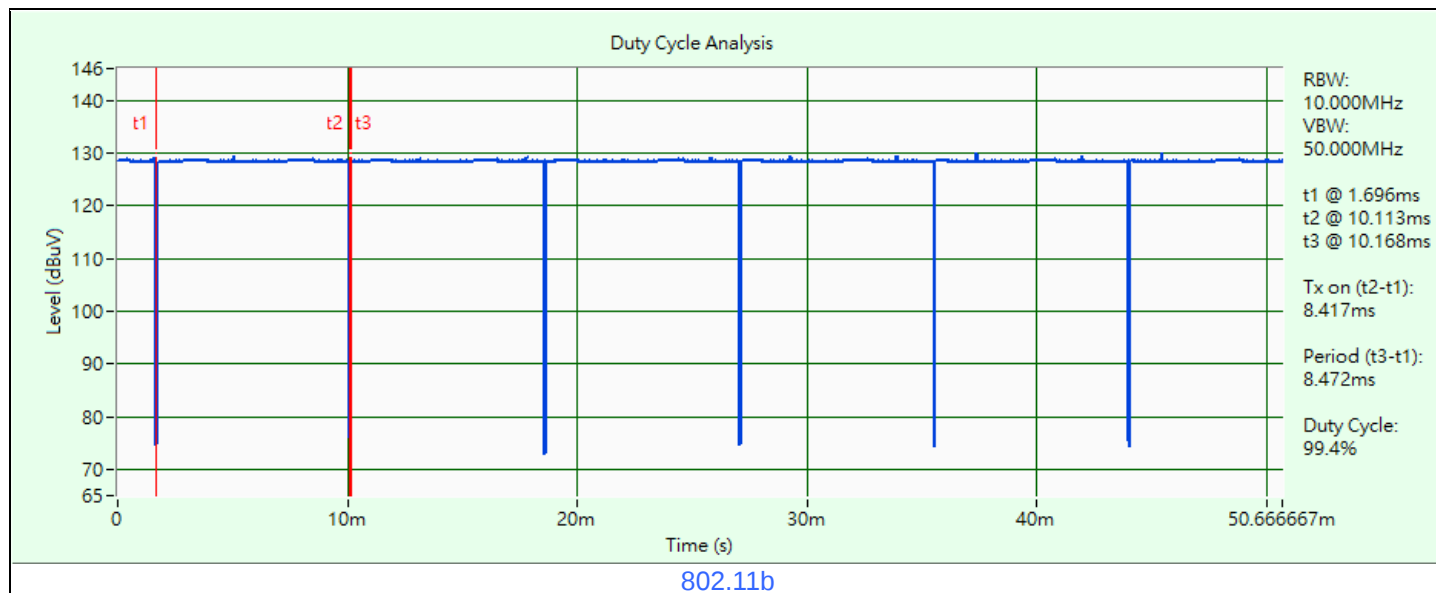
3.5 Duty Cycle of Test Signal

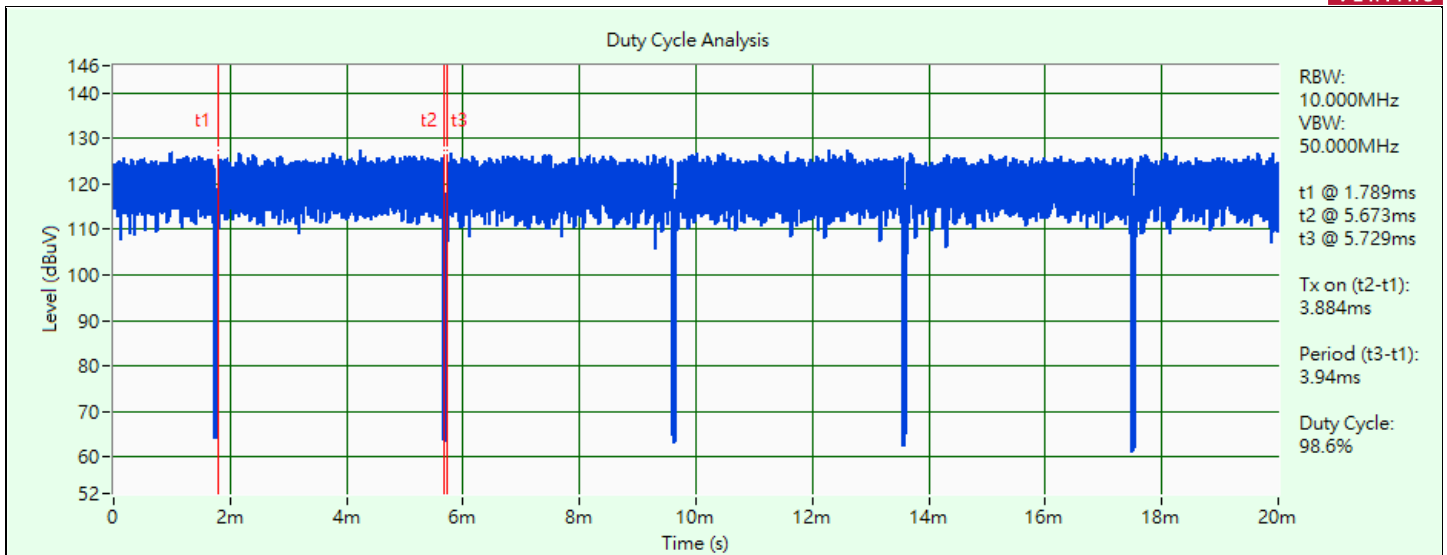
802.11b: Duty cycle = 8.417 ms / 8.472 ms x 100% = 99.4%

802.11g: Duty cycle = 1.397 ms / 1.453 ms x 100% = 96.1%, duty factor = $10 \cdot \log(1/\text{Duty cycle}) = 0.17 \text{ dB}$

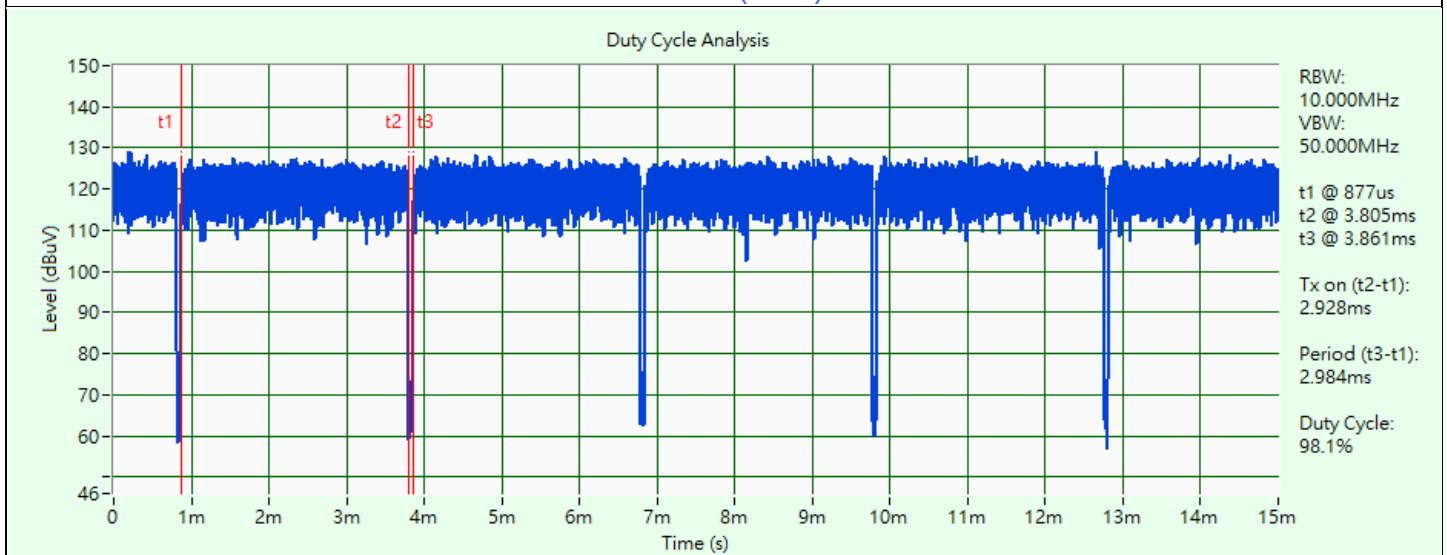
802.11ax (HE20): Duty cycle = 3.884 ms / 3.94 ms x 100% = 98.6%

802.11ax (HE40): Duty cycle = 2.928 ms / 2.984 ms x 100% = 98.1%





802.11ax (HE20)

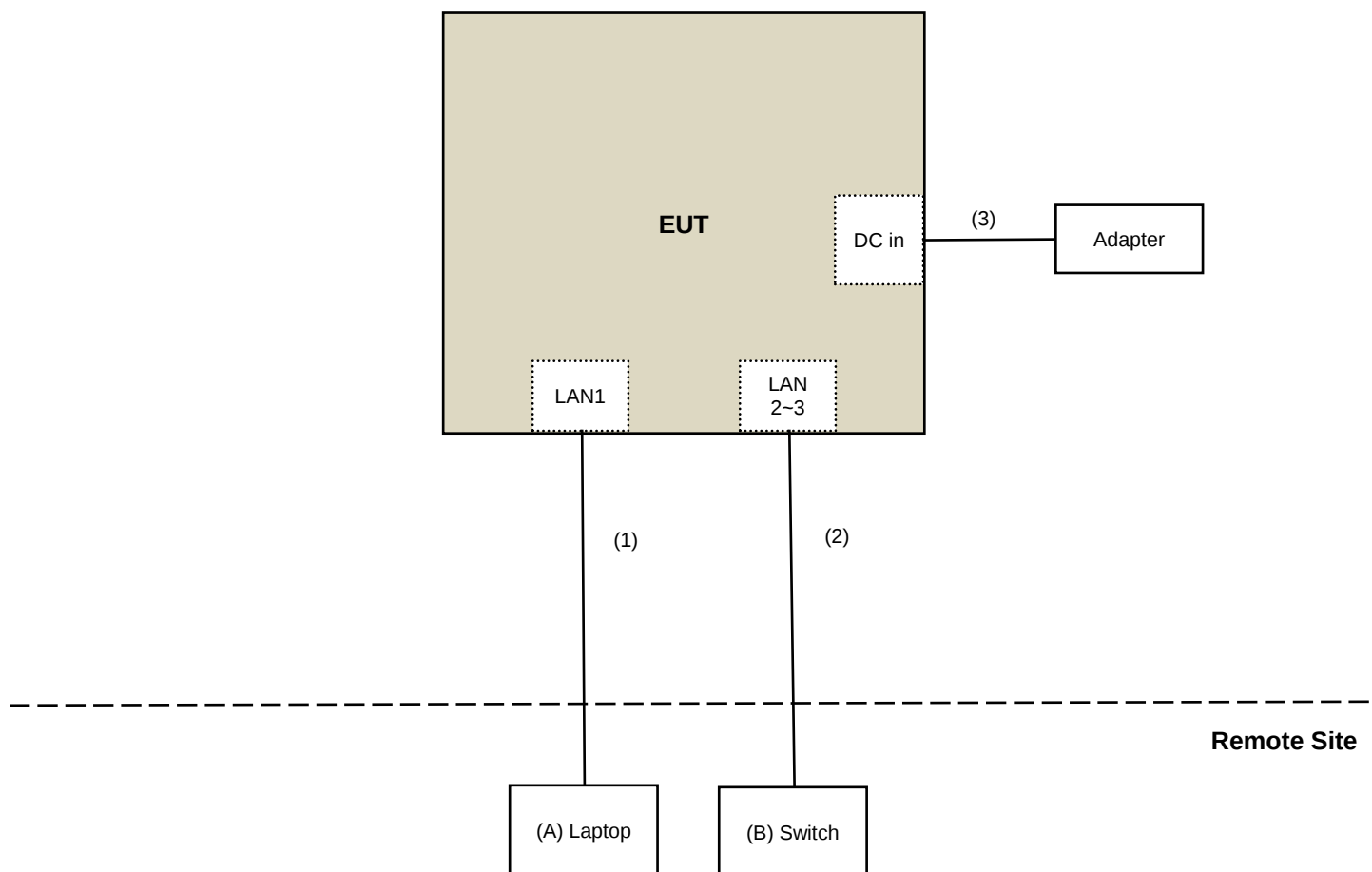


802.11ax (HE40)

3.6 Test Program Used and Operation Descriptions

Controlling software (QATool_Ulv2.88_DLLv6.93_ap_2022.01.04(V14)c) 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-1ANPYA	N/A	Provided by Lab
B	Switch	D-Link	DGS-1005D	DR8WC92000523	N/A	Provided by Lab

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

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
Fixed Attenuator Woken	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
Pulse Power Sensor Anritsu	MA2411B	1726434	2022/6/22	2023/6/21

Notes:

1. The test was performed in Oven room 2.
2. Tested Date: 2023/1/10

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Fixed Attenuator Woken	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
MXA Signal Analyzer Keysight	N9020B	MY60112409	2022/3/11	2023/3/10
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: 2023/1/10

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 ohm terminal resistance	N/A	EMC-01	2022/9/27	2023/9/26
EMI Test Receiver R&S	ESCS 30	847124/029	2022/10/14	2023/10/13
Fixed Attenuator STI	STI02-2200-10	005	2022/8/24	2023/8/23
LISN R&S	ESH3-Z5	848773/004	2022/10/18	2023/10/17
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

Notes:

1. The test was performed in Conduction 1
2. Tested Date: 2023/6/16

4.6 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-406	2022/10/21	2023/10/20
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	2022/12/28	2023/12/27
Loop Antenna Electro-Metrics	EM-6879	264	2023/2/21	2024/2/20
MXE EMI Receiver Keysight	N9038A	MY54450088	2022/7/11	2023/7/10
Preamplifier Agilent	8447D	2944A10636	2023/3/12	2024/3/11
Preamplifier EMCI	EMC330N	980701	2023/2/18	2024/2/17
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/12/19	2023/12/18
		LOOPCAB-002	2022/12/19	2023/12/18
RF Coaxial Cable PEWC	8D	966-4-1	2023/2/18	2024/2/17
		966-4-2	2023/2/18	2024/2/17
		966-4-3	2023/2/18	2024/2/17
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 4.
2. Tested Date: 2023/6/15

4.7 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-783	2022/11/13	2023/11/12
	BBHA 9170	9170-739	2022/11/13	2023/11/12
MXE EMI Receiver Keysight	N9038A	MY54450088	2022/7/11	2023/7/10
Preamplifier EMCI	EMC12630SE	980688	2022/10/4	2023/10/3
	EMC184045SE	980387	2022/12/28	2023/12/27
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2023/2/20	2024/2/19
	EMC102-KM-KM-1200	160924	2022/12/28	2023/12/27
	EMC104-SM-SM-1200	160922	2022/12/15	2023/12/14
	EMC104-SM-SM-2000	180502	2023/3/27	2024/3/26
	EMC104-SM-SM-6000	210704	2022/11/4	2023/11/3
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 4.
2. Tested Date: 2023/6/7 ~ 2023/6/16

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

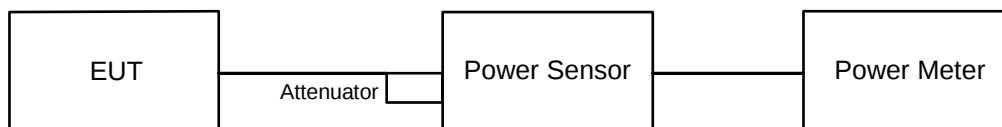
Notes:

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



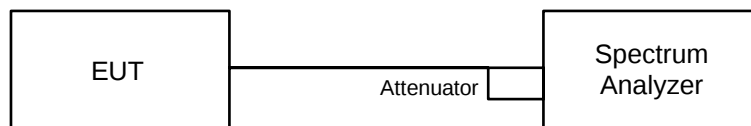
6.1.2 Test Procedure

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

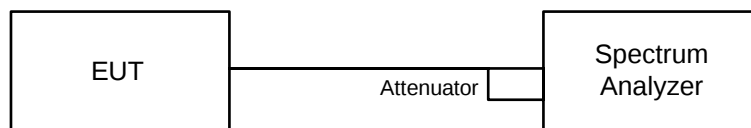


6.2.2 Test Procedure

- 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 $\geq 3 \times$ RBW.
- f. Detector = power averaging (RMS) or sample detector (when RMS not available).
- g. Ensure that the number of measurement points in the sweep $\geq 2 \times$ span/RBW.
- h. Sweep time = auto couple.
- i. Do not use sweep triggering. Allow sweep to "free run".
- j. Employ trace averaging (RMS) mode over a minimum of 100 traces.
- k. Use the peak marker function to determine the maximum amplitude level.
- l. 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

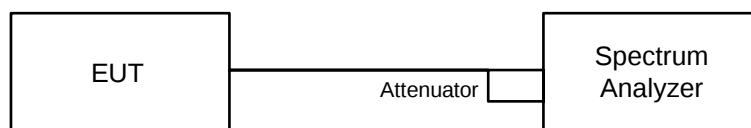


6.3.2 Test Procedure

- Set resolution bandwidth (RBW) = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.4 Conducted Out of Band Emissions

6.4.1 Test Setup



6.4.2 Test Procedure

MEASUREMENT PROCEDURE REF

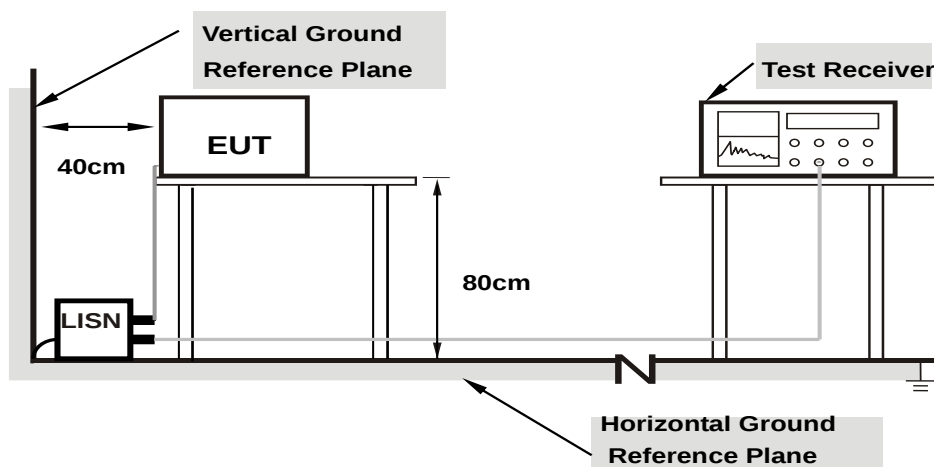
- Set the RBW = 100 kHz.
- Set the VBW ≥ 300 kHz.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

- Set RBW = 100 kHz.
- Set VBW ≥ 300 kHz.
- Detector = peak.
- Sweep = auto couple.
- Trace Mode = max hold.
- Allow trace to fully stabilize.
- 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

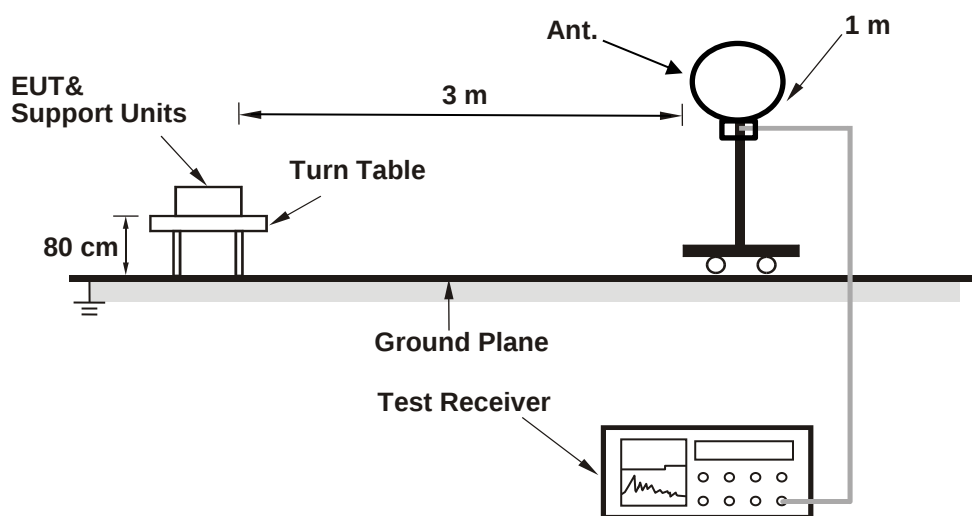
- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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.

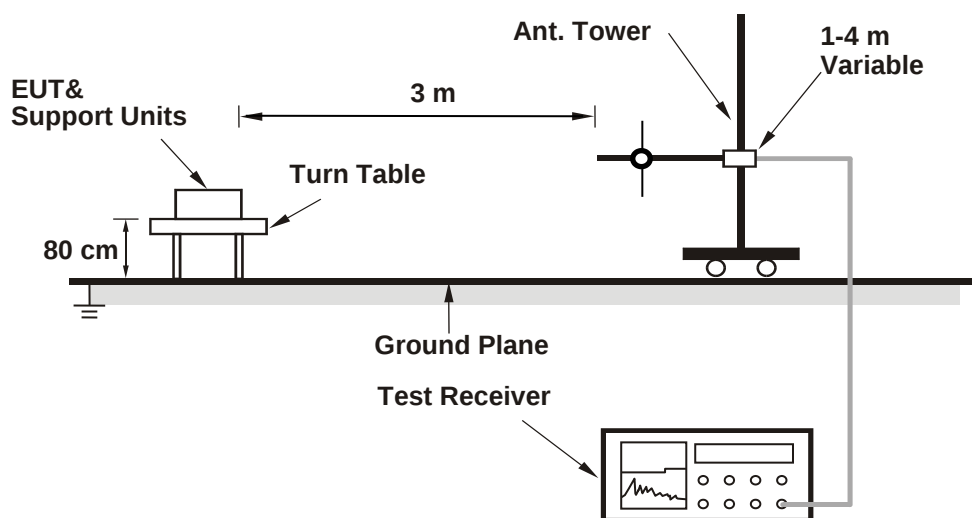
6.6 Unwanted Emissions below 1 GHz

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

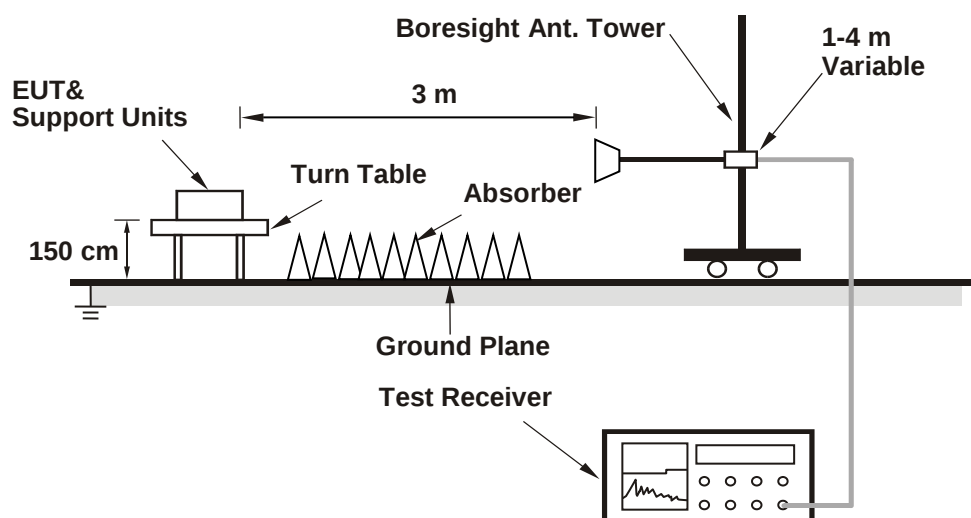
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the 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

- 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.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- 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:

- 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.
- For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
- 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:	Louis Yang
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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	Chain 2	Chain 3				
1	2412	11.35	10.51	12.13	11.57	55.577	17.45	30	Pass
6	2437	16.45	16.77	17.96	17.34	208.408	23.19	30	Pass
11	2462	16.19	16.71	17.72	17.45	203.219	23.08	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.26 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	Chain 2	Chain 3				
1	2412	17.36	17.75	18.47	18.09	248.741	23.96	30	Pass
6	2437	21.12	22.31	22.94	22.51	674.662	28.29	30	Pass
11	2462	22.53	23.72	23.97	23.65	895.764	29.52	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.26 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	Chain 2	Chain 3				
1	2412	16.92	17.11	17.80	17.56	217.881	23.38	30	Pass
6	2437	21.64	22.51	23.07	22.81	717.873	28.56	30	Pass
11	2462	22.11	23.59	23.56	23.51	842.489	29.26	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.26 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	Chain 2	Chain 3				
3	2422	19.67	20.51	20.85	20.84	448.101	26.51	30	Pass
6	2437	22.19	23.42	23.77	23.41	842.875	29.26	30	Pass
9	2452	20.91	21.92	22.47	22.09	617.319	27.91	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.26 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	Chain 2	Chain 3				
1	2412	17.20	17.36	18.03	17.83	231.138	23.64	30	Pass
6	2437	21.86	22.76	23.31	23.09	760.254	28.81	30	Pass
11	2462	22.33	23.83	23.77	23.76	888.464	29.49	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.26 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	Chain 2	Chain 3				
3	2422	19.91	20.76	21.13	21.12	476.211	26.78	30	Pass
6	2437	22.45	23.63	24.03	23.66	891.671	29.50	30	Pass
9	2452	21.16	22.13	22.74	22.36	654.041	28.16	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 4.26 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	Chain 2	Chain 3				
1	2412	16.92	17.11	17.80	17.56	217.881	23.38	30	Pass
6	2437	21.64	22.51	23.07	22.81	717.873	28.56	30	Pass
11	2462	22.11	23.59	23.56	23.51	842.489	29.26	30	Pass

Notes:

1. Directional gain is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.
2. The directional gain is 5.81 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT40 Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	19.67	20.51	20.85	20.84	448.101	26.51	30	Pass
6	2437	22.19	23.42	23.77	23.41	842.875	29.26	30	Pass
9	2452	20.91	21.92	22.47	22.09	617.319	27.91	30	Pass

Notes:

1. Directional gain is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.
2. The directional gain is 5.81 dBi < 6 dBi, so the output power limit shall not be reduced.

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	Chain 2	Chain 3				
1	2412	17.20	17.36	18.03	17.83	231.138	23.64	30	Pass
6	2437	21.86	22.76	23.31	23.09	760.254	28.81	30	Pass
11	2462	22.33	23.83	23.77	23.76	888.464	29.49	30	Pass

Notes:

1. Directional gain is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.
2. The directional gain is 5.81 dBi < 6 dBi, so the output power limit shall not be reduced.

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	Chain 2	Chain 3				
3	2422	19.91	20.76	21.13	21.12	476.211	26.78	30	Pass
6	2437	22.45	23.63	24.03	23.66	891.671	29.50	30	Pass
9	2452	21.16	22.13	22.74	22.36	654.041	28.16	30	Pass

Notes:

1. Directional gain is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.
2. The directional gain is 5.81 dBi < 6 dBi, so the output power limit shall not be reduced.

7.2 Power Spectral Density

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Louis Yang
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802.11b

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)				Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3			
1	2412	-8.30	-7.30	-7.33	-7.04	-1.45	8	Pass
6	2437	-8.82	-7.59	-7.08	-13.67	-2.64	8	Pass
11	2462	-8.34	-7.42	-7.25	-13.19	-2.49	8	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 is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.
3. The directional gain is 5.81 dBi < 6 dBi, so the power density limit shall not be reduced.

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	Chain 2	Chain 3				
1	2412	-15.77	-15.66	-14.53	-14.71	0.17	-8.94	8	Pass
6	2437	-11.13	-10.50	-9.85	-10.32	0.17	-4.23	8	Pass
11	2462	-10.77	-9.52	-9.70	-9.78	0.17	-3.73	8	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 is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.
3. The directional gain is 5.81 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)				Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3			
1	2412	-17.55	-16.65	-17.31	-17.64	-11.25	8	Pass
6	2437	-12.81	-11.13	-11.35	-11.79	-5.70	8	Pass
11	2462	-12.10	-10.50	-11.24	-11.32	-5.23	8	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 is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.
3. The directional gain is 5.81 dBi < 6 dBi, so the power density limit shall not be reduced.

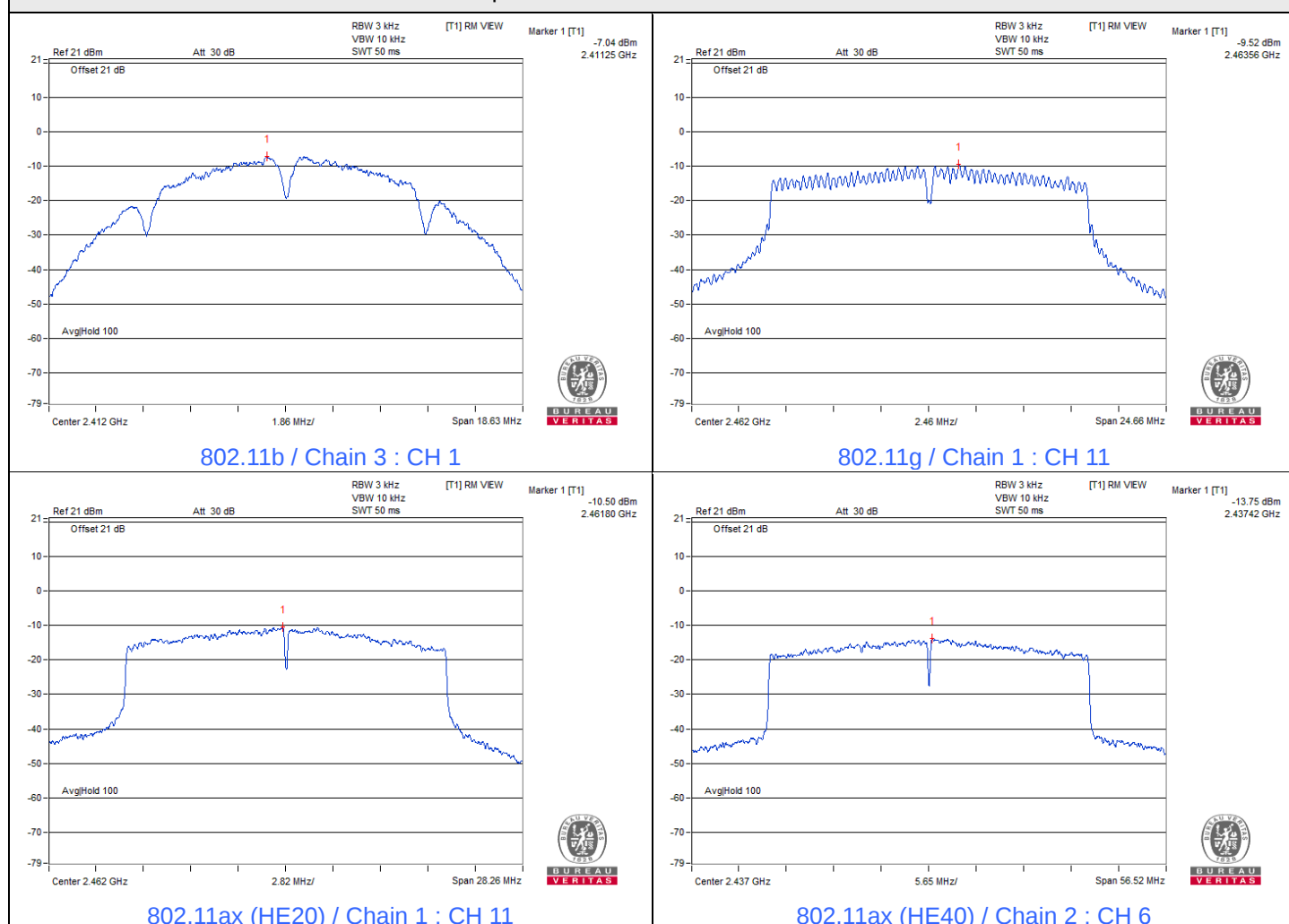
802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)				Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3			
3	2422	-17.36	-17.83	-17.04	-16.80	-11.22	8	Pass
6	2437	-15.01	-15.58	-13.75	-13.98	-8.50	8	Pass
9	2452	-16.71	-16.18	-14.86	-15.56	-9.75	8	Pass

Notes:

- Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
- Directional gain is the measured value according to KDB 662911 D03 Method of MIMO Antenna Gain Measurement.
- The directional gain is 5.81 dBi < 6 dBi, so the power density limit shall not be reduced.

Spectrum Plot of Maximum Value



7.3 6 dB Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Louis Yang
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802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)				Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	7.10	8.04	7.59	8.07	0.5	Pass
6	2437	8.08	8.07	8.04	7.60	0.5	Pass
11	2462	8.06	7.58	7.58	8.06	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)				Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	15.16	15.48	15.15	15.17	0.5	Pass
6	2437	15.13	15.17	15.49	15.13	0.5	Pass
11	2462	15.14	15.15	15.33	15.16	0.5	Pass

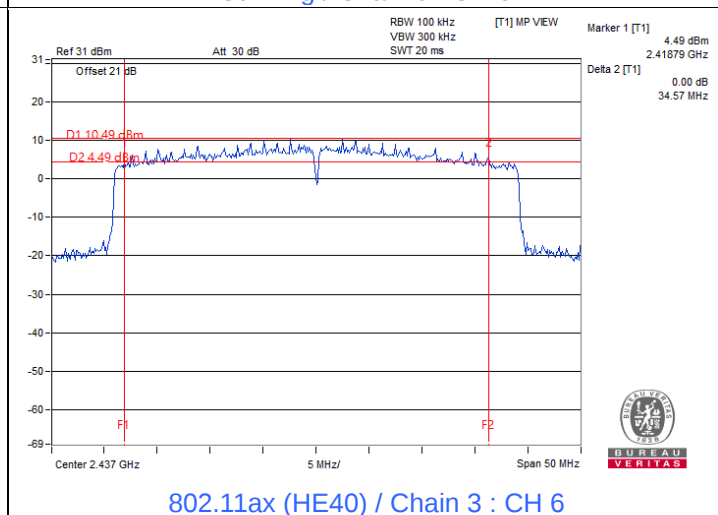
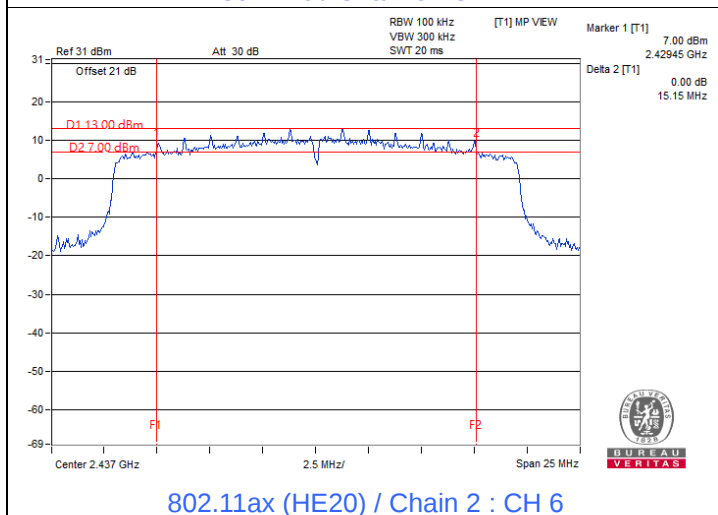
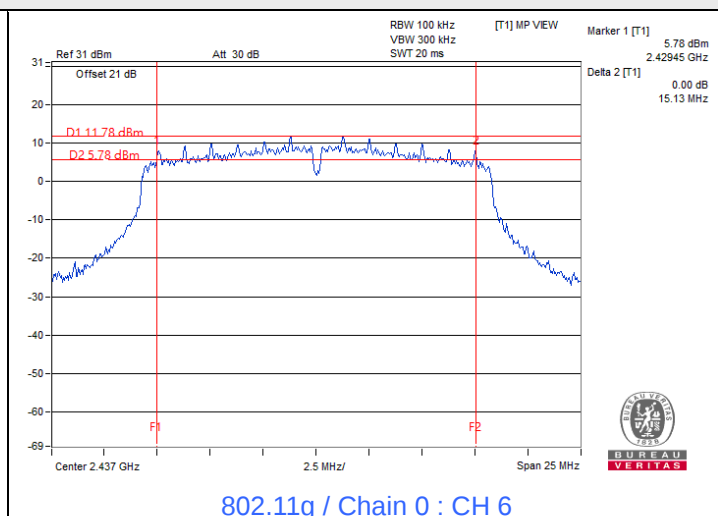
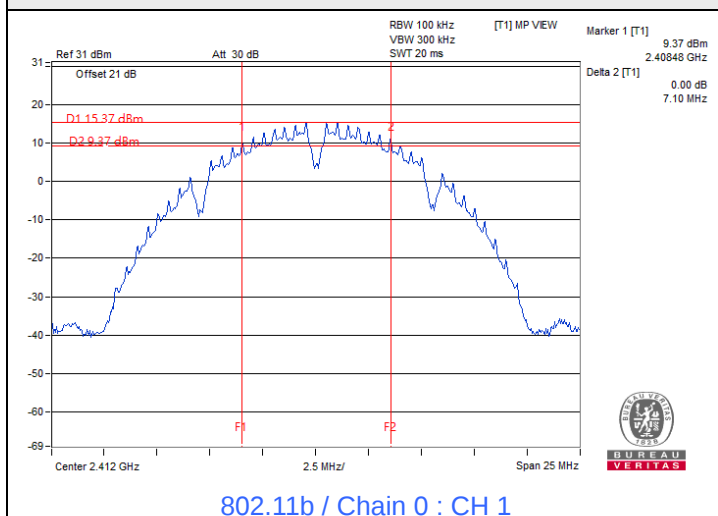
802.11ax (HE20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)				Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	18.09	16.55	16.34	17.35	0.5	Pass
6	2437	18.14	16.36	15.15	17.31	0.5	Pass
11	2462	17.74	15.88	15.55	16.71	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)				Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	37.04	35.20	35.19	35.14	0.5	Pass
6	2437	36.37	36.51	35.18	34.57	0.5	Pass
9	2452	35.35	35.16	35.26	35.02	0.5	Pass

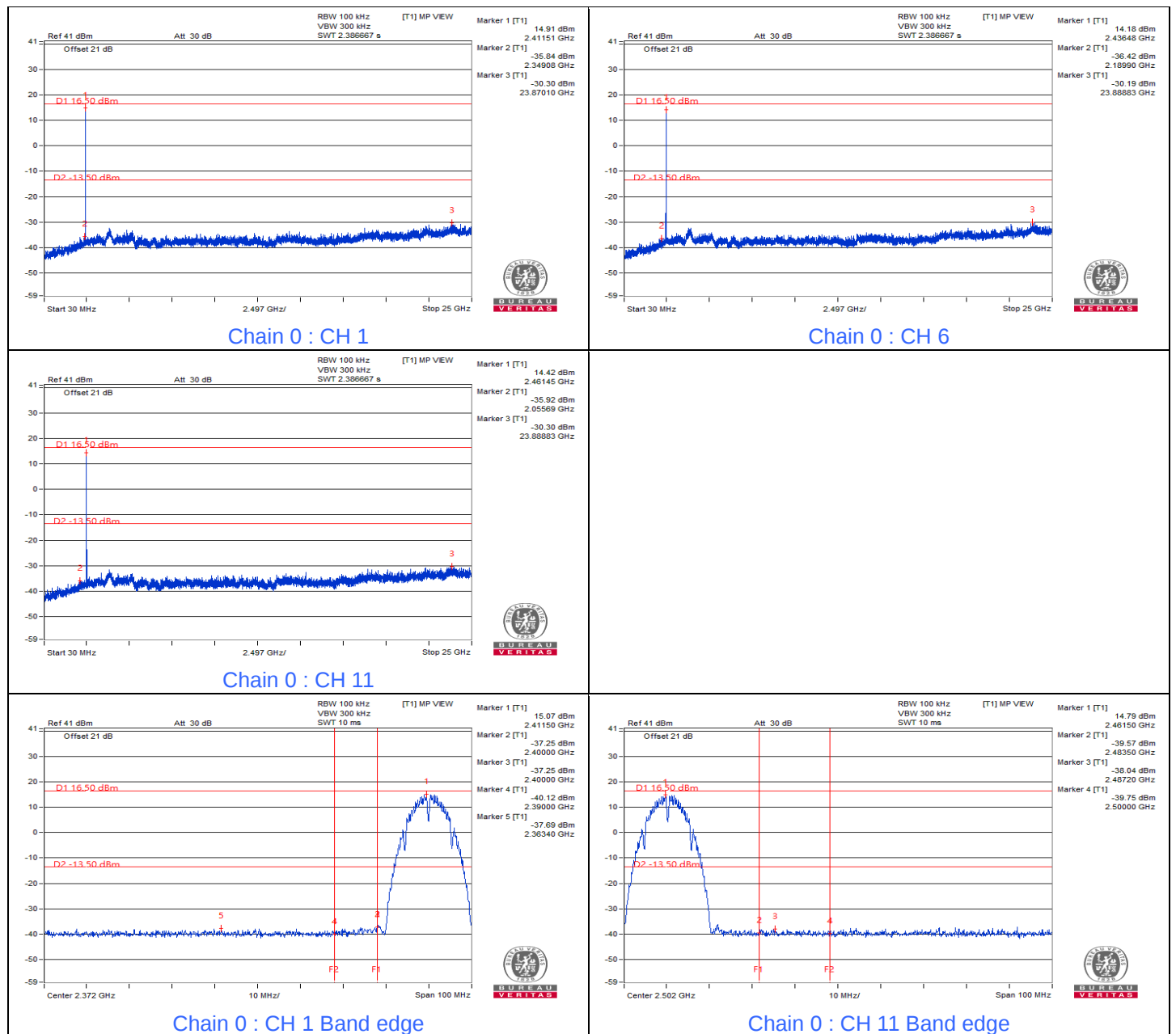
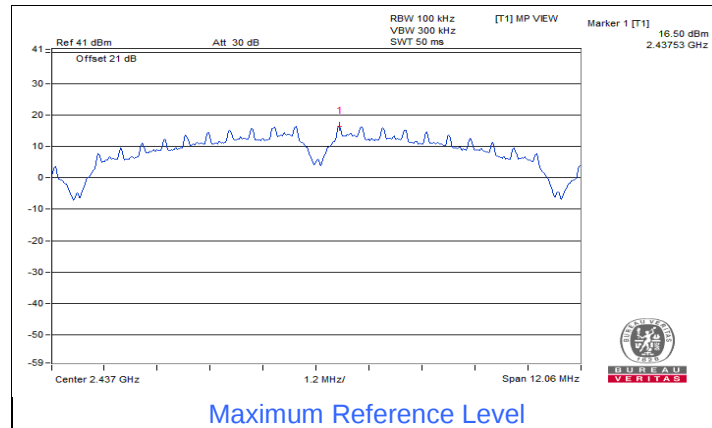
Spectrum Plot of Minimum Value

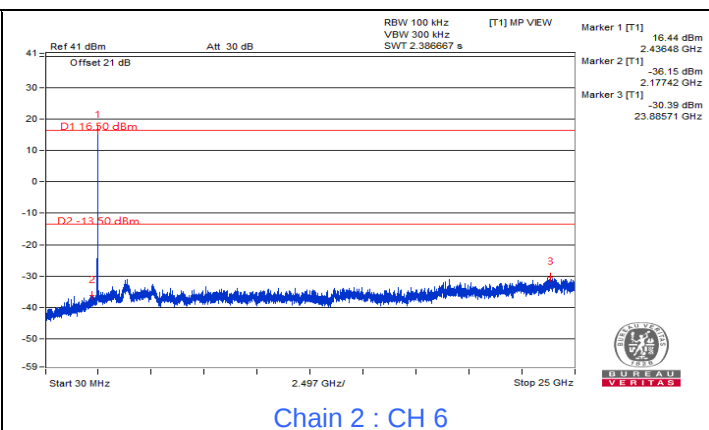
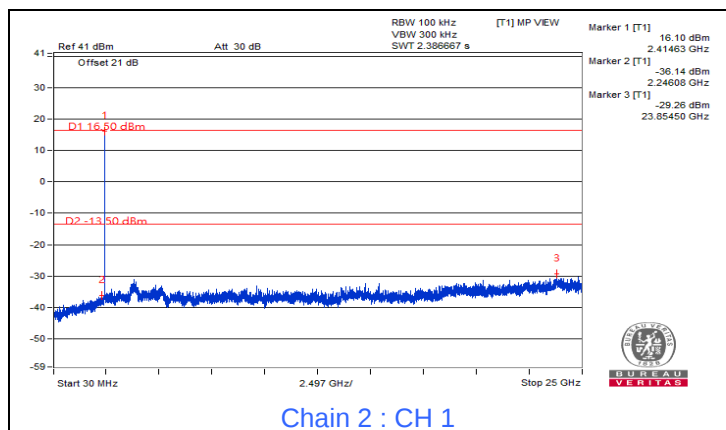
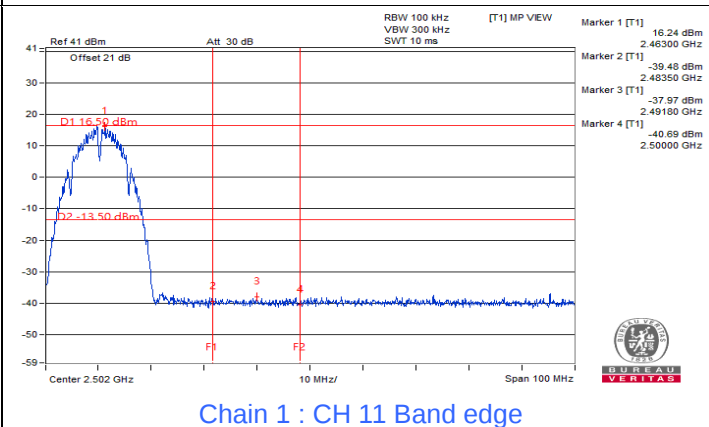
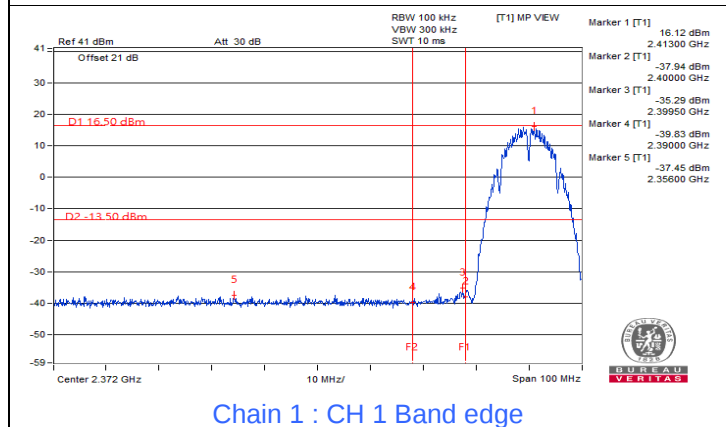
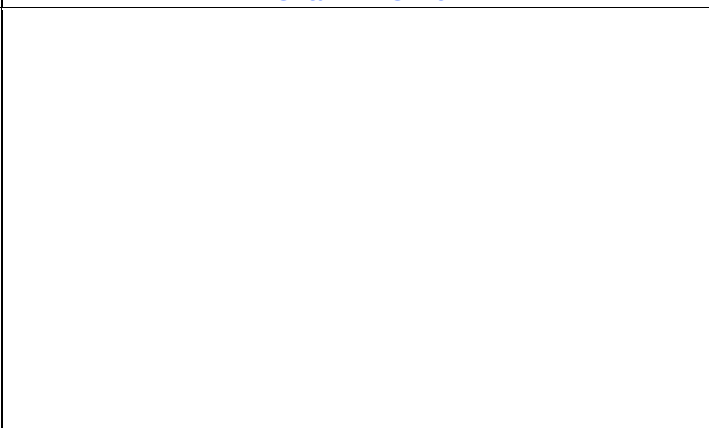
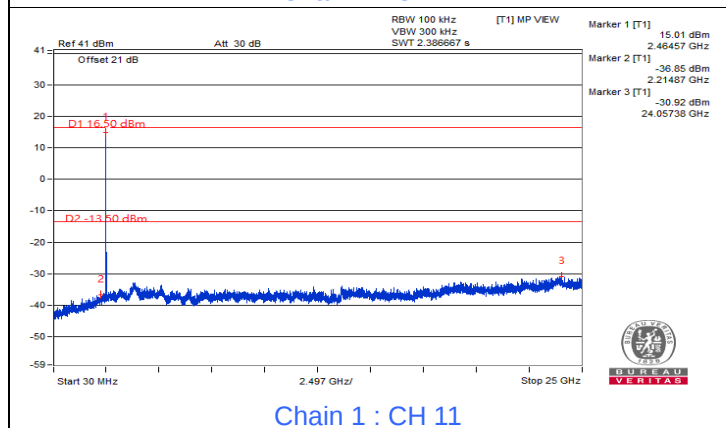
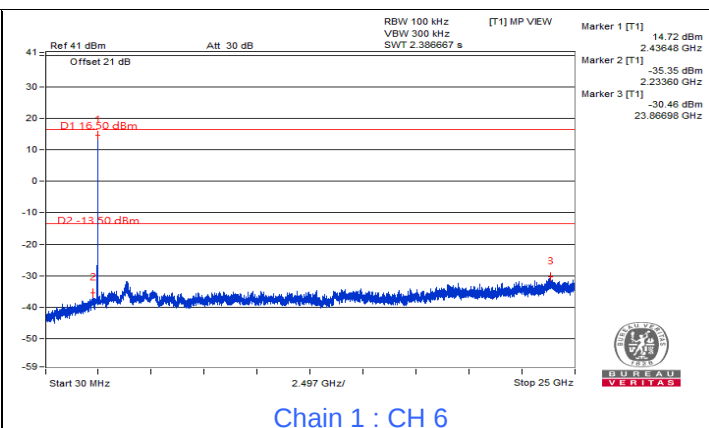
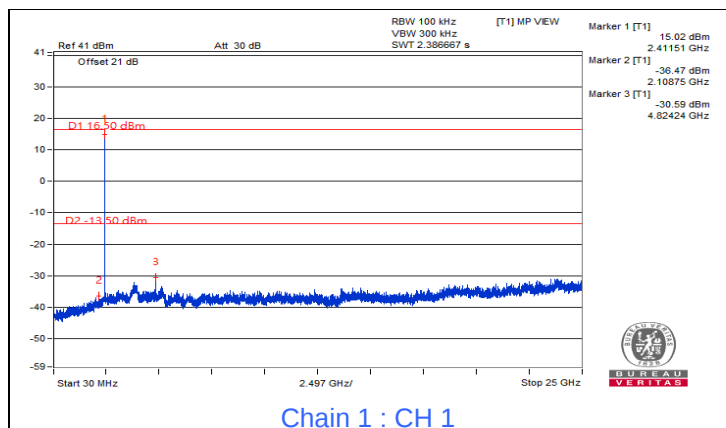


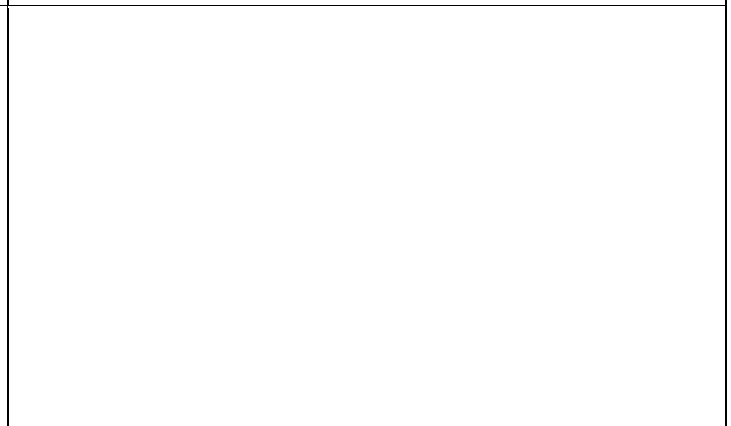
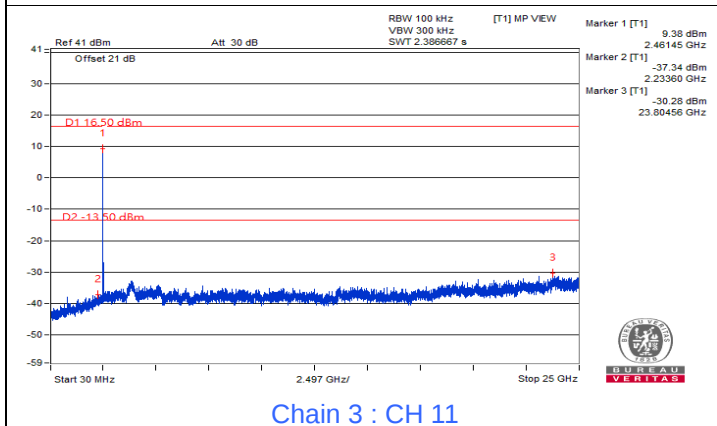
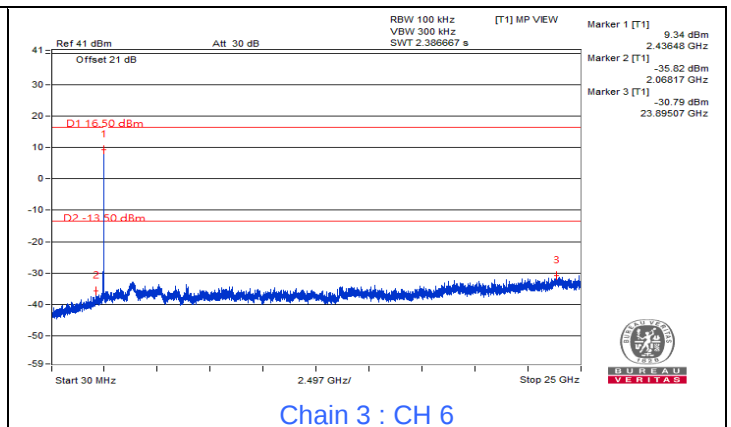
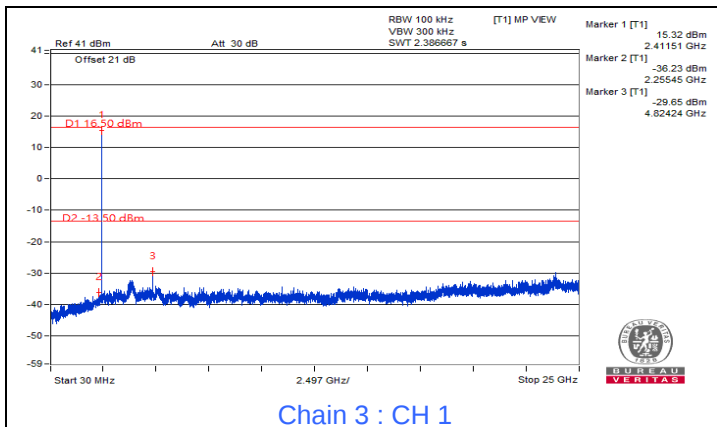
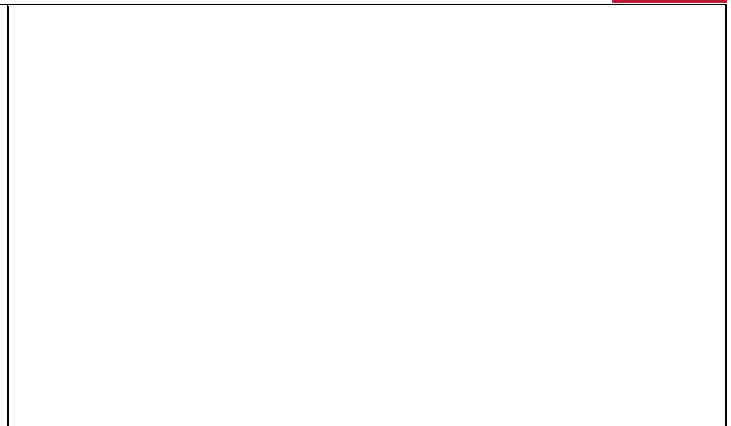
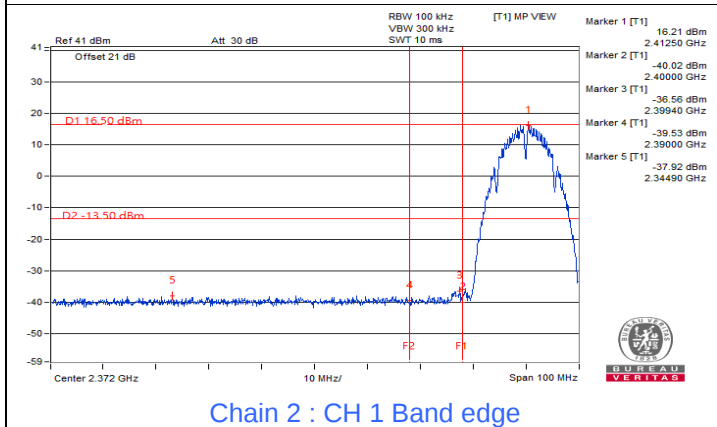
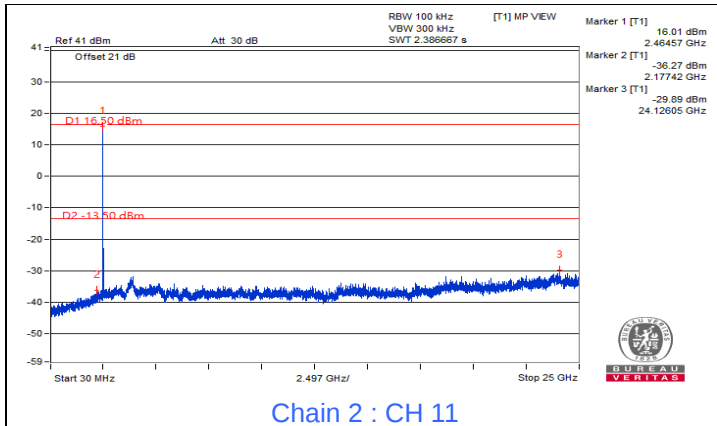
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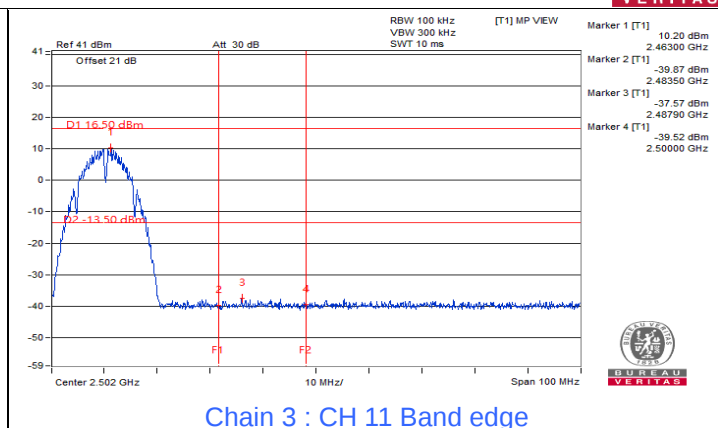
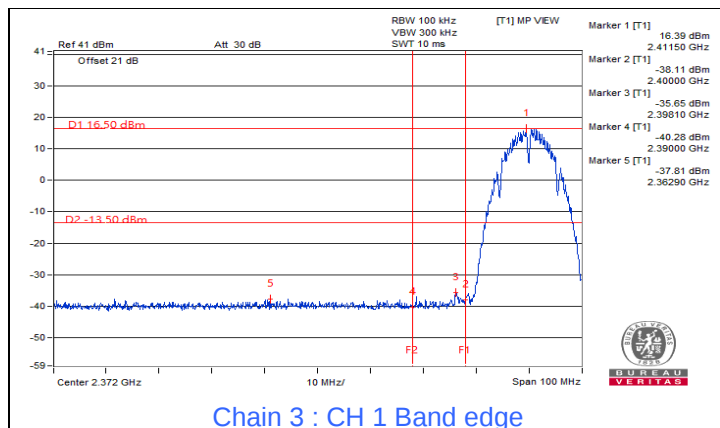
Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Louis Yang
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802.11b

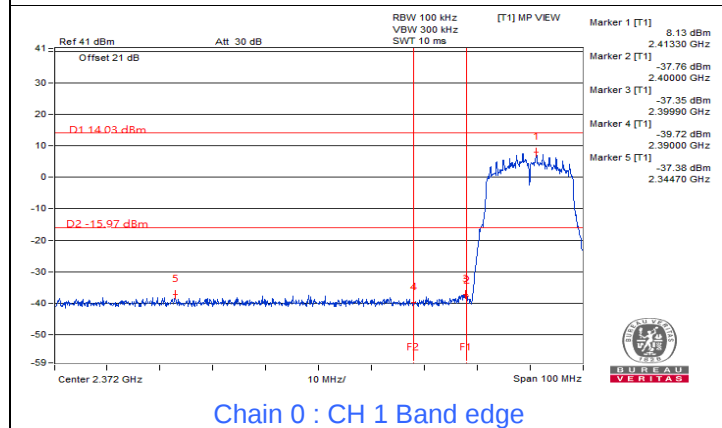
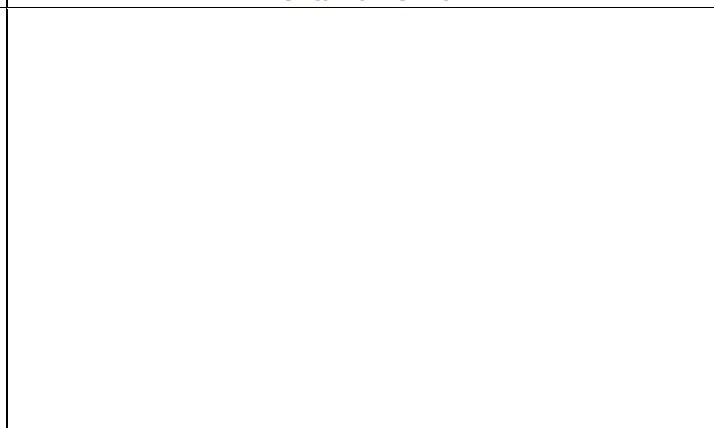
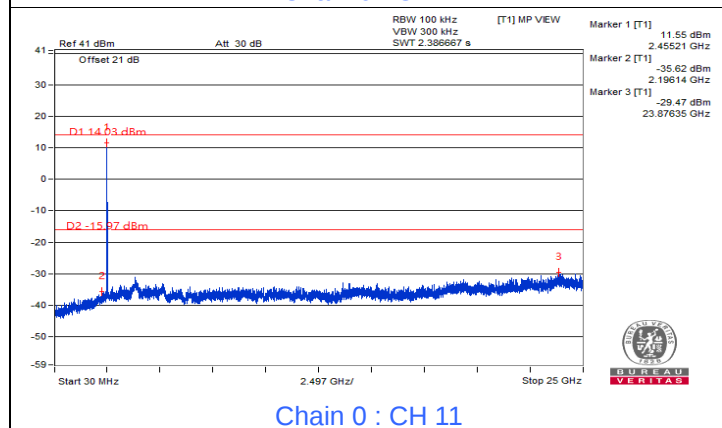
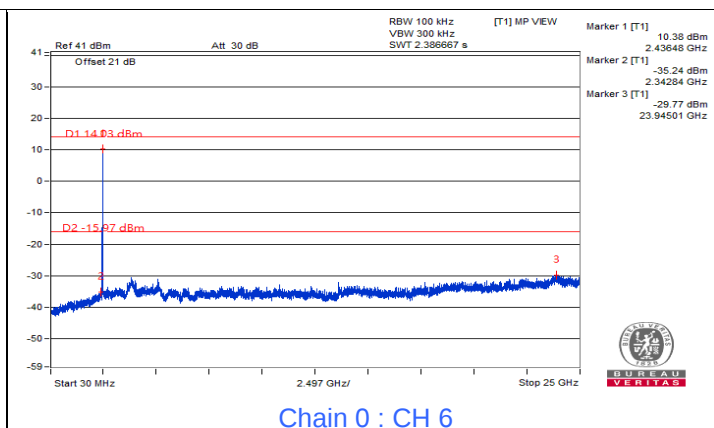
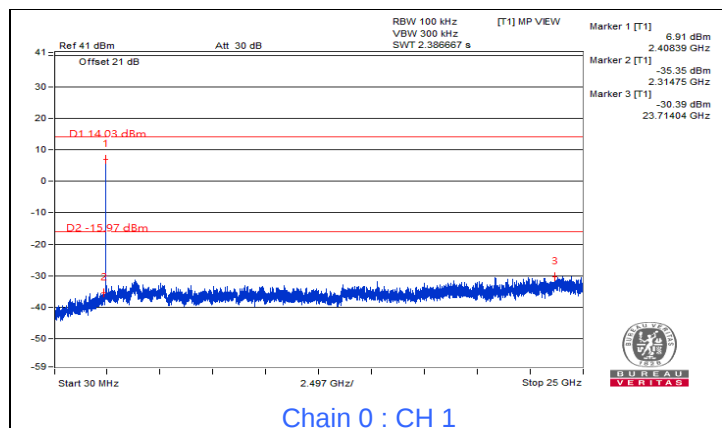
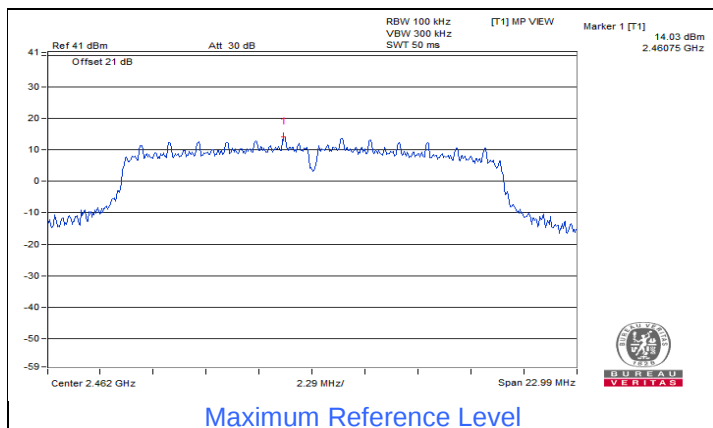


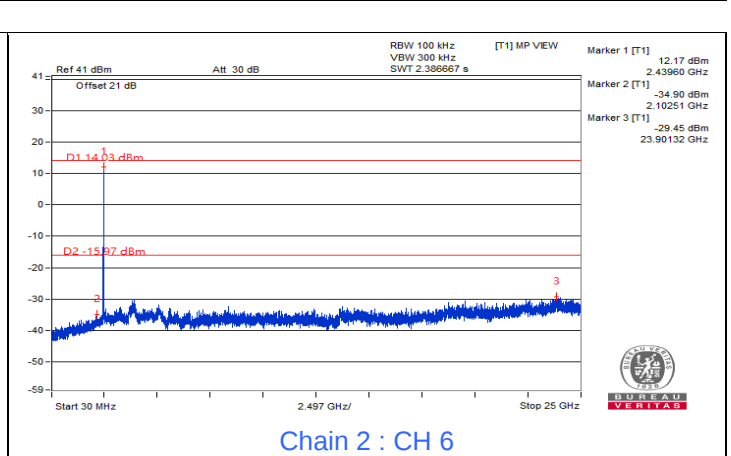
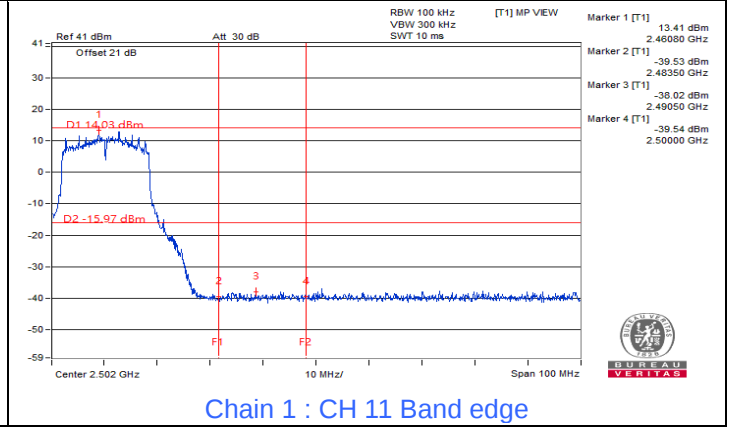
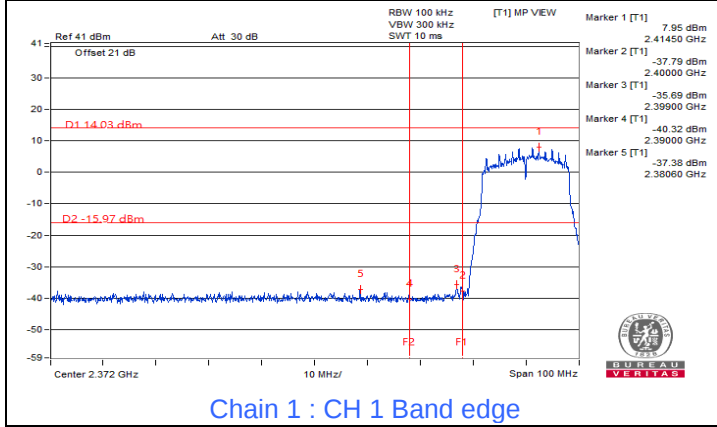
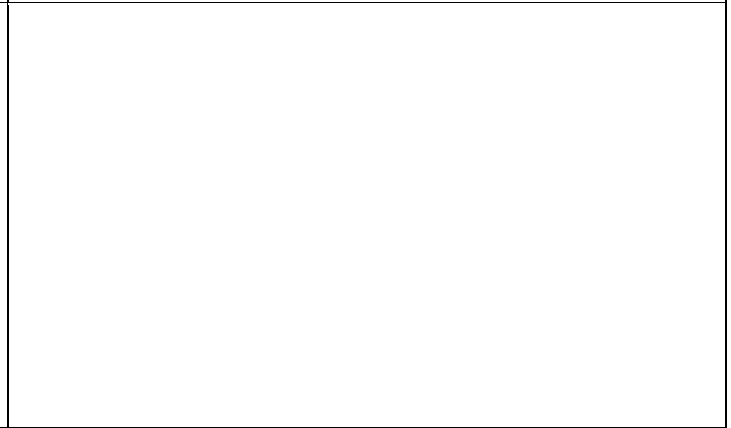
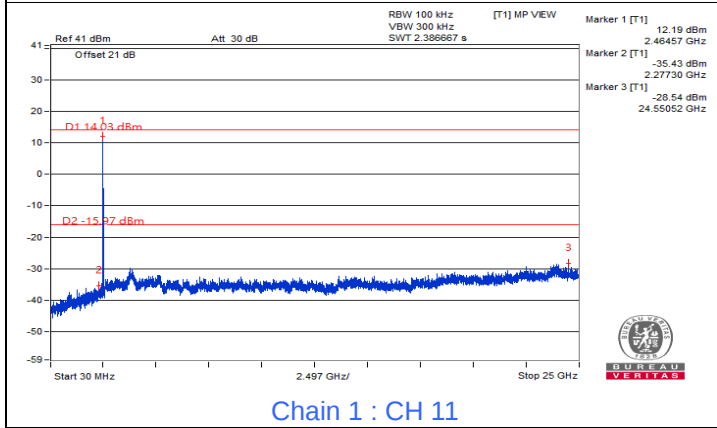
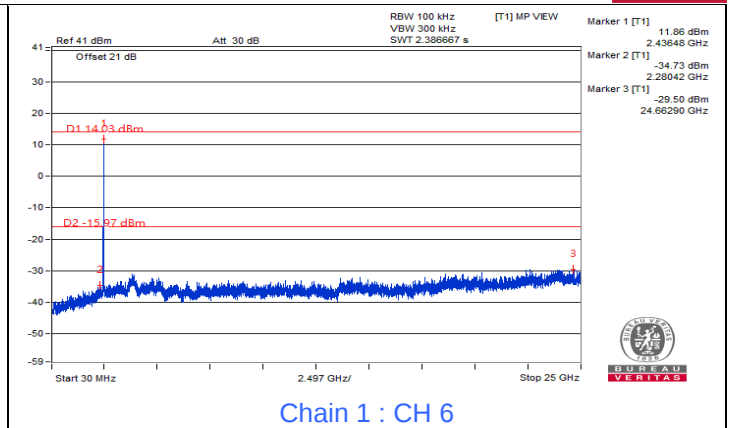
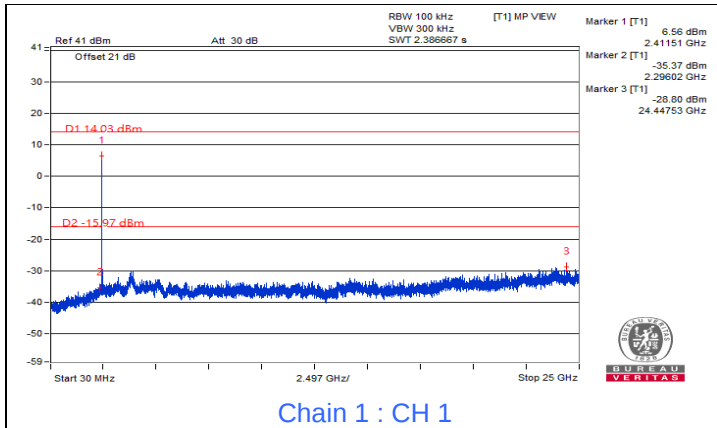


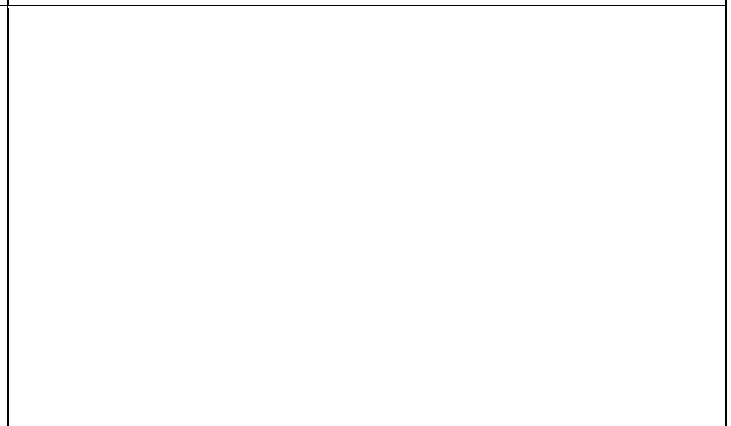
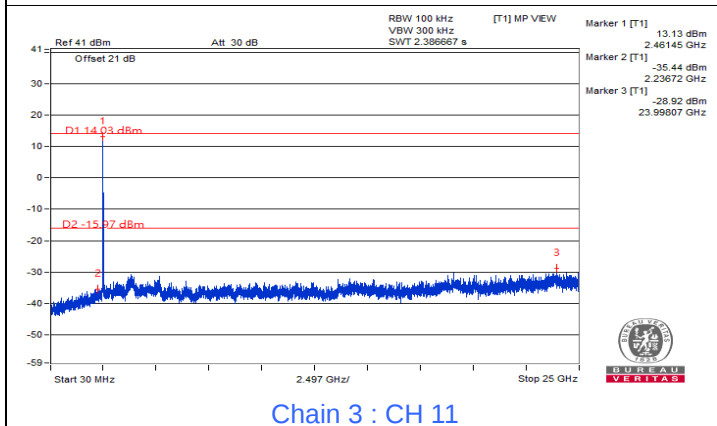
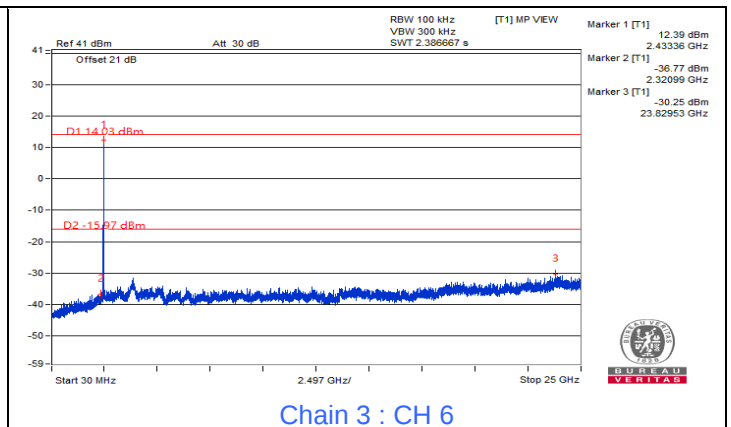
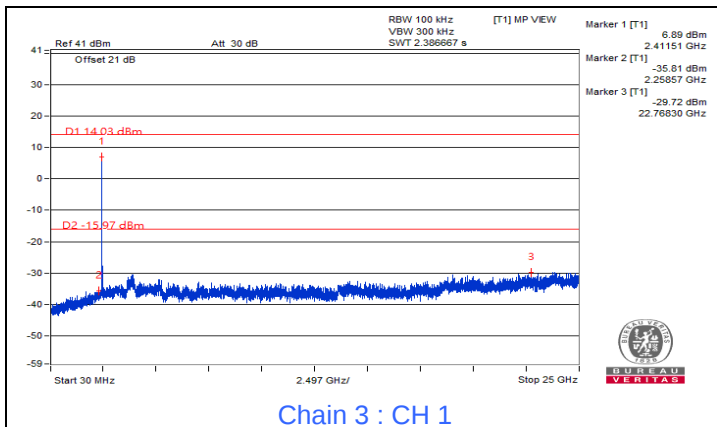
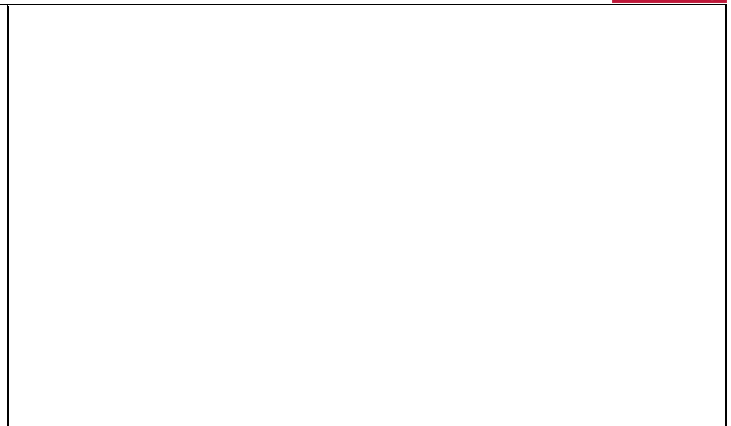
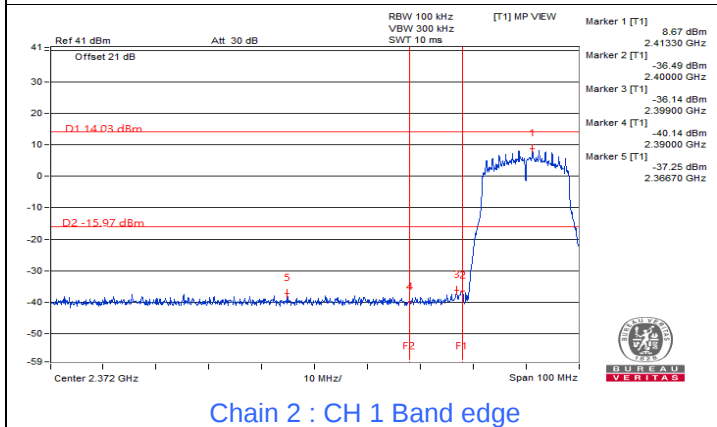
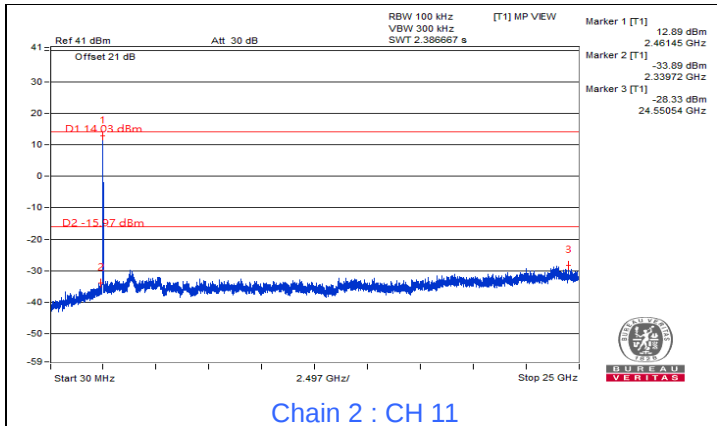


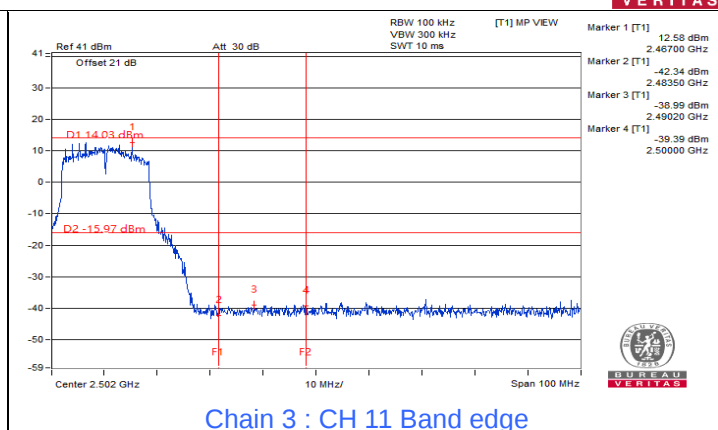
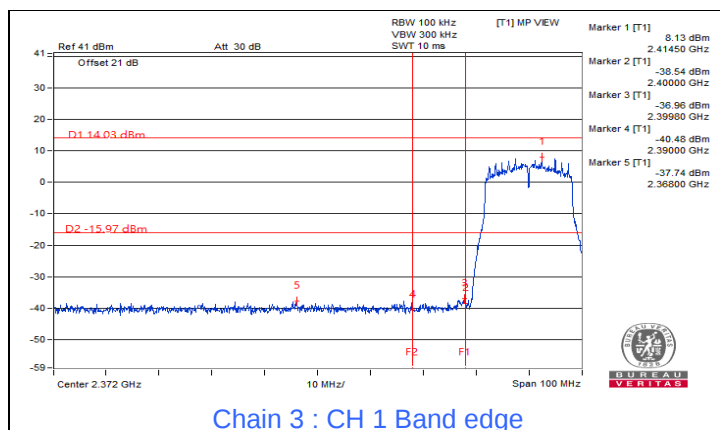


802.11g

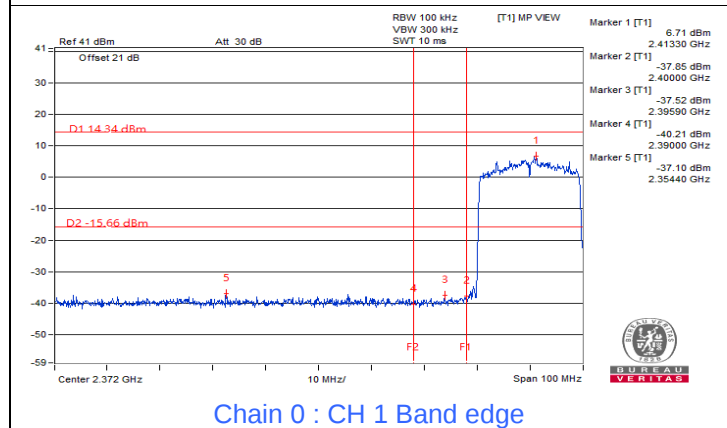
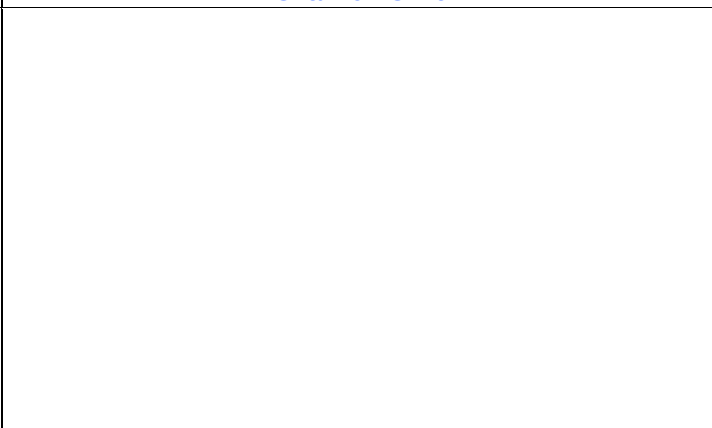
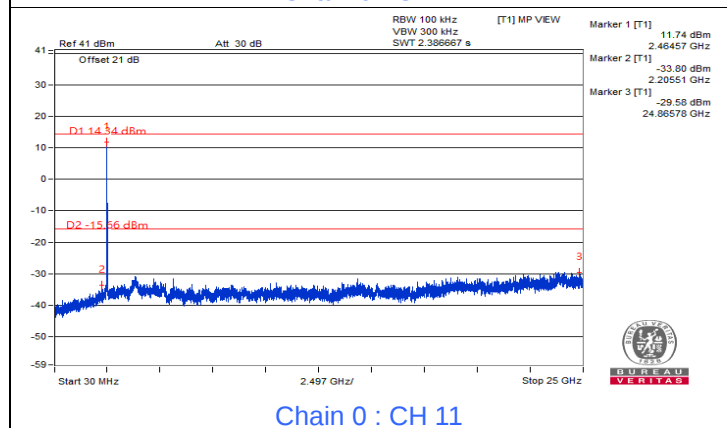
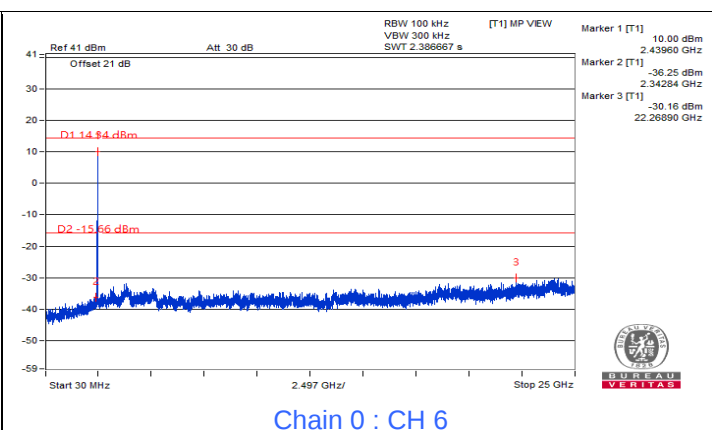
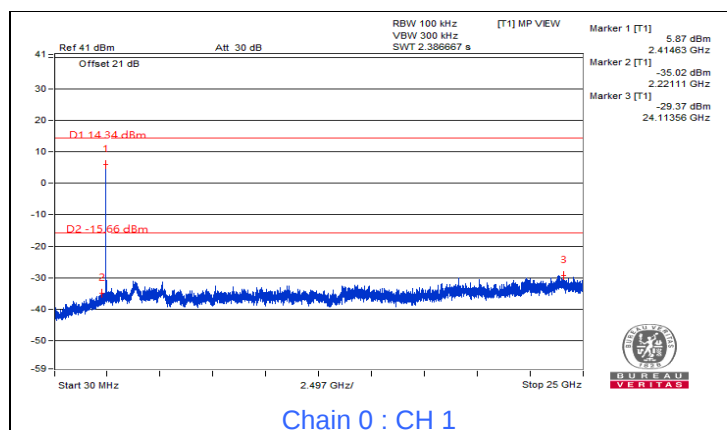
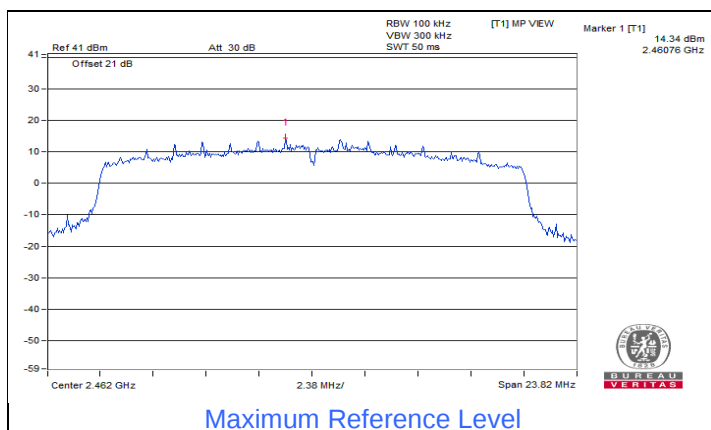


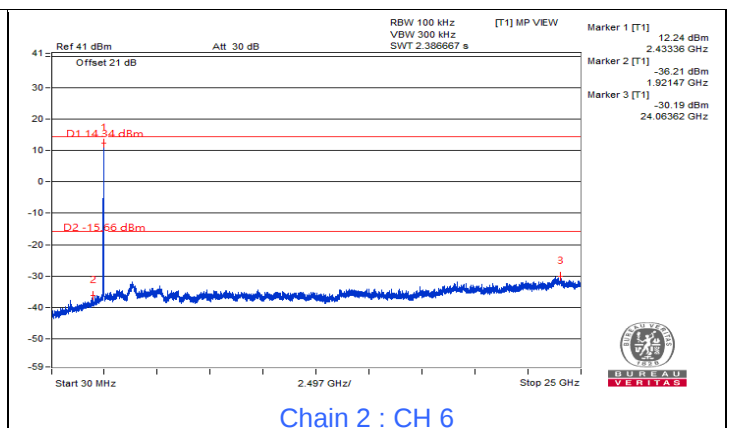
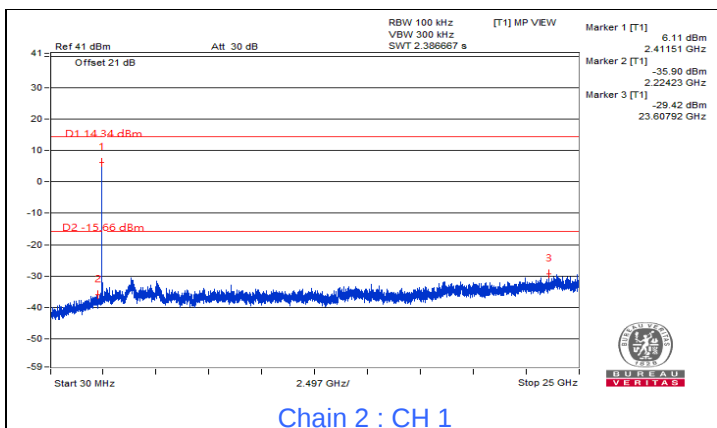
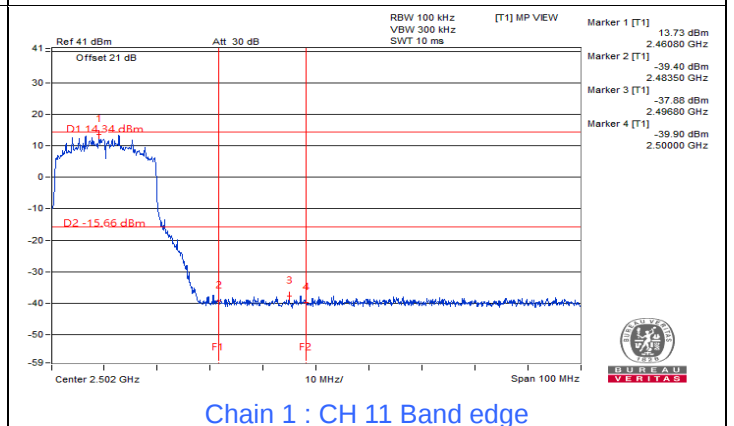
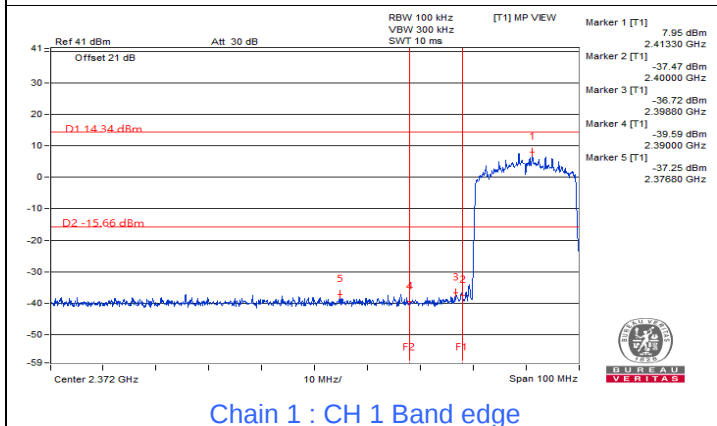
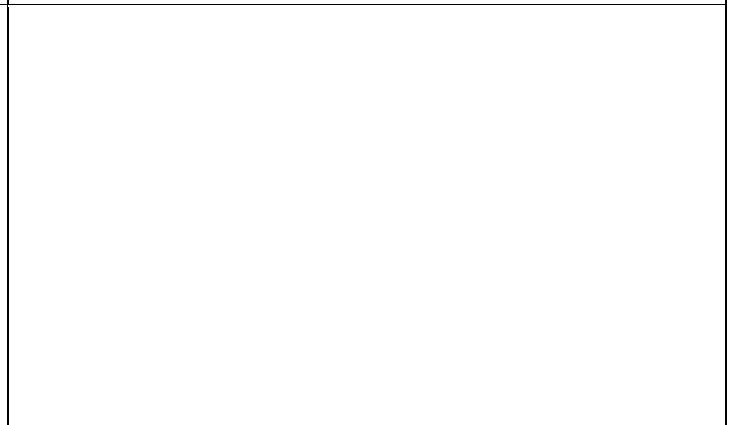
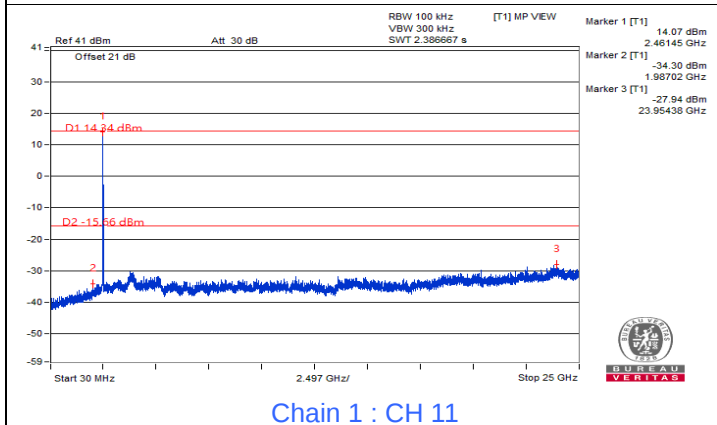
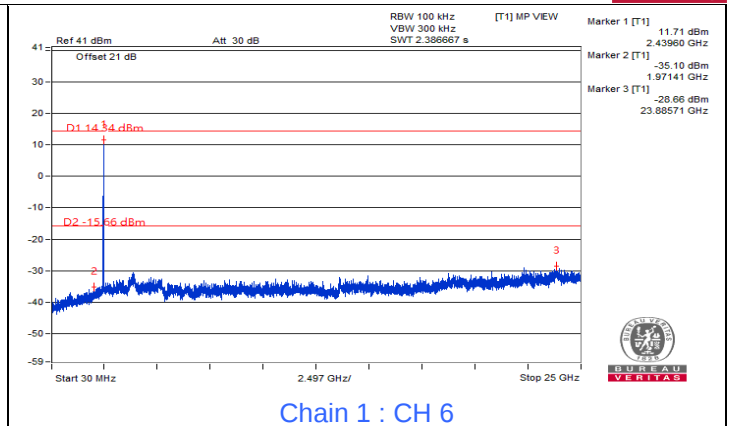
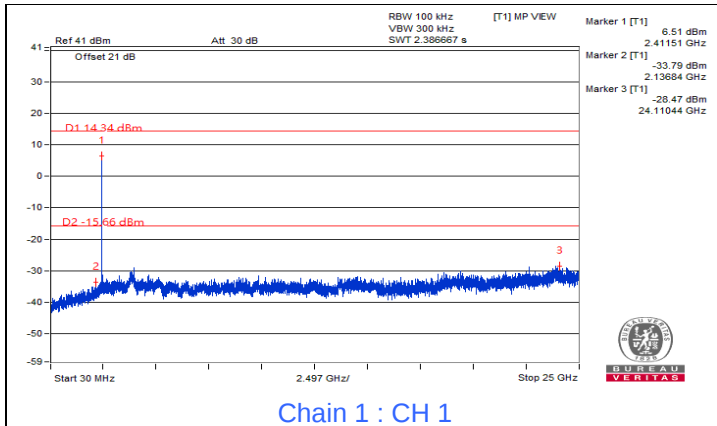


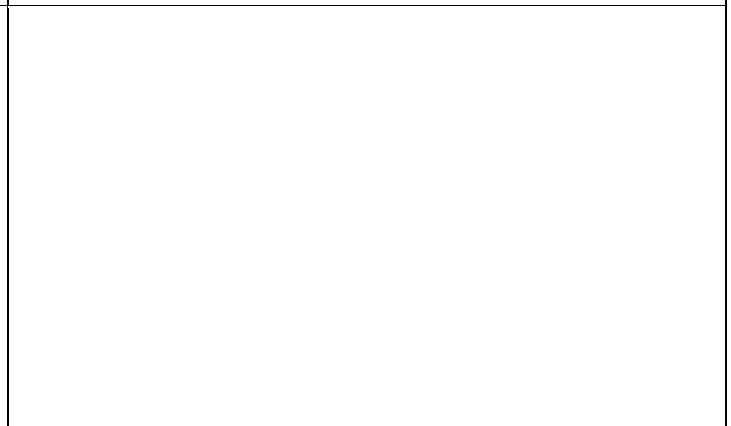
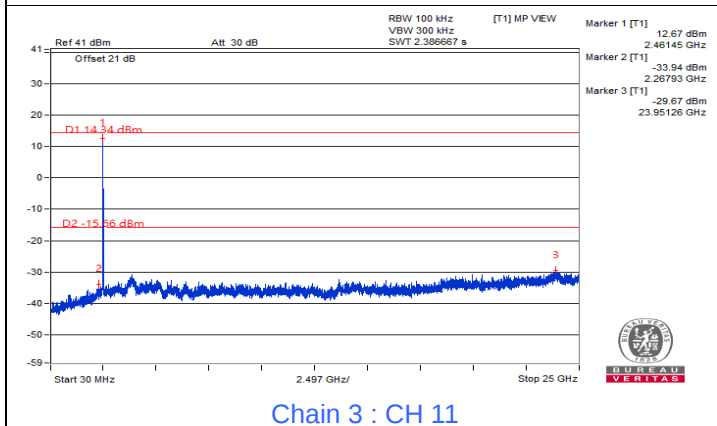
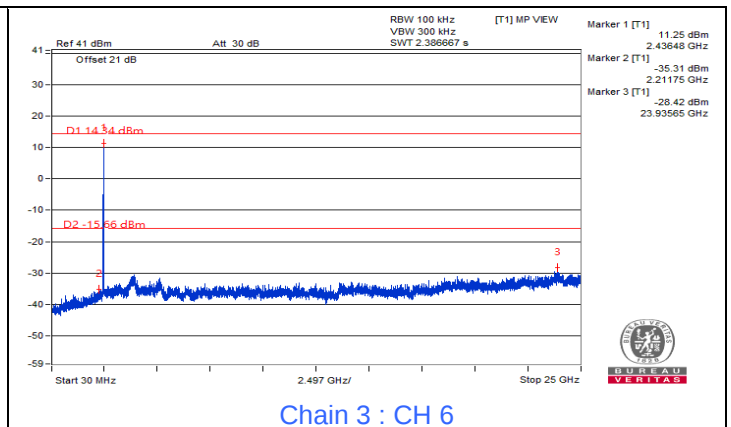
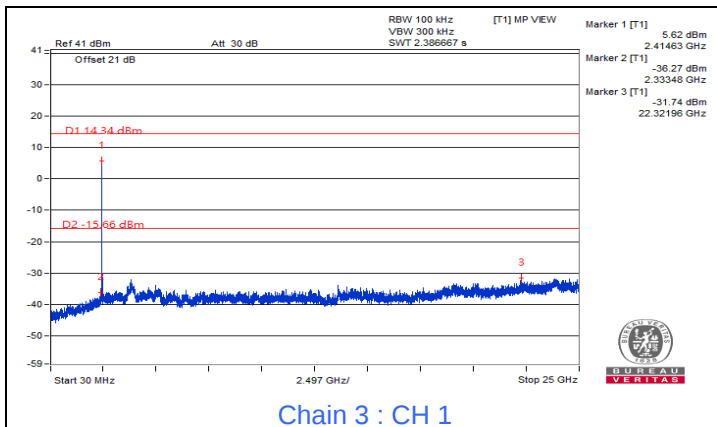
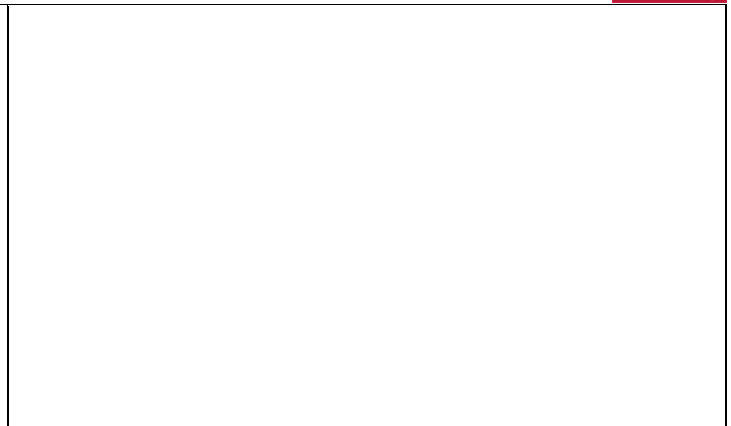
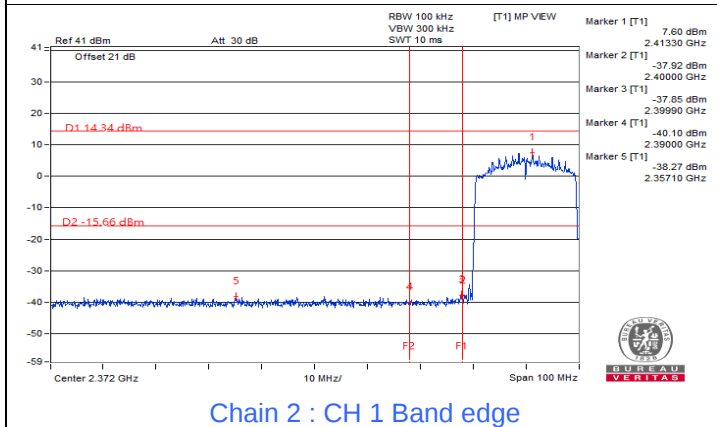
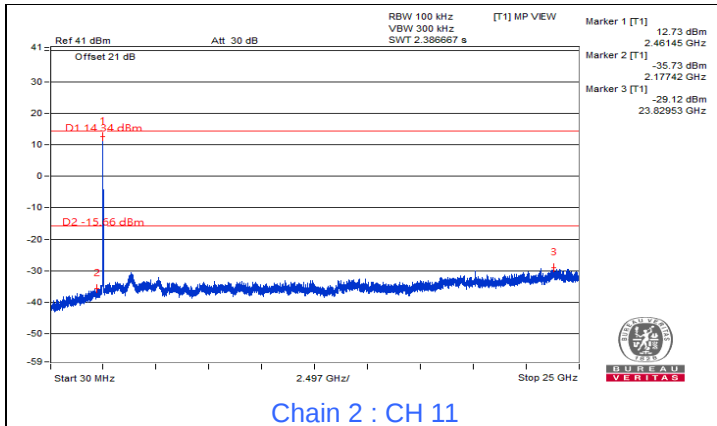


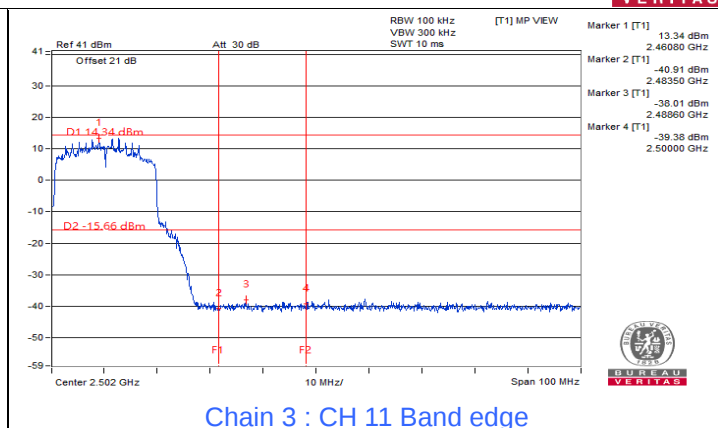
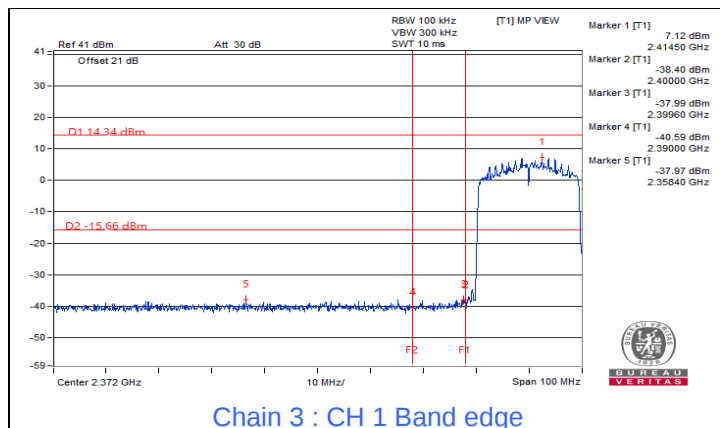


802.11ax (HE20)

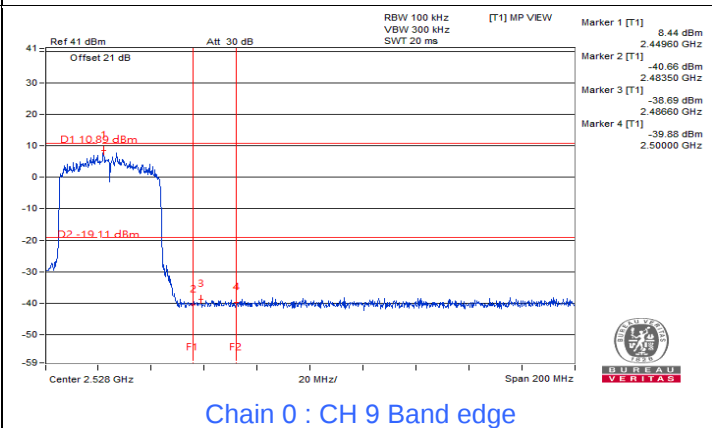
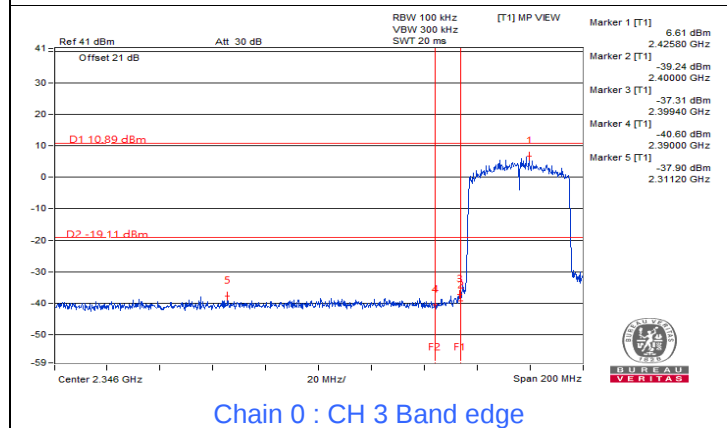
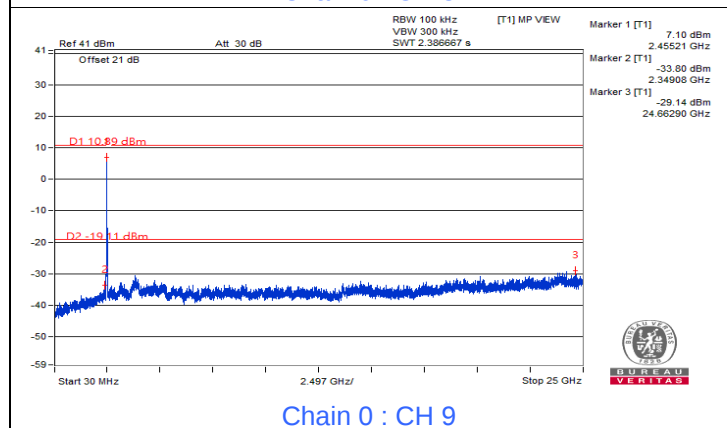
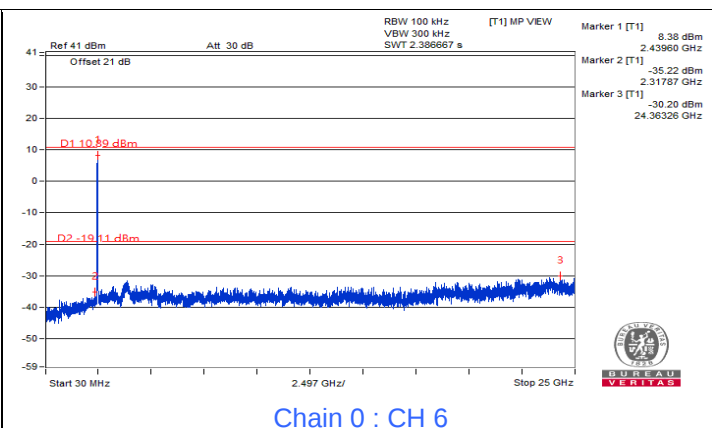
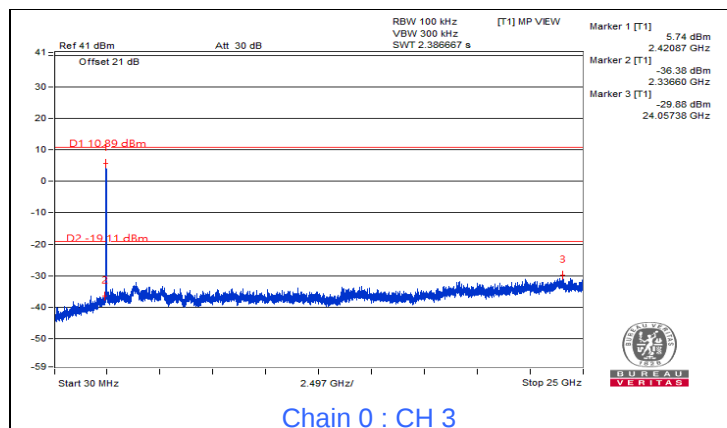
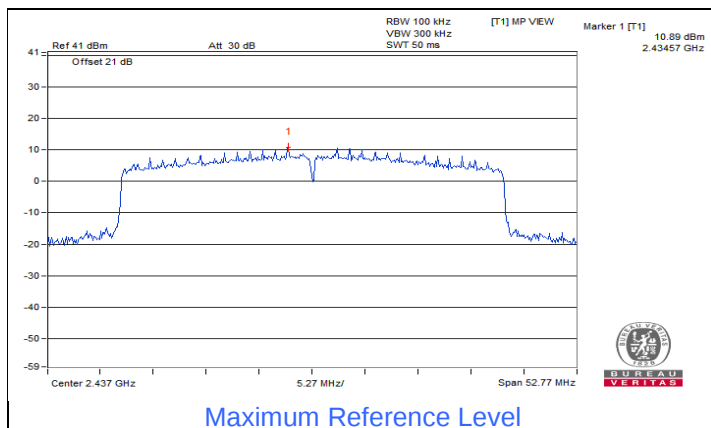


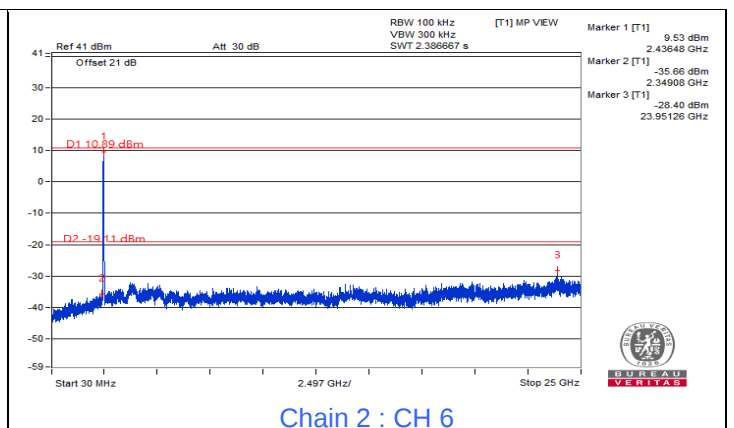
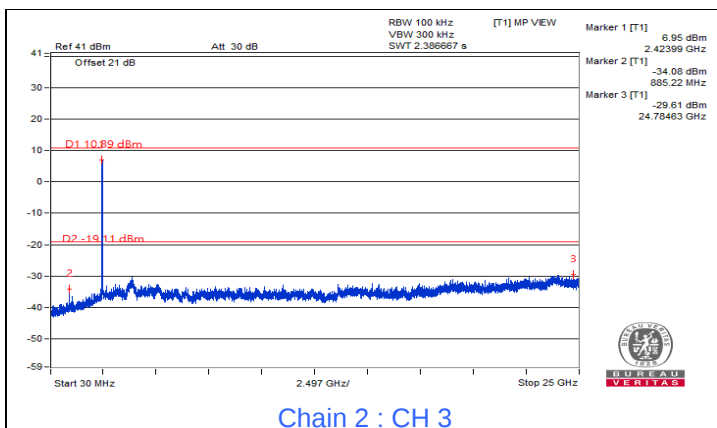
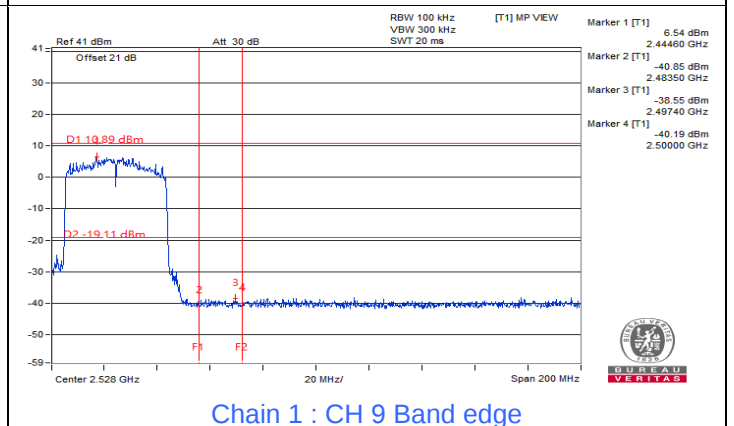
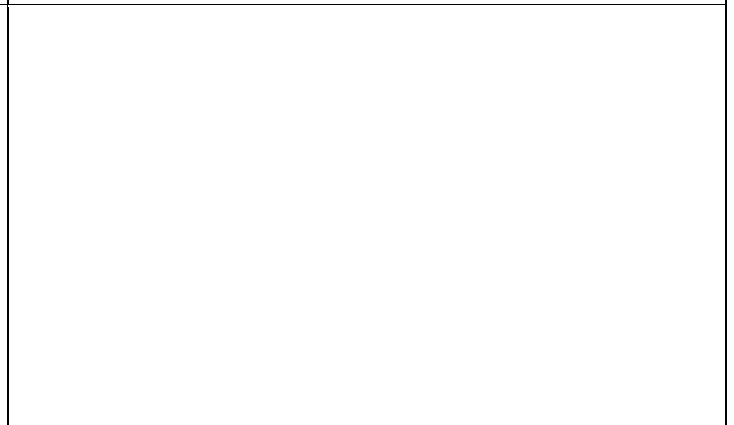
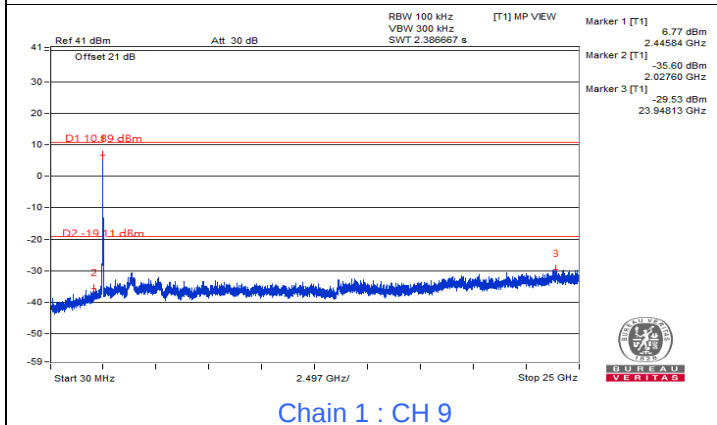
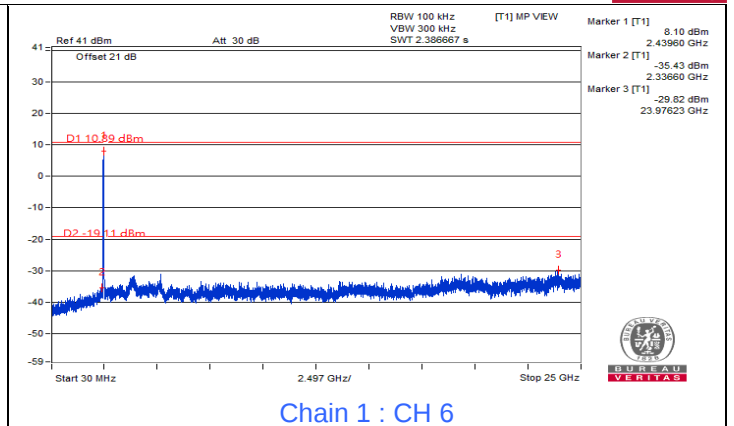
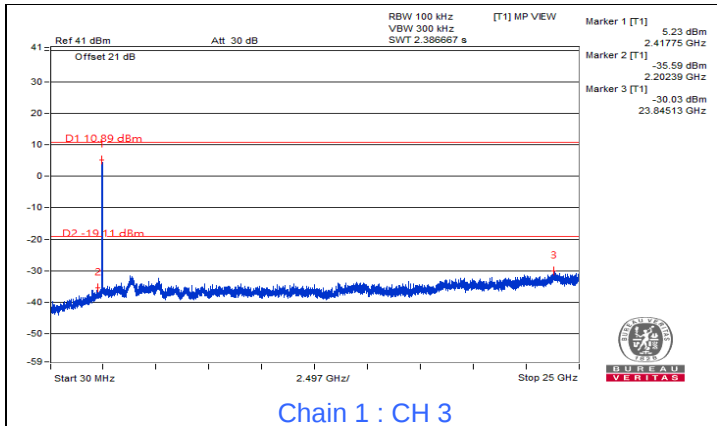


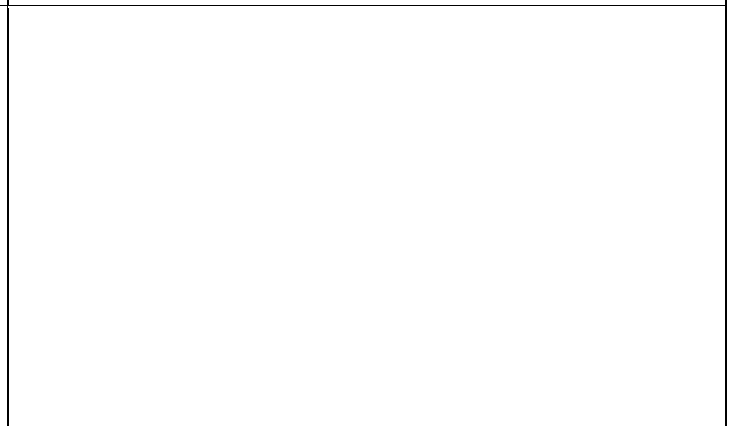
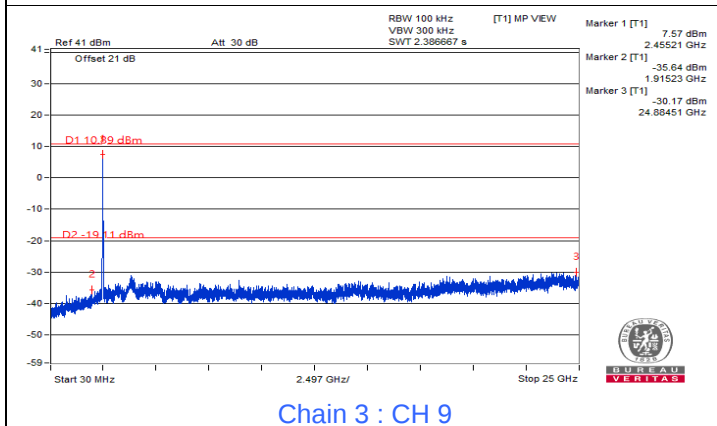
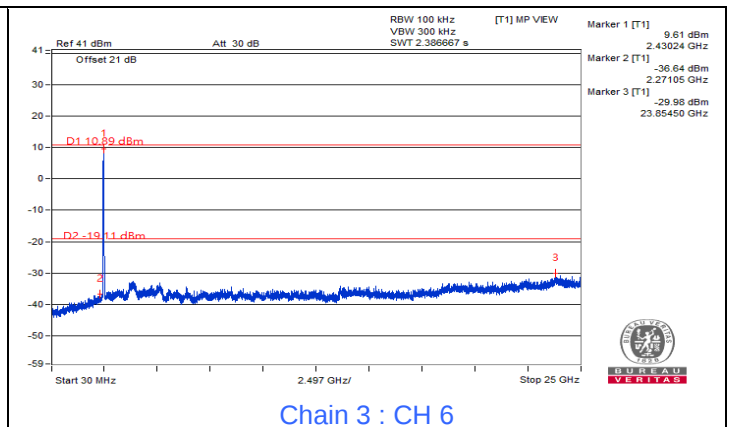
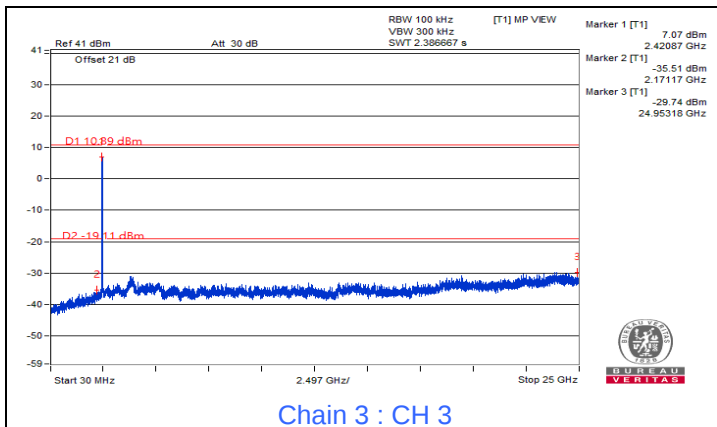
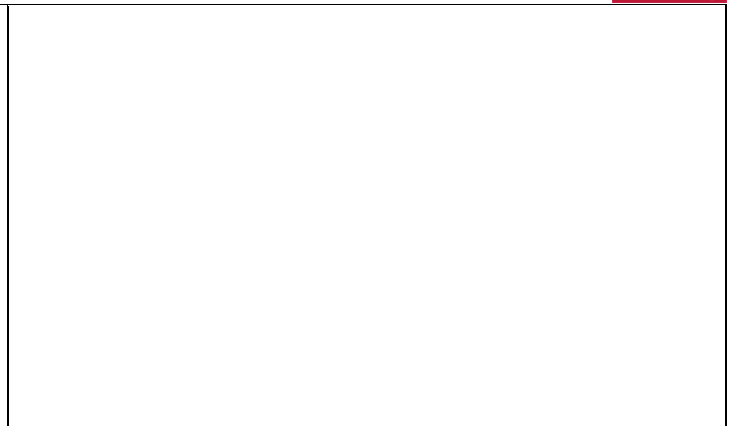
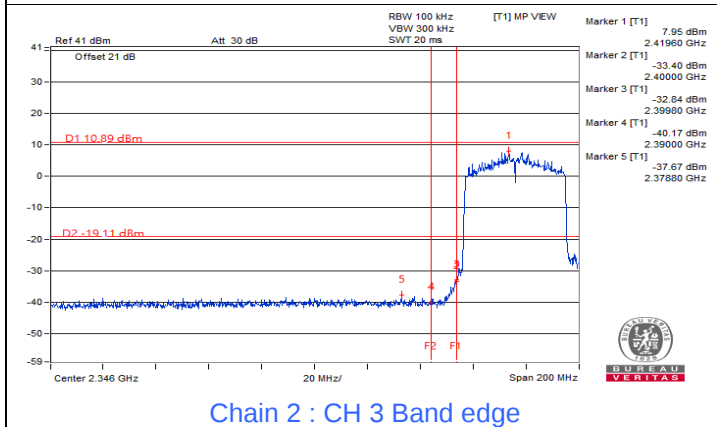
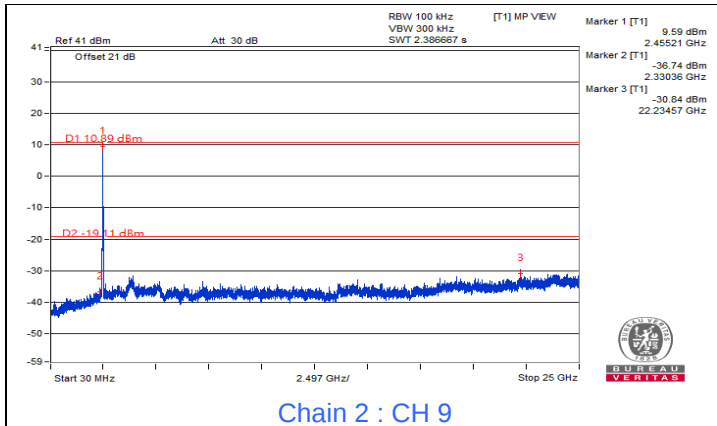


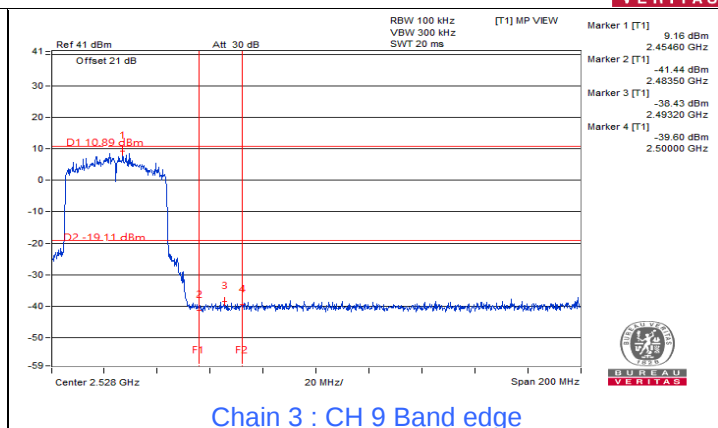
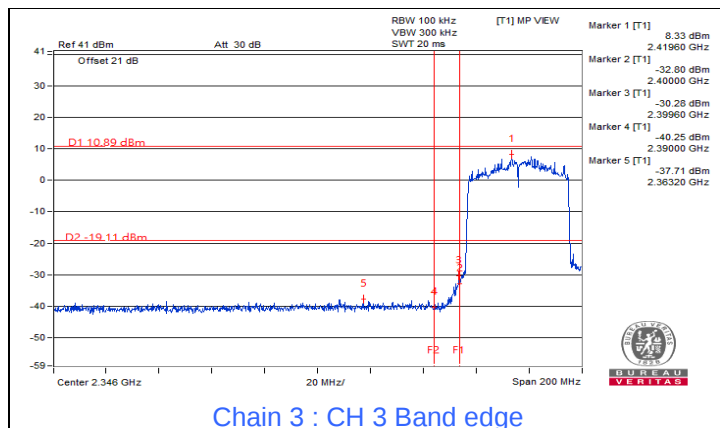


802.11ax (HE40)









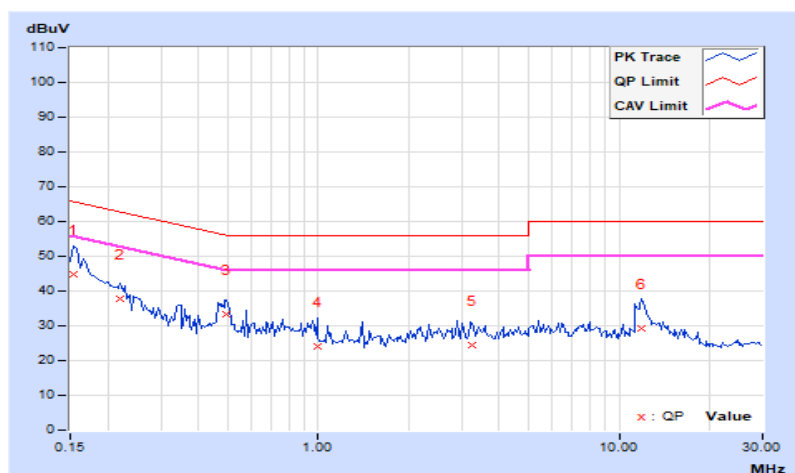
7.5 AC Power Conducted Emissions

RF Mode	802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 68% RH
Tested By	Tom Yang		

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	0.15391	9.94	34.82	20.60	44.76	30.54	65.79	55.79	-21.03	-25.25
2	0.22031	9.95	27.89	16.47	37.84	26.42	62.81	52.81	-24.97	-26.39
3	0.49766	9.96	23.43	15.61	33.39	25.57	56.04	46.04	-22.65	-20.47
4	0.98984	9.99	13.91	7.47	23.90	17.46	56.00	46.00	-32.10	-28.54
5	3.26172	10.14	14.26	7.22	24.40	17.36	56.00	46.00	-31.60	-28.64
6	11.90234	10.71	18.49	12.97	29.20	23.68	60.00	50.00	-30.80	-26.32

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

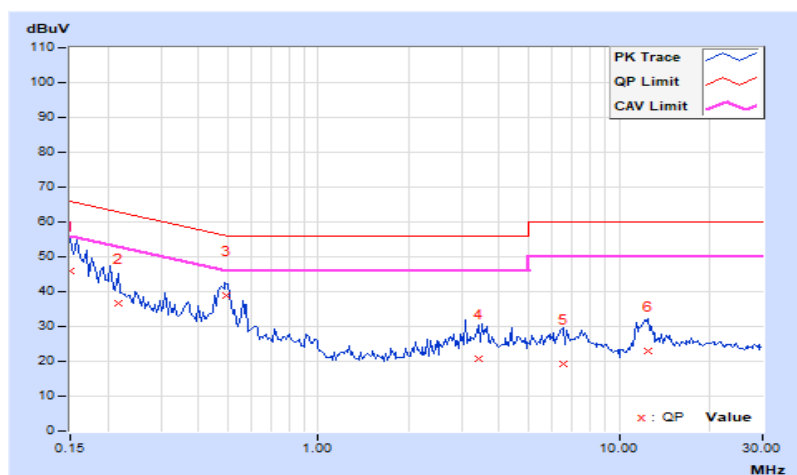


RF Mode	802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 68% RH
Tested By	Tom Yang		

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	9.97	35.78	19.07	45.75	29.04	66.00	56.00	-20.25	-26.96
2	0.21641	9.97	26.63	12.25	36.60	22.22	62.96	52.96	-26.36	-30.74
3	0.49766	9.99	29.04	23.23	39.03	33.22	56.04	46.04	-17.01	-12.82
4	3.40234	10.16	10.56	2.16	20.72	12.32	56.00	46.00	-35.28	-33.68
5	6.52734	10.34	8.92	2.76	19.26	13.10	60.00	50.00	-40.74	-36.90
6	12.41797	10.65	12.30	7.17	22.95	17.82	60.00	50.00	-37.05	-32.18

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



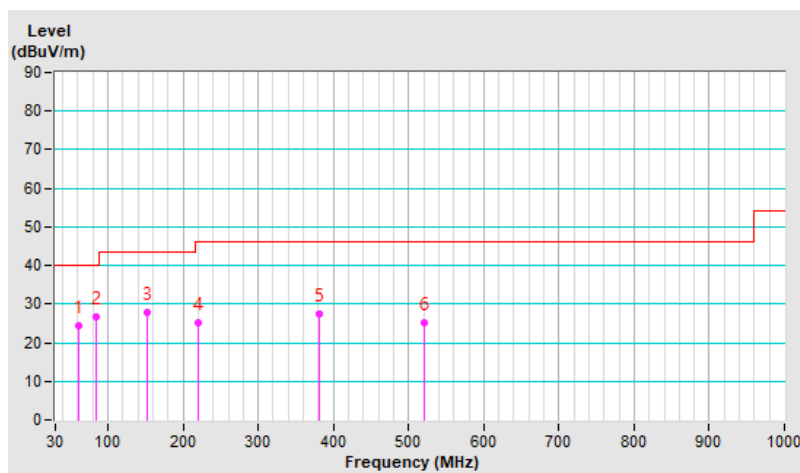
7.6 Unwanted Emissions below 1 GHz

RF Mode	802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	Quasi-Peak (QP), RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	26°C, 67% RH
Tested By	Tom Yang		

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	61.04	24.3 QP	40.0	-15.7	1.50 H	242	38.4	-14.1
2	84.22	26.8 QP	40.0	-13.2	2.00 H	230	45.5	-18.7
3	152.34	27.7 QP	43.5	-15.8	2.00 H	253	40.8	-13.1
4	220.53	25.1 QP	46.0	-20.9	1.00 H	257	41.7	-16.6
5	381.14	27.4 QP	46.0	-18.6	1.00 H	134	37.8	-10.4
6	519.85	25.0 QP	46.0	-21.0	1.50 H	139	32.2	-7.2

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 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.

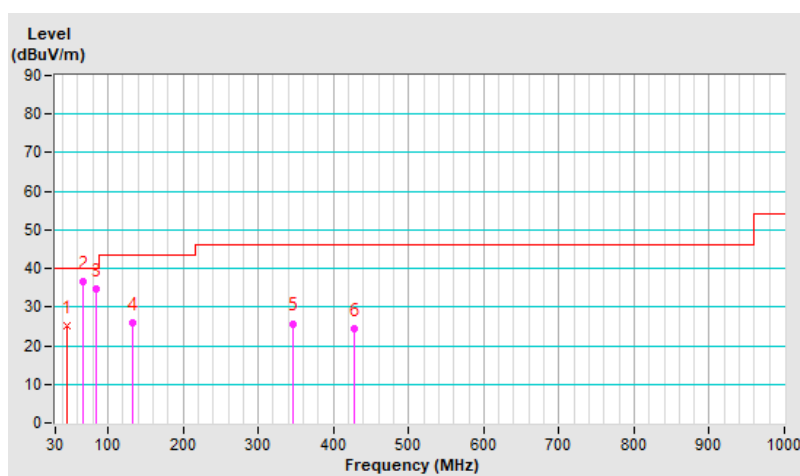


RF Mode	802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	Quasi-Peak (QP), RB = 120kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	26°C, 67% RH
Tested By	Tom Yang		

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	44.86	25.1 QP	40.0	-14.9	2.00 V	2	38.3	-13.2
2	66.64	36.7 QP	40.0	-3.3	1.50 V	360	51.3	-14.6
3	83.96	34.7 QP	40.0	-5.3	1.50 V	129	53.3	-18.6
4	132.17	25.9 QP	43.5	-17.6	1.00 V	350	39.9	-14.0
5	346.41	25.7 QP	46.0	-20.3	1.00 V	165	37.3	-11.6
6	427.51	24.5 QP	46.0	-21.5	1.00 V	84	33.4	-8.9

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 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.



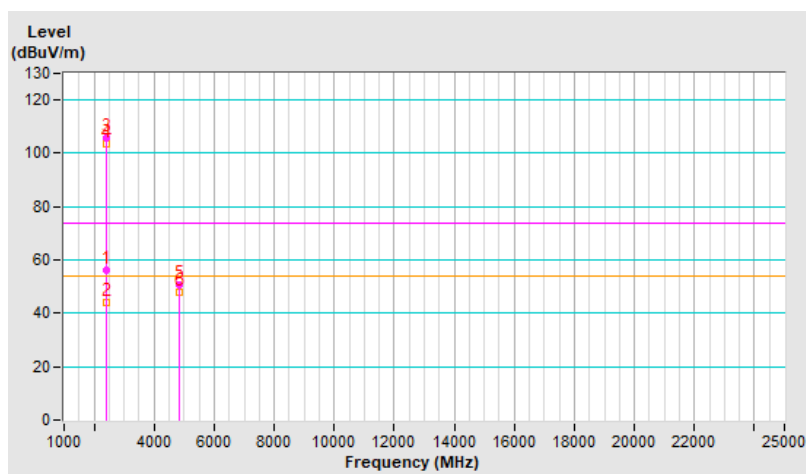
7.7 Unwanted Emissions above 1 GHz

RF Mode	802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.4 PK	74.0	-17.6	2.51 H	149	56.5	-0.1
2	2390.00	43.9 AV	54.0	-10.1	2.51 H	149	44.0	-0.1
3	*2412.00	105.6 PK			2.51 H	149	105.7	-0.1
4	*2412.00	103.4 AV			2.51 H	149	103.5	-0.1
5	4824.00	50.6 PK	74.0	-23.4	1.10 H	141	46.1	4.5
6	4824.00	48.1 AV	54.0	-5.9	1.10 H	141	43.6	4.5

Remarks:

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

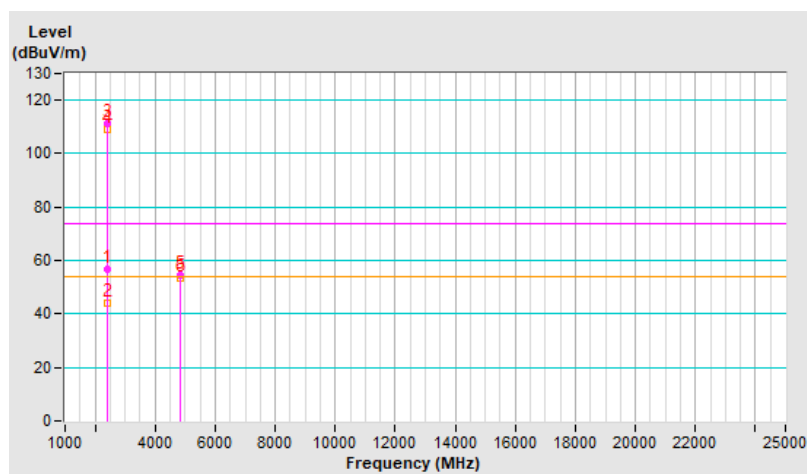


RF Mode	802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	56.6 PK	74.0	-17.4	1.58 V	264	56.7	-0.1
2	2390.00	43.9 AV	54.0	-10.1	1.58 V	264	44.0	-0.1
3	*2412.00	111.5 PK			1.58 V	264	111.6	-0.1
4	*2412.00	109.2 AV			1.58 V	264	109.3	-0.1
5	4824.00	54.5 PK	74.0	-19.5	1.96 V	88	50.0	4.5
6	4824.00	53.4 AV	54.0	-0.6	1.96 V	88	48.9	4.5

Remarks:

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

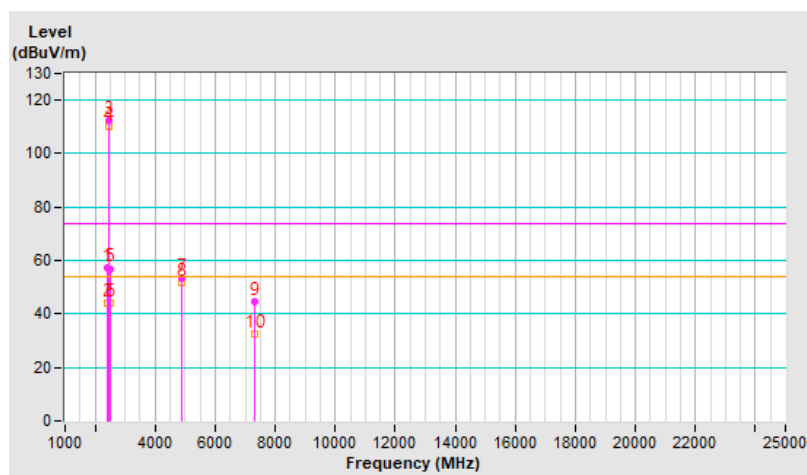


RF Mode	802.11b	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	57.5 PK	74.0	-16.5	1.17 H	302	57.6	-0.1
2	2390.00	44.2 AV	54.0	-9.8	1.17 H	302	44.3	-0.1
3	*2437.00	112.4 PK			1.17 H	302	112.5	-0.1
4	*2437.00	110.1 AV			1.17 H	302	110.2	-0.1
5	2483.50	57.0 PK	74.0	-17.0	1.17 H	302	57.2	-0.2
6	2483.50	44.0 AV	54.0	-10.0	1.17 H	302	44.2	-0.2
7	4874.00	53.3 PK	74.0	-20.7	2.17 H	230	48.7	4.6
8	4874.00	51.8 AV	54.0	-2.2	2.17 H	230	47.2	4.6
9	7311.00	44.8 PK	74.0	-29.2	2.00 H	169	33.2	11.6
10	7311.00	32.5 AV	54.0	-21.5	2.00 H	169	20.9	11.6

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.

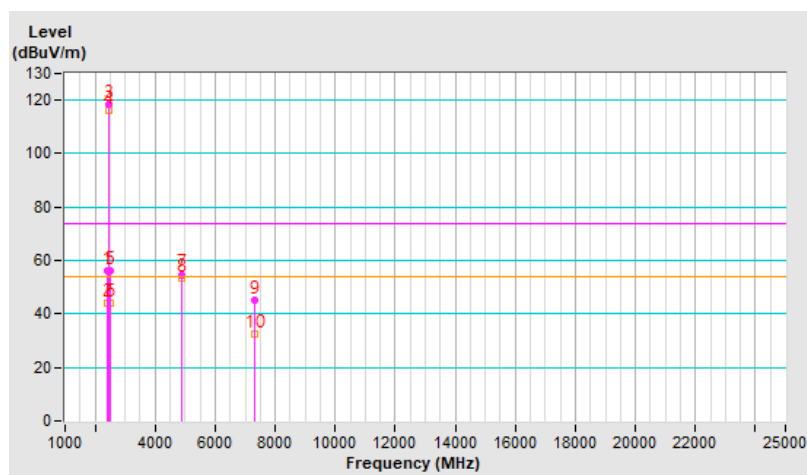


RF Mode	802.11b	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	56.0 PK	74.0	-18.0	1.33 V	265	56.1	-0.1
2	2390.00	44.0 AV	54.0	-10.0	1.33 V	265	44.1	-0.1
3	*2437.00	118.3 PK			1.33 V	265	118.4	-0.1
4	*2437.00	116.2 AV			1.33 V	265	116.3	-0.1
5	2483.50	56.1 PK	74.0	-17.9	1.33 V	265	56.3	-0.2
6	2483.50	43.8 AV	54.0	-10.2	1.33 V	265	44.0	-0.2
7	4874.00	54.8 PK	74.0	-19.2	1.72 V	360	50.2	4.6
8	4874.00	53.4 AV	54.0	-0.6	1.72 V	360	48.8	4.6
9	7311.00	45.2 PK	74.0	-28.8	2.16 V	232	33.6	11.6
10	7311.00	32.5 AV	54.0	-21.5	2.16 V	232	20.9	11.6

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.

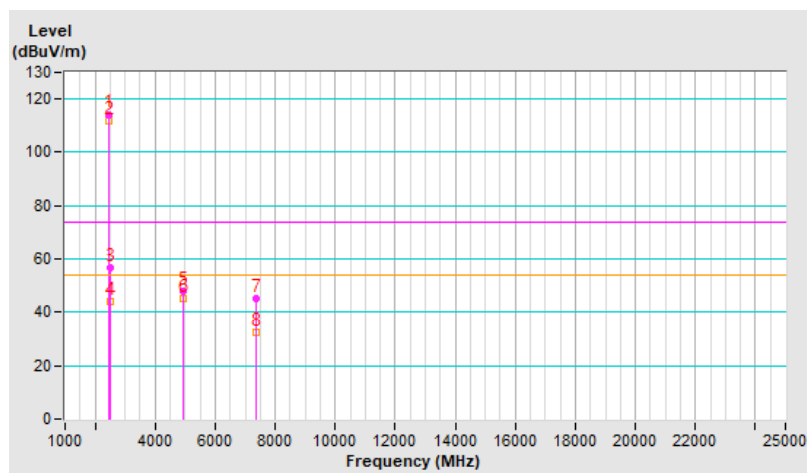


RF Mode	802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	114.3 PK			1.49 H	357	114.3	0.0
2	*2462.00	111.7 AV			1.49 H	357	111.7	0.0
3	2483.50	56.8 PK	74.0	-17.2	1.49 H	357	57.0	-0.2
4	2483.50	44.0 AV	54.0	-10.0	1.49 H	357	44.2	-0.2
5	4924.00	48.1 PK	74.0	-25.9	1.27 H	144	43.4	4.7
6	4924.00	45.1 AV	54.0	-8.9	1.27 H	144	40.4	4.7
7	7386.00	45.2 PK	74.0	-28.8	2.04 H	176	33.6	11.6
8	7386.00	32.6 AV	54.0	-21.4	2.04 H	176	21.0	11.6

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.

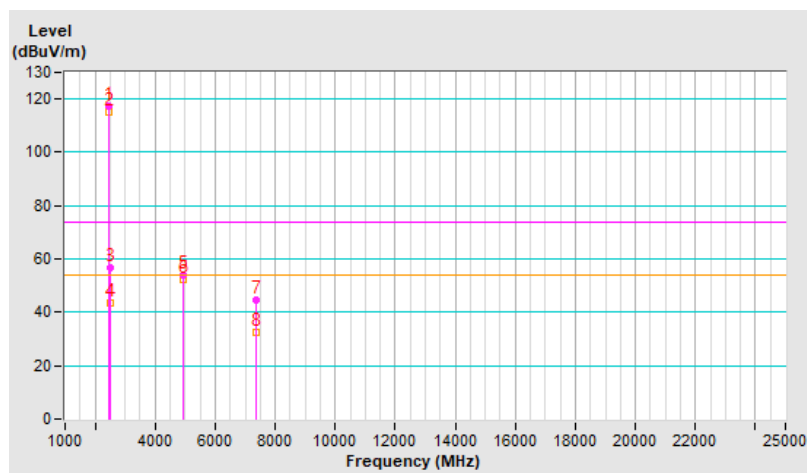


RF Mode	802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	117.5 PK			1.53 V	262	117.5	0.0
2	*2462.00	115.2 AV			1.53 V	262	115.2	0.0
3	2483.50	56.9 PK	74.0	-17.1	1.53 V	262	57.1	-0.2
4	2483.50	43.7 AV	54.0	-10.3	1.53 V	262	43.9	-0.2
5	4924.00	53.9 PK	74.0	-20.1	1.26 V	344	49.2	4.7
6	4924.00	52.4 AV	54.0	-1.6	1.26 V	344	47.7	4.7
7	7386.00	44.8 PK	74.0	-29.2	1.98 V	244	33.2	11.6
8	7386.00	32.7 AV	54.0	-21.3	1.98 V	244	21.1	11.6

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.

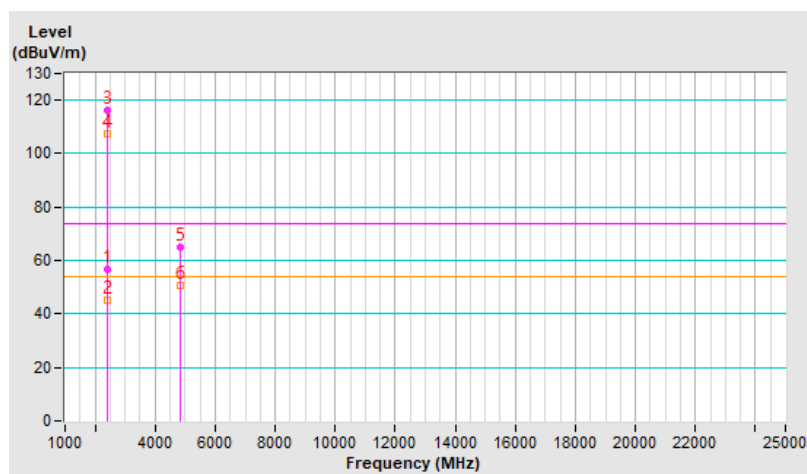


RF Mode	802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.8 PK	74.0	-17.2	1.55 H	62	56.9	-0.1
2	2390.00	45.2 AV	54.0	-8.8	1.55 H	62	45.3	-0.1
3	*2412.00	116.3 PK			1.55 H	62	116.4	-0.1
4	*2412.00	107.4 AV			1.55 H	62	107.5	-0.1
5	4824.00	64.8 PK	74.0	-9.2	2.16 H	244	60.3	4.5
6	4824.00	50.7 AV	54.0	-3.3	2.16 H	244	46.2	4.5

Remarks:

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

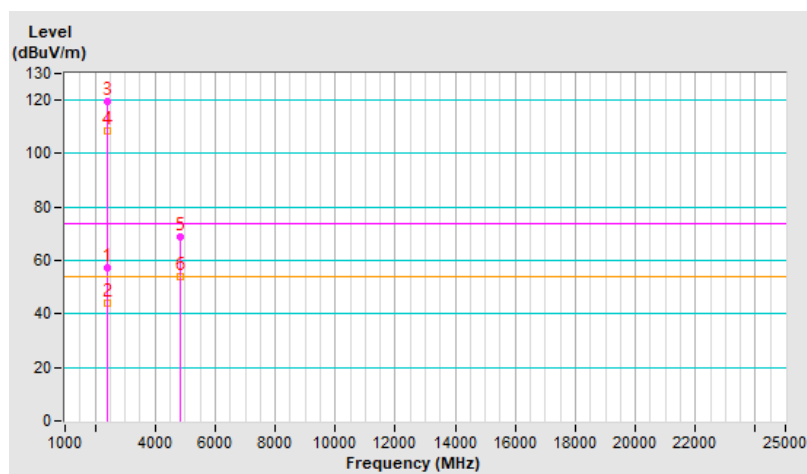


RF Mode	802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	57.4 PK	74.0	-16.6	2.16 V	260	57.5	-0.1
2	2390.00	43.9 AV	54.0	-10.1	2.16 V	260	44.0	-0.1
3	*2412.00	119.6 PK			2.16 V	260	119.7	-0.1
4	*2412.00	108.6 AV			2.16 V	260	108.7	-0.1
5	4824.00	68.6 PK	74.0	-5.4	1.16 V	360	64.1	4.5
6	4824.00	53.8 AV	54.0	-0.2	1.16 V	360	49.3	4.5

Remarks:

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

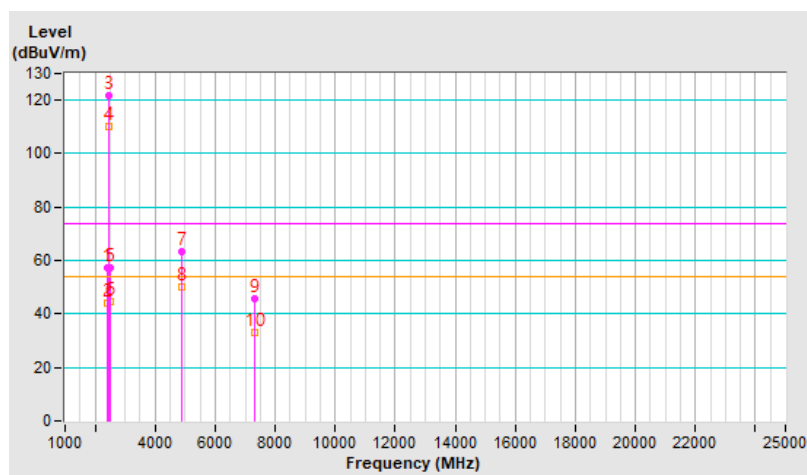


RF Mode	802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	57.4 PK	74.0	-16.6	1.02 H	331	57.5	-0.1
2	2390.00	44.0 AV	54.0	-10.0	1.02 H	331	44.1	-0.1
3	*2437.00	121.7 PK			1.02 H	331	121.8	-0.1
4	*2437.00	110.3 AV			1.02 H	331	110.4	-0.1
5	2483.50	57.2 PK	74.0	-16.8	1.02 H	331	57.4	-0.2
6	2483.50	44.4 AV	54.0	-9.6	1.02 H	331	44.6	-0.2
7	4874.00	63.1 PK	74.0	-10.9	1.01 H	63	58.5	4.6
8	4874.00	50.3 AV	54.0	-3.7	1.01 H	63	45.7	4.6
9	7311.00	45.6 PK	74.0	-28.4	2.00 H	189	34.0	11.6
10	7311.00	32.8 AV	54.0	-21.2	2.00 H	189	21.2	11.6

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.

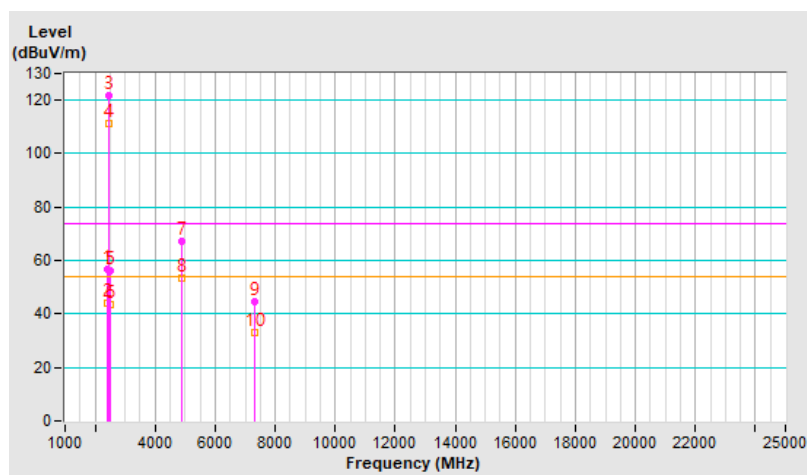


RF Mode	802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	56.8 PK	74.0	-17.2	1.38 V	265	56.9	-0.1
2	2390.00	44.0 AV	54.0	-10.0	1.38 V	265	44.1	-0.1
3	*2437.00	121.7 PK			1.38 V	265	121.8	-0.1
4	*2437.00	111.1 AV			1.38 V	265	111.2	-0.1
5	2483.50	56.4 PK	74.0	-17.6	1.38 V	265	56.6	-0.2
6	2483.50	43.7 AV	54.0	-10.3	1.38 V	265	43.9	-0.2
7	4874.00	67.1 PK	74.0	-6.9	1.38 V	349	62.5	4.6
8	4874.00	53.5 AV	54.0	-0.5	1.38 V	349	48.9	4.6
9	7311.00	44.8 PK	74.0	-29.2	2.04 V	214	33.2	11.6
10	7311.00	33.1 AV	54.0	-20.9	2.04 V	214	21.5	11.6

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.

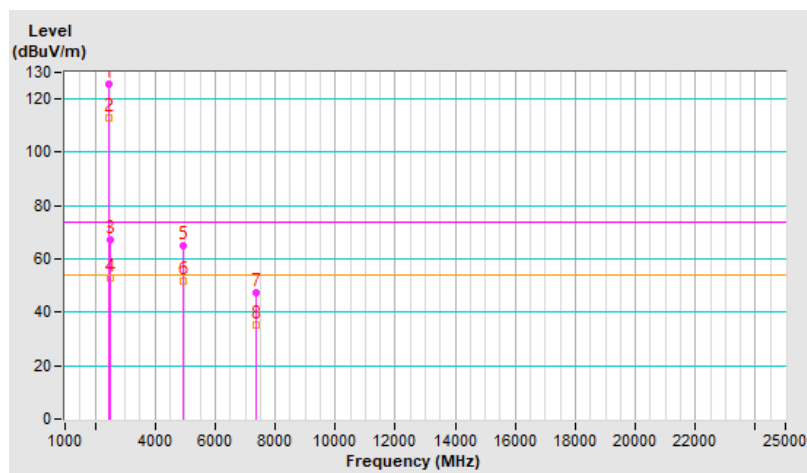


RF Mode	802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	125.7 PK			2.05 H	0	125.7	0.0
2	*2462.00	113.0 AV			2.05 H	0	113.0	0.0
3	2483.50	67.0 PK	74.0	-7.0	2.05 H	0	67.2	-0.2
4	2483.50	53.0 AV	54.0	-1.0	2.05 H	0	53.2	-0.2
5	4924.00	64.8 PK	74.0	-9.2	2.20 H	228	60.1	4.7
6	4924.00	51.6 AV	54.0	-2.4	2.20 H	228	46.9	4.7
7	7386.00	47.6 PK	74.0	-26.4	2.04 H	154	36.0	11.6
8	7386.00	35.3 AV	54.0	-18.7	2.04 H	154	23.7	11.6

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.

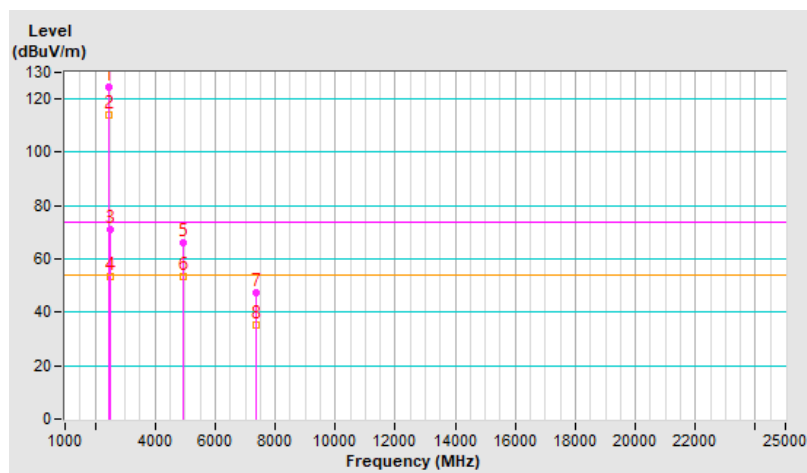


RF Mode	802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 1 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	124.7 PK			1.23 V	263	124.7	0.0
2	*2462.00	113.8 AV			1.23 V	263	113.8	0.0
3	2483.50	71.1 PK	74.0	-2.9	1.23 V	263	71.3	-0.2
4	2483.50	53.2 AV	54.0	-0.8	1.23 V	263	53.4	-0.2
5	4924.00	66.2 PK	74.0	-7.8	1.32 V	360	61.5	4.7
6	4924.00	53.2 AV	54.0	-0.8	1.32 V	360	48.5	4.7
7	7386.00	47.5 PK	74.0	-26.5	2.11 V	322	35.9	11.6
8	7386.00	35.3 AV	54.0	-18.7	2.11 V	322	23.7	11.6

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.

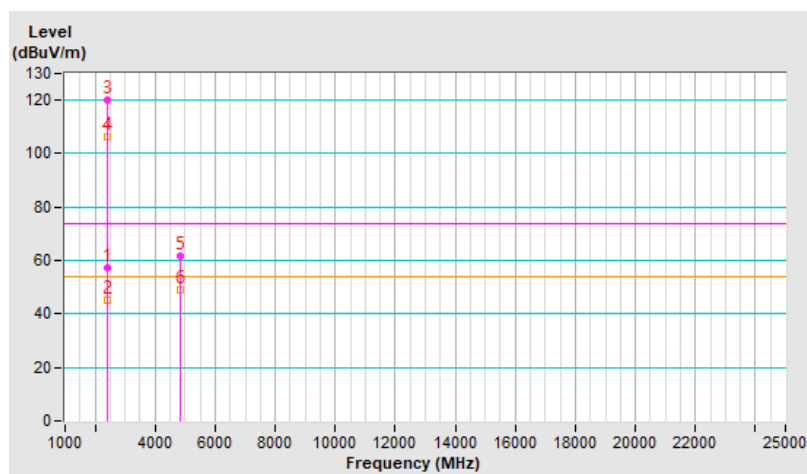


RF Mode	802.11ax (HE20)	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	57.5 PK	74.0	-16.5	1.61 H	0	57.6	-0.1
2	2390.00	45.2 AV	54.0	-8.8	1.61 H	0	45.3	-0.1
3	*2412.00	119.9 PK			1.61 H	0	120.0	-0.1
4	*2412.00	106.3 AV			1.61 H	0	106.4	-0.1
5	4824.00	61.7 PK	74.0	-12.3	1.99 H	148	57.2	4.5
6	4824.00	48.9 AV	54.0	-5.1	1.99 H	148	44.4	4.5

Remarks:

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

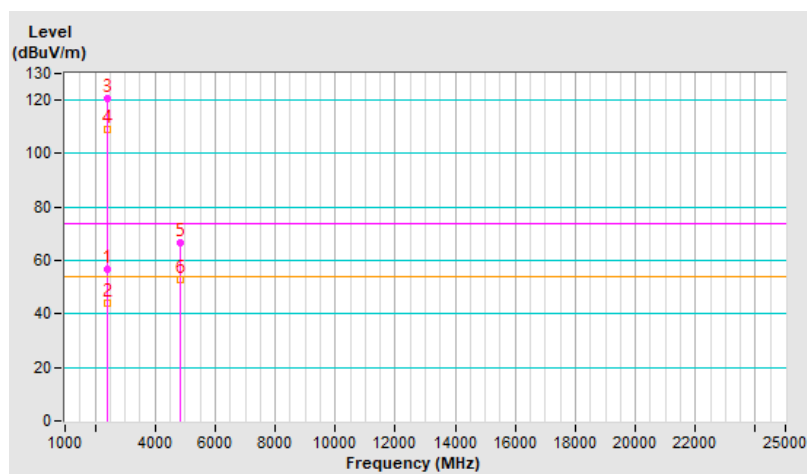


RF Mode	802.11ax (HE20)	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	56.9 PK	74.0	-17.1	1.94 V	264	57.0	-0.1
2	2390.00	44.0 AV	54.0	-10.0	1.94 V	264	44.1	-0.1
3	*2412.00	120.7 PK			1.94 V	264	120.8	-0.1
4	*2412.00	109.3 AV			1.94 V	264	109.4	-0.1
5	4824.00	66.5 PK	74.0	-7.5	1.37 V	348	62.0	4.5
6	4824.00	52.9 AV	54.0	-1.1	1.37 V	348	48.4	4.5

Remarks:

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

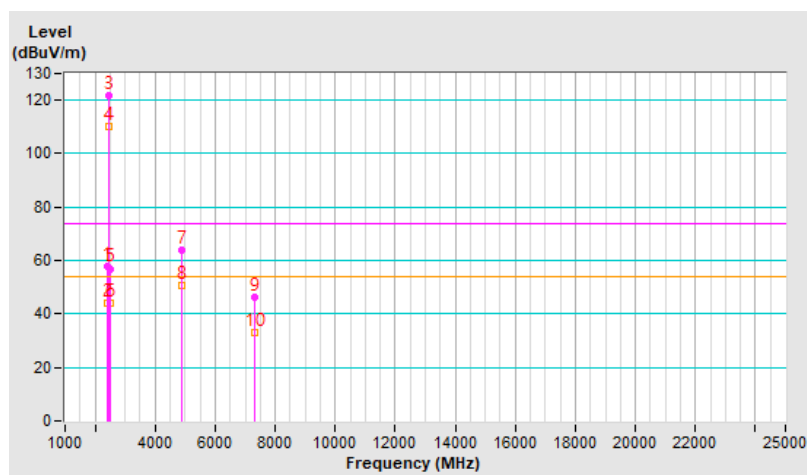


RF Mode	802.11ax (HE20)	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	57.9 PK	74.0	-16.1	1.03 H	324	58.0	-0.1
2	2390.00	44.3 AV	54.0	-9.7	1.03 H	324	44.4	-0.1
3	*2437.00	121.7 PK			1.03 H	324	121.8	-0.1
4	*2437.00	110.2 AV			1.03 H	324	110.3	-0.1
5	2483.50	57.0 PK	74.0	-17.0	1.03 H	324	57.2	-0.2
6	2483.50	44.3 AV	54.0	-9.7	1.03 H	324	44.5	-0.2
7	4874.00	63.8 PK	74.0	-10.2	2.10 H	241	59.2	4.6
8	4874.00	50.9 AV	54.0	-3.1	2.10 H	241	46.3	4.6
9	7311.00	46.1 PK	74.0	-27.9	2.05 H	159	34.5	11.6
10	7311.00	32.8 AV	54.0	-21.2	2.05 H	159	21.2	11.6

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.

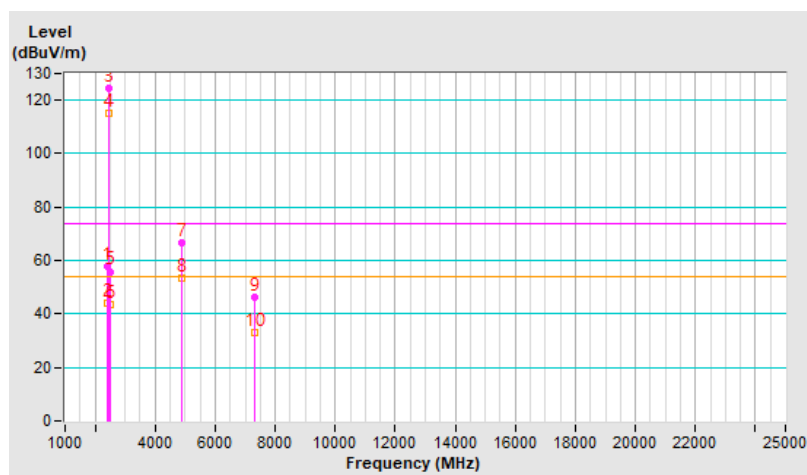


RF Mode	802.11ax (HE20)	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	57.8 PK	74.0	-16.2	1.53 V	265	57.9	-0.1
2	2390.00	44.0 AV	54.0	-10.0	1.53 V	265	44.1	-0.1
3	*2437.00	124.5 PK			1.53 V	265	124.6	-0.1
4	*2437.00	115.1 AV			1.53 V	265	115.2	-0.1
5	2483.50	55.9 PK	74.0	-18.1	1.53 V	265	56.1	-0.2
6	2483.50	43.7 AV	54.0	-10.3	1.53 V	265	43.9	-0.2
7	4874.00	66.8 PK	74.0	-7.2	1.37 V	346	62.2	4.6
8	4874.00	53.2 AV	54.0	-0.8	1.37 V	346	48.6	4.6
9	7311.00	46.2 PK	74.0	-27.8	2.31 V	190	34.6	11.6
10	7311.00	32.8 AV	54.0	-21.2	2.31 V	190	21.2	11.6

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.

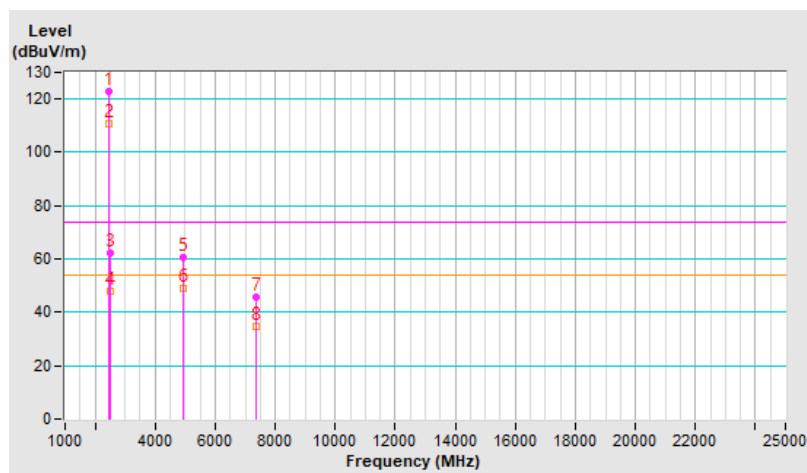


RF Mode	802.11ax (HE20)	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	122.7 PK			1.31 H	358	122.7	0.0
2	*2462.00	110.6 AV			1.31 H	358	110.6	0.0
3	2483.50	62.2 PK	74.0	-11.8	1.31 H	358	62.4	-0.2
4	2483.50	48.1 AV	54.0	-5.9	1.31 H	358	48.3	-0.2
5	4924.00	60.6 PK	74.0	-13.4	1.50 H	148	55.9	4.7
6	4924.00	48.9 AV	54.0	-5.1	1.50 H	148	44.2	4.7
7	7386.00	45.5 PK	74.0	-28.5	1.61 H	156	33.9	11.6
8	7386.00	34.6 AV	54.0	-19.4	1.61 H	156	23.0	11.6

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.

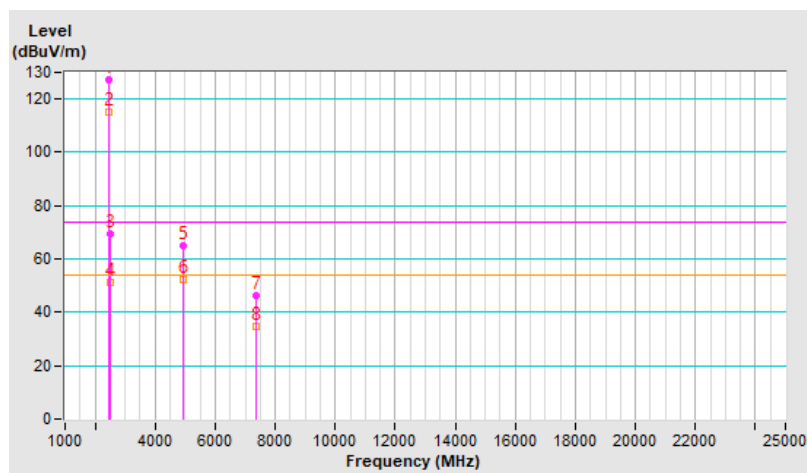


RF Mode	802.11ax (HE20)	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	127.3 PK			1.63 V	265	127.3	0.0
2	*2462.00	115.2 AV			1.63 V	265	115.2	0.0
3	2483.50	69.2 PK	74.0	-4.8	1.63 V	265	69.4	-0.2
4	2483.50	51.4 AV	54.0	-2.6	1.63 V	265	51.6	-0.2
5	4924.00	65.2 PK	74.0	-8.8	1.48 V	15	60.5	4.7
6	4924.00	52.1 AV	54.0	-1.9	1.48 V	15	47.4	4.7
7	7386.00	46.5 PK	74.0	-27.5	2.09 V	140	34.9	11.6
8	7386.00	34.6 AV	54.0	-19.4	2.09 V	140	23.0	11.6

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.

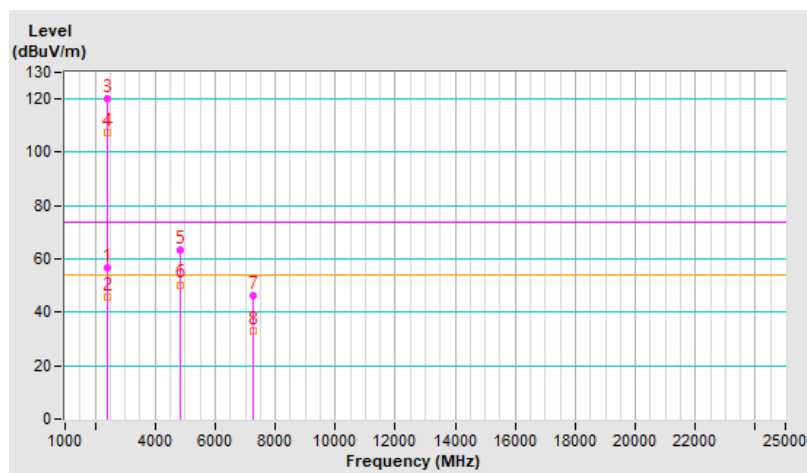


RF Mode	802.11ax (HE40)	Channel	CH 3 : 2422 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.7 PK	74.0	-17.3	1.09 H	304	56.8	-0.1
2	2390.00	45.5 AV	54.0	-8.5	1.09 H	304	45.6	-0.1
3	*2422.00	119.9 PK			1.09 H	304	120.0	-0.1
4	*2422.00	107.3 AV			1.09 H	304	107.4	-0.1
5	4844.00	63.4 PK	74.0	-10.6	2.00 H	244	58.9	4.5
6	4844.00	50.4 AV	54.0	-3.6	2.00 H	244	45.9	4.5
7	7266.00	46.2 PK	74.0	-27.8	2.04 H	211	34.9	11.3
8	7266.00	32.8 AV	54.0	-21.2	2.04 H	211	21.5	11.3

Remarks:

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

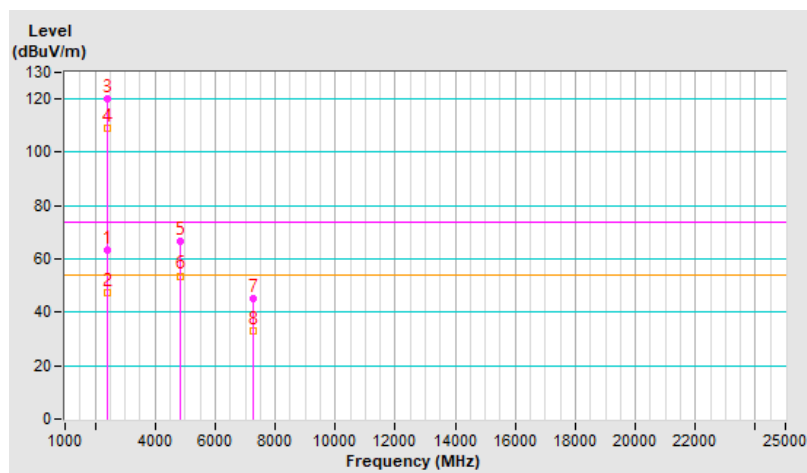


RF Mode	802.11ax (HE40)	Channel	CH 3 : 2422 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.5 PK	74.0	-10.5	1.83 V	264	63.6	-0.1
2	2390.00	47.1 AV	54.0	-6.9	1.83 V	264	47.2	-0.1
3	*2422.00	120.2 PK			1.83 V	264	120.3	-0.1
4	*2422.00	109.2 AV			1.83 V	264	109.3	-0.1
5	4844.00	66.7 PK	74.0	-7.3	1.46 V	347	62.2	4.5
6	4844.00	53.7 AV	54.0	-0.3	1.46 V	347	49.2	4.5
7	7266.00	45.4 PK	74.0	-28.6	2.85 V	254	34.1	11.3
8	7266.00	32.8 AV	54.0	-21.2	2.85 V	254	21.5	11.3

Remarks:

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

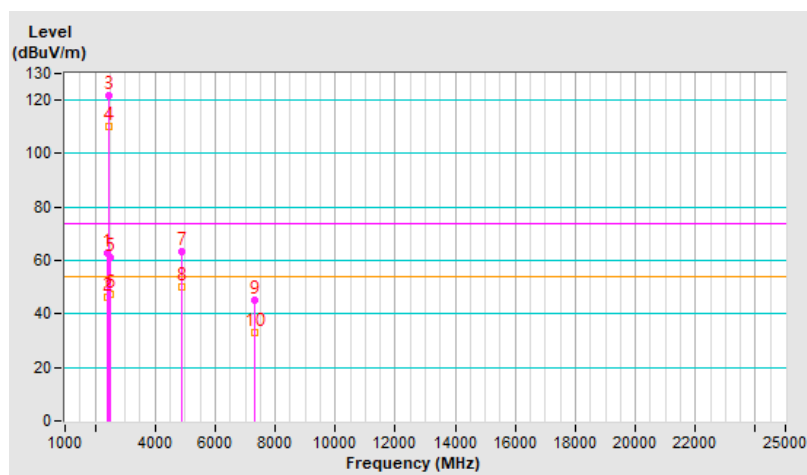


RF Mode	802.11ax (HE40)	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	62.8 PK	74.0	-11.2	1.12 H	311	62.9	-0.1
2	2390.00	46.3 AV	54.0	-7.7	1.12 H	311	46.4	-0.1
3	*2437.00	121.6 PK			1.12 H	311	121.7	-0.1
4	*2437.00	110.1 AV			1.12 H	311	110.2	-0.1
5	2483.50	61.1 PK	74.0	-12.9	1.12 H	311	61.3	-0.2
6	2483.50	47.6 AV	54.0	-6.4	1.12 H	311	47.8	-0.2
7	4874.00	63.2 PK	74.0	-10.8	2.21 H	227	58.6	4.6
8	4874.00	50.1 AV	54.0	-3.9	2.21 H	227	45.5	4.6
9	7311.00	45.4 PK	74.0	-28.6	2.63 H	219	33.8	11.6
10	7311.00	32.8 AV	54.0	-21.2	2.63 H	219	21.2	11.6

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.

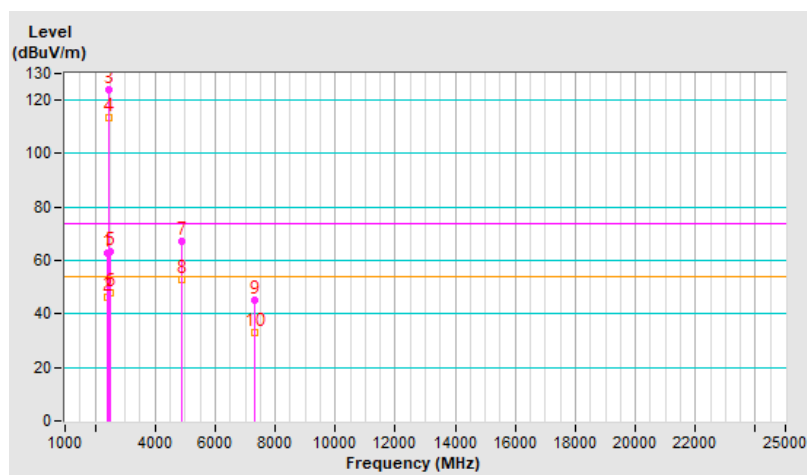


RF Mode	802.11ax (HE40)	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.0 PK	74.0	-11.0	1.70 V	264	63.1	-0.1
2	2390.00	46.4 AV	54.0	-7.6	1.70 V	264	46.5	-0.1
3	*2437.00	124.0 PK			1.70 V	264	124.1	-0.1
4	*2437.00	113.4 AV			1.70 V	264	113.5	-0.1
5	2483.50	63.1 PK	74.0	-10.9	1.70 V	264	63.3	-0.2
6	2483.50	48.1 AV	54.0	-5.9	1.70 V	264	48.3	-0.2
7	4874.00	67.4 PK	74.0	-6.6	1.33 V	360	62.8	4.6
8	4874.00	52.8 AV	54.0	-1.2	1.33 V	360	48.2	4.6
9	7311.00	45.2 PK	74.0	-28.8	1.97 V	276	33.6	11.6
10	7311.00	32.8 AV	54.0	-21.2	1.97 V	276	21.2	11.6

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.

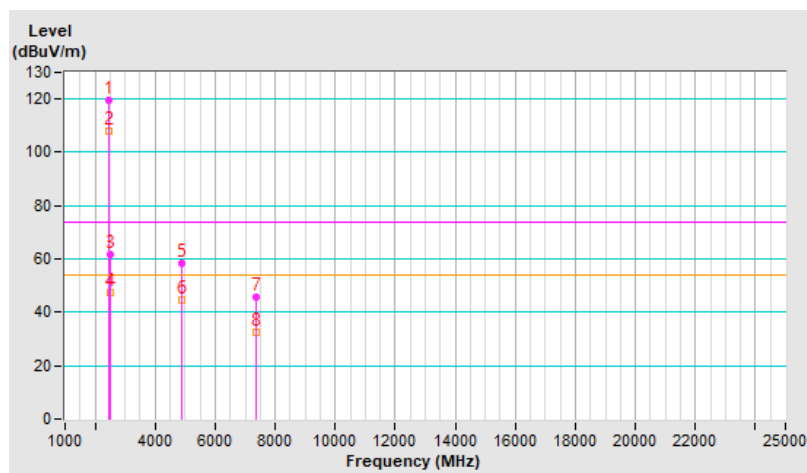


RF Mode	802.11ax (HE40)	Channel	CH 9 : 2452 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

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	119.6 PK			1.52 H	36	119.7	-0.1
2	*2452.00	108.1 AV			1.52 H	36	108.2	-0.1
3	2483.50	61.9 PK	74.0	-12.1	1.52 H	36	62.1	-0.2
4	2483.50	47.4 AV	54.0	-6.6	1.52 H	36	47.6	-0.2
5	4904.00	58.4 PK	74.0	-15.6	2.22 H	236	53.8	4.6
6	4904.00	44.6 AV	54.0	-9.4	2.22 H	236	40.0	4.6
7	7356.00	45.5 PK	74.0	-28.5	1.98 H	186	33.7	11.8
8	7356.00	32.7 AV	54.0	-21.3	1.98 H	186	20.9	11.8

Remarks:

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

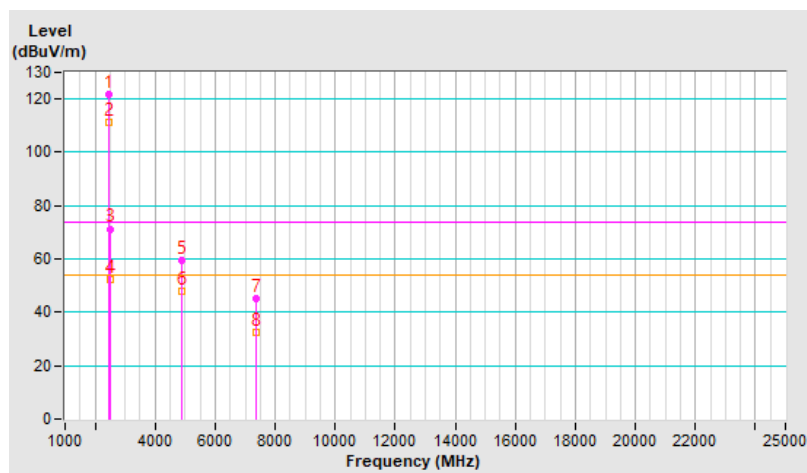


RF Mode	802.11ax (HE40)	Channel	CH 9 : 2452 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	Peak (PK), RB = 1 MHz, VB = 3 MHz Peak (AV), RB = 1 MHz, VB = 10 Hz
Input Power	120 Vac, 60 Hz	Environmental Conditions	25°C, 67% RH
Tested By	Louis Yang		

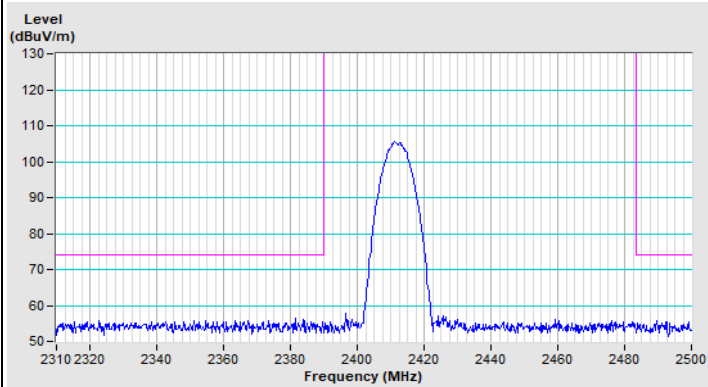
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	121.8 PK			1.48 V	264	121.9	-0.1
2	*2452.00	111.3 AV			1.48 V	264	111.4	-0.1
3	2483.50	71.3 PK	74.0	-2.7	1.48 V	264	71.5	-0.2
4	2483.50	52.5 AV	54.0	-1.5	1.48 V	264	52.7	-0.2
5	4904.00	59.4 PK	74.0	-14.6	1.29 V	348	54.8	4.6
6	4904.00	48.0 AV	54.0	-6.0	1.29 V	348	43.4	4.6
7	7356.00	45.2 PK	74.0	-28.8	2.01 V	228	33.4	11.8
8	7356.00	32.7 AV	54.0	-21.3	2.01 V	228	20.9	11.8

Remarks:

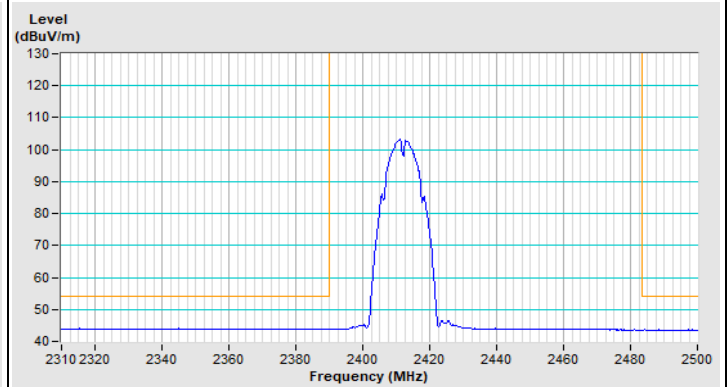
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency,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



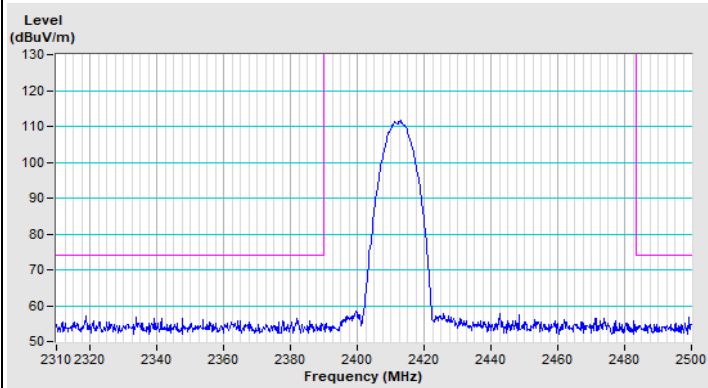
802.11b Channel 1



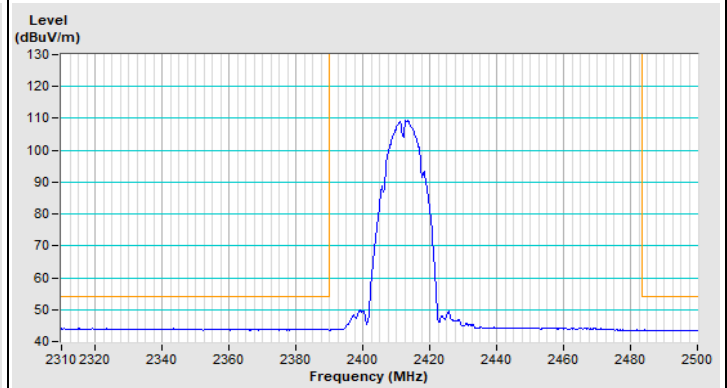
Horizontal (Peak)



Horizontal (Average)

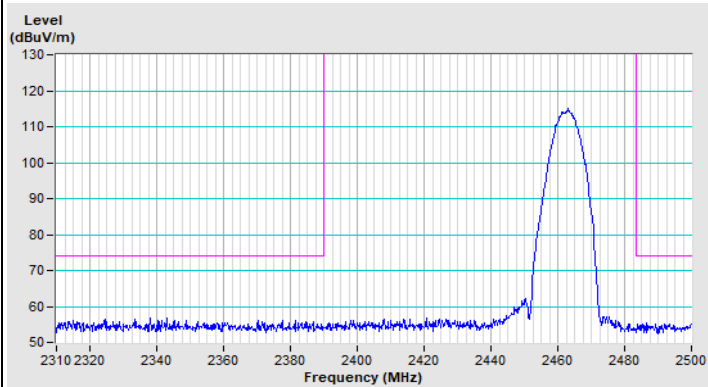


Vertical (Peak)

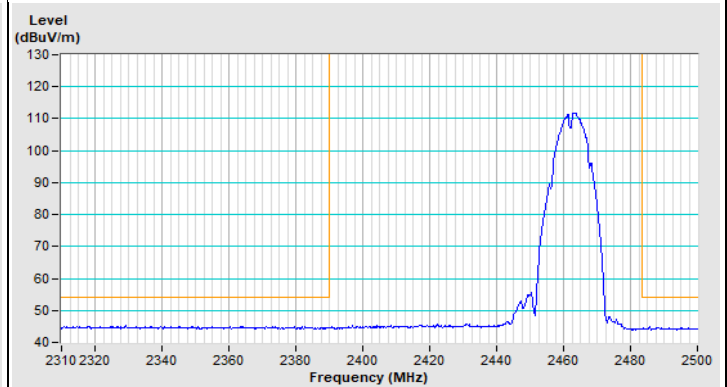


Vertical (Average)

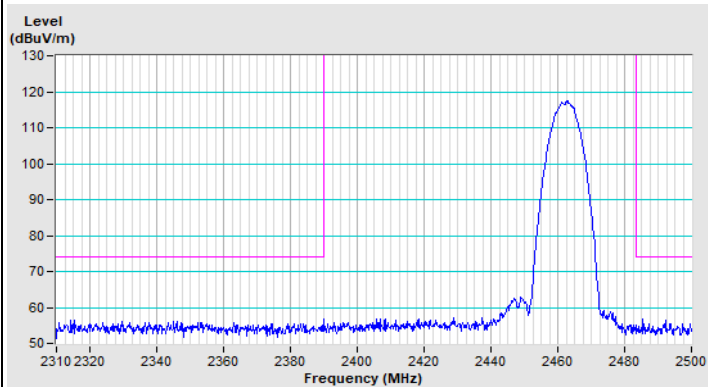
802.11b Channel 11



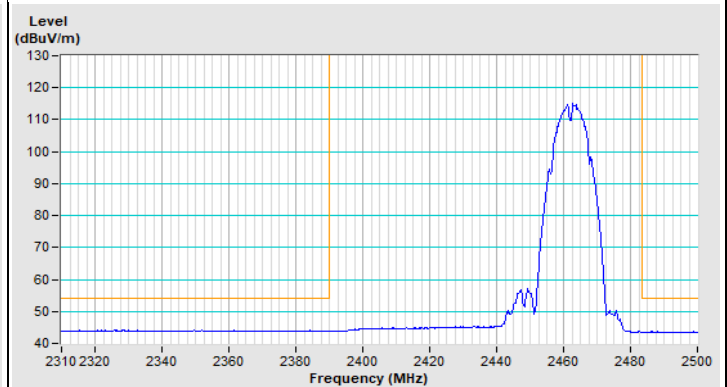
Horizontal (Peak)



Horizontal (Average)

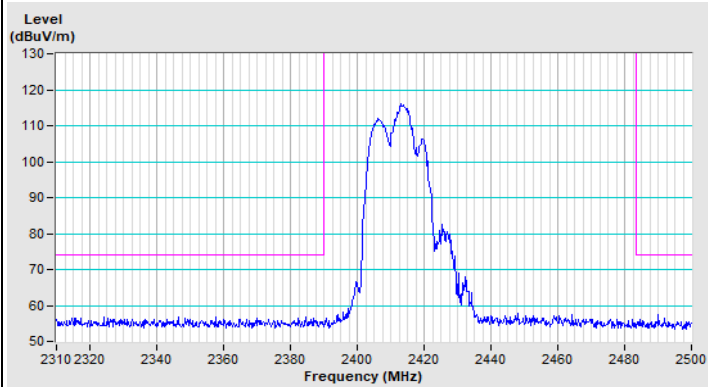


Vertical (Peak)

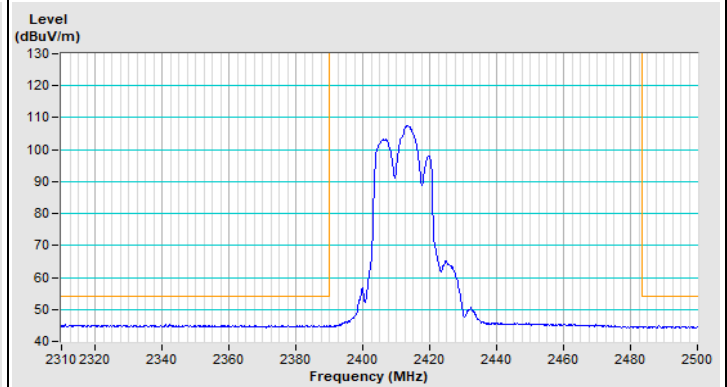


Vertical (Average)

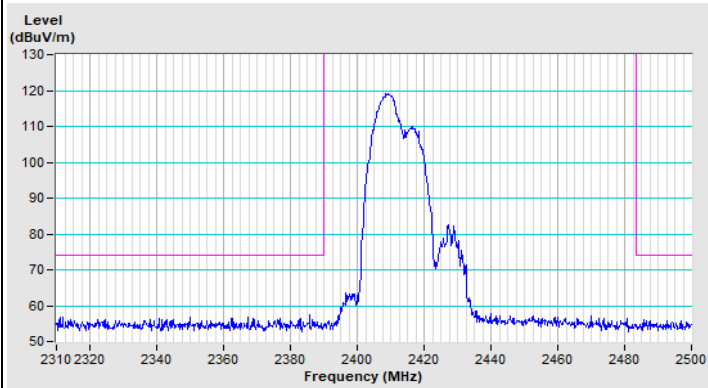
802.11g Channel 1



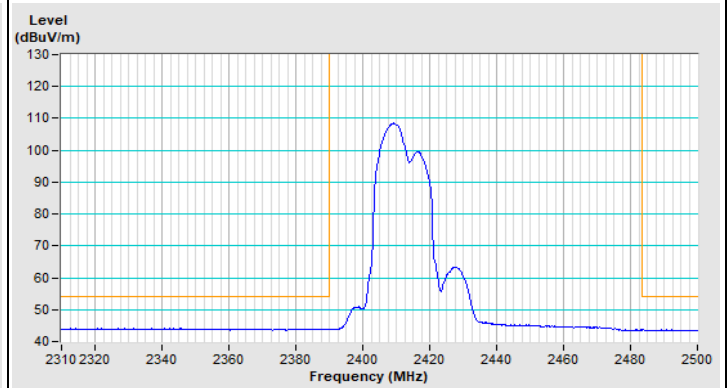
Horizontal (Peak)



Horizontal (Average)

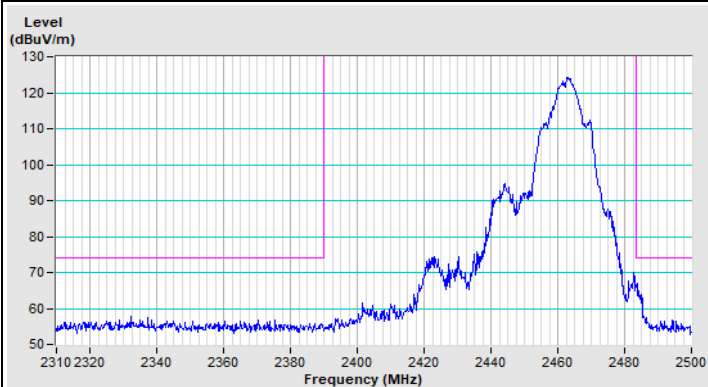


Vertical (Peak)

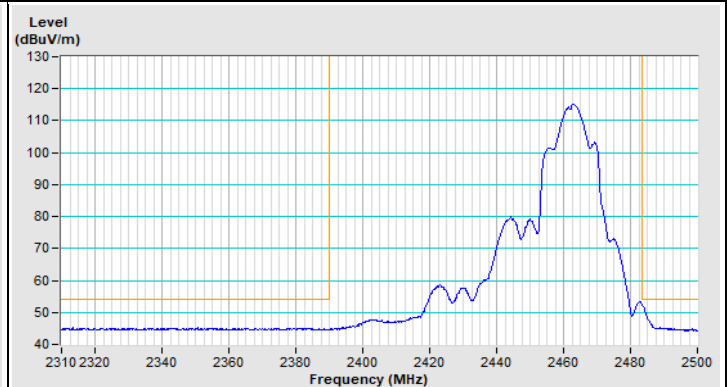


Vertical (Average)

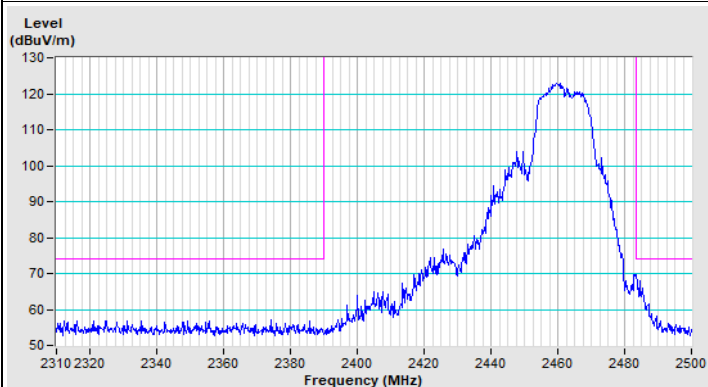
802.11g Channel 11



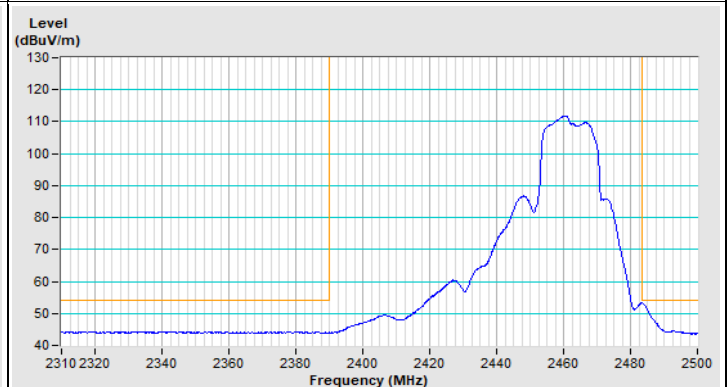
Horizontal (Peak)



Horizontal (Average)

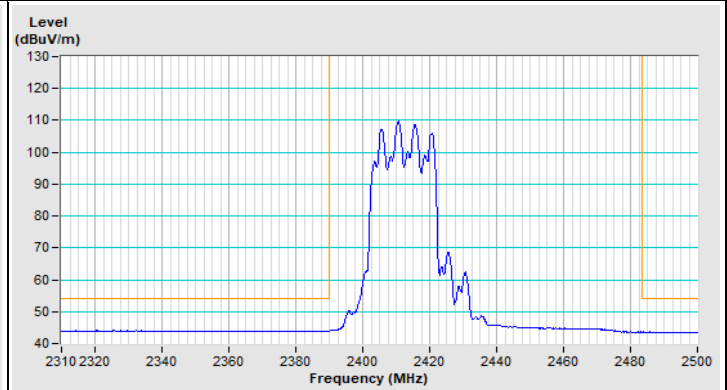
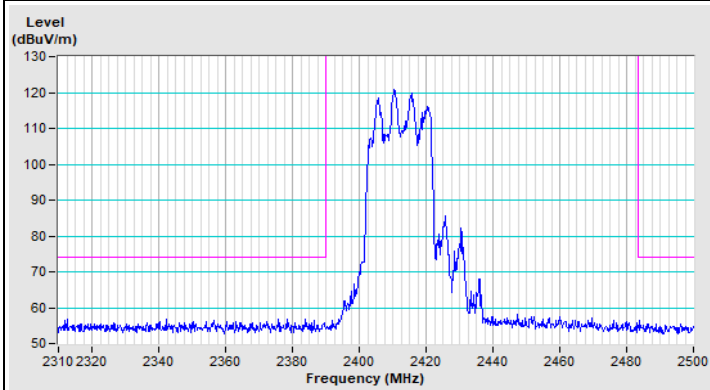
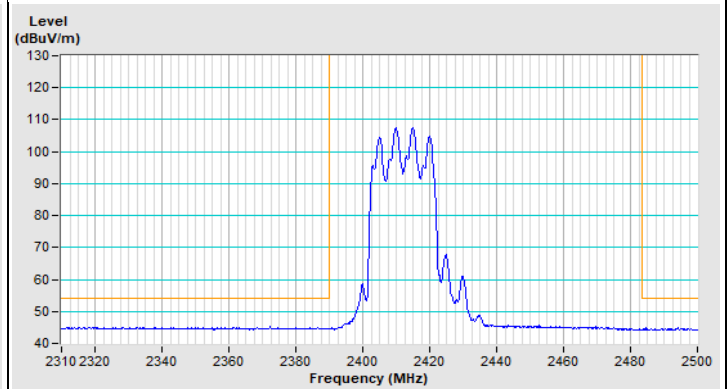
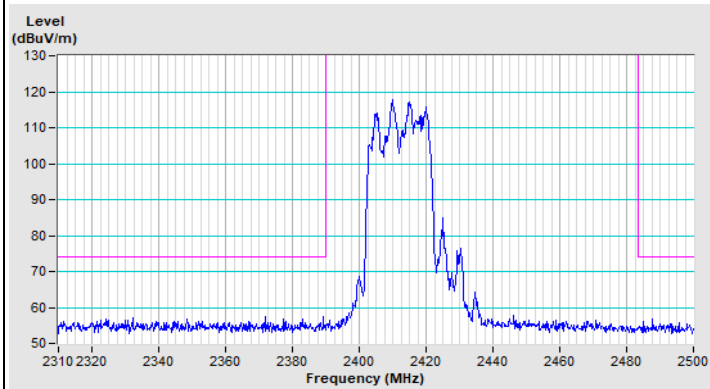


Vertical (Peak)

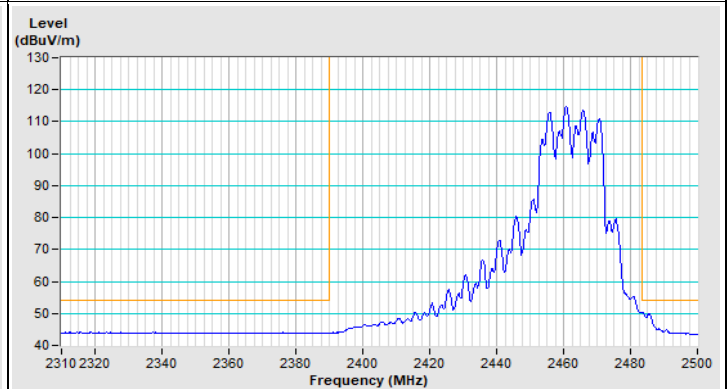
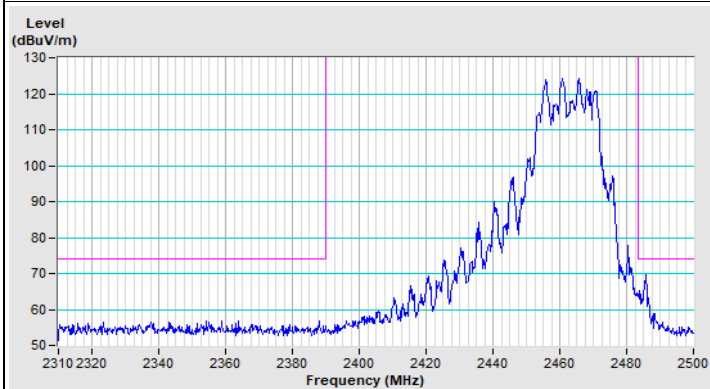
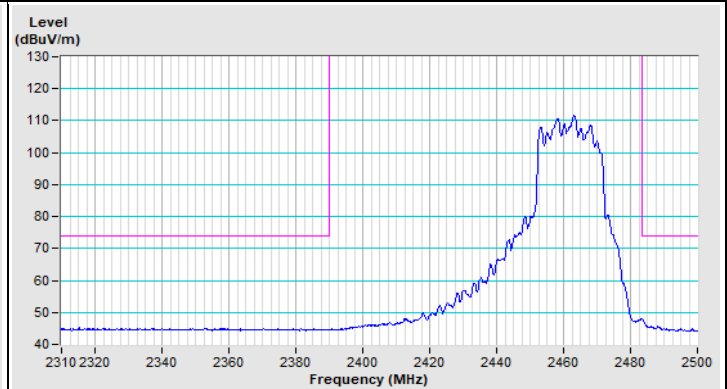
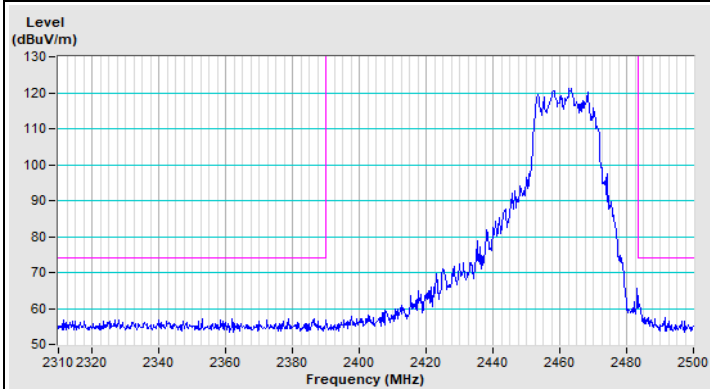


Vertical (Average)

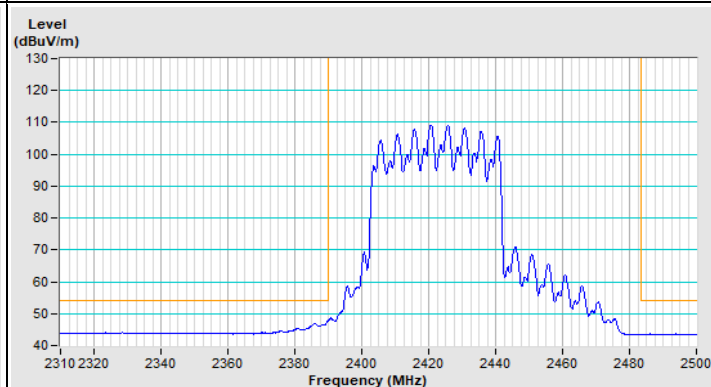
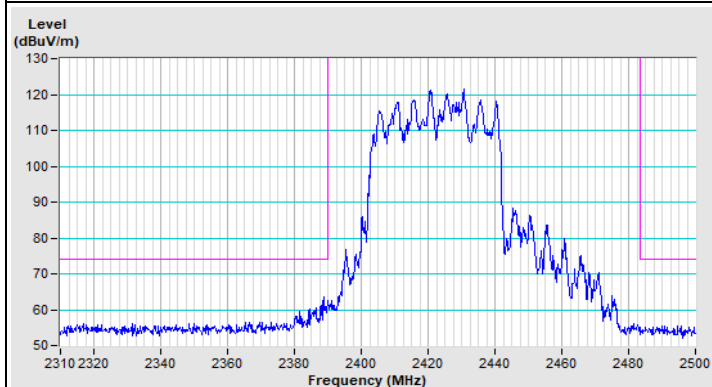
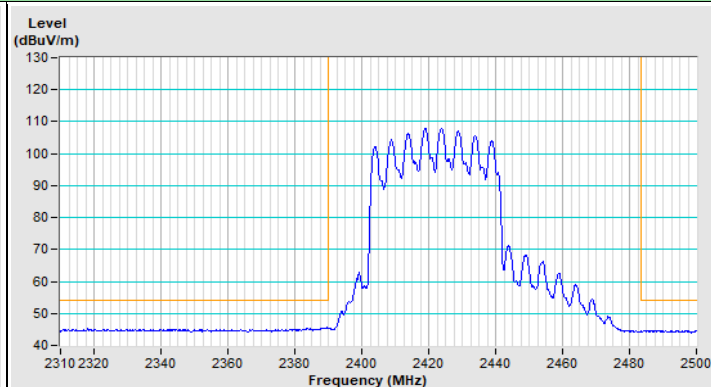
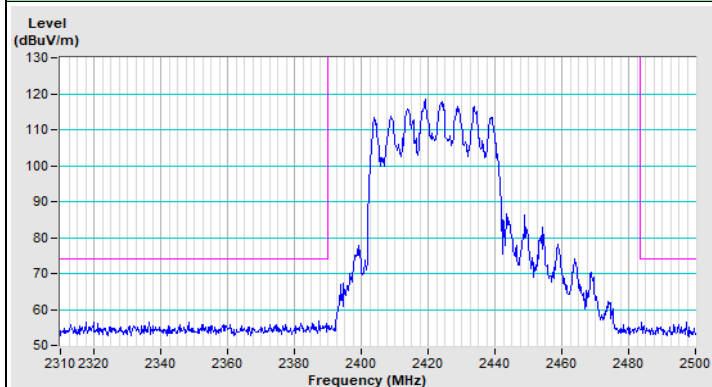
802.11ax (HE20) Channel 1



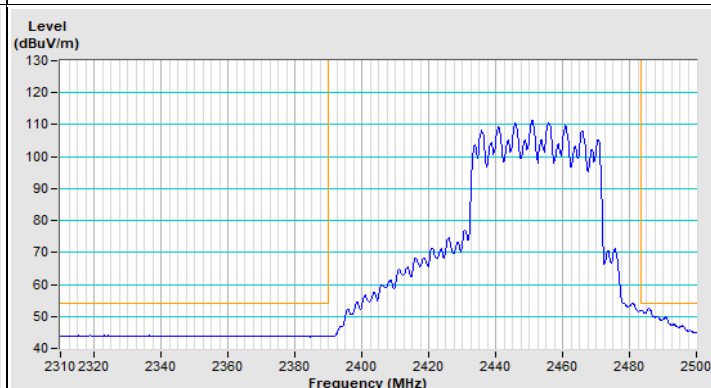
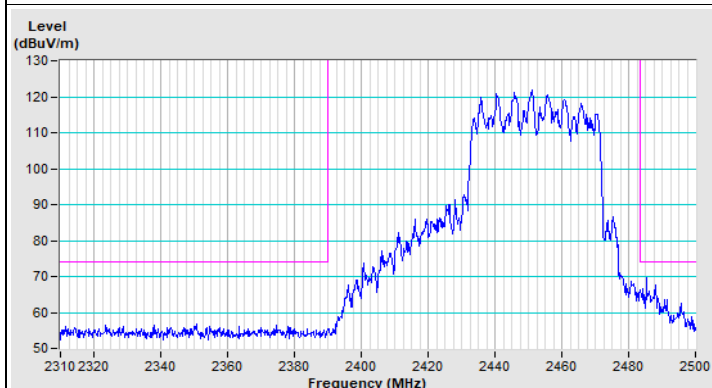
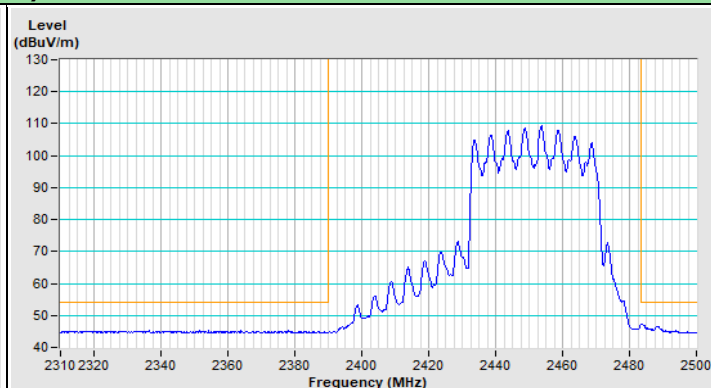
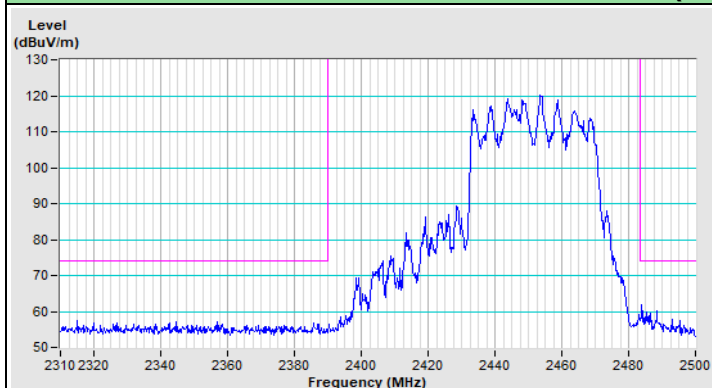
802.11ax (HE20) Channel 11



802.11ax (HE40) Channel 3



802.11ax (HE40) Channel 9



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:

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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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