

TEST REPORT

CERTIFICATE OF CONFORMITY

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

Report No.: RFBHPY-WTW-P23100691-2

FCC ID: LY5-PCITP2

Product: Telematics Platform 2

Brand: PCI

Model No.: PCI-TP2

Received Date: 2023/10/31

Test Date: 2023/11/24 ~ 2023/12/9

Issued Date: 2024/3/27

Applicant: PCI Private Limited

Address: 35 Pioneer Road North Singapore 628475

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

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

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

FCC Registration /
Designation Number: 788550 / TW0003

Approved by: Jeremy Lin, **Date:** 2024/3/27
Jeremy Lin / Project Engineer

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Prepared by : Pettie Chen / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBHPY-WTW-P23100691-2	Original release.	2024/3/27

1 Certificate

Product: Telematics Platform 2

Brand: PCI

Test Model: PCI-TP2

Sample Status: Engineering sample

Applicant: PCI Private Limited

Test Date: 2023/11/24 ~ 2023/12/9

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

Measurement procedure: ANSI C63.10-2013

KDB 558074 D01 15.247 Meas Guidance v05r02

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	NA	EUT is powered from DC power supply
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -4.7 dB at 743.92 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.3 dB at 2483.50 MHz
15.203	Antenna Requirement	Pass	Antenna connector is MMCX 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) (±)
RF Output Power	-	1.371 dB
Power Spectral Density	-	1.017 dB
6 dB Bandwidth	-	206.5 Hz
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.79 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	2.44 dB
	30 MHz ~ 1 GHz	2.95 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 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	Telematics Platform 2
Brand	PCI
Test Model	PCI-TP2
Status of EUT	Engineering sample
Power Supply Rating	3.7Vdc from battery 12Vdc or 24Vdc from power supply
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	Up to 200Mbps
Operating Frequency	2.412 GHz ~ 2.462 GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7
Output Power	489.779 mW (26.9 dBm)

Note:

1. This EUT contains FCC ID: LY5-PCITP200.
2. 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.	Gain (dBi)	Antenna Type	Connector Type
	2400~2483.5 MHz		
1	2.96	FPC	MMCX

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

2. The EUT provides 1 completed transmitter and 1 receiver.

2.4 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
VHT20	1TX	1RX
VHT40	1TX	1RX

Note:

1. The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), VHT mode for 20 MHz (40 MHz), therefore the manufacturer will control the power for 802.11n mode is same as the VHT mode or 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:

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:

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:	EUT can be used in the following ways: X-axis / Y-axis / Z-axis. Pre-scan in these ways and find the worst case as a representative test condition.
Worst Case:	Worst Condition: Y-axis

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

Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power	802.11b	1, 6, 11	DBPSK	1Mb/s
	802.11g	1, 6, 11	BPSK	6Mb/s
	802.11n (HT20)	1, 6, 11	BPSK	MCS0
	802.11n (HT40)	3, 6, 9	BPSK	MCS0
	VHT20	1, 6, 11	BPSK	MCS0
	VHT40	3, 6, 9	BPSK	MCS0
6 dB Bandwidth / Conducted Out of Band Emissions / Power Spectral Density	802.11b	1, 6, 11	DBPSK	1Mb/s
	802.11g	1, 6, 11	BPSK	6Mb/s
	VHT20	1, 6, 11	BPSK	MCS0
	VHT40	3, 6, 9	BPSK	MCS0
Unwanted Emissions below 1 GHz	802.11g	6	BPSK	6Mb/s
Unwanted Emissions above 1 GHz	802.11b	1, 6, 11	DBPSK	1Mb/s
	802.11g	1, 6, 11	BPSK	6Mb/s
	VHT20	1, 6, 11	BPSK	MCS0
	VHT40	3, 6, 9	BPSK	MCS0

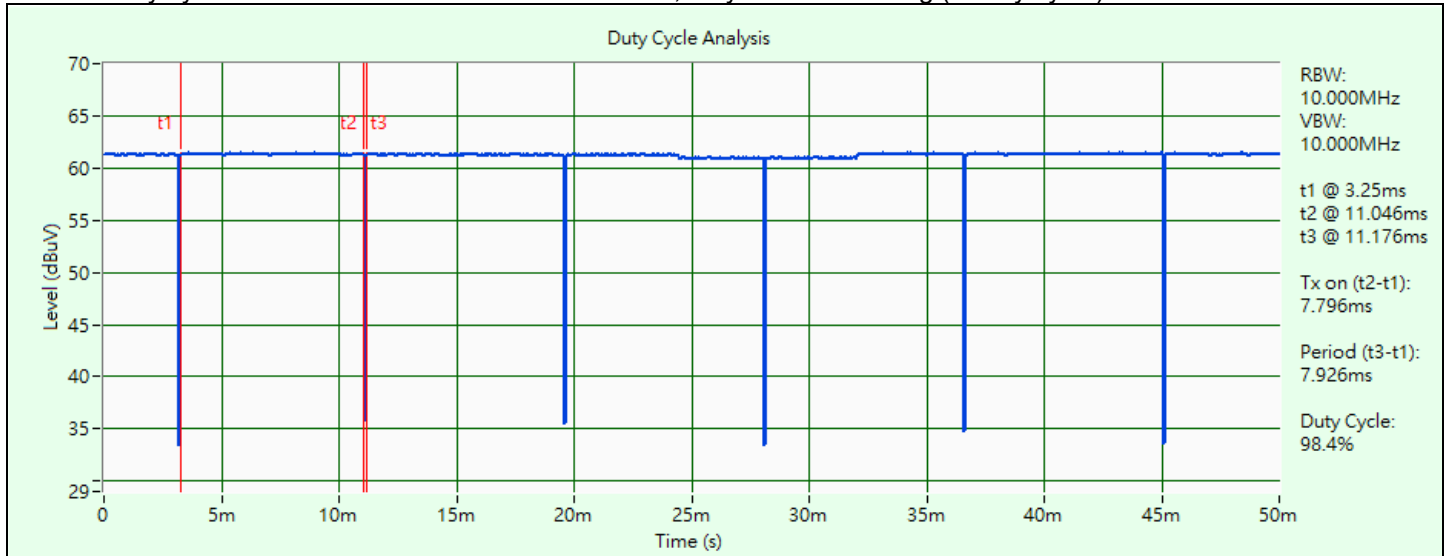
3.5 Duty Cycle of Test Signal

802.11b: Duty cycle = 7.796 ms / 7.926 ms x 100% = 98.4%

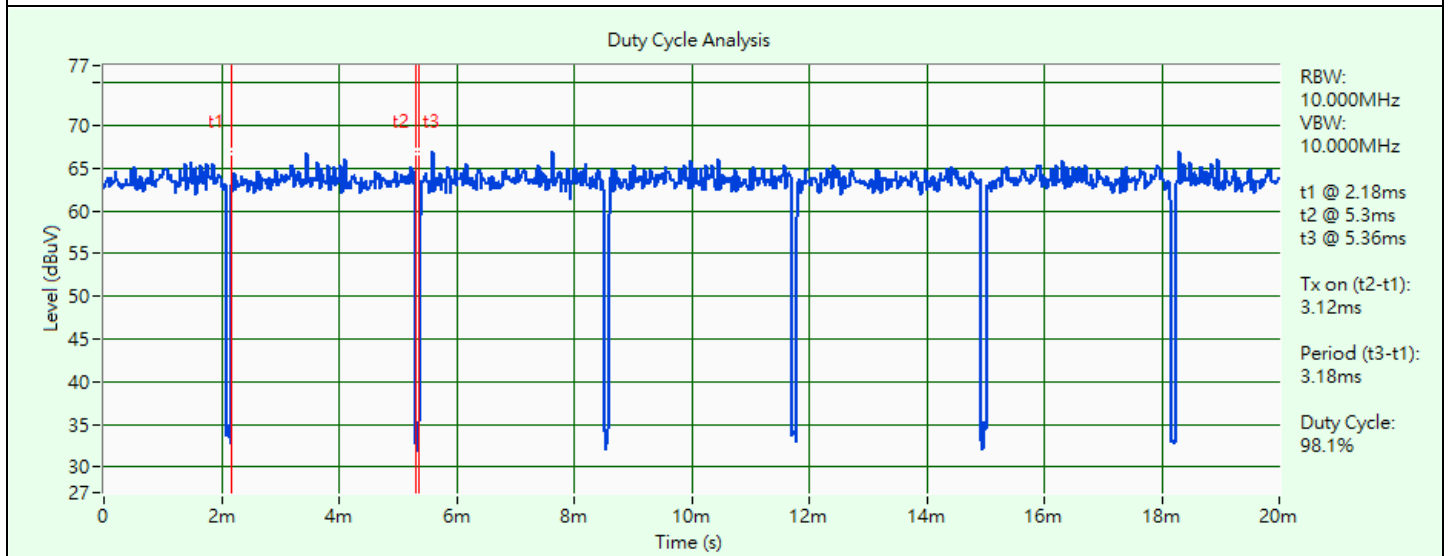
802.11g: Duty cycle = 3.12 ms / 3.18 ms x 100% = 98.1%

VHT20: Duty cycle = 4.8 ms / 4.86 ms x 100% = 98.8%

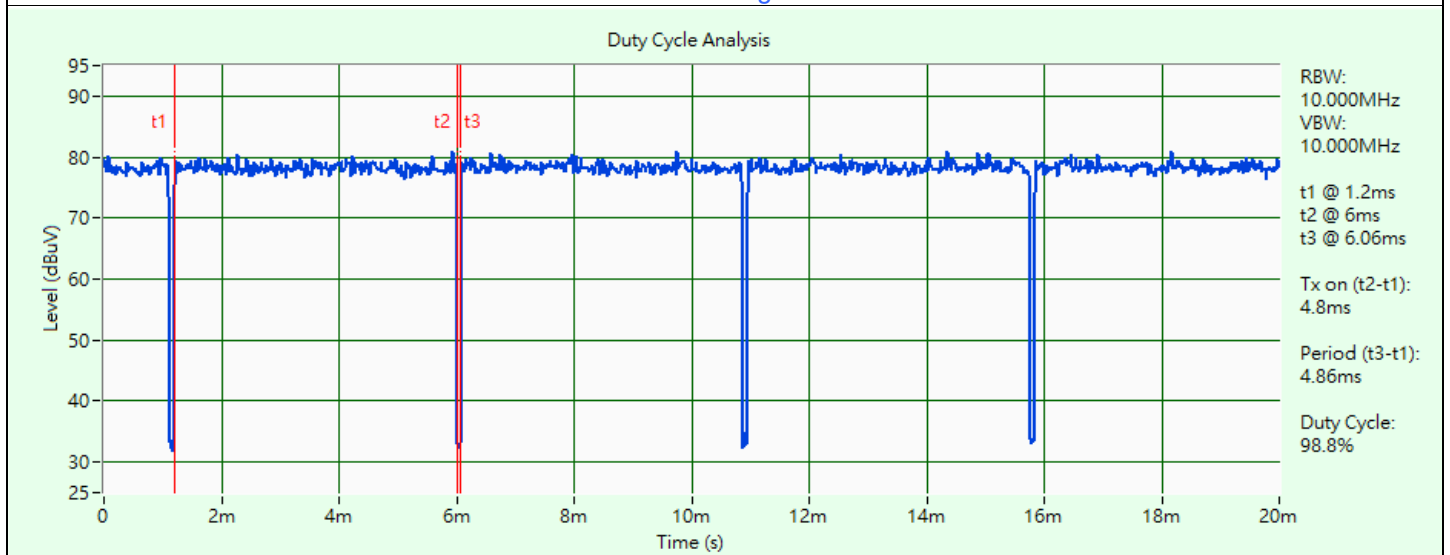
VHT40: Duty cycle = 2.33 ms / 2.41 ms x 100% = 96.7%, duty factor = 10 * log (1/Duty cycle) = 0.15 dB



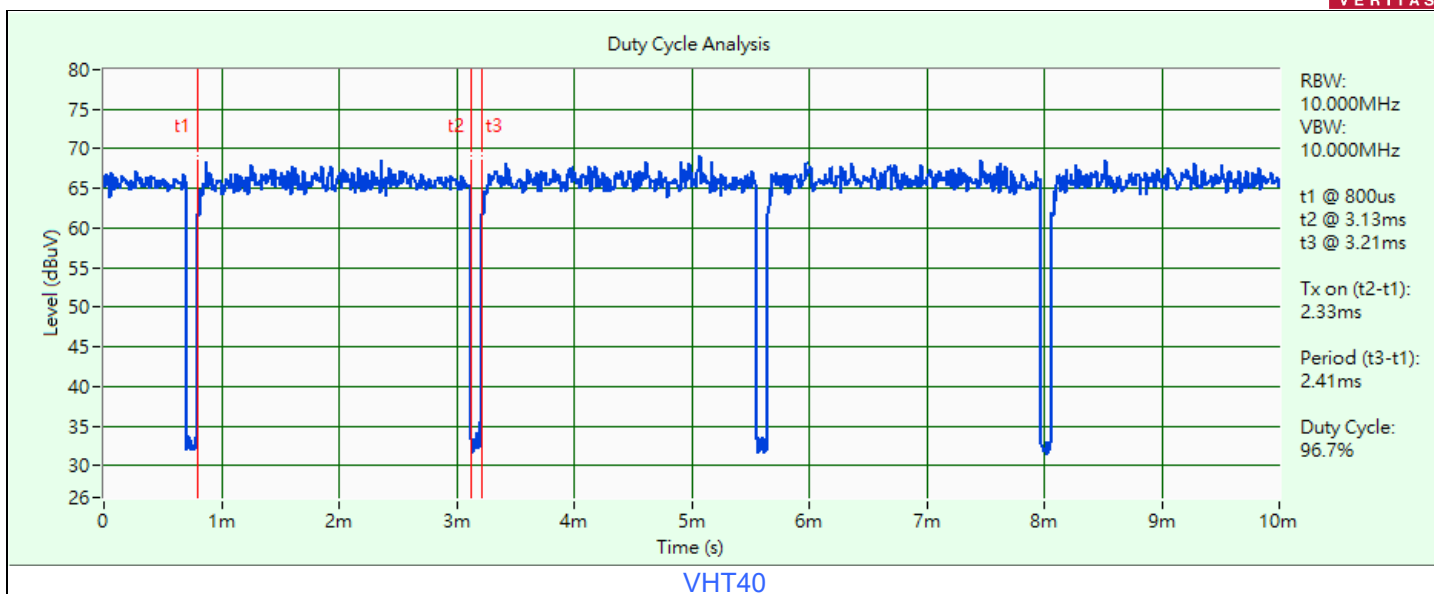
802.11b



802.11g



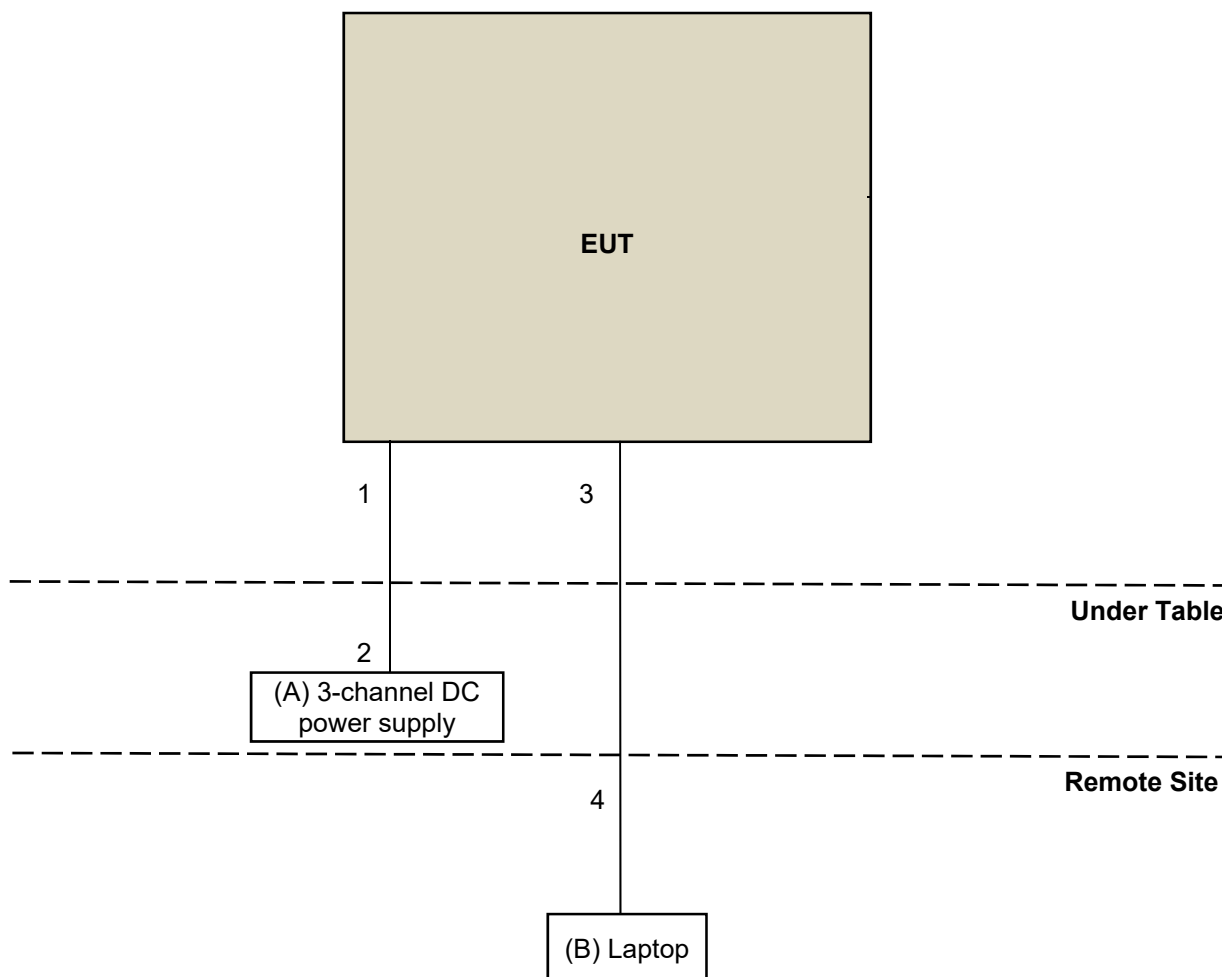
VHT20



3.6 Test Program Used and Operation Descriptions

Controlling software (labtool) 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	3-channel DC power supply	JIN YIH Technology	ODP3033	ODP30332128133	NA	NA
B	Laptop	DELL	Inspiron 14R	8LRKKW1	NA	NA

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.8	No	0	Supplied by applicant
2	DC Cable	1	3	No	0	Provided by Lab
3	LAN Cable	1	1.5	No	0	Supplied by applicant
4	LAN Cable	1	10	No	0	Provided by Lab

4 Test Instruments

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

4.1 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Peak Power Analyzer Keysight	8990B	MY51000485	2023/1/19	2024/1/18
Wideband Power Sensor Keysight	N1923A	MY58020002	2023/1/18	2024/1/17
		MY58140009	2023/1/18	2024/1/17

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/12/9

4.2 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSU43	100115	2023/1/17	2024/1/16

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/12/9

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 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Max-Full	MFA-440H	AT93021705	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-472	2023/10/16	2024/10/15
EXA Signal Analyzer Agilent	N9010A	MY52220207	2023/1/3	2024/1/2
Loop Antenna Electro-Metrics	EM-6879	269	2023/9/23	2024/9/22
Loop Antenna TESEQ	HLA 6121	45745	2023/8/8	2024/8/7
MXE EMI Receiver Keysight	N9038A	MY55420137	2023/5/3	2024/5/2
Preamplifier EMCI	EMC 330H	980112	2023/9/27	2024/9/26
	EMC001340	980201	2023/9/27	2024/9/26
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2023/1/7	2024/1/6
RF Coaxial Cable Woken	8D-FB	Cable-Ch10-01	2023/9/27	2024/9/26
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MG-7802	N/A	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 5.
2. Tested Date: 2023/12/1

4.6 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Max-Full	MFA-440H	AT93021705	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	7	N/A	N/A
EXA Signal Analyzer Agilent	N9010A	MY52220207	2023/1/3	2024/1/2
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-969	2023/11/12	2024/11/11
	BBHA 9170	148	2023/11/12	2024/11/11
MXE EMI Receiver Keysight	N9038A	MY55420137	2023/5/3	2024/5/2
Notch Filter Micro-Tronics	BRM17690	004	2023/1/11	2024/1/10
	BRM50716	060	2023/1/11	2024/1/10
Preamplifier EMCI	EMC 012645	980115	2023/9/27	2024/9/26
	EMC 184045	980116	2023/9/27	2024/9/26
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2023/7/8	2024/7/7
	EMC102-KM-KM-3000	150929	2023/7/8	2024/7/7
	EMC104-SM-SM- 8000+3000	171005	2023/9/27	2024/9/26
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	EMC104-SM-SM- 1000(140807)	2023/9/27	2024/9/26
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MG-7802	N/A	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 5.
2. Tested Date: 2023/11/24 ~ 2023/11/28

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)

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

5.5 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 20 dB below the highest level of the desired power:

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

Notes:

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

5.6 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 20 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

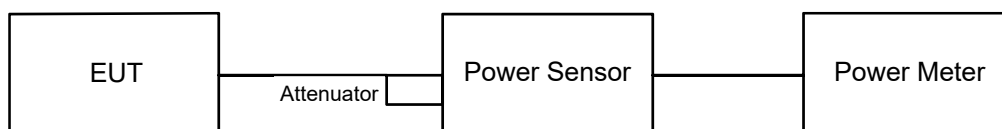
Notes:

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

Peak Power:

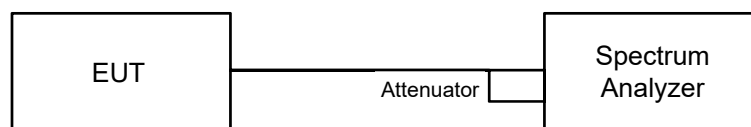
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average Power:

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

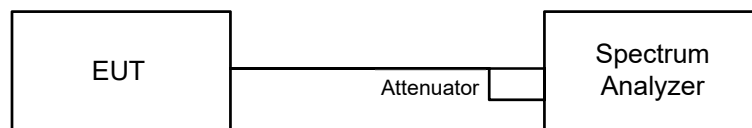


6.2.2 Test Procedure

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to: 3 kHz.
- d. Set the VBW $\geq 3 \times$ RBW.
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

6.3 6 dB Bandwidth

6.3.1 Test Setup

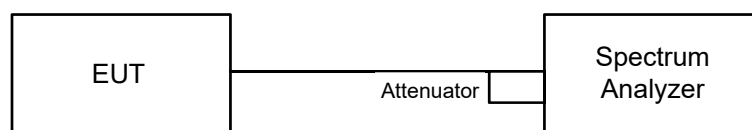


6.3.2 Test Procedure

- 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.

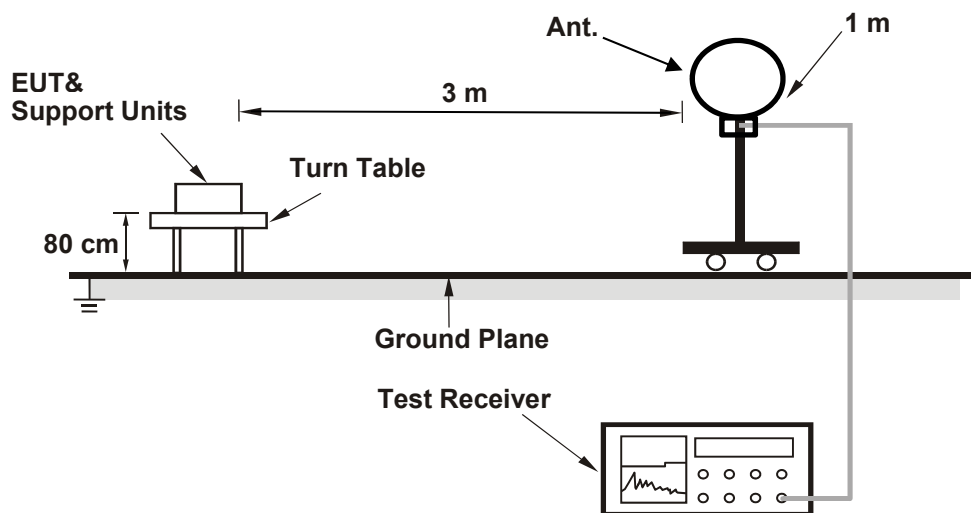
MEASUREMENT PROCEDURE OOB

- 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.

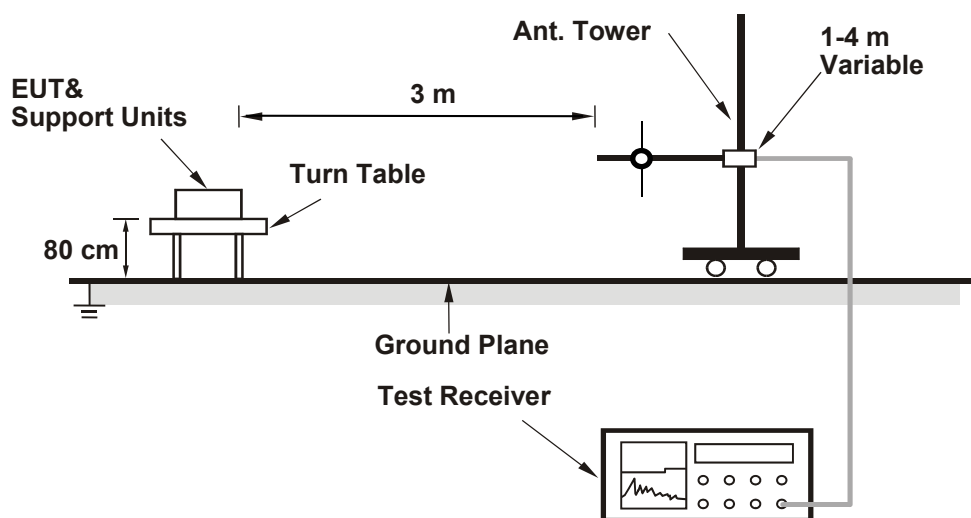
6.5 Unwanted Emissions below 1 GHz

6.5.1 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).

6.5.2 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

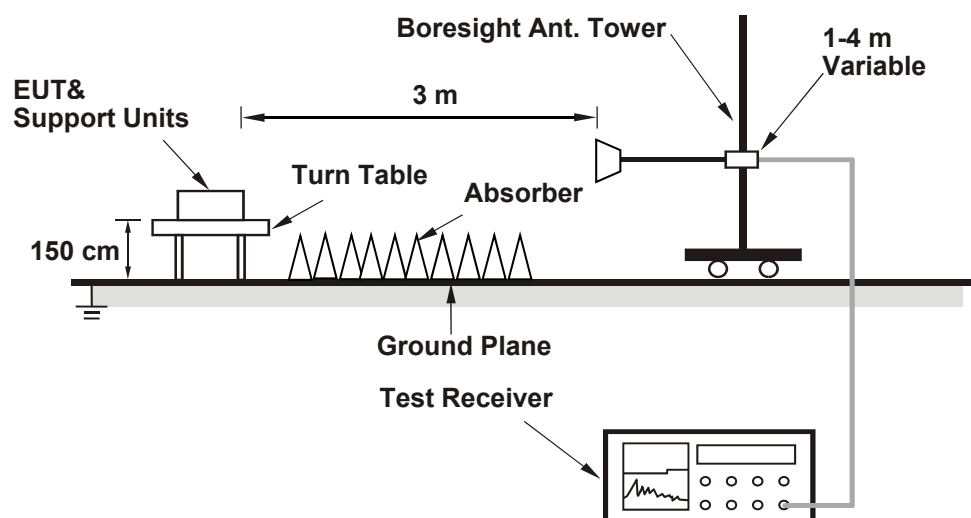
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the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

6.6 Unwanted Emissions above 1 GHz

6.6.1 Test Setup



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

6.6.2 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:	12 Vdc	Environmental Conditions:	24°C, 63% RH	Tested By:	Henry Hsu
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For Peak Power

802.11b

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2412	111.686	20.48	30	Pass
6	2437	52	17.16	30	Pass
11	2462	55.081	17.41	30	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11g

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2412	383.707	25.84	30	Pass
6	2437	489.779	26.90	30	Pass
11	2462	351.56	25.46	30	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2412	334.195	25.24	30	Pass
6	2437	465.586	26.68	30	Pass
11	2462	315.5	24.99	30	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
3	2422	251.768	24.01	30	Pass
6	2437	447.713	26.51	30	Pass
9	2452	449.78	26.53	30	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT20

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
1	2412	339.625	25.31	30	Pass
6	2437	478.63	26.80	30	Pass
11	2462	326.588	25.14	30	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the output power limit shall not be reduced.

VHT40

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Power Limit (dBm)	Test Result
3	2422	257.04	24.10	30	Pass
6	2437	465.586	26.68	30	Pass
9	2452	461.318	26.64	30	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the output power limit shall not be reduced.

For Average Power

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	17.62	12.46
6	2437	10.617	10.26
11	2462	8.375	9.23

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	52.966	17.24
6	2437	101.625	20.07
11	2462	49.204	16.92

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	53.827	17.31
6	2437	101.391	20.06
11	2462	50.234	17.01

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	42.17	16.25
6	2437	79.983	19.03
9	2452	61.944	17.92

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	55.081	17.41
6	2437	103.753	20.16
11	2462	50.933	17.07

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	43.351	16.37
6	2437	82.035	19.14
9	2452	63.68	18.04

7.2 Power Spectral Density

Input Power:	12 Vdc	Environmental Conditions:	24°C, 63% RH	Tested By:	Henry Hsu
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802.11b

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2412	-1.84	8	Pass
6	2437	-5.20	8	Pass
11	2462	-4.97	8	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11g

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2412	-8.15	8	Pass
6	2437	-7.02	8	Pass
11	2462	-8.49	8	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the power density limit shall not be reduced.

VHT20

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
1	2412	-9.53	8	Pass
6	2437	-8.06	8	Pass
11	2462	-9.70	8	Pass

Note: The antenna gain is 2.96 dBi < 6 dBi, so the power density limit shall not be reduced.

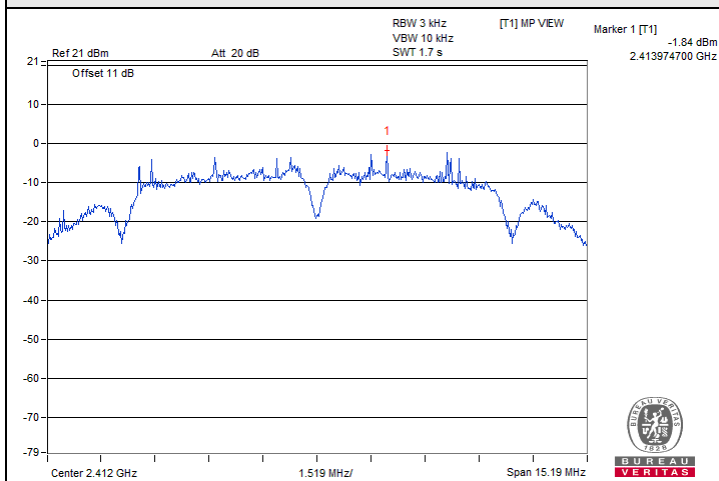
VHT40

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
3	2422	-12.37	8	Pass
6	2437	-9.72	8	Pass
9	2452	-9.89	8	Pass

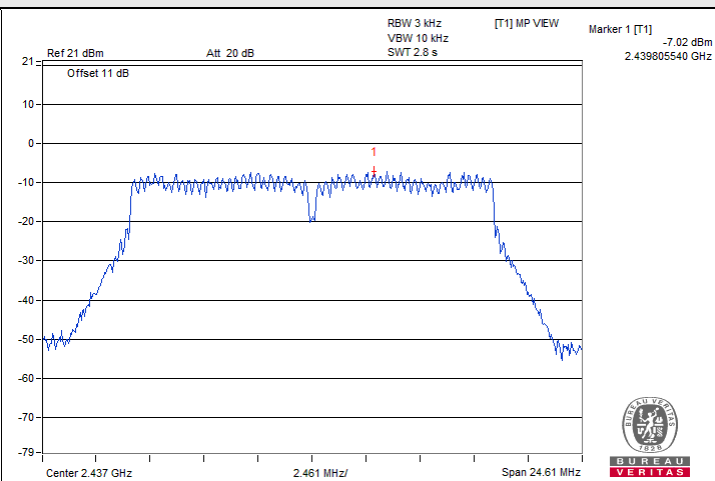
Note: The antenna gain is 2.96 dBi < 6 dBi, so the power density limit shall not be reduced.



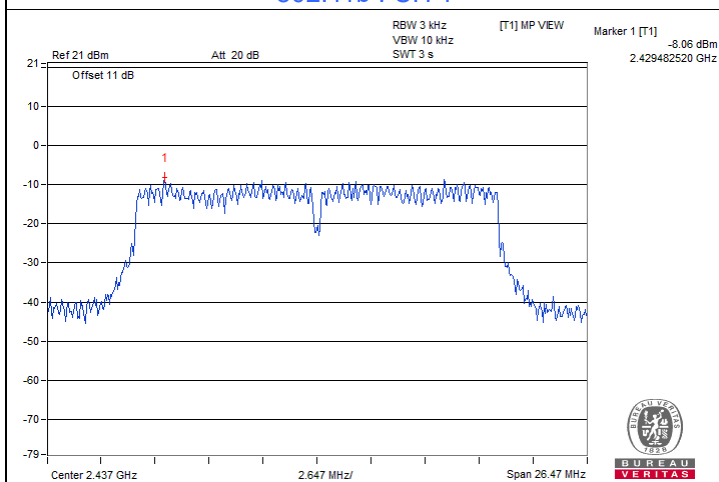
Spectrum Plot of Maximum Value



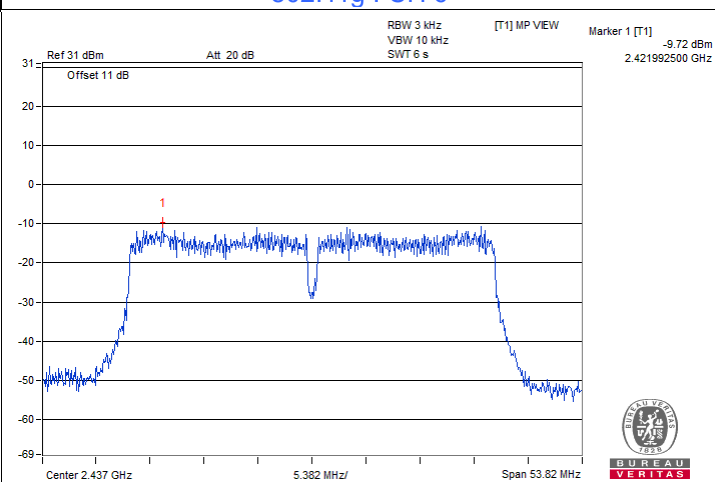
802.11b : CH 1



802.11g : CH 6



VHT20 : CH 6



VHT40 : CH 6

7.3 6 dB Bandwidth

Input Power:	12 Vdc	Environmental Conditions:	24°C, 63% RH	Tested By:	Henry Hsu
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802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	10.13	0.5	Pass
6	2437	10.12	0.5	Pass
11	2462	10.11	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	16.42	0.5	Pass
6	2437	16.41	0.5	Pass
11	2462	16.5	0.5	Pass

VHT20

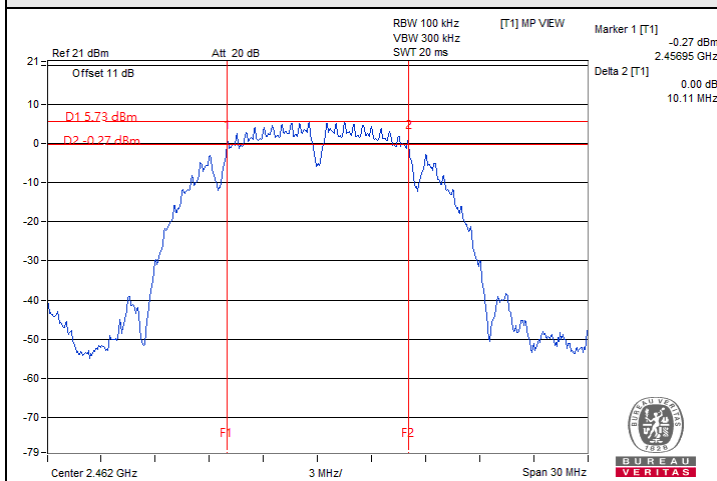
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
1	2412	17.65	0.5	Pass
6	2437	17.65	0.5	Pass
11	2462	17.64	0.5	Pass

VHT40

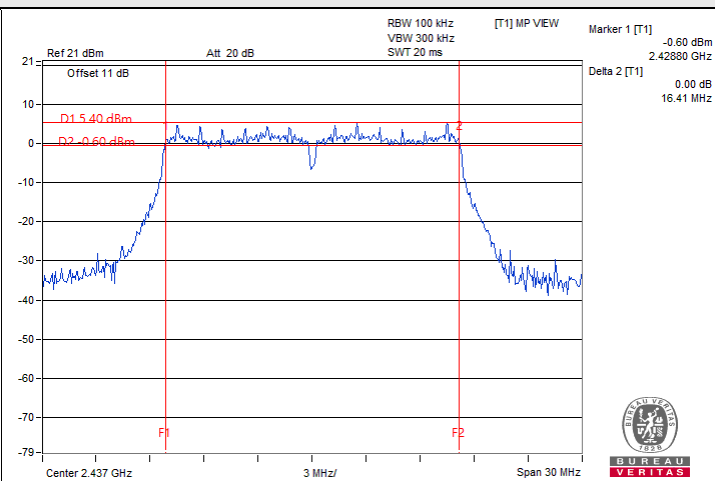
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
3	2422	35.91	0.5	Pass
6	2437	35.88	0.5	Pass
9	2452	35.96	0.5	Pass



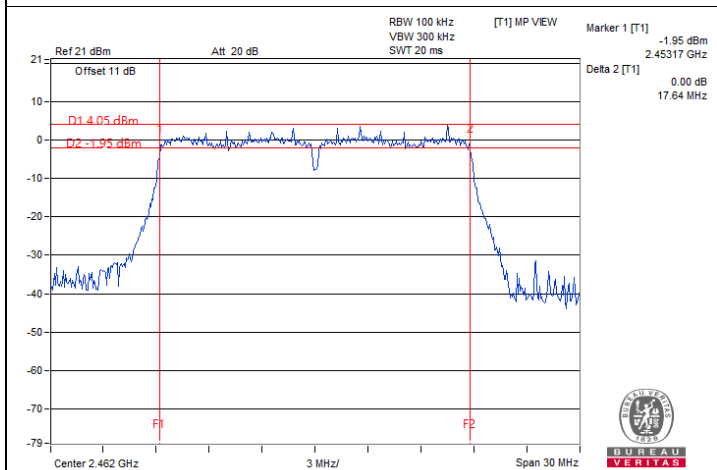
Spectrum Plot of Minimum Value



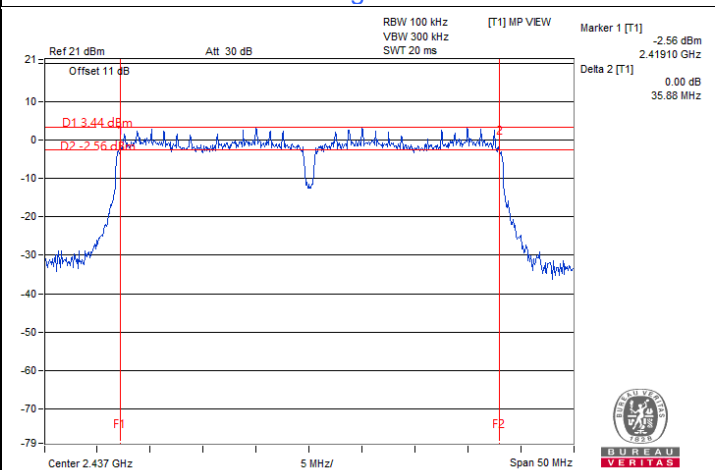
802.11b : CH 11



802.11g : CH 6



VHT20 : CH 11



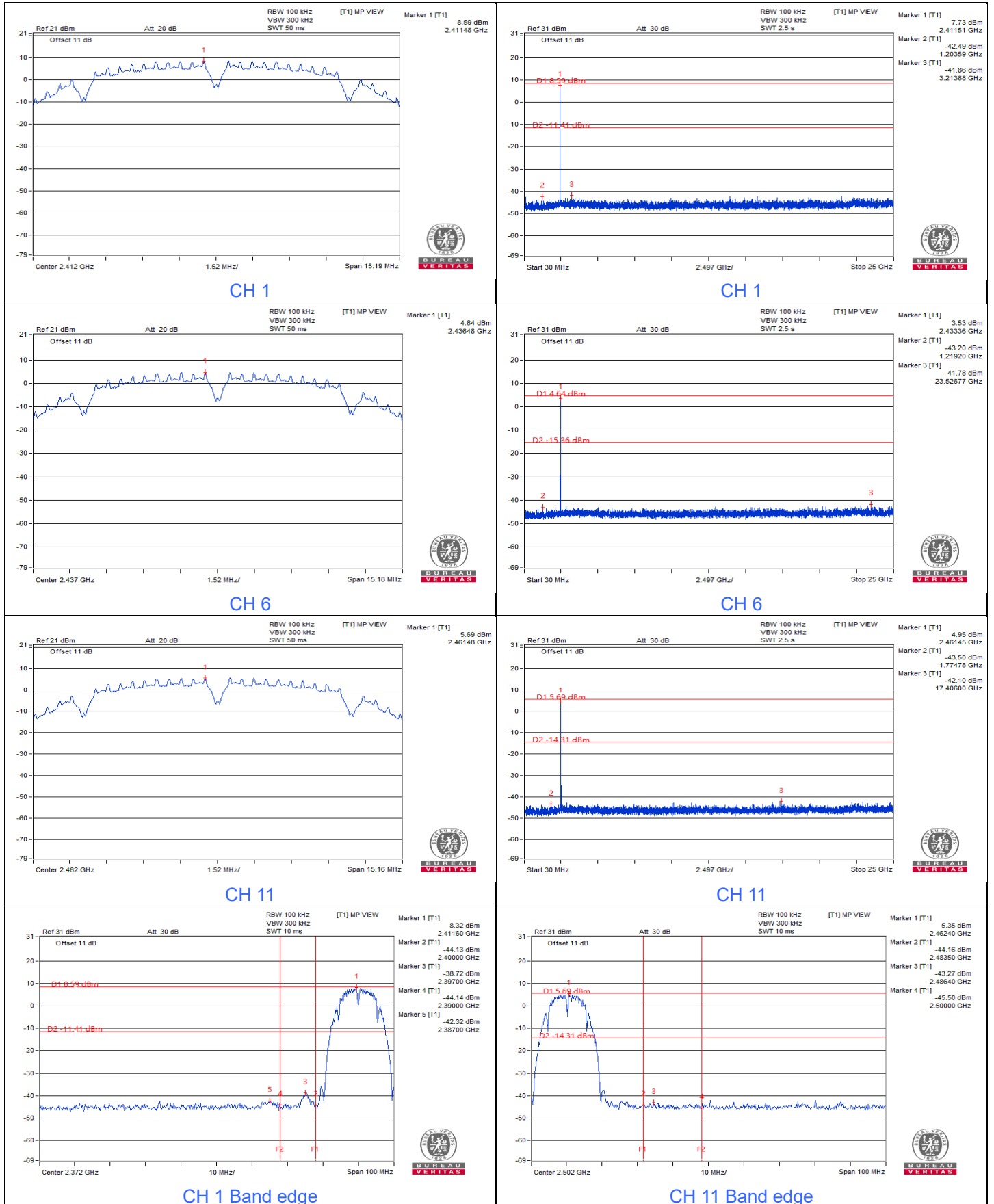
VHT40 : CH 6



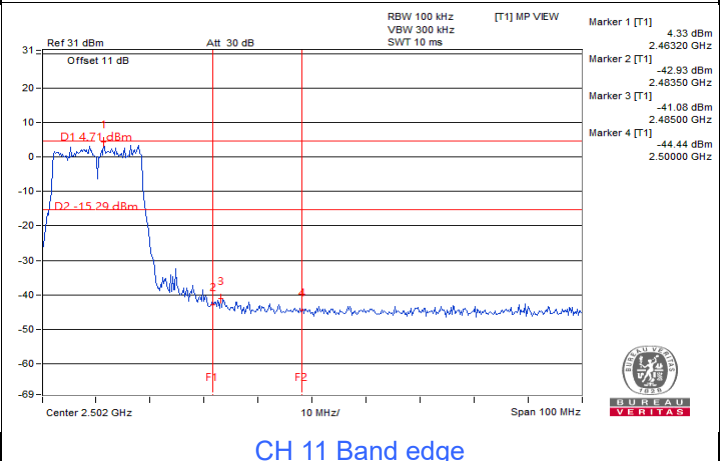
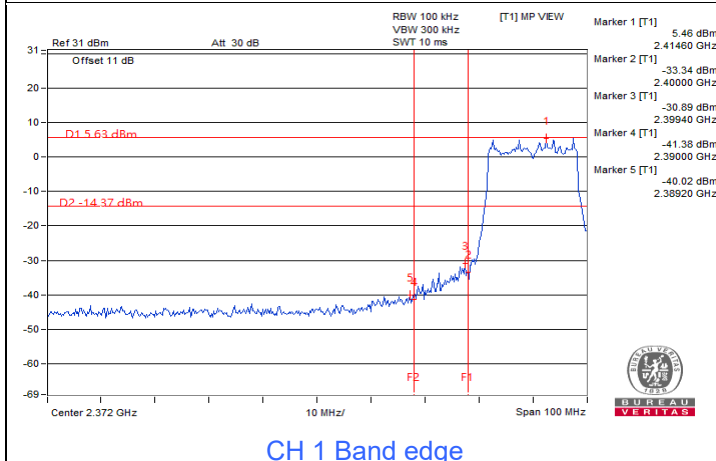
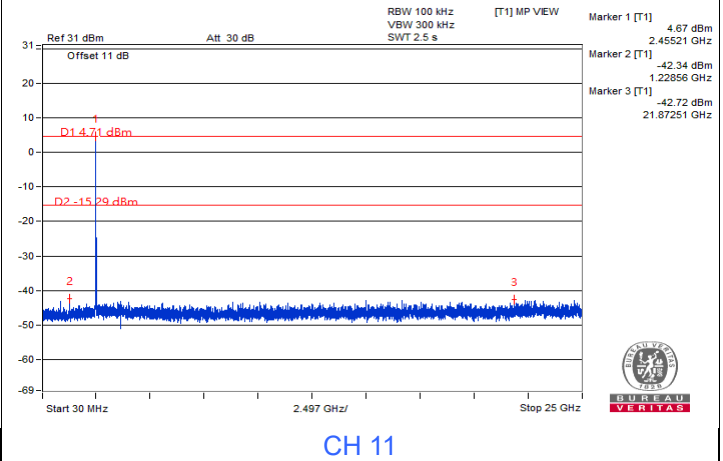
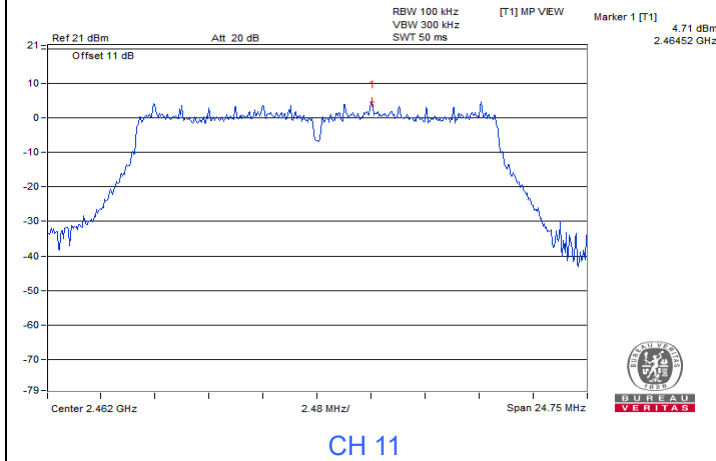
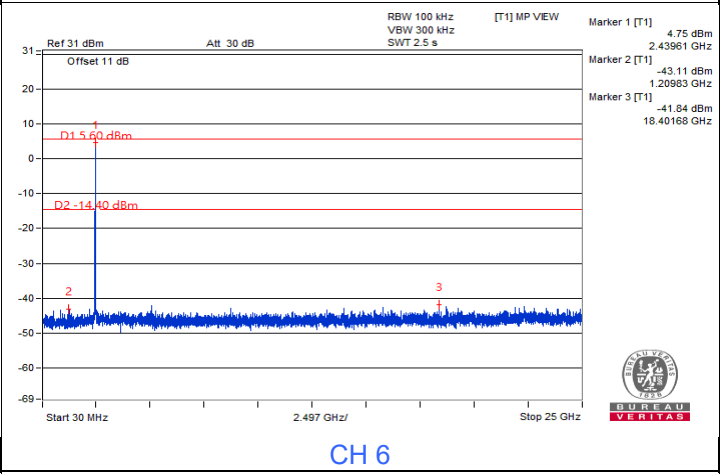
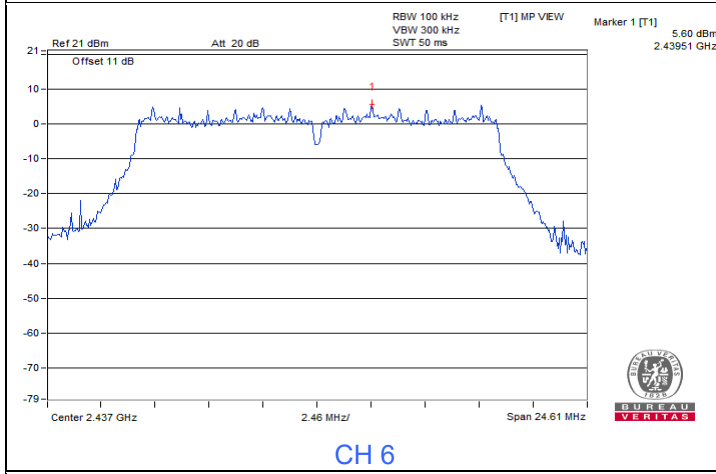
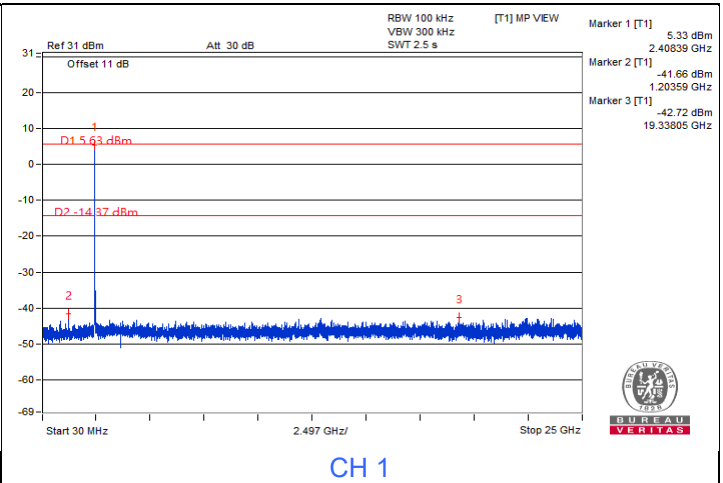
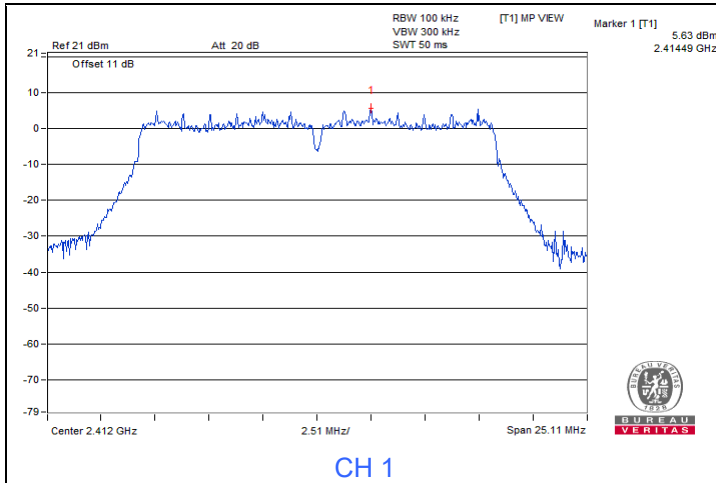
7.4 Conducted Out of Band Emissions

Input Power:	12 Vdc	Environmental Conditions:	24°C, 63% RH	Tested By:	Henry Hsu
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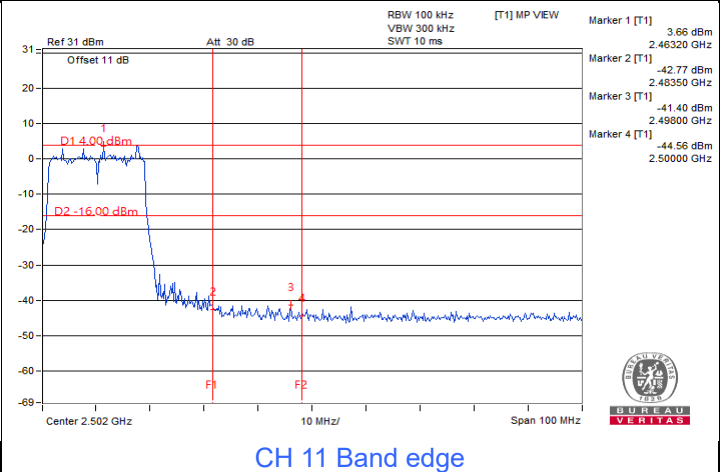
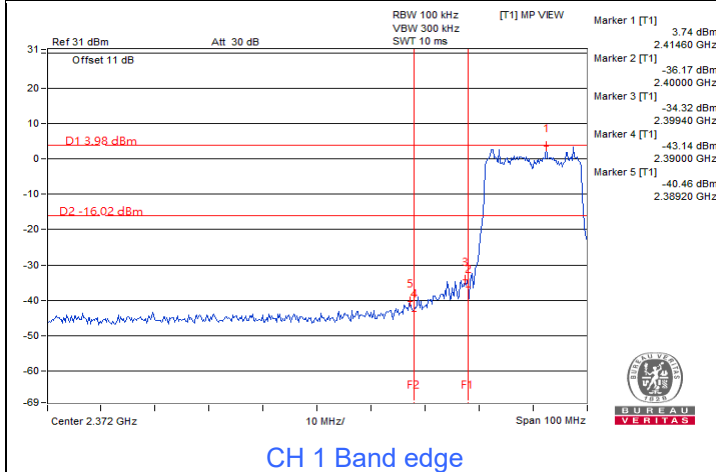
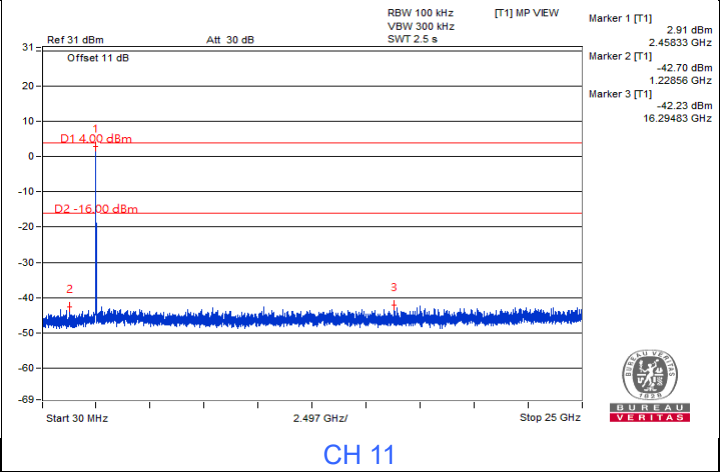
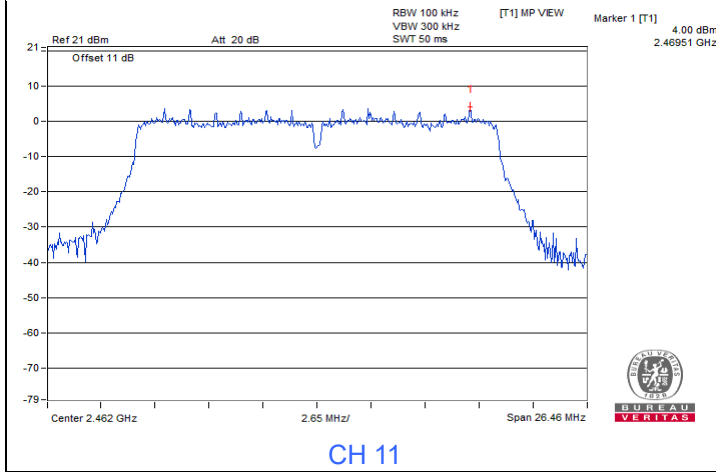
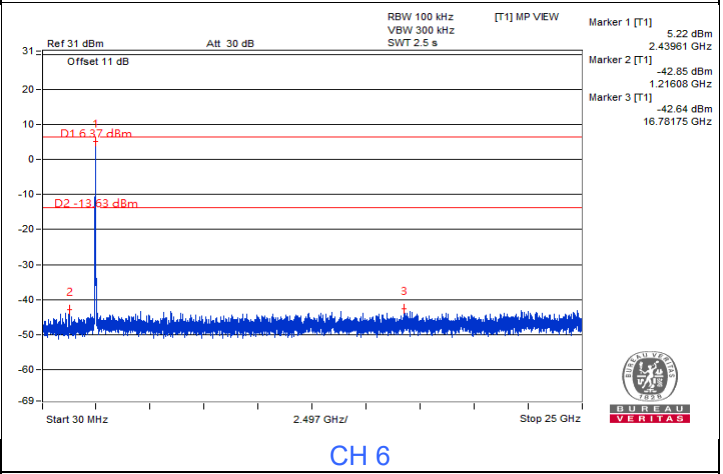
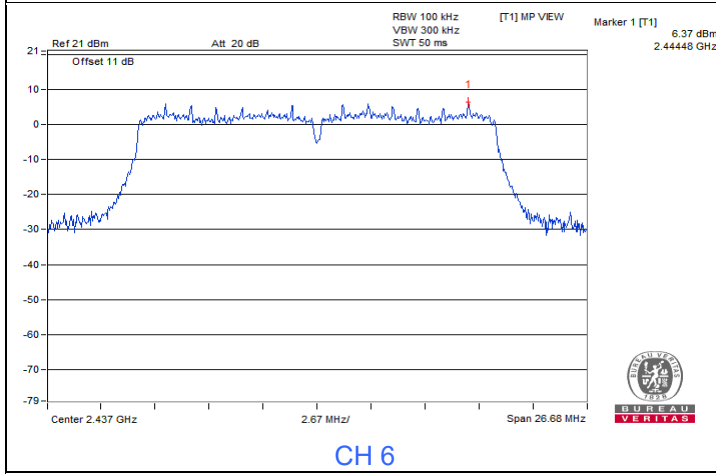
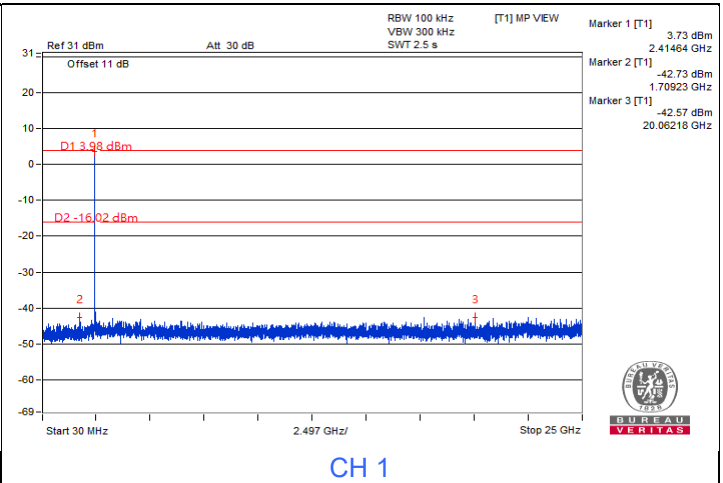
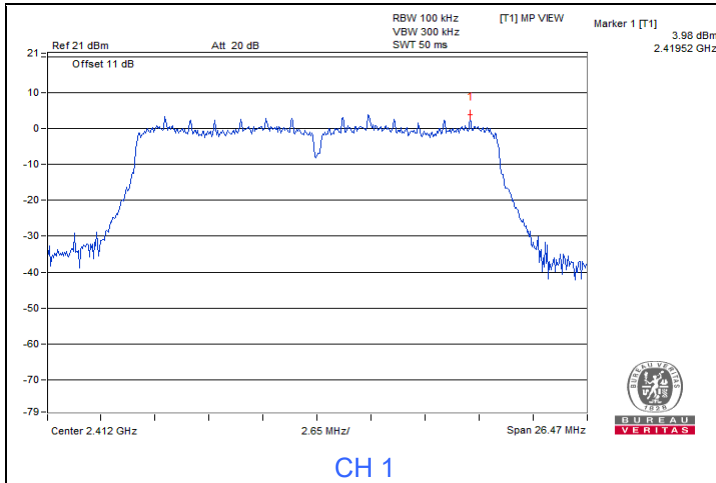
802.11b



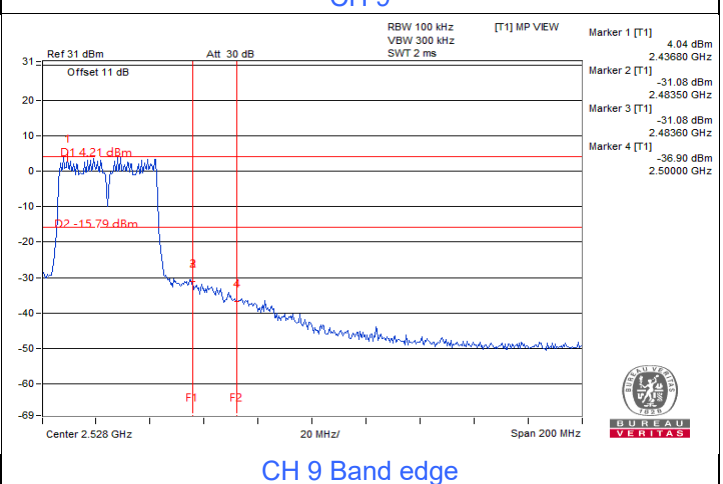
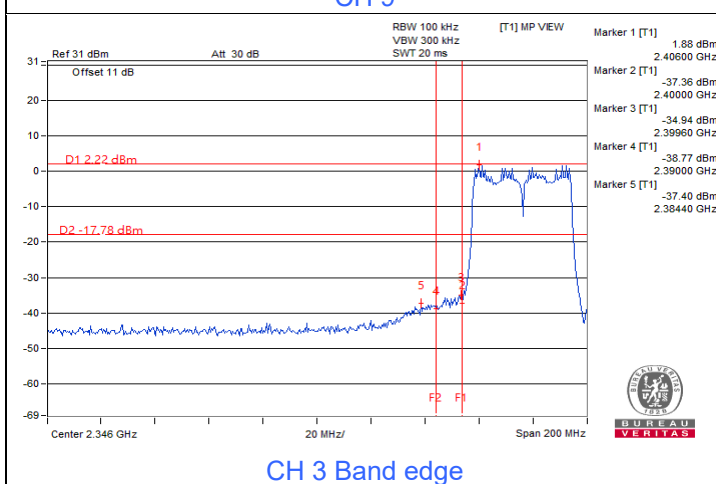
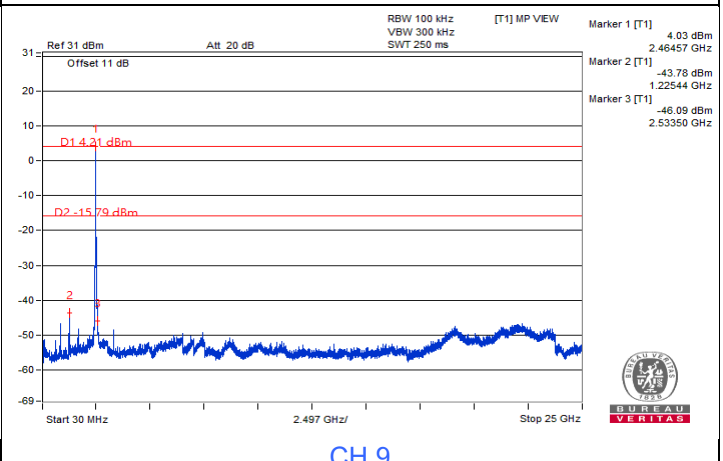
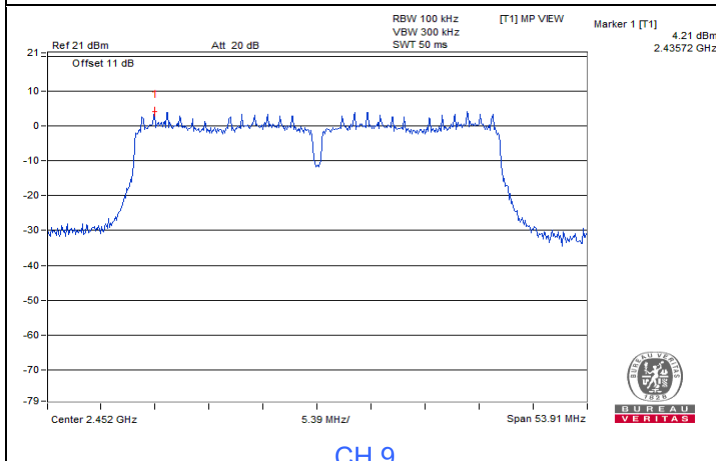
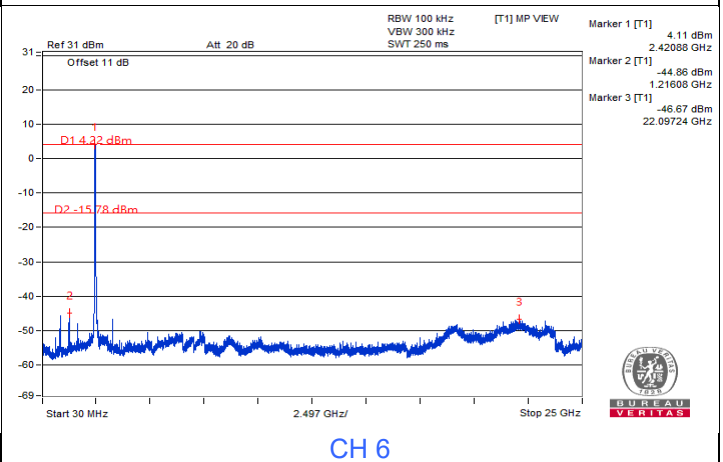
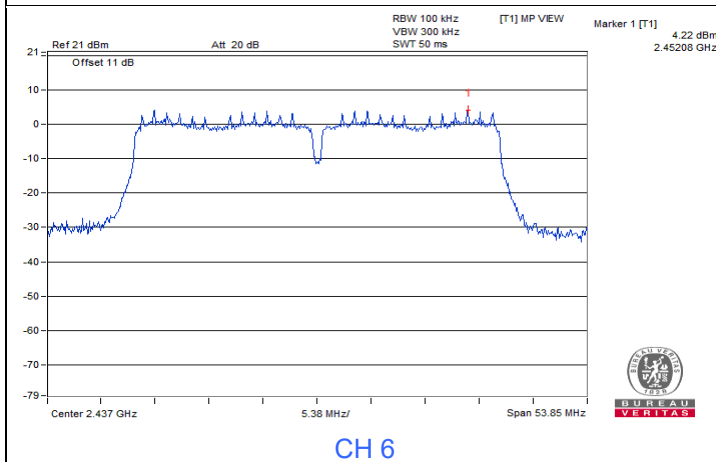
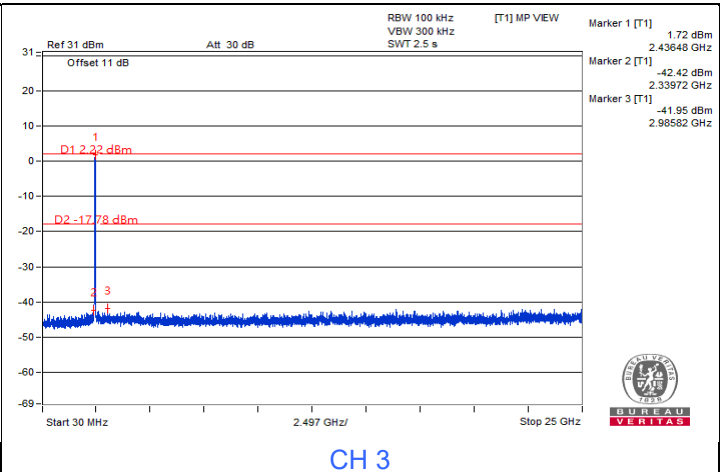
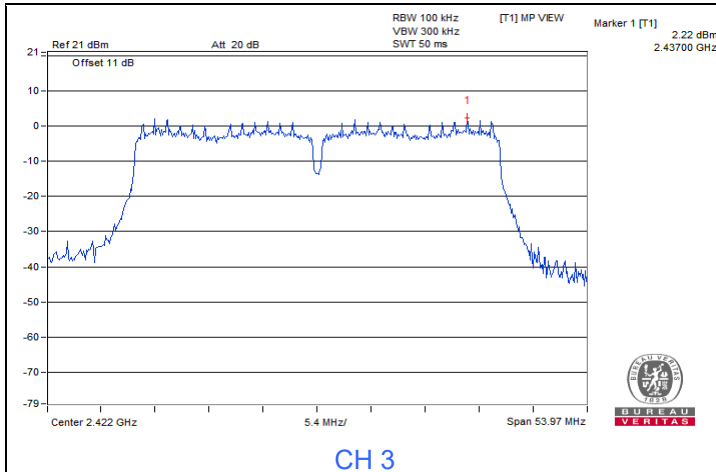
802.11g



VHT20



VHT40



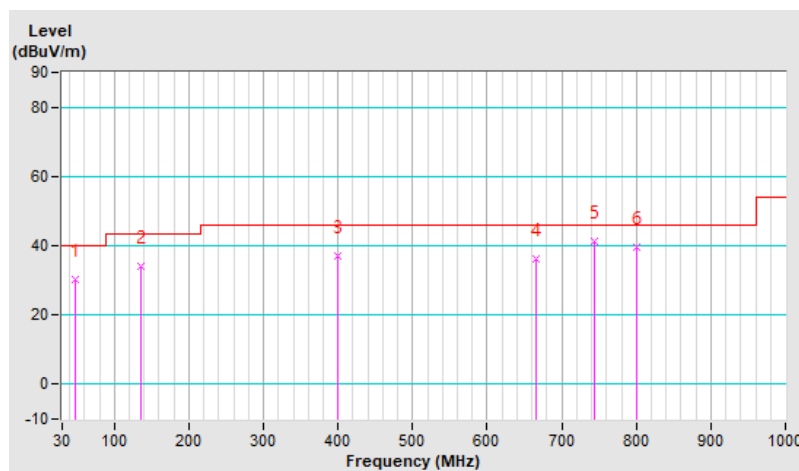
7.5 Unwanted Emissions below 1 GHz

RF Mode	802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	12Vdc	Environmental Conditions	24°C, 78% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	48.43	30.2 QP	40.0	-9.8	2.00 H	202	42.7	-12.5
2	135.73	34.1 QP	43.5	-9.4	1.00 H	80	47.4	-13.3
3	399.57	36.9 QP	46.0	-9.1	1.00 H	146	46.5	-9.6
4	666.32	36.2 QP	46.0	-9.8	1.50 H	192	40.0	-3.8
5	743.92	41.3 QP	46.0	-4.7	1.00 H	322	42.9	-1.6
6	800.18	39.4 QP	46.0	-6.6	2.00 H	39	40.6	-1.2

Remarks:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- Margin value = Emission Level – Limit value
- The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
- The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

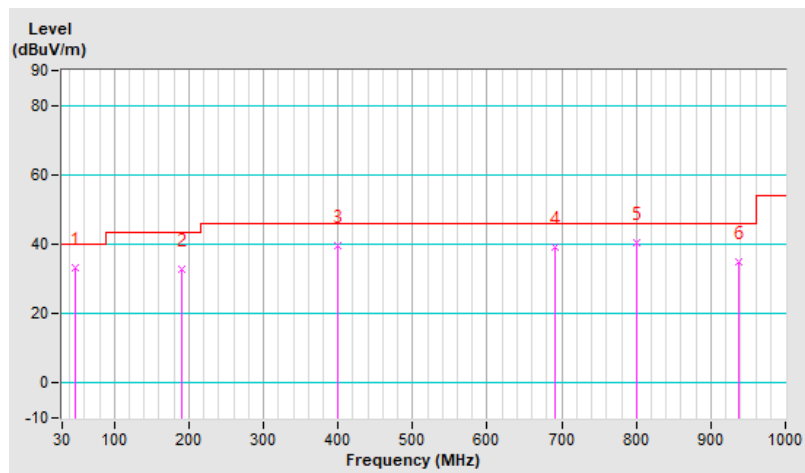


RF Mode	802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	12Vdc	Environmental Conditions	24°C, 78% RH
Tested By	Vincent Chen		

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	47.46	33.3 QP	40.0	-6.7	1.00 V	84	45.8	-12.5
2	190.05	32.7 QP	43.5	-10.8	1.50 V	121	47.9	-15.2
3	399.57	39.7 QP	46.0	-6.3	1.00 V	23	49.3	-9.6
4	690.57	39.2 QP	46.0	-6.8	2.00 V	163	42.6	-3.4
5	800.18	40.6 QP	46.0	-5.4	1.00 V	330	41.8	-1.2
6	937.92	34.9 QP	46.0	-11.1	1.50 V	168	35.3	-0.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.6 Unwanted Emissions above 1 GHz

RF Mode	802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	60.1 PK	74.0	-13.9	2.24 H	233	25.3	34.8
2	2390.00	47.0 AV	54.0	-7.0	2.24 H	233	12.2	34.8
3	*2412.00	103.3 PK			2.24 H	233	68.5	34.8
4	*2412.00	100.7 AV			2.24 H	233	65.9	34.8
5	4824.00	59.0 PK	74.0	-15.0	1.65 H	168	49.7	9.3
6	4824.00	53.6 AV	54.0	-0.4	1.65 H	168	44.3	9.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	59.4 PK	74.0	-14.6	2.11 V	111	24.6	34.8
2	2390.00	46.5 AV	54.0	-7.5	2.11 V	111	11.7	34.8
3	*2412.00	101.2 PK			2.11 V	111	66.4	34.8
4	*2412.00	98.6 AV			2.11 V	111	63.8	34.8
5	4824.00	56.8 PK	74.0	-17.2	1.50 V	191	47.5	9.3
6	4824.00	50.6 AV	54.0	-3.4	1.50 V	191	41.3	9.3

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	802.11b	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	100.6 PK			2.05 H	215	65.8	34.8
2	*2437.00	98.0 AV			2.05 H	215	63.2	34.8
3	4874.00	59.0 PK	74.0	-15.0	1.59 H	166	49.5	9.5
4	4874.00	53.4 AV	54.0	-0.6	1.59 H	166	43.9	9.5

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	98.4 PK			1.40 V	158	63.6	34.8
2	*2437.00	95.9 AV			1.40 V	158	61.1	34.8
3	4874.00	57.9 PK	74.0	-16.1	1.87 V	131	48.4	9.5
4	4874.00	52.0 AV	54.0	-2.0	1.87 V	131	42.5	9.5

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 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	99.4 PK			2.03 H	214	64.4	35.0
2	*2462.00	96.7 AV			2.03 H	214	61.7	35.0
3	2483.50	61.1 PK	74.0	-12.9	2.03 H	214	26.1	35.0
4	2483.50	47.2 AV	54.0	-6.8	2.03 H	214	12.2	35.0
5	4924.00	59.1 PK	74.0	-14.9	1.61 H	168	49.6	9.5
6	4924.00	53.5 AV	54.0	-0.5	1.61 H	168	44.0	9.5

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	97.4 PK			3.00 V	178	62.4	35.0
2	*2462.00	94.8 AV			3.00 V	178	59.8	35.0
3	2483.50	60.6 PK	74.0	-13.4	3.00 V	178	25.6	35.0
4	2483.50	47.1 AV	54.0	-6.9	3.00 V	178	12.1	35.0
5	4924.00	56.7 PK	74.0	-17.3	1.36 V	192	47.2	9.5
6	4924.00	49.5 AV	54.0	-4.5	1.36 V	192	40.0	9.5

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	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	73.4 PK	74.0	-0.6	2.28 H	236	38.6	34.8
2	2390.00	51.8 AV	54.0	-2.2	2.28 H	236	17.0	34.8
3	*2412.00	111.9 PK			2.28 H	236	77.1	34.8
4	*2412.00	101.4 AV			2.28 H	236	66.6	34.8
5	4824.00	54.1 PK	74.0	-19.9	1.78 H	154	44.8	9.3
6	4824.00	41.4 AV	54.0	-12.6	1.78 H	154	32.1	9.3

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	72.5 PK	74.0	-1.5	2.16 V	96	37.7	34.8
2	2390.00	51.4 AV	54.0	-2.6	2.16 V	96	16.6	34.8
3	*2412.00	109.8 PK			2.16 V	96	75.0	34.8
4	*2412.00	99.4 AV			2.16 V	96	64.6	34.8
5	4824.00	47.6 PK	74.0	-26.4	2.64 V	274	43.5	4.1
6	4824.00	35.5 AV	54.0	-18.5	2.64 V	274	31.4	4.1

Remarks:

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



RF Mode	802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	113.9 PK			2.01 H	215	79.1	34.8
2	*2437.00	103.3 AV			2.01 H	215	68.5	34.8
3	4874.00	67.3 PK	74.0	-6.7	1.56 H	166	57.8	9.5
4	4874.00	53.1 AV	54.0	-0.9	1.56 H	166	43.6	9.5

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	111.6 PK			1.42 V	156	76.8	34.8
2	*2437.00	101.0 AV			1.42 V	156	66.2	34.8
3	4874.00	63.4 PK	74.0	-10.6	1.46 V	293	53.9	9.5
4	4874.00	49.2 AV	54.0	-4.8	1.46 V	293	39.7	9.5

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 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

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	110.3 PK			1.97 H	215	75.3	35.0
2	*2462.00	100.3 AV			1.97 H	215	65.3	35.0
3	2483.50	73.2 PK	74.0	-0.8	1.97 H	215	38.2	35.0
4	2483.50	49.8 AV	54.0	-4.2	1.97 H	215	14.8	35.0
5	4924.00	61.6 PK	74.0	-12.4	1.73 H	168	52.1	9.5
6	4924.00	46.4 AV	54.0	-7.6	1.73 H	168	36.9	9.5

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	107.8 PK			2.13 V	104	72.8	35.0
2	*2462.00	97.5 AV			2.13 V	104	62.5	35.0
3	2483.50	71.5 PK	74.0	-2.5	2.13 V	104	36.5	35.0
4	2483.50	48.5 AV	54.0	-5.5	2.13 V	104	13.5	35.0
5	4924.00	57.3 PK	74.0	-16.7	1.95 V	226	47.8	9.5
6	4924.00	44.0 AV	54.0	-10.0	1.95 V	226	34.5	9.5

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	VHT20	Channel	CH 1 : 2412 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	73.3 PK	74.0	-0.7	1.78 H	206	38.5	34.8
2	2390.00	52.3 AV	54.0	-1.7	1.78 H	206	17.5	34.8
3	*2412.00	109.6 PK			1.78 H	206	74.8	34.8
4	*2412.00	99.4 AV			1.78 H	206	64.6	34.8
5	4824.00	61.6 PK	74.0	-12.4	1.76 H	173	52.3	9.3
6	4824.00	46.0 AV	54.0	-8.0	1.76 H	173	36.7	9.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	72.7 PK	74.0	-1.3	1.27 V	114	37.9	34.8
2	2390.00	51.8 AV	54.0	-2.2	1.27 V	114	17.0	34.8
3	*2412.00	108.7 PK			1.27 V	114	73.9	34.8
4	*2412.00	98.6 AV			1.27 V	114	63.8	34.8
5	4824.00	56.9 PK	74.0	-17.1	1.87 V	234	47.6	9.3
6	4824.00	43.7 AV	54.0	-10.3	1.87 V	234	34.4	9.3

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	VHT20	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	112.4 PK			1.68 H	207	77.6	34.8
2	*2437.00	102.2 AV			1.68 H	207	67.4	34.8
3	4874.00	69.5 PK	74.0	-4.5	1.38 H	159	60.0	9.5
4	4874.00	53.1 AV	54.0	-0.9	1.38 H	159	43.6	9.5

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	111.1 PK			1.08 V	116	76.3	34.8
2	*2437.00	100.9 AV			1.08 V	116	66.1	34.8
3	4874.00	63.1 PK	74.0	-10.9	1.39 V	284	53.6	9.5
4	4874.00	49.2 AV	54.0	-4.8	1.39 V	284	39.7	9.5

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	VHT20	Channel	CH 11 : 2462 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	109.1 PK			1.59 H	208	74.1	35.0
2	*2462.00	99.1 AV			1.59 H	208	64.1	35.0
3	2483.50	73.4 PK	74.0	-0.6	1.59 H	208	38.4	35.0
4	2483.50	49.9 AV	54.0	-4.1	1.59 H	208	14.9	35.0
5	4924.00	61.7 PK	74.0	-12.3	2.46 H	152	52.2	9.5
6	4924.00	45.9 AV	54.0	-8.1	2.46 H	152	36.4	9.5

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	108.0 PK			1.51 V	97	73.0	35.0
2	*2462.00	97.7 AV			1.51 V	97	62.7	35.0
3	2483.50	72.1 PK	74.0	-1.9	1.51 V	97	37.1	35.0
4	2483.50	49.8 AV	54.0	-4.2	1.51 V	97	14.8	35.0
5	4924.00	56.9 PK	74.0	-17.1	2.26 V	189	47.4	9.5
6	4924.00	44.1 AV	54.0	-9.9	2.26 V	189	34.6	9.5

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	VHT40	Channel	CH 3 : 2422 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=510 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

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	72.0 PK	74.0	-2.0	1.45 H	202	37.2	34.8
2	2390.00	53.6 AV	54.0	-0.4	1.45 H	202	18.8	34.8
3	*2422.00	105.7 PK			1.45 H	202	70.9	34.8
4	*2422.00	94.8 AV			1.45 H	202	60.0	34.8
5	4844.00	54.0 PK	74.0	-20.0	2.54 H	163	44.7	9.3
6	4844.00	40.9 AV	54.0	-13.1	2.54 H	163	31.6	9.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	71.9 PK	74.0	-2.1	1.32 V	102	37.1	34.8
2	2390.00	53.4 AV	54.0	-0.6	1.32 V	102	18.6	34.8
3	*2422.00	103.3 PK			1.32 V	102	68.5	34.8
4	*2422.00	93.2 AV			1.32 V	102	58.4	34.8
5	4844.00	52.8 PK	74.0	-21.2	3.14 V	227	43.5	9.3
6	4844.00	39.6 AV	54.0	-14.4	3.14 V	227	30.3	9.3

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	VHT40	Channel	CH 6 : 2437 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=510 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	73.1 PK	74.0	-0.9	1.79 H	204	38.3	34.8
2	2390.00	53.1 AV	54.0	-0.9	1.79 H	204	18.3	34.8
3	*2437.00	108.4 PK			1.79 H	204	73.6	34.8
4	*2437.00	98.2 AV			1.79 H	204	63.4	34.8
5	2483.50	71.5 PK	74.0	-2.5	1.79 H	204	36.5	35.0
6	2483.50	50.3 AV	54.0	-3.7	1.79 H	204	15.3	35.0
7	4874.00	64.5 PK	74.0	-9.5	1.42 H	158	55.0	9.5
8	4874.00	49.8 AV	54.0	-4.2	1.42 H	158	40.3	9.5

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	71.5 PK	74.0	-2.5	1.28 V	93	36.7	34.8
2	2390.00	53.2 AV	54.0	-0.8	1.28 V	93	18.4	34.8
3	*2437.00	106.5 PK			1.28 V	93	71.7	34.8
4	*2437.00	96.2 AV			1.28 V	93	61.4	34.8
5	2483.50	71.7 PK	74.0	-2.3	1.28 V	93	36.7	35.0
6	2483.50	50.5 AV	54.0	-3.5	1.28 V	93	15.5	35.0
7	4874.00	64.1 PK	74.0	-9.9	2.56 V	197	54.6	9.5
8	4874.00	49.0 AV	54.0	-5.0	2.56 V	197	39.5	9.5

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	VHT40	Channel	CH 9 : 2452 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=510 Hz, DET=Peak
Input Power	12Vdc	Environmental Conditions	23.4°C, 68.2% RH
Tested By	Vincent Chen		

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	106.4 PK			1.56 H	203	71.3	35.1
2	*2452.00	96.3 AV			1.56 H	203	61.2	35.1
3	2483.50	73.7 PK	74.0	-0.3	1.56 H	203	38.7	35.0
4	2483.50	53.1 AV	54.0	-0.9	1.56 H	203	18.1	35.0
5	4904.00	60.8 PK	74.0	-13.2	1.47 H	148	51.3	9.5
6	4904.00	47.1 AV	54.0	-6.9	1.47 H	148	37.6	9.5

Antenna Polarity & Test Distance : Vertical at 3 m

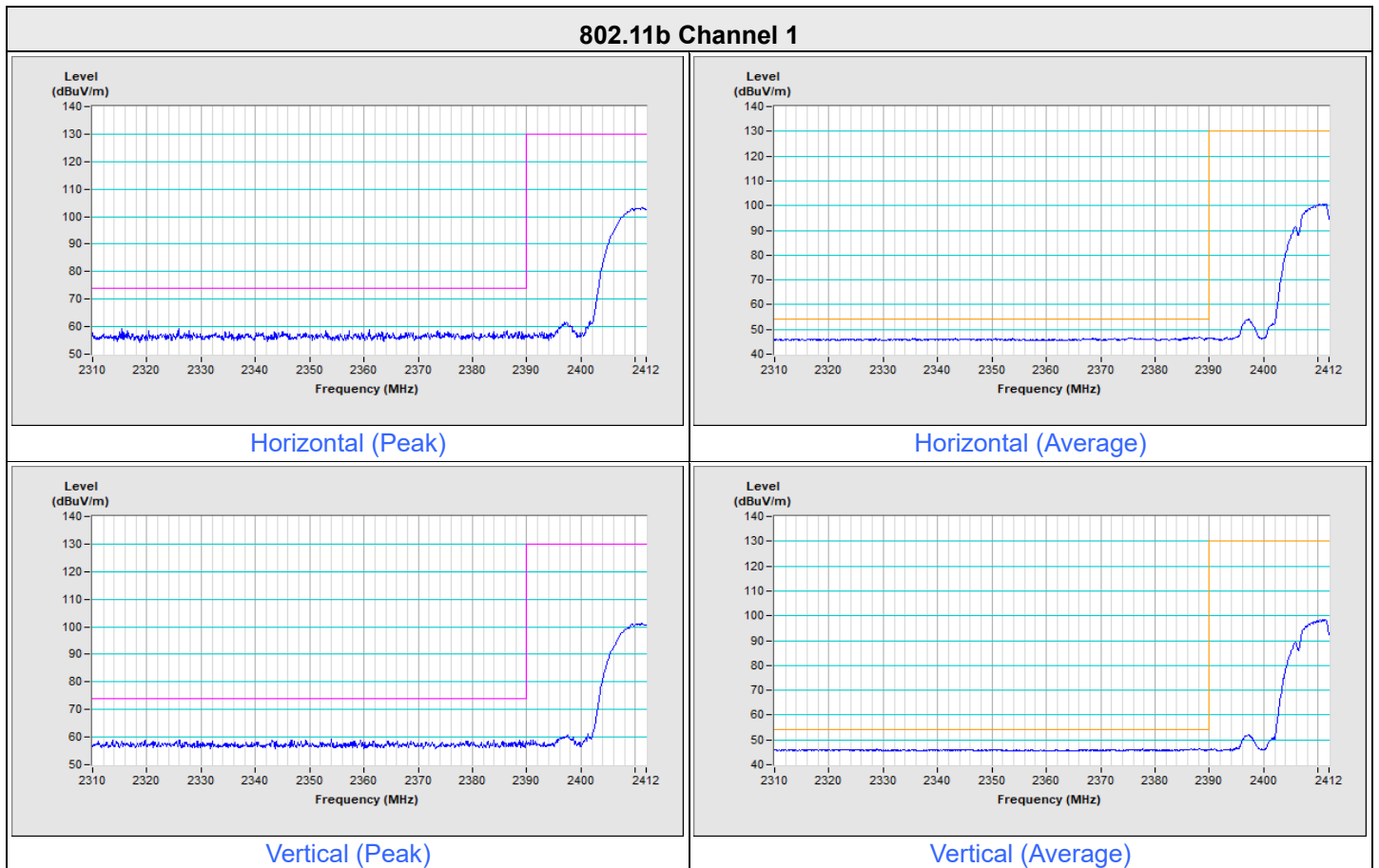
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1	*2452.00	105.6 PK			1.49 V	120	70.5	35.1
2	*2452.00	95.4 AV			1.49 V	120	60.3	35.1
3	2483.50	73.3 PK	74.0	-0.7	1.49 V	120	38.3	35.0
4	2483.50	52.2 AV	54.0	-1.8	1.49 V	120	17.2	35.0
5	4904.00	55.7 PK	74.0	-18.3	1.41 V	180	46.2	9.5
6	4904.00	43.1 AV	54.0	-10.9	1.41 V	180	33.6	9.5

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.

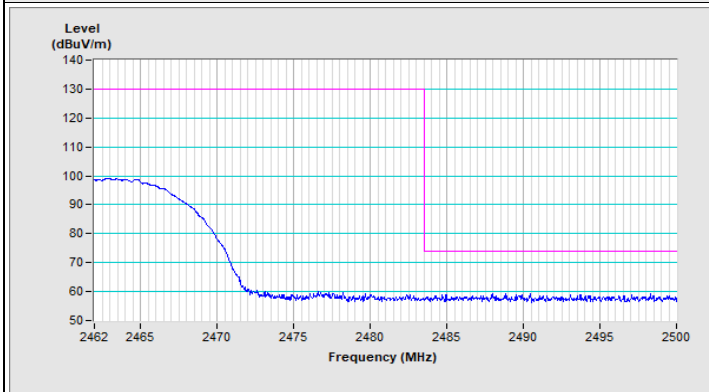
Plot of Band Edge

Frequency Range	2.31 GHz ~ 2.412 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
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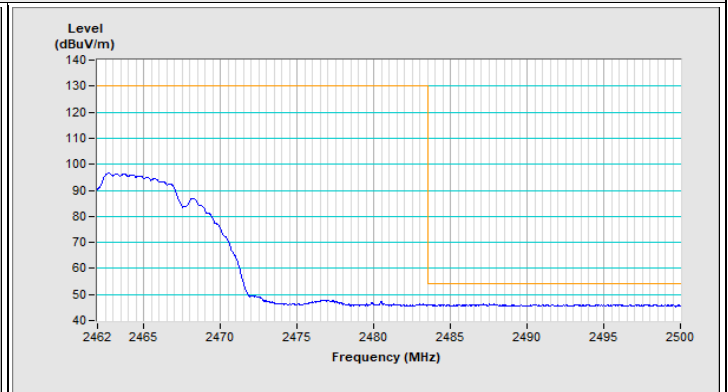


Frequency Range	2.462 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
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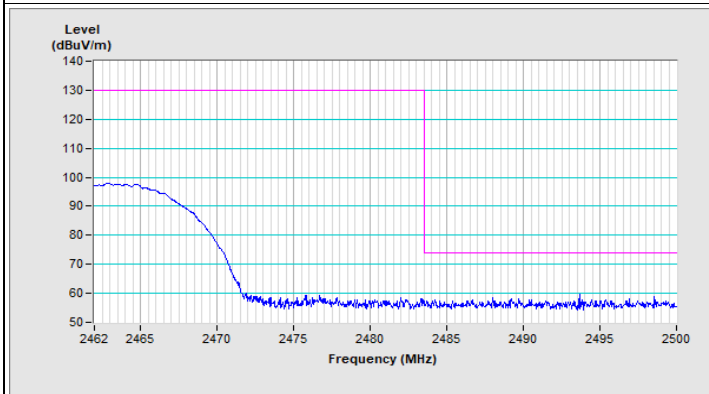
802.11b Channel 11



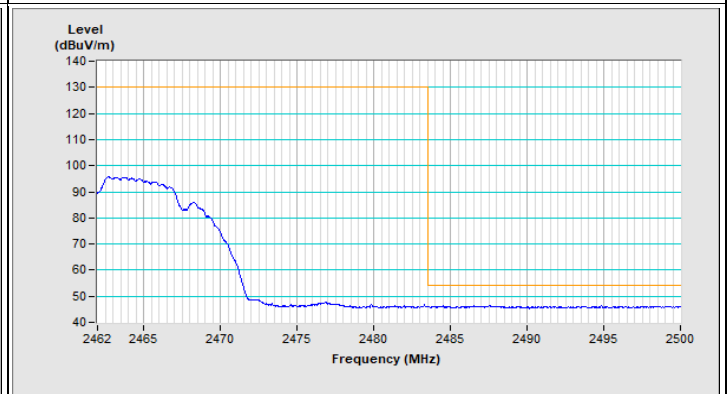
Horizontal (Peak)



Horizontal (Average)



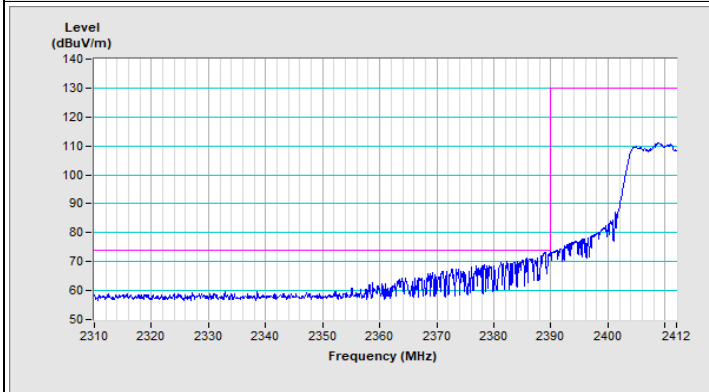
Vertical (Peak)



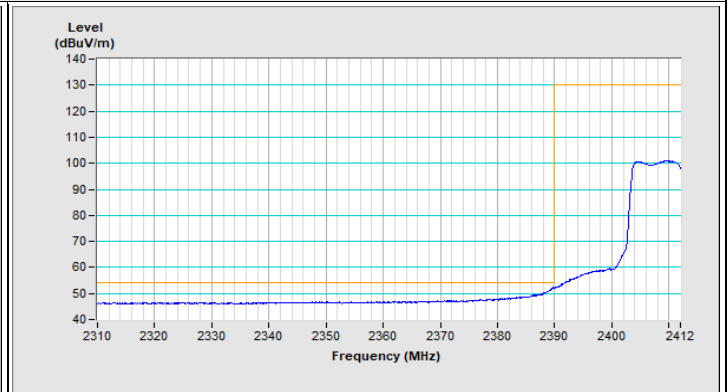
Vertical (Average)

Frequency Range	2.31 GHz ~ 2.412 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
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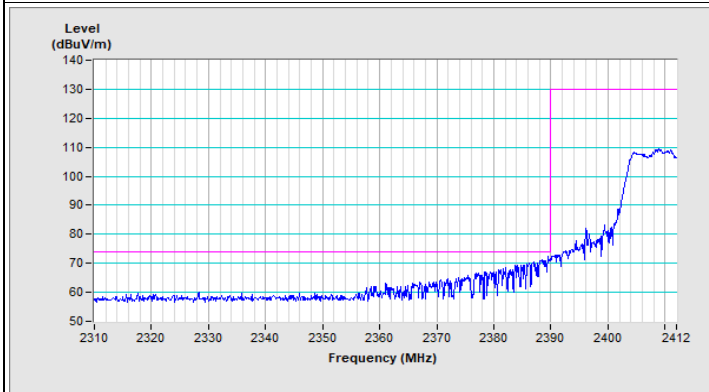
802.11g Channel 1



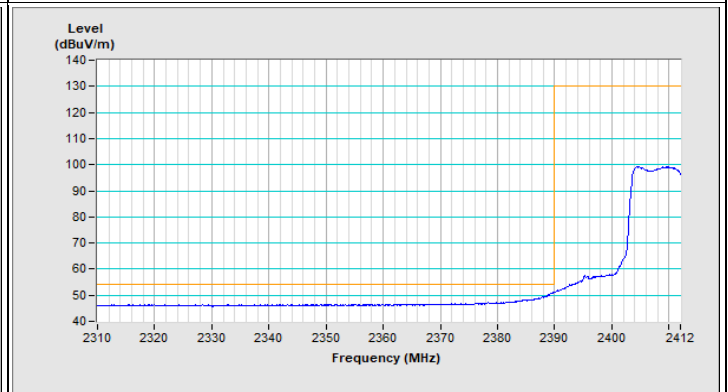
Horizontal (Peak)



Horizontal (Average)



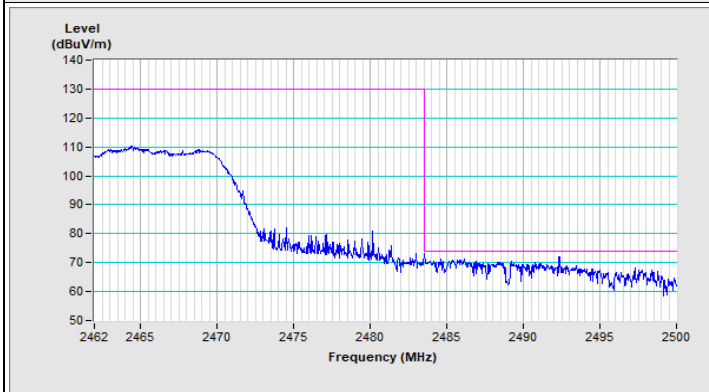
Vertical (Peak)



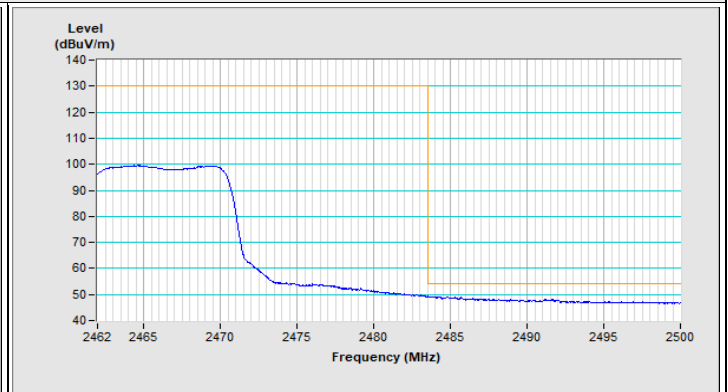
Vertical (Average)

Frequency Range	2.462 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
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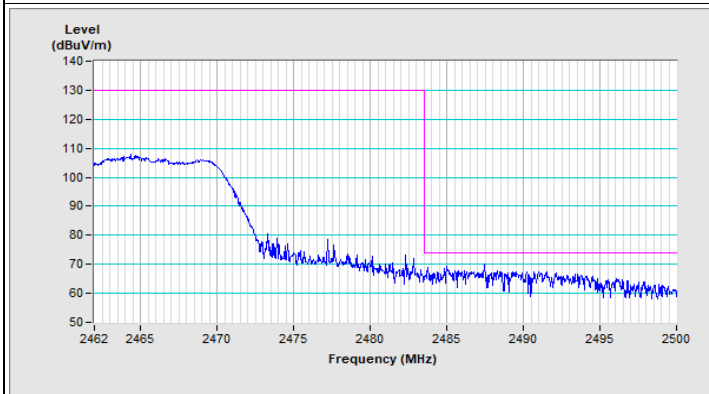
802.11g Channel 11



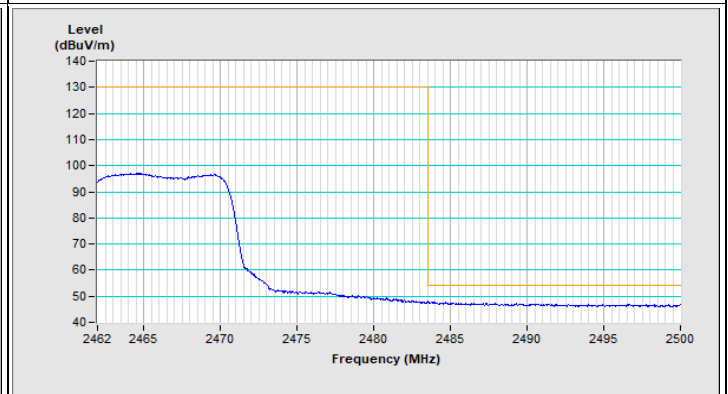
Horizontal (Peak)



Horizontal (Average)



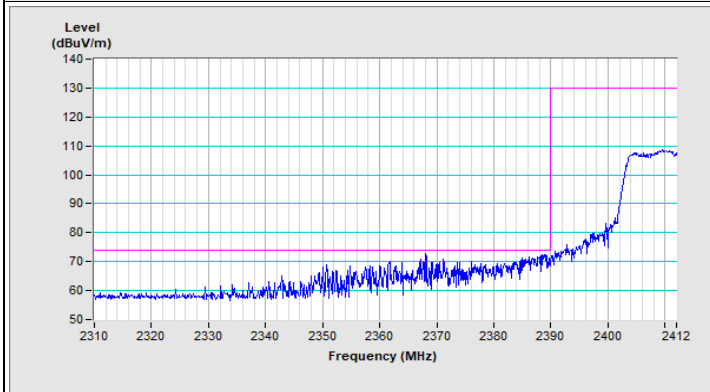
Vertical (Peak)



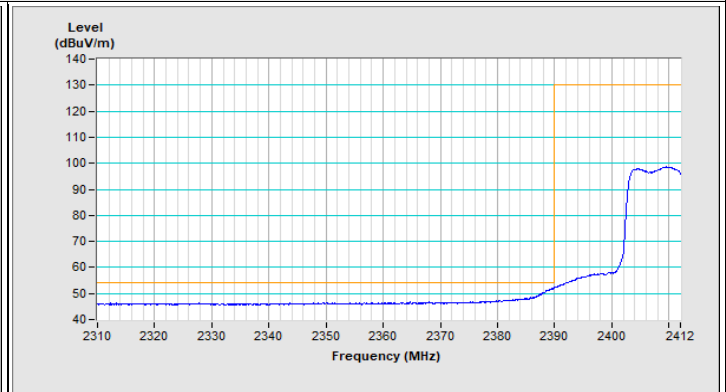
Vertical (Average)

Frequency Range	2.31 GHz ~ 2.412 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=510 Hz, DET=Peak
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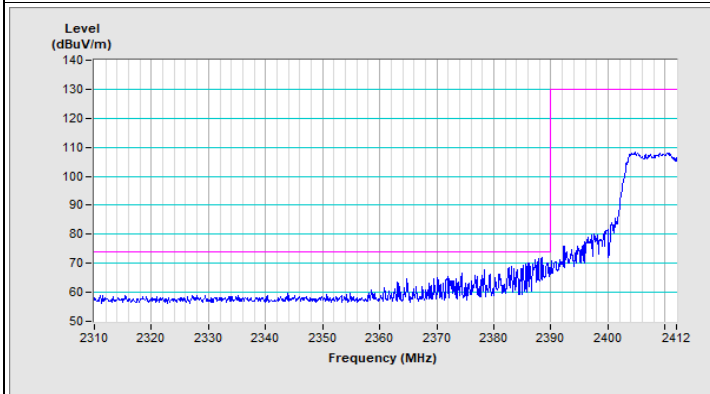
VHT20 Channel 1



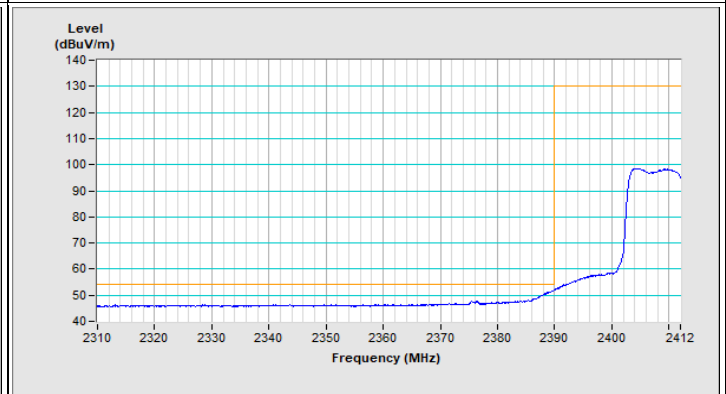
Horizontal (Peak)



Horizontal (Average)



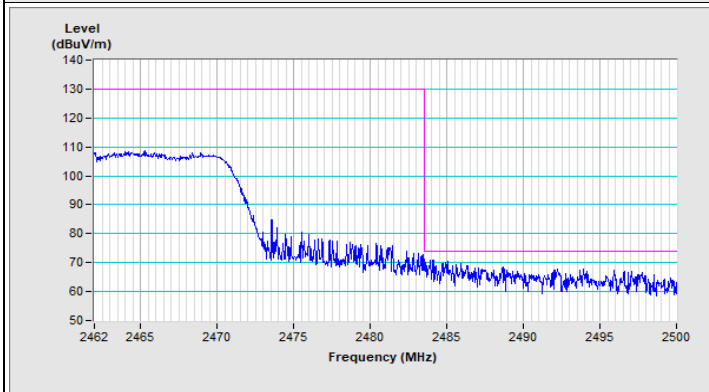
Vertical (Peak)



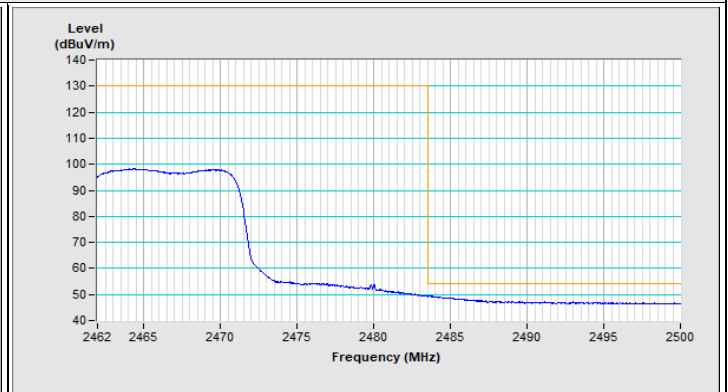
Vertical (Average)

Frequency Range	2.462 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=510 Hz, DET=Peak
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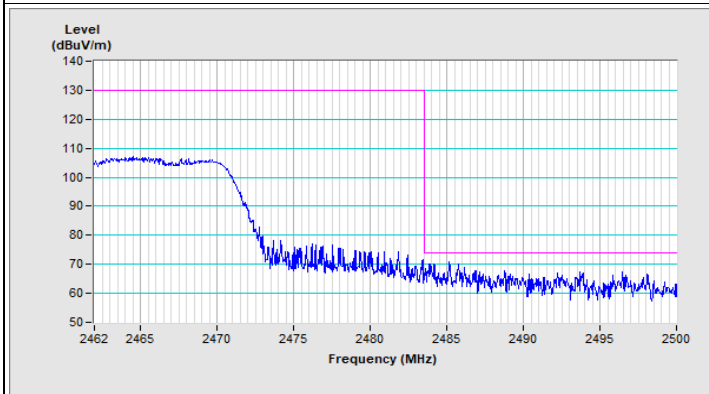
VHT20 Channel 11



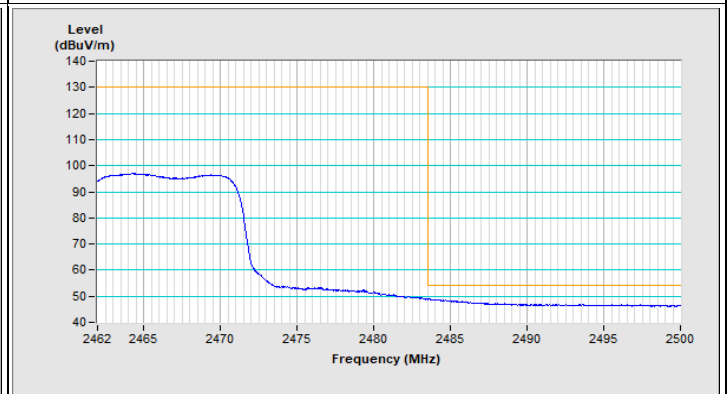
Horizontal (Peak)



Horizontal (Average)



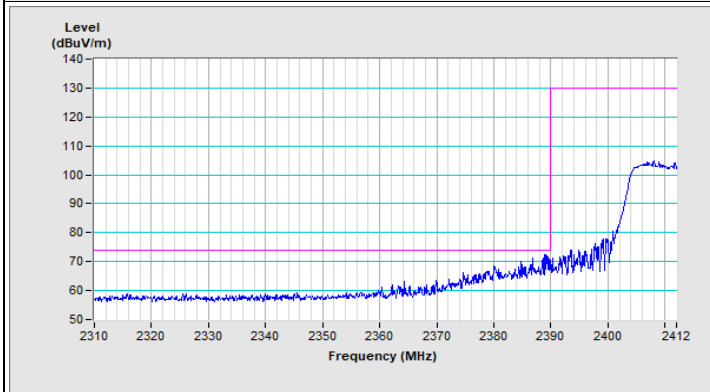
Vertical (Peak)



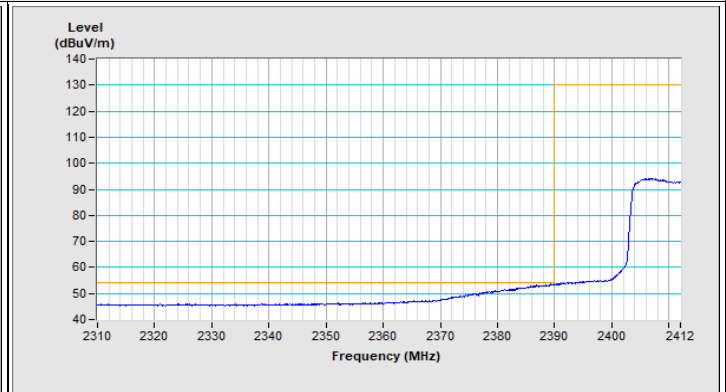
Vertical (Average)

Frequency Range	2.462 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=510 Hz, DET=Peak
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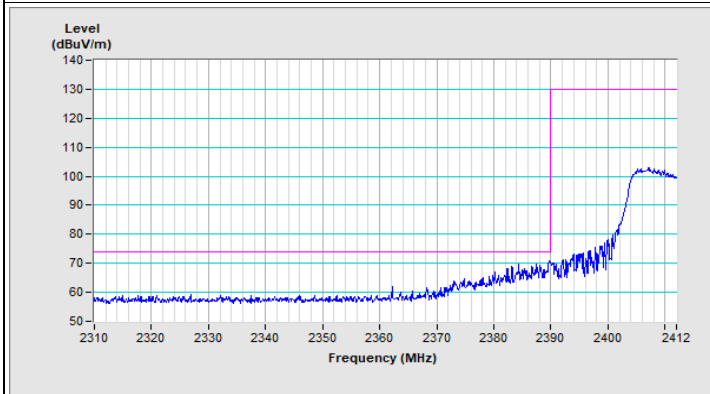
VHT40 Channel 3



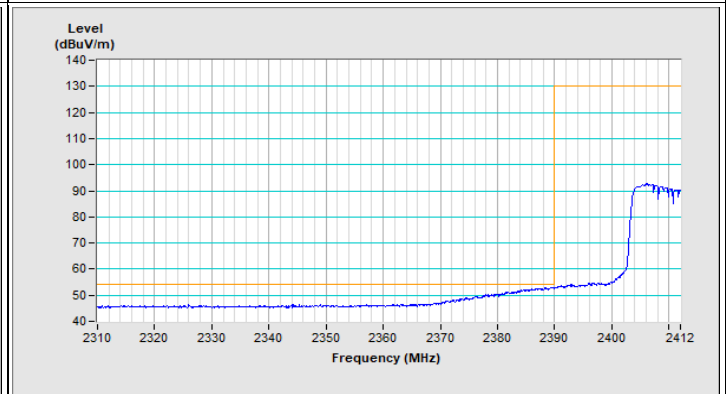
Horizontal (Peak)



Horizontal (Average)

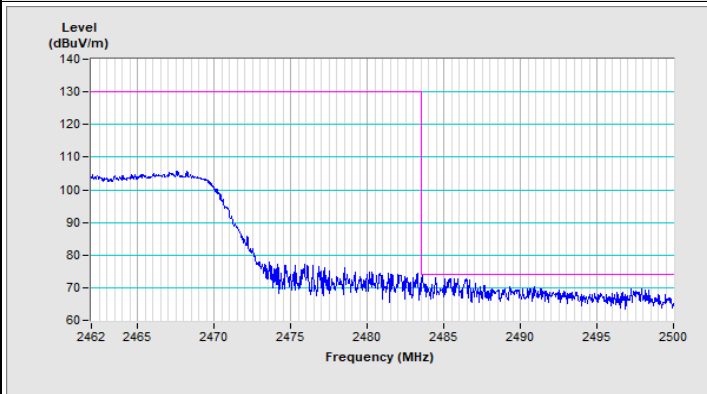


Vertical (Peak)

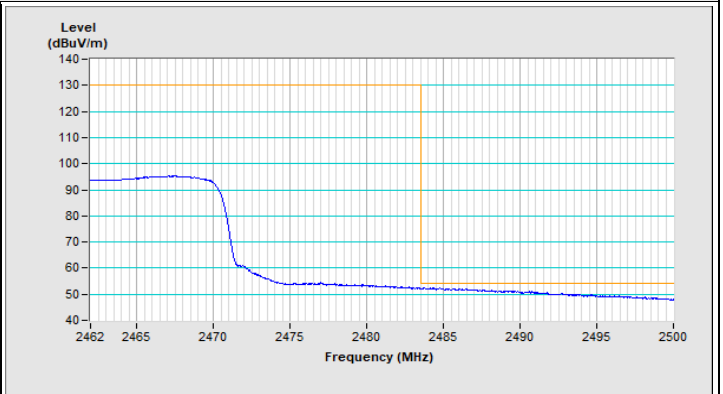


Vertical (Average)

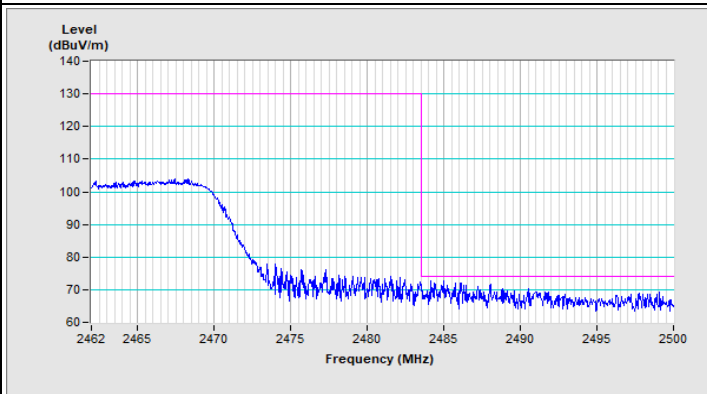
VHT40 Channel 9



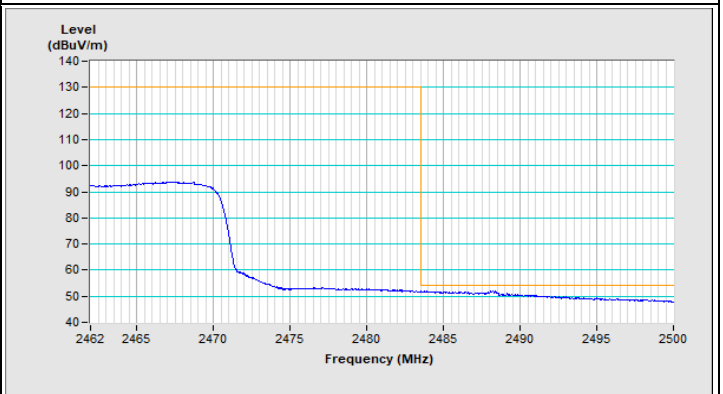
Horizontal (Peak)



Horizontal (Average)



Vertical (Peak)



Vertical (Average)

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)



9 Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

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

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