

FCC Test Report

Report No.: RFCCOG-WTW-P22060455

FCC ID: 2AH7L-UPSA

Test Model: PAS800, PAS800L, PAS800P (Refer to item 3.1 for more details)

Received Date: Jun. 15, 2022

Test Date: Sep. 08, 2022

Issued Date: Oct. 26, 2023

Applicant: Schneider Electric Industries SAS

Address: Electropole Site - 38EQ1, 31 rue Pierre Mendes France, Eybens - 38050
Grenoble cedex 9

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



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Release Control Record

Issue No.	Description	Date Issued
RFCCOG-WTW-P22060455	Original Release	Oct. 26, 2023

1 Certificate of Conformity

Product: EcoStruxure™ Panel Server Advanced

Brand: Schneider Electric

Test Model: PAS800, PAS800L, PAS800P (Refer to item 3.1 for more details)

Sample Status: Engineering sample

Applicant: Schneider Electric Industries SAS

Test Date: Sep. 08, 2022

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

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

Prepared by : Vera Huang , Date: Oct. 26, 2023
Vera Huang / Specialist

Approved by : Jeremy Lin , Date: Oct. 26, 2023
Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	N/A	Refer to Note 1
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	N/A	Refer to Note 1
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Internal Antenna: No antenna connector is used. External Antenna: Antenna connector is RP-SMA not a standard connector.

Note:

1. Only antenna port conducted measurement tests were performed for this addendum. Refer to original report for other test data.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	EcoStruxure™ Panel Server Advanced
Brand	Schneider Electric
Test Model	PAS800, PAS800L, PAS800P
Model Difference	Refer to note
Sample Status	Engineering sample
Power Supply rating	PAS800: 110 to 277Vac/dc +/-10%, 50-60Hz(+/-5Hz) < 3.5W/12VA , -25°C to 70°C PAS800L: 24Vdc +/-10% , 145 mA , < 3.5W, -25°C to 70°C PAS800P: POE(PD) - Class 0, 37Vdc to 57Vdc, < 3.5 W, 48Vdc (Typical), 72 mA, -25°C to 70°C
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 150Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	0.811mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	External Antenna (Brand: Schneider Electric, Model: PASA-ANT1)
Cable Supplied	NA

Note:

- This report is prepared for FCC class II permissive change. The difference compared with the original report (BV CPS report no.: RFBHBQ-WTW-P21080521) are listed as below. The output power is lowered via firmware/software settings only (and cannot be changed by end-user / any other third parties. Therefore, only antenna port conducted measurement tests were verified and recorded in this report.
 - Reducing power setting
 - Changing internal antenna gain
 - Changing 5G antenna gain of external antenna

2. All models are listed as below.

Brand	Model	Difference
Schneider Electric	PAS800	All three models are similar in construction and functioning except the mode of powering. PAS800: powered by 110V-277Vac/dc PAS800L: powered by 24Vdc source PAS800P: Powered Over Ethernet.
	PAS800L	
	PAS800P	

3. The EUT provide 1 completed transmitter and 1 receiver.

Modulation Mode	TX Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

4. The following antennas were provided to the EUT.

Internal Antenna

No.	Antenna Type	Brand	Model	Connector	Gain(dBi)		Remark
					2.4G	5G	
1	PCB	Schneider Electric	U31_1	NA	0.80	0.75	WLAN, BT LE
2	PCB	Schneider Electric	U7_1	NA	2.31	-	Zigbee (long cable)
3	PCB	Schneider Electric	U8_1	NA	0.91	-	Zigbee (short cable)

External Antenna

No.	Antenna Type	Brand	Model	Connector	Gain(dBi)			Remark
					2.4G	5G B1	5G B4	
1	Dipole	Schneider Electric	PASA-ANT1	RP-SMA	2.54	3.24	3.88	WLAN, BT LE, Zigbee

* Detail antenna specification please refer to antenna datasheet or an antenna gain measurement report.

5. The WLAN 2.4GHz, 5GHz, Zigbee and BT of the device can transmit simultaneously but not WLAN 2.4GHz and 5GHz at the same time.

6. Spurious emission of the simultaneous operation (WLAN 2.4GHz, 5GHz, Zigbee and BT) has been evaluated and no non-compliance was found.

3.2 Description of Test Modes

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

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

7 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Antenna	Description
	RE $\geq$ 1G	RE<1G	PLC	APCM		
-	-	-	-	√	Internal	EUT (PAS800) + AC power

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note:

1. "-" means no effect.

2. The internal and external antenna had been pre-tested for reduced power conducted power. The worst case scenario is the internal antenna.

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Wayne Lin

3.3 Duty Cycle of Test Signal

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

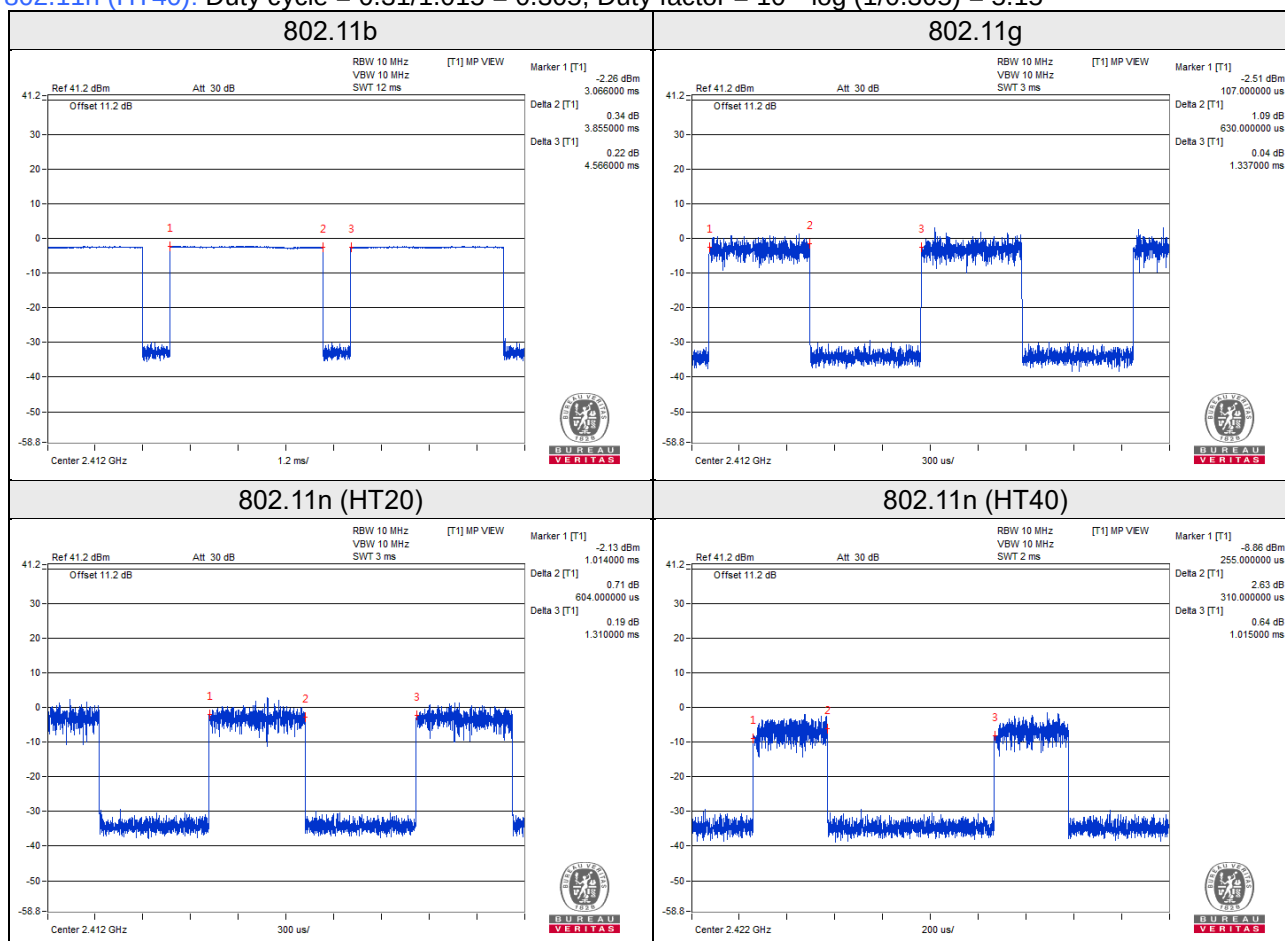
Duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = $3.855/4.566 = 0.844$, Duty factor = $10 * \log(1/0.844) = 0.74$

802.11g: Duty cycle = $0.63/1.337 = 0.471$, Duty factor = $10 * \log(1/0.471) = 3.27$

802.11n (HT20): Duty cycle = $0.604/1.31 = 0.461$, Duty factor = $10 * \log(1/0.461) = 3.36$

802.11n (HT40): Duty cycle = $0.31/1.015 = 0.305$, Duty factor = $10 * \log(1/0.305) = 5.15$



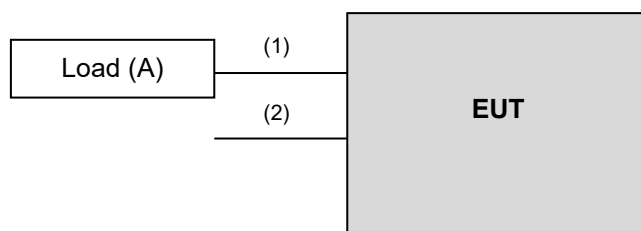
3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Load	NA	NA	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN	2	1.5	N	0	RJ45, Cat5e
2.	AC cable	1	30	Y	0	Provided by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

ANSI C63.10-2020

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

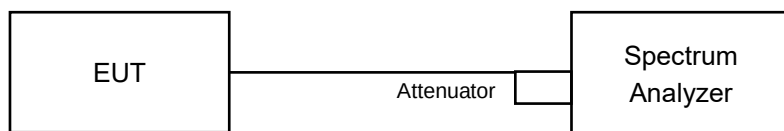
4 Test Types and Results

4.1 6dB Bandwidth Measurement

4.1.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.1.2 Test Setup



4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100980	Apr. 20, 2022	Apr. 19, 2023
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 18, 2022	Jan. 17, 2023
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 17, 2022	Jan. 16, 2023

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

4.1.4 Test Procedure

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

4.1.5 Deviation from Test Standard

No deviation.

4.1.6 EUT Operating Conditions

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

4.1.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.07	0.5	Pass
6	2437	10.06	0.5	Pass
11	2462	10.09	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.08	0.5	Pass
6	2437	15.17	0.5	Pass
11	2462	15.14	0.5	Pass

802.11n (HT20)

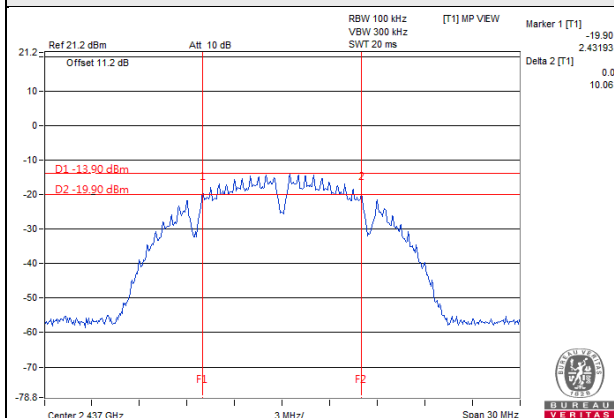
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.16	0.5	Pass
6	2437	15.15	0.5	Pass
11	2462	15.18	0.5	Pass

802.11n (HT40)

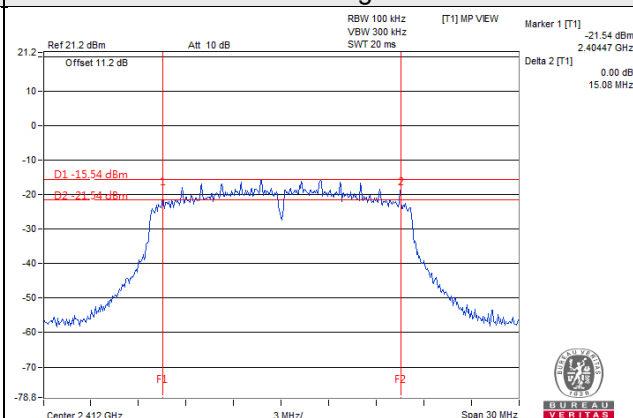
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	33.88	0.5	Pass
6	2437	35.08	0.5	Pass
9	2452	35.13	0.5	Pass

Spectrum Plot of Worst Value

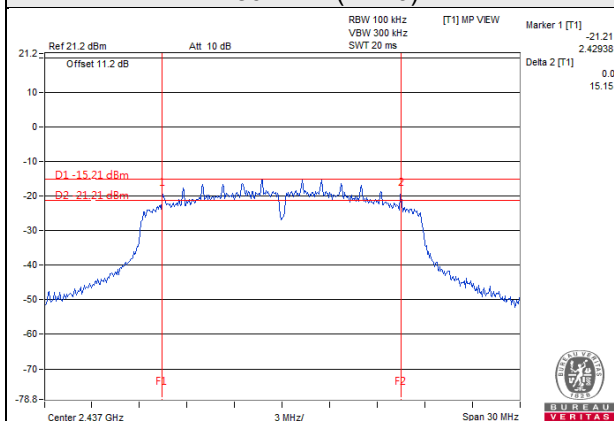
802.11b



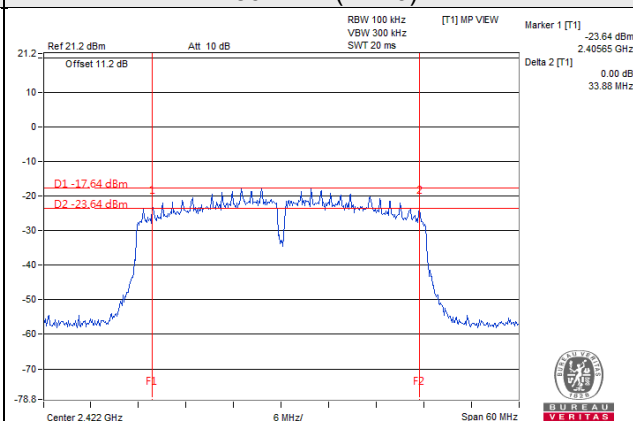
802.11g



802.11n (HT20)



802.11n (HT40)

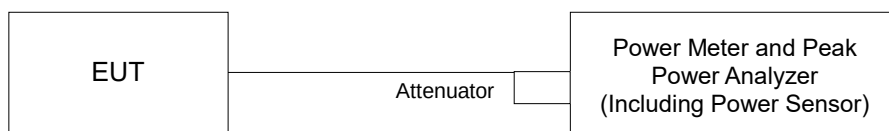


4.2 Conducted Output Power Measurement

4.2.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.2.4 Test Procedures

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

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

Same as item 4.1.6.

4.2.7 Test Results

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	0.5768	-2.39	30.00	Pass
6	2437	0.6067	-2.17	30.00	Pass
11	2462	0.6252	-2.04	30.00	Pass

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	0.5	-3.01	30.00	Pass
6	2437	0.5483	-2.61	30.00	Pass
11	2462	0.5546	-2.56	30.00	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	0.811	-0.91	30.00	Pass
6	2437	0.5284	-2.77	30.00	Pass
11	2462	0.542	-2.66	30.00	Pass

802.11n (HT40)

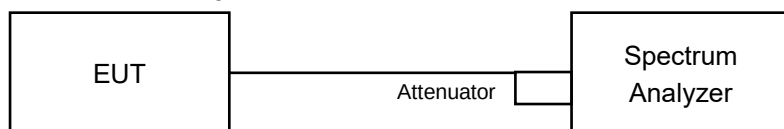
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	0.2421	-6.16	30.00	Pass
6	2437	0.2323	-6.34	30.00	Pass
9	2452	0.25	-6.02	30.00	Pass

4.3 Power Spectral Density Measurement

4.3.1 Limits of Power Spectral Density Measurement

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.3.4 Test Procedure

For Average Power (Duty cycle < 98%)

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

Same as item 4.1.6

4.3.7 Test Results

802.11b

Channel	Frequency (MHz)	PSD W/O Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-36	0.74	-35.27	8.00	Pass
6	2437	-35.78	0.74	-35.04	8.00	Pass
11	2462	-35.61	0.74	-34.87	8.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11g

Channel	Frequency (MHz)	PSD W/O Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-40.23	3.27	-36.96	8.00	Pass
6	2437	-39.83	3.27	-36.56	8.00	Pass
11	2462	-39.72	3.27	-36.45	8.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Channel	Frequency (MHz)	PSD W/O Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-40.14	3.36	-36.78	8.00	Pass
6	2437	-42.04	3.36	-38.68	8.00	Pass
11	2462	-41.92	3.36	-38.56	8.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

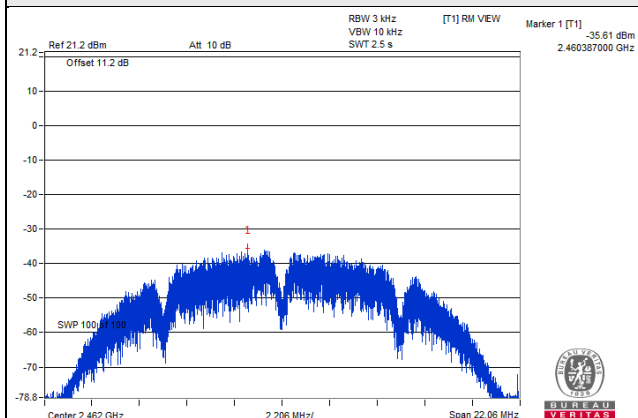
802.11n (HT40)

Channel	Frequency (MHz)	PSD W/O Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
3	2422	-42.3	5.15	-37.15	8.00	Pass
6	2437	-42.51	5.15	-37.36	8.00	Pass
9	2452	-42.16	5.15	-37.01	8.00	Pass

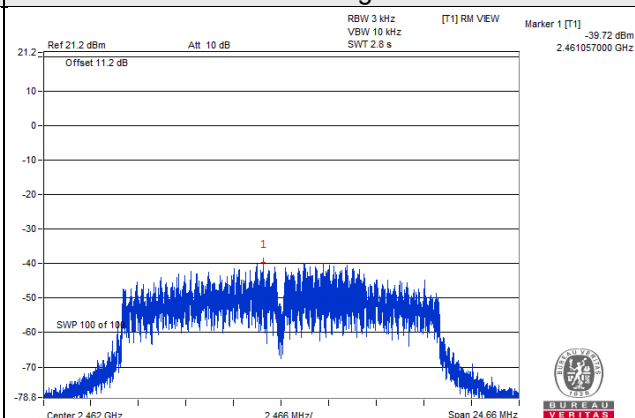
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

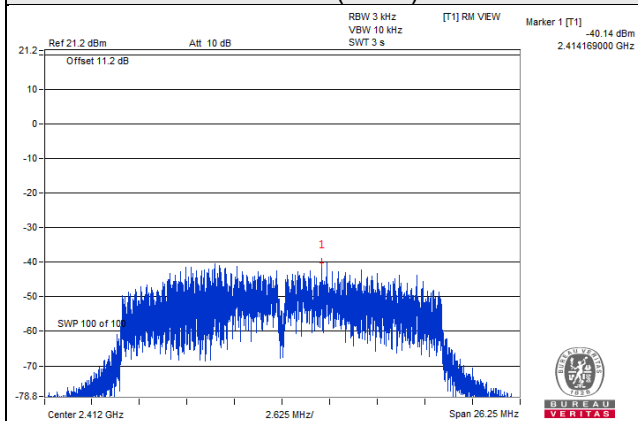
802.11b



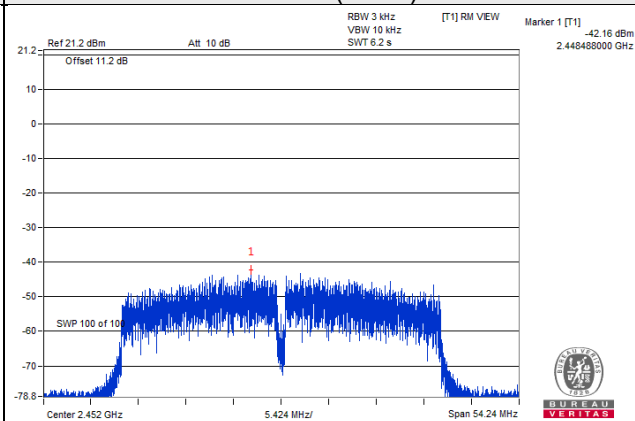
802.11g



802.11n (HT20)



802.11n (HT40)

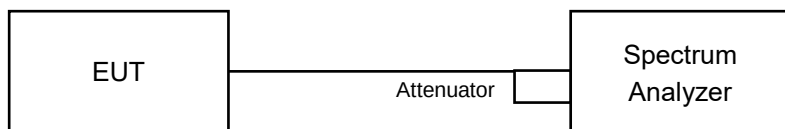


4.4 Conducted Out of Band Emission Measurement

4.4.1 Limits of Conducted Out of Band Emission Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.4.4 Test Procedure

MEASUREMENT PROCEDURE REF

- Set the RBW = 100 kHz.
- Set the VBW $\geq$ 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 $\geq$ 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.

4.4.5 Deviation from Test Standard

No deviation.

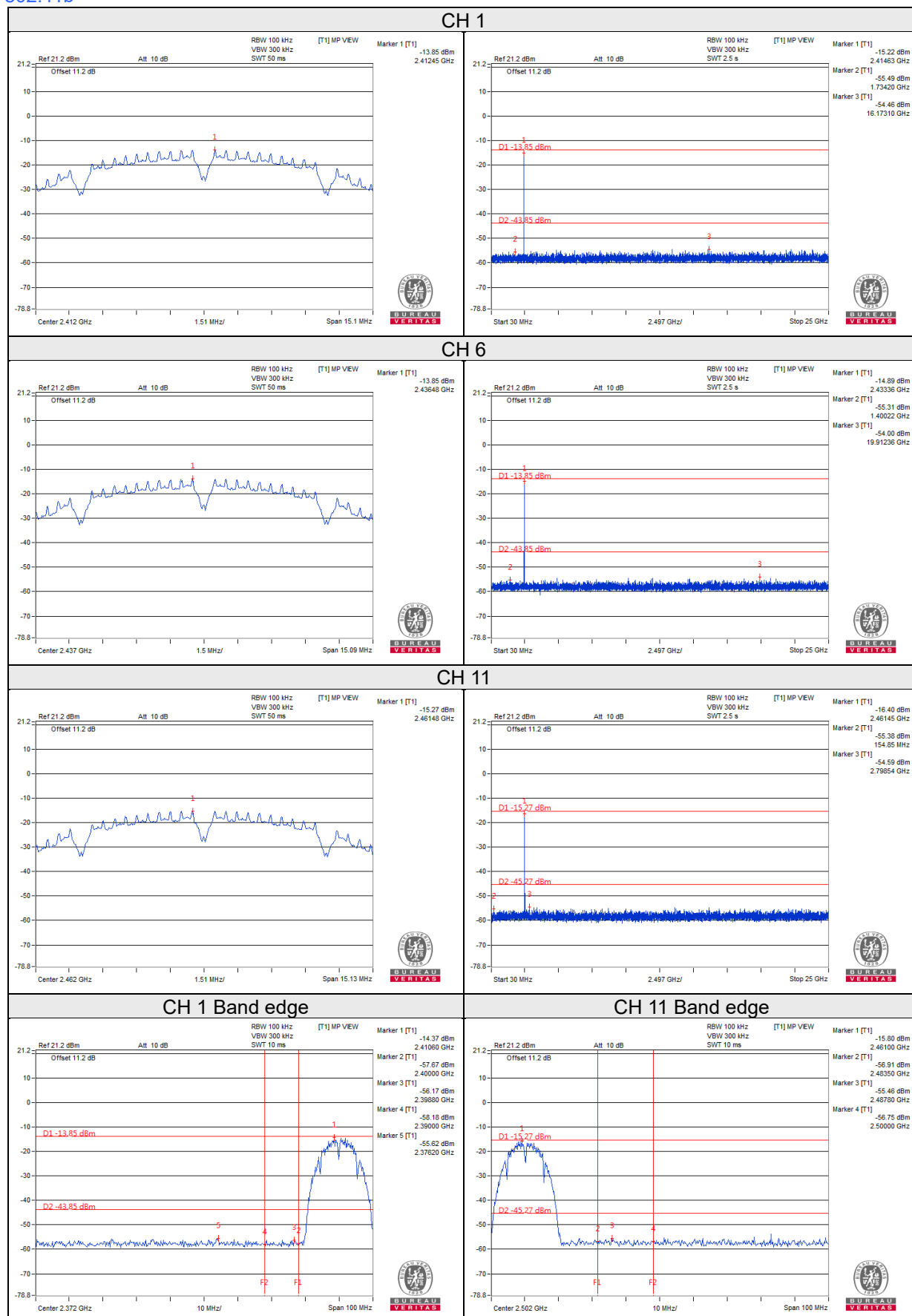
4.4.6 EUT Operating Condition

Same as item 4.1.6

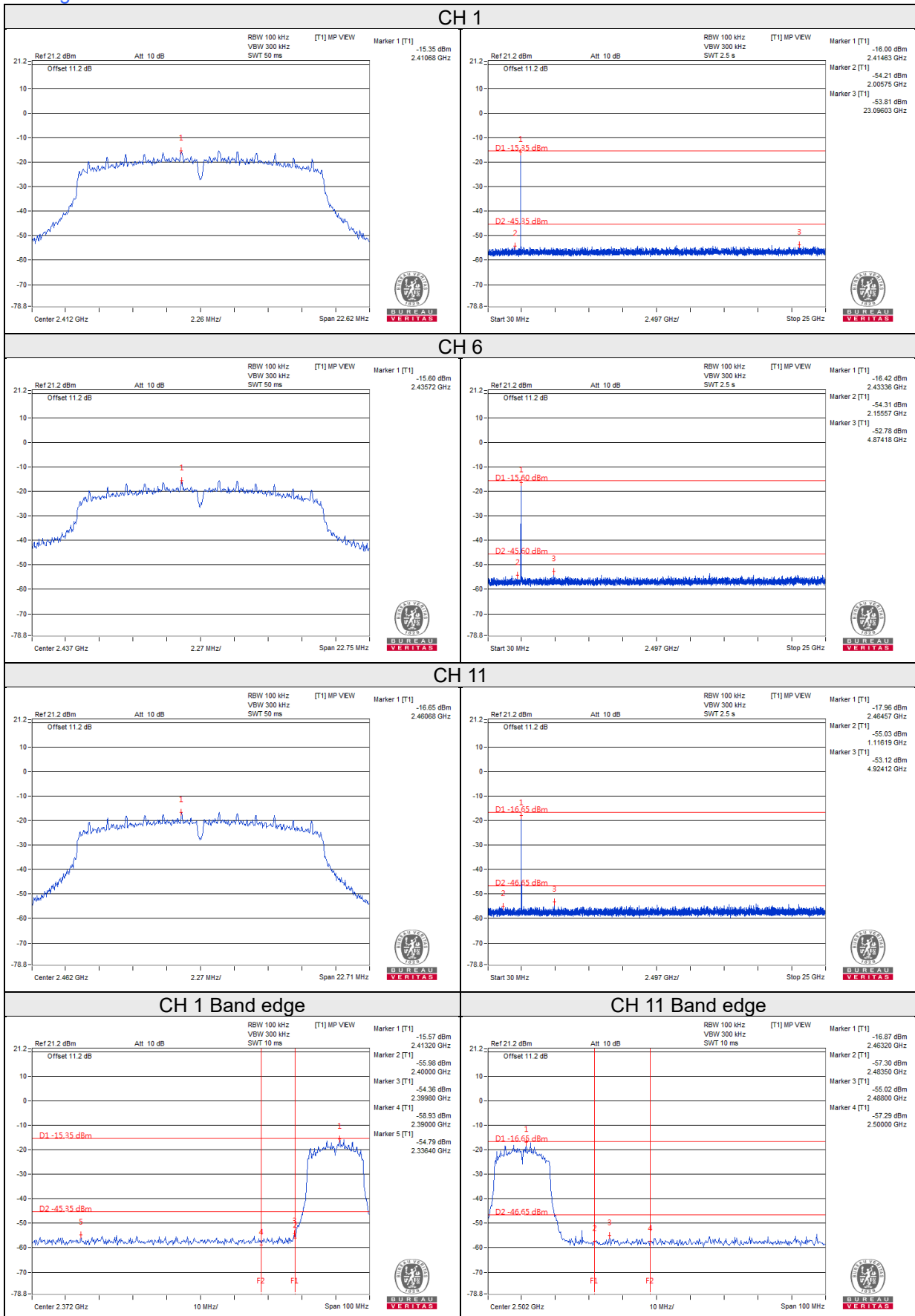
4.4.7 Test Results

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

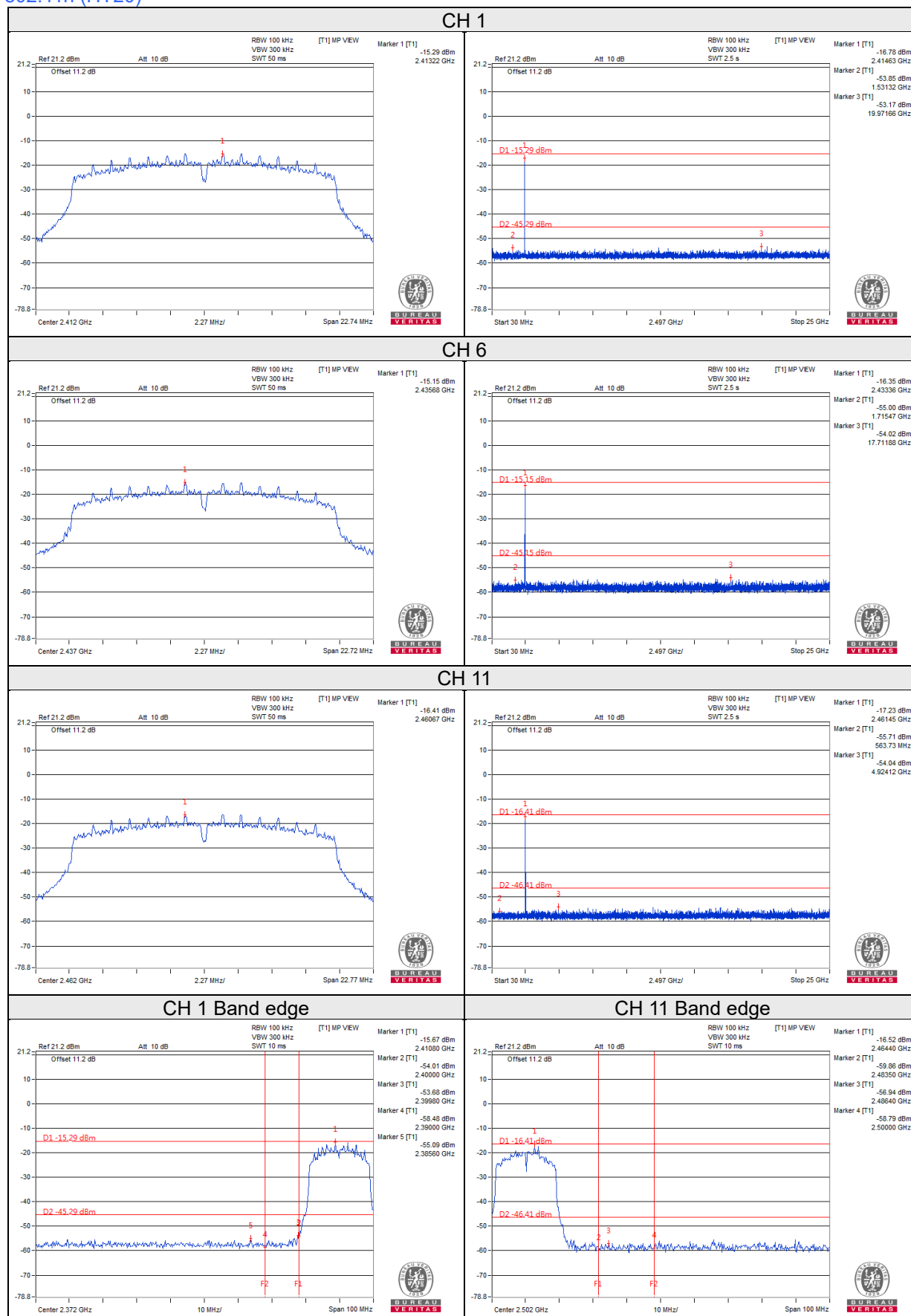
802.11b



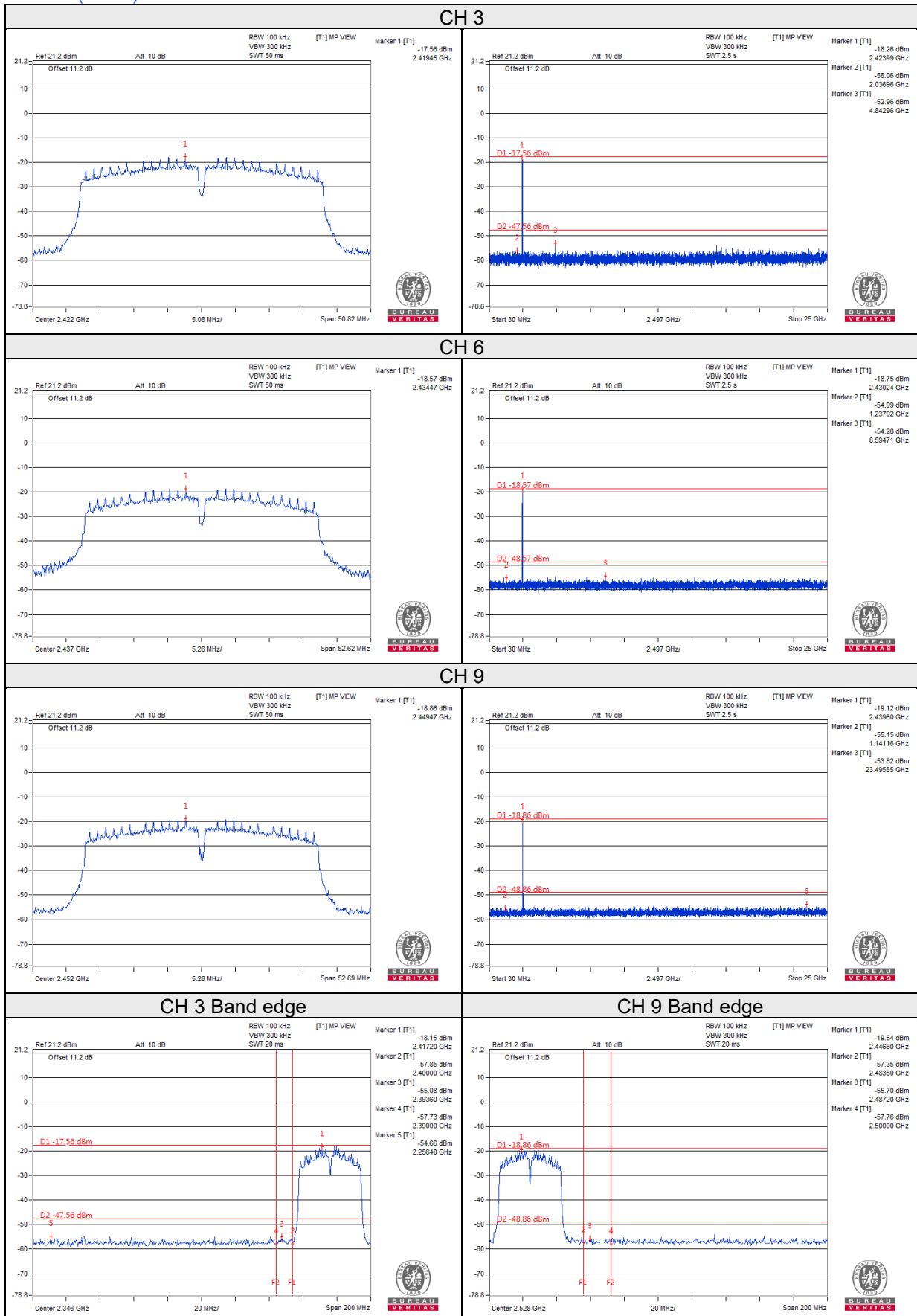
802.11g



802.11n (HT20)



802.11n (HT40)



Appendix – Information of the Testing Laboratories

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

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

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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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