

FCC Test Report (WLAN)

Report No.: RF171206E03

FCC ID: 2A0IDGRYPHON01

Test Model: Gryphon

Received Date: Dec. 06, 2017

Test Date: Dec. 22, 2017 to Jan. 12, 2018

Issued Date: Jan. 30, 2018

Applicant: Gryphon Online Safety, Inc.

Address: 10265 Prairie Springs Road, San Diego, California 92127, United States

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Hsin Chu Laboratory

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Taiwan R.O.C.

Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF171206E03	Original release.	Jan. 30, 2018

1 Certificate of Conformity

Product: Wireless Router

Brand: Gryphon

Test Model: Gryphon

Sample Status: ENGINEERING SAMPLE

Applicant: Gryphon Online Safety, Inc.

Test Date: Dec. 22, 2017 to Jan. 12, 2018

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 EMC characteristics under the conditions specified in this report.

Prepared by :



Date:

Jan. 30, 2018

Claire Kuan / Specialist

Approved by :



Date:

Jan. 30, 2018

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -8.09dB at 0.31797MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2383.50MHz, 2386.50MHz, 2390.00MHz.
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	Antenna connector is i-pex(MHF) not a standard connector.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.30 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	5.16 dB
	6GHz ~ 18GHz	4.91 dB
	18GHz ~ 40GHz	5.30 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	Wireless Router
Brand	Gryphon
Test Model	Gryphon
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	2.4GHz: 2.412 ~ 2.462GHz 5GHz: 5.18~ 5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	2.4GHz: CDD Mode: 565.458mW Beamforming Mode: 547.294mW 5GHz: CDD Mode: 5.18 ~ 5.24GHz: 457.937mW 5.745 ~ 5.825GHz: 875.673mW Beamforming Mode: 5.18 ~ 5.24GHz: 445.887mW 5.745 ~ 5.825GHz: 336.034mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x 1
Data Cable Supplied	Ethernet Cable x 1 (Unshielded, 1m)

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	WLAN (5GHz)
2	WLAN (5GHz)	Buletooth

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

2. The EUT power needs to be supplied from one power adapter, the information is as below table:

Brand	Model No.	Spec.
Asian Power Devices Inc.	WA-36L12FU	Input: 200-240Vac, 0.6A, 50/60Hz Output: 12V, 2.0A DC cable: 1.8m, unshielded

3. The Chip of EUT as following table:

Technology	Chip Model	TX & RX Configuration
2.4GHz	IPQ-4019	2T2R
5GHz (UNII 1)		
5GHz (UNII 3)	QCA9984	4T4R

4. The antennas provided to the EUT, please refer to the following table:

WLAN Antenna Spec.

Antenna No.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	*Cable Length (mm)
1	3.9	5.47~5.85GHz	PCB	i-pex(MHF)	235
2	4.17	5.47~5.85GHz	PCB	i-pex(MHF)	195
3	5.04	5.47~5.85GHz	PCB	i-pex(MHF)	160
4	5.62	5.47~5.85GHz	PCB	i-pex(MHF)	175
5	2.55	2.4~2.4835GHz	PCB	i-pex(MHF)	75
	5.49	5.15~5.35GHz			
6	3.14	2.4~2.4835GHz	PCB	i-pex(MHF)	60
	5.2	5.15~5.35GHz			

Buletooth Antenna Spec.

Antenna No.	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	*Cable Length (mm)
7	1.96	2.4~2.4835GHz	-	-	-

5. The EUT incorporates a MIMO function.

2.4GHz Band			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
VHT20	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
VHT40	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
5GHz Band (UNII 1)			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS0~8 Nss=1	2TX	2RX
	MCS0~8 Nss=2	2TX	2RX
802.11ac (VHT40)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
802.11ac (VHT80)	MCS0~9 Nss=1	2TX	2RX
	MCS0~9 Nss=2	2TX	2RX
5GHz Band (UNII 3)			
MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	4TX	4RX
802.11n (HT20)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
802.11n (HT40)	MCS 0~7	4TX	4RX
	MCS 8~15	4TX	4RX
802.11ac (VHT20)	MCS0~8 Nss=1	4TX	4RX
	MCS0~8 Nss=2	4TX	4RX
802.11ac (VHT40)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX
802.11ac (VHT80)	MCS0~9 Nss=1	4TX	4RX
	MCS0~9 Nss=2	4TX	4RX

Note:

1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

6. 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 Description of Test Modes

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

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), VHT40:

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				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
1	√	√	√	√	-

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: “-” means no effect.

Radiated Emission Test (Above 1GHz):

- ☒ 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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

- ☒ 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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

Power Line Conducted Emission Test:

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

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	6	DSSS	DBPSK	1

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.

CDD Mode					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 2, 6, 10, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
Beamforming Mode (output power only)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	1, 2, 6, 10, 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	TESTED BY
RE $\geq$ 1G	23deg. C, 69%RH	120Vac, 60Hz	Eason Tseng
RE $<$ 1G	25deg. C, 69%RH	120Vac, 60Hz	Andy Ho
PLC	24deg. C, 73%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 65%RH	120Vac, 60Hz	Anderson Chen

3.3 Duty Cycle of Test Signal

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

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

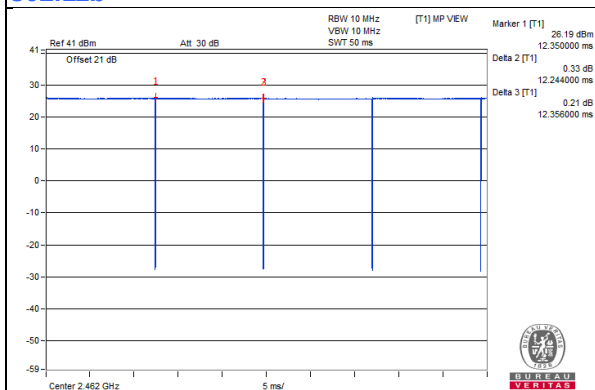
802.11b: Duty cycle = $12.244/12.356 = 0.991$

802.11g: Duty cycle = $2.025/2.11 = 0.96$

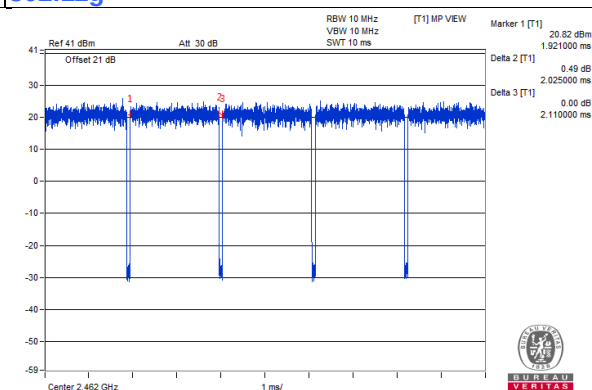
802.11n (HT20): Duty cycle = $4.958/5.048 = 0.982$

802.11n (HT40): Duty cycle = $2.404/2.494 = 0.964$, Duty factor = $10 * \log(1/0.964) = 0.16$

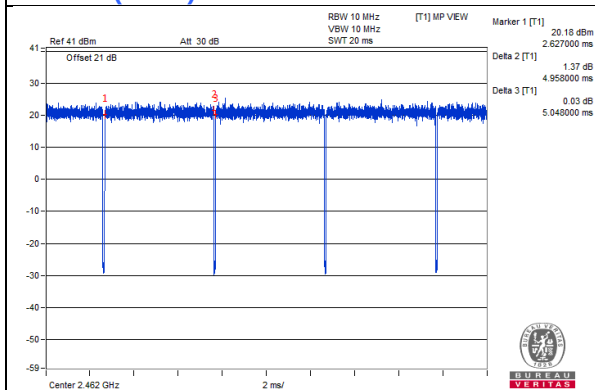
802.11b



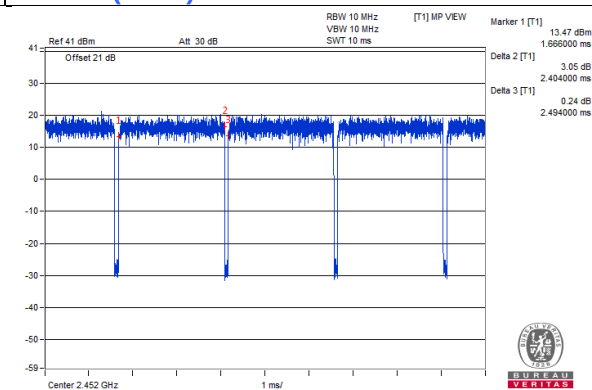
802.11g



802.11n (HT20)



802.11n (HT40)



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.

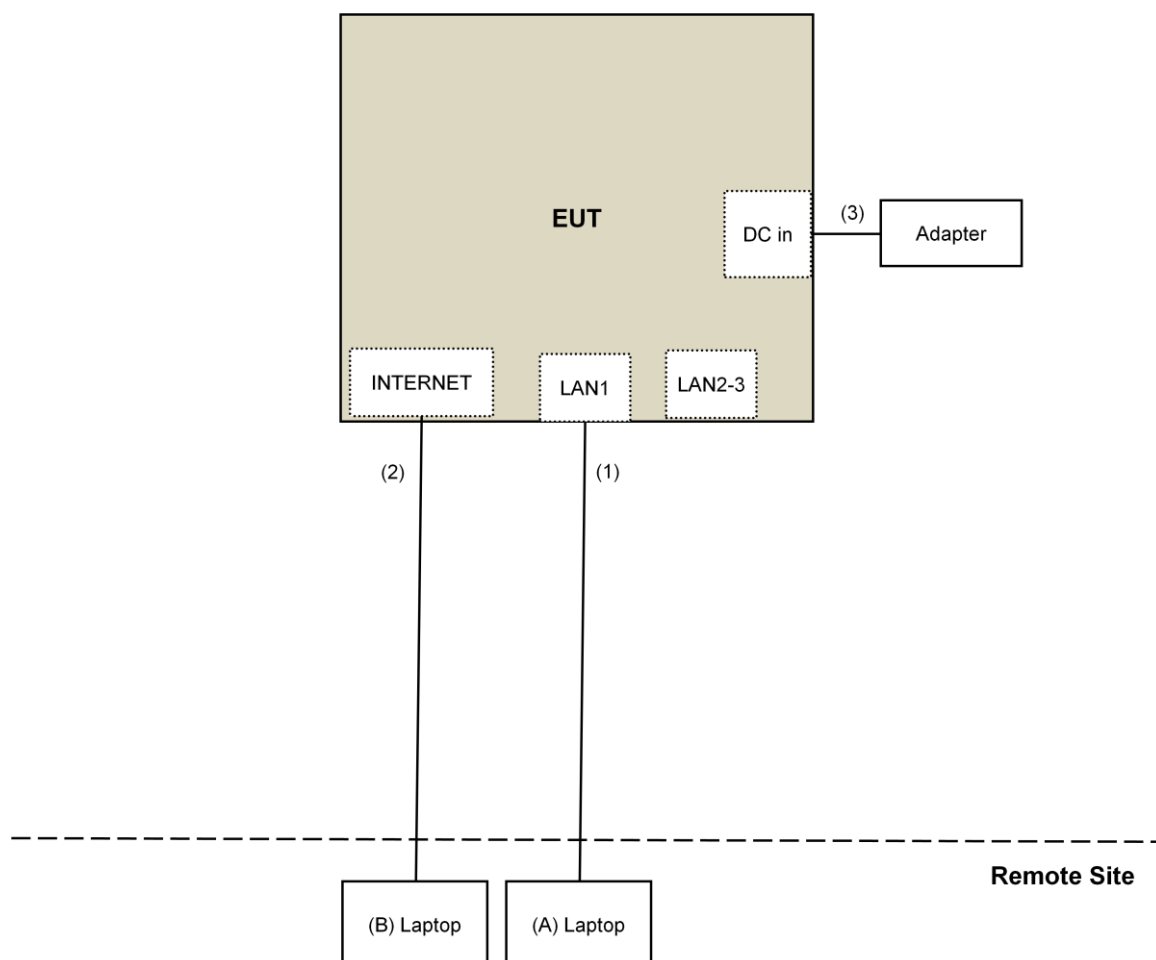
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
B.	Laptop	DELL	E6420	482T3R1	FCC DoC	Provided by Lab

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	DC Cable	1	1.8	No	0	Supplied by client

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 DTS Meas Guidance v04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, 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 20dB under any condition of modulation.

4.1.2 Test Instruments

For radiated test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Pre-Amplifier ^(*) EMCi	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna ^(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 09, 2017	Nov. 08, 2018
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 29, 2017	Nov. 28, 2018
RF Cable	8D	966-4-1 966-4-2 966-4-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Oct. 03, 2017	Oct. 02, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCi	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Pre-Amplifier EMCi	EMC184045SE	980387	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 21, 2017	Nov. 20, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 4.
4. The CANADA Site Registration No. is 20331-2
5. Loop antenna was used for all emissions below 30 MHz.
6. Tested Date: Jan. 11, 2018

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250254	Nov. 21, 2017	Nov. 20, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018

Note:

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: Jan. 15, 2018

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

NOTE:

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

For Radiated emission above 30MHz

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

Note:

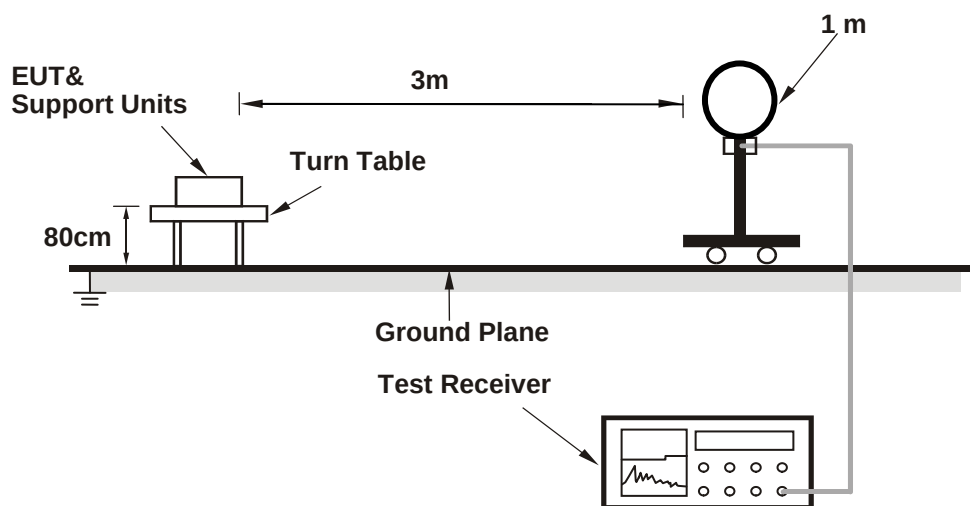
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

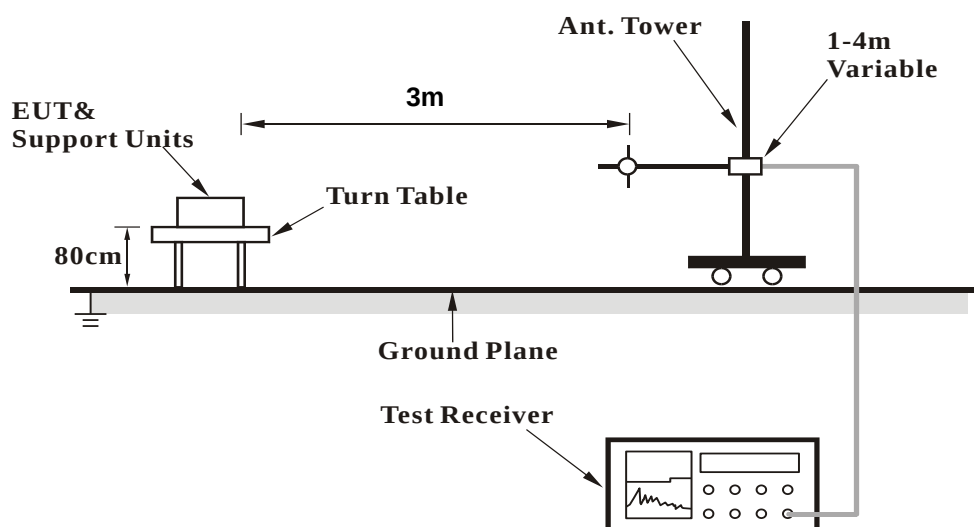
No deviation.

4.1.5 Test Setup

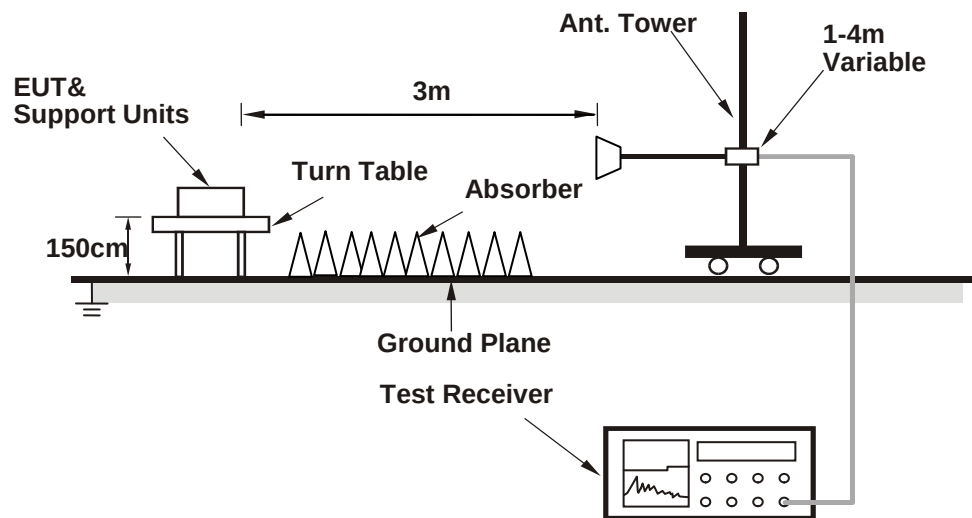
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Connected the EUT with the Laptop which is placed on remote site.
- Controlling software (QCARCT.exe[Ver10.0.0.4]) has been activated to set the EUT on specific status.

4.1.7 Test Results

Above 1GHz Data:

802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	2.72 H	360	58.8	-1.0
2	2390.00	46.8 AV	54.0	-7.2	2.72 H	360	47.8	-1.0
3	*2412.00	116.3 PK			2.72 H	360	117.3	-1.0
4	*2412.00	112.2 AV			2.72 H	360	113.2	-1.0
5	4824.00	45.1 PK	74.0	-28.9	2.73 H	239	42.0	3.1
6	4824.00	41.1 AV	54.0	-12.9	2.73 H	239	38.0	3.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	59.6 PK	74.0	-14.4	2.41 V	333	60.6	-1.0
2	2390.00	53.7 AV	54.0	-0.3	2.41 V	333	54.7	-1.0
3	*2412.00	119.2 PK			2.41 V	333	120.2	-1.0
4	*2412.00	114.9 AV			2.41 V	333	115.9	-1.0
5	4824.00	49.0 PK	74.0	-25.0	1.61 V	192	45.9	3.1
6	4824.00	44.9 AV	54.0	-9.1	1.61 V	192	41.8	3.1

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	50.4 PK	74.0	-23.6	2.74 H	360	51.4	-1.0
2	2390.00	39.6 AV	54.0	-14.4	2.74 H	360	40.6	-1.0
3	*2437.00	116.0 PK			2.74 H	360	117.4	-1.4
4	*2437.00	113.2 AV			2.74 H	360	114.6	-1.4
5	4874.00	45.3 PK	74.0	-28.7	2.73 H	249	42.0	3.3
6	4874.00	40.9 AV	54.0	-13.1	2.73 H	249	37.6	3.3
7	7311.00	45.8 PK	74.0	-28.2	3.19 H	191	35.8	10.0
8	7311.00	34.1 AV	54.0	-19.9	3.19 H	191	24.1	10.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	2.18 V	338	57.9	-1.0
2	2390.00	44.9 AV	54.0	-9.1	2.18 V	338	45.9	-1.0
3	*2437.00	119.2 PK			2.18 V	338	120.6	-1.4
4	*2437.00	115.9 AV			2.18 V	338	117.3	-1.4
5	4874.00	48.9 PK	74.0	-25.1	1.63 V	205	45.6	3.3
6	4874.00	45.0 AV	54.0	-9.0	1.63 V	205	41.7	3.3
7	7311.00	45.2 PK	74.0	-28.8	3.19 V	175	35.2	10.0
8	7311.00	33.5 AV	54.0	-20.5	3.19 V	175	23.5	10.0

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	114.2 PK			2.76 H	360	115.6	-1.4
2	*2462.00	110.7 AV			2.76 H	360	112.1	-1.4
3	2488.67	58.2 PK	74.0	-15.8	2.76 H	360	59.4	-1.2
4	2488.67	47.2 AV	54.0	-6.8	2.76 H	360	48.4	-1.2
5	4924.00	45.5 PK	74.0	-28.5	2.68 H	246	42.0	3.5
6	4924.00	41.2 AV	54.0	-12.8	2.68 H	246	37.7	3.5
7	7386.00	45.3 PK	74.0	-28.7	3.16 H	192	35.1	10.2
8	7386.00	33.9 AV	54.0	-20.1	3.16 H	192	23.7	10.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	116.5 PK			2.18 V	319	117.9	-1.4
2	*2462.00	112.9 AV			2.18 V	319	114.3	-1.4
3	2488.67	61.4 PK	74.0	-12.6	2.18 V	319	62.6	-1.2
4	2488.67	53.8 AV	54.0	-0.2	2.18 V	319	55.0	-1.2
5	4924.00	48.6 PK	74.0	-25.4	1.68 V	195	45.1	3.5
6	4924.00	44.8 AV	54.0	-9.2	1.68 V	195	41.3	3.5
7	7386.00	45.7 PK	74.0	-28.3	3.21 V	185	35.5	10.2
8	7386.00	34.0 AV	54.0	-20.0	3.21 V	185	23.8	10.2

REMARKS:

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

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	60.8 PK	74.0	-13.2	2.78 H	360	61.8	-1.0
2	2390.00	50.5 AV	54.0	-3.5	2.78 H	360	51.5	-1.0
3	*2412.00	114.8 PK			2.78 H	360	115.8	-1.0
4	*2412.00	101.5 AV			2.78 H	360	102.5	-1.0
5	4824.00	42.3 PK	74.0	-31.7	2.77 H	241	39.2	3.1
6	4824.00	36.1 AV	54.0	-17.9	2.77 H	241	33.0	3.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	73.2 PK	74.0	-0.8	2.29 V	325	74.2	-1.0
2	2390.00	53.8 AV	54.0	-0.2	2.29 V	325	54.8	-1.0
3	*2412.00	118.0 PK			2.29 V	325	119.0	-1.0
4	*2412.00	104.7 AV			2.29 V	325	105.7	-1.0
5	4824.00	44.8 PK	74.0	-29.2	2.01 V	202	41.7	3.1
6	4824.00	38.7 AV	54.0	-15.3	2.01 V	202	35.6	3.1

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2388.40	61.1 PK	74.0	-12.9	2.75 H	360	62.1	-1.0
2	2388.40	50.9 AV	54.0	-3.1	2.75 H	360	51.9	-1.0
3	*2417.00	116.1 PK			2.75 H	360	117.2	-1.1
4	*2417.00	103.1 AV			2.75 H	360	104.2	-1.1
5	4834.00	42.3 PK	74.0	-31.7	2.71 H	228	39.2	3.1
6	4834.00	36.1 AV	54.0	-17.9	2.71 H	228	33.0	3.1
7	7251.00	46.2 PK	74.0	-27.8	3.10 H	215	36.5	9.7
8	7251.00	34.3 AV	54.0	-19.7	3.10 H	215	24.6	9.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2388.40	73.0 PK	74.0	-1.0	1.98 V	328	74.0	-1.0
2	2388.40	53.7 AV	54.0	-0.3	1.98 V	328	54.7	-1.0
3	*2417.00	119.3 PK			1.98 V	328	120.4	-1.1
4	*2417.00	106.5 AV			1.98 V	328	107.6	-1.1
5	4834.00	45.3 PK	74.0	-28.7	2.04 V	197	42.2	3.1
6	4834.00	39.0 AV	54.0	-15.0	2.04 V	197	35.9	3.1
7	7251.00	45.6 PK	74.0	-28.4	3.21 V	207	35.9	9.7
8	7251.00	33.8 AV	54.0	-20.2	3.21 V	207	24.1	9.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.3 PK	74.0	-9.7	2.80 H	360	65.3	-1.0
2	2390.00	45.2 AV	54.0	-8.8	2.80 H	360	46.2	-1.0
3	*2437.00	117.1 PK			2.80 H	360	118.5	-1.4
4	*2437.00	104.9 AV			2.80 H	360	106.3	-1.4
5	2483.50	62.8 PK	74.0	-11.2	2.80 H	360	64.0	-1.2
6	2483.50	44.9 AV	54.0	-9.1	2.80 H	360	46.1	-1.2
7	4874.00	42.2 PK	74.0	-31.8	2.72 H	241	38.9	3.3
8	4874.00	35.8 AV	54.0	-18.2	2.72 H	241	32.5	3.3
9	7311.00	45.8 PK	74.0	-28.2	3.11 H	200	35.8	10.0
10	7311.00	34.1 AV	54.0	-19.9	3.11 H	200	24.1	10.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.4 PK	74.0	-6.6	1.90 V	320	68.4	-1.0
2	2390.00	48.0 AV	54.0	-6.0	1.90 V	320	49.0	-1.0
3	*2437.00	120.6 PK			1.90 V	320	122.0	-1.4
4	*2437.00	108.3 AV			1.90 V	320	109.7	-1.4
5	2483.50	65.1 PK	74.0	-8.9	1.90 V	320	66.3	-1.2
6	2483.50	48.0 AV	54.0	-6.0	1.90 V	320	49.2	-1.2
7	4874.00	45.7 PK	74.0	-28.3	2.07 V	191	42.4	3.3
8	4874.00	39.4 AV	54.0	-14.6	2.07 V	191	36.1	3.3
9	7311.00	46.3 PK	74.0	-27.7	3.21 V	200	36.3	10.0
10	7311.00	34.3 AV	54.0	-19.7	3.21 V	200	24.3	10.0

REMARKS:

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

CHANNEL	TX Channel 10	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	115.9 PK			2.77 H	360	117.3	-1.4
2	*2457.00	102.8 AV			2.77 H	360	104.2	-1.4
3	2483.50	61.3 PK	74.0	-12.7	2.77 H	360	62.5	-1.2
4	2483.50	51.0 AV	54.0	-3.0	2.77 H	360	52.2	-1.2
5	4914.00	41.9 PK	74.0	-32.1	2.78 H	235	38.4	3.5
6	4914.00	35.7 AV	54.0	-18.3	2.78 H	235	32.2	3.5
7	7371.00	45.7 PK	74.0	-28.3	3.15 H	214	35.5	10.2
8	7371.00	33.8 AV	54.0	-20.2	3.15 H	214	23.6	10.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	119.1 PK			2.03 V	318	120.5	-1.4
2	*2457.00	106.0 AV			2.03 V	318	107.4	-1.4
3	2483.50	70.5 PK	74.0	-3.5	2.03 V	318	71.7	-1.2
4	2483.50	53.9 AV	54.0	-0.1	2.03 V	318	55.1	-1.2
5	4914.00	45.8 PK	74.0	-28.2	2.01 V	196	42.3	3.5
6	4914.00	39.4 AV	54.0	-14.6	2.01 V	196	35.9	3.5
7	7371.00	46.0 PK	74.0	-28.0	3.26 V	217	35.8	10.2
8	7371.00	33.9 AV	54.0	-20.1	3.26 V	217	23.7	10.2

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	114.0 PK			2.79 H	360	115.4	-1.4
2	*2462.00	100.1 AV			2.79 H	360	101.5	-1.4
3	2483.50	60.2 PK	74.0	-13.8	2.79 H	360	61.4	-1.2
4	2483.50	50.3 AV	54.0	-3.7	2.79 H	360	51.5	-1.2
5	4924.00	41.9 PK	74.0	-32.1	2.67 H	238	38.4	3.5
6	4924.00	35.5 AV	54.0	-18.5	2.67 H	238	32.0	3.5
7	7386.00	46.4 PK	74.0	-27.6	3.14 H	191	36.2	10.2
8	7386.00	34.5 AV	54.0	-19.5	3.14 H	191	24.3	10.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	117.2 PK			1.92 V	324	118.6	-1.4
2	*2462.00	103.8 AV			1.92 V	324	105.2	-1.4
3	2483.50	72.5 PK	74.0	-1.5	1.92 V	324	73.7	-1.2
4	2483.50	53.8 AV	54.0	-0.2	1.92 V	324	55.0	-1.2
5	4924.00	44.7 PK	74.0	-29.3	2.06 V	189	41.2	3.5
6	4924.00	38.6 AV	54.0	-15.4	2.06 V	189	35.1	3.5
7	7386.00	45.0 PK	74.0	-29.0	3.19 V	199	34.8	10.2
8	7386.00	33.4 AV	54.0	-20.6	3.19 V	199	23.2	10.2

REMARKS:

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

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	60.9 PK	74.0	-13.1	2.81 H	360	61.9	-1.0
2	2390.00	50.6 AV	54.0	-3.4	2.81 H	360	51.6	-1.0
3	*2412.00	113.1 PK			2.81 H	360	114.1	-1.0
4	*2412.00	101.1 AV			2.81 H	360	102.1	-1.0
5	4824.00	41.7 PK	74.0	-32.3	2.75 H	234	38.6	3.1
6	4824.00	35.3 AV	54.0	-18.7	2.75 H	234	32.2	3.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	72.1 PK	74.0	-1.9	1.96 V	331	73.1	-1.0
2	2390.00	53.9 AV	54.0	-0.1	1.96 V	331	54.9	-1.0
3	*2412.00	116.6 PK			1.96 V	331	117.6	-1.0
4	*2412.00	104.5 AV			1.96 V	331	105.5	-1.0
5	4824.00	45.5 PK	74.0	-28.5	2.02 V	181	42.4	3.1
6	4824.00	39.1 AV	54.0	-14.9	2.02 V	181	36.0	3.1

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 2	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2383.80	60.4 PK	74.0	-13.6	2.78 H	360	61.3	-0.9
2	2383.80	50.5 AV	54.0	-3.5	2.78 H	360	51.4	-0.9
3	*2417.00	117.6 PK			2.78 H	360	118.7	-1.1
4	*2417.00	105.2 AV			2.78 H	360	106.3	-1.1
5	4834.00	42.3 PK	74.0	-31.7	2.71 H	239	39.2	3.1
6	4834.00	35.9 AV	54.0	-18.1	2.71 H	239	32.8	3.1
7	7251.00	45.9 PK	74.0	-28.1	3.17 H	211	36.2	9.7
8	7251.00	34.3 AV	54.0	-19.7	3.17 H	211	24.6	9.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2383.80	72.1 PK	74.0	-1.9	1.96 V	336	73.0	-0.9
2	2383.80	53.8 AV	54.0	-0.2	1.96 V	336	54.7	-0.9
3	*2417.00	120.8 PK			1.96 V	336	121.9	-1.1
4	*2417.00	108.9 AV			1.96 V	336	110.0	-1.1
5	4834.00	44.7 PK	74.0	-29.3	2.03 V	194	41.6	3.1
6	4834.00	38.6 AV	54.0	-15.4	2.03 V	194	35.5	3.1
7	7251.00	46.1 PK	74.0	-27.9	3.24 V	192	36.4	9.7
8	7251.00	34.3 AV	54.0	-19.7	3.24 V	192	24.6	9.7

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.1 PK	74.0	-9.9	2.73 H	360	65.1	-1.0
2	2390.00	45.0 AV	54.0	-9.0	2.73 H	360	46.0	-1.0
3	*2437.00	117.2 PK			2.73 H	360	118.6	-1.4
4	*2437.00	106.1 AV			2.73 H	360	107.5	-1.4
5	2483.50	63.2 PK	74.0	-10.8	2.73 H	360	64.4	-1.2
6	2483.50	45.2 AV	54.0	-8.8	2.73 H	360	46.4	-1.2
7	4874.00	42.1 PK	74.0	-31.9	2.68 H	256	38.8	3.3
8	4874.00	35.9 AV	54.0	-18.1	2.68 H	256	32.6	3.3
9	7311.00	46.3 PK	74.0	-27.7	3.17 H	188	36.3	10.0
10	7311.00	34.4 AV	54.0	-19.6	3.17 H	188	24.4	10.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.7 PK	74.0	-6.3	2.19 V	328	68.7	-1.0
2	2390.00	48.5 AV	54.0	-5.5	2.19 V	328	49.5	-1.0
3	*2437.00	120.9 PK			2.19 V	328	122.3	-1.4
4	*2437.00	109.4 AV			2.19 V	328	110.8	-1.4
5	2483.50	65.2 PK	74.0	-8.8	2.19 V	328	66.4	-1.2
6	2483.50	48.3 AV	54.0	-5.7	2.19 V	328	49.5	-1.2
7	4874.00	45.5 PK	74.0	-28.5	2.11 V	179	42.2	3.3
8	4874.00	39.0 AV	54.0	-15.0	2.11 V	179	35.7	3.3
9	7311.00	46.4 PK	74.0	-27.6	3.23 V	191	36.4	10.0
10	7311.00	34.3 AV	54.0	-19.7	3.23 V	191	24.3	10.0

REMARKS:

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

CHANNEL	TX Channel 10	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	115.2 PK			2.78 H	360	116.6	-1.4
2	*2457.00	103.8 AV			2.78 H	360	105.2	-1.4
3	2483.50	60.9 PK	74.0	-13.1	2.78 H	360	62.1	-1.2
4	2483.50	51.2 AV	54.0	-2.8	2.78 H	360	52.4	-1.2
5	4914.00	41.8 PK	74.0	-32.2	2.77 H	231	38.3	3.5
6	4914.00	35.5 AV	54.0	-18.5	2.77 H	231	32.0	3.5
7	7371.00	46.0 PK	74.0	-28.0	3.11 H	187	35.8	10.2
8	7371.00	34.3 AV	54.0	-19.7	3.11 H	187	24.1	10.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2457.00	118.8 PK			1.99 V	321	120.2	-1.4
2	*2457.00	107.0 AV			1.99 V	321	108.4	-1.4
3	2483.50	69.5 PK	74.0	-4.5	1.99 V	321	70.7	-1.2
4	2483.50	53.7 AV	54.0	-0.3	1.99 V	321	54.9	-1.2
5	4914.00	45.0 PK	74.0	-29.0	2.04 V	182	41.5	3.5
6	4914.00	38.9 AV	54.0	-15.1	2.04 V	182	35.4	3.5
7	7371.00	45.6 PK	74.0	-28.4	3.19 V	209	35.4	10.2
8	7371.00	33.6 AV	54.0	-20.4	3.19 V	209	23.4	10.2

REMARKS:

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

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	113.4 PK			2.79 H	360	114.8	-1.4
2	*2462.00	101.1 AV			2.79 H	360	102.5	-1.4
3	2483.50	60.8 PK	74.0	-13.2	2.71 H	360	62.0	-1.2
4	2483.50	50.8 AV	54.0	-3.2	2.71 H	360	52.0	-1.2
5	4924.00	38.0 PK	74.0	-36.0	2.65 H	226	34.5	3.5
6	4924.00	26.2 AV	54.0	-27.8	2.65 H	226	22.7	3.5
7	7386.00	46.2 PK	74.0	-27.8	3.20 H	214	36.0	10.2
8	7386.00	34.2 AV	54.0	-19.8	3.20 H	214	24.0	10.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	116.8 PK			1.81 V	334	118.2	-1.4
2	*2462.00	104.4 AV			1.81 V	334	105.8	-1.4
3	2483.50	71.5 PK	74.0	-2.5	1.81 V	333	72.7	-1.2
4	2483.50	53.9 AV	54.0	-0.1	1.81 V	333	55.1	-1.2
5	4924.00	45.2 PK	74.0	-28.8	2.10 V	213	41.7	3.5
6	4924.00	38.6 AV	54.0	-15.4	2.10 V	213	35.1	3.5
7	7386.00	45.9 PK	74.0	-28.1	3.20 V	213	35.7	10.2
8	7386.00	34.2 AV	54.0	-19.8	3.20 V	213	24.0	10.2

REMARKS:

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

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.50	60.7 PK	74.0	-13.3	2.88 H	360	61.7	-1.0
2	2386.50	50.7 AV	54.0	-3.3	2.88 H	360	51.7	-1.0
3	*2422.00	108.2 PK			2.88 H	360	109.5	-1.3
4	*2422.00	96.1 AV			2.88 H	360	97.4	-1.3
5	4844.00	38.7 PK	74.0	-35.3	2.67 H	222	35.6	3.1
6	4844.00	26.6 AV	54.0	-27.4	2.67 H	222	23.5	3.1
7	7266.00	45.6 PK	74.0	-28.4	3.23 H	194	35.8	9.8
8	7266.00	34.1 AV	54.0	-19.9	3.23 H	194	24.3	9.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.50	70.6 PK	74.0	-3.4	2.06 V	326	71.6	-1.0
2	2386.50	53.9 AV	54.0	-0.1	2.06 V	326	54.9	-1.0
3	*2422.00	111.2 PK			2.06 V	326	112.5	-1.3
4	*2422.00	99.5 AV			2.06 V	326	100.8	-1.3
5	4844.00	38.3 PK	74.0	-35.7	1.96 V	205	35.2	3.1
6	4844.00	26.4 AV	54.0	-27.6	1.96 V	205	23.3	3.1
7	7266.00	45.7 PK	74.0	-28.3	3.28 V	205	35.9	9.8
8	7266.00	34.2 AV	54.0	-19.8	3.28 V	205	24.4	9.8

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.1 PK	74.0	-8.9	2.77 H	360	66.1	-1.0
2	2390.00	47.0 AV	54.0	-7.0	2.77 H	360	48.0	-1.0
3	*2437.00	111.1 PK			2.77 H	360	112.5	-1.4
4	*2437.00	98.9 AV			2.77 H	360	100.3	-1.4
5	2483.50	60.4 PK	74.0	-13.6	2.77 H	360	61.6	-1.2
6	2483.50	50.6 AV	54.0	-3.4	2.77 H	360	51.8	-1.2
7	4874.00	38.3 PK	74.0	-35.7	2.60 H	219	35.0	3.3
8	4874.00	26.0 AV	54.0	-28.0	2.60 H	219	22.7	3.3
9	7311.00	46.9 PK	74.0	-27.1	3.16 H	209	36.9	10.0
10	7311.00	34.8 AV	54.0	-19.2	3.16 H	209	24.8	10.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.3 PK	74.0	-5.7	2.01 V	322	69.3	-1.0
2	2390.00	50.2 AV	54.0	-3.8	2.01 V	322	51.2	-1.0
3	*2437.00	114.6 PK			2.01 V	322	116.0	-1.4
4	*2437.00	102.3 AV			2.01 V	322	103.7	-1.4
5	2483.50	72.0 PK	74.0	-2.0	2.01 V	322	73.2	-1.2
6	2483.50	53.7 AV	54.0	-0.3	2.01 V	322	54.9	-1.2
7	4874.00	38.6 PK	74.0	-35.4	2.01 V	194	35.3	3.3
8	4874.00	26.8 AV	54.0	-27.2	2.01 V	194	23.5	3.3
9	7311.00	46.3 PK	74.0	-27.7	3.25 V	217	36.3	10.0
10	7311.00	34.7 AV	54.0	-19.3	3.25 V	217	24.7	10.0

REMARKS:

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

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	108.1 PK			2.74 H	360	109.5	-1.4
2	*2452.00	96.8 AV			2.74 H	360	98.2	-1.4
3	2483.50	61.1 PK	74.0	-12.9	2.74 H	360	62.3	-1.2
4	2483.50	51.1 AV	54.0	-2.9	2.74 H	360	52.3	-1.2
5	4904.00	38.4 PK	74.0	-35.6	2.62 H	233	34.9	3.5
6	4904.00	26.4 AV	54.0	-27.6	2.62 H	233	22.9	3.5
7	7356.00	46.3 PK	74.0	-27.7	3.21 H	198	36.1	10.2
8	7356.00	34.5 AV	54.0	-19.5	3.21 H	198	24.3	10.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	111.6 PK			1.99 V	319	113.0	-1.4
2	*2452.00	100.1 AV			1.99 V	319	101.5	-1.4
3	2483.50	69.8 PK	74.0	-4.2	1.99 V	319	71.0	-1.2
4	2483.50	53.8 AV	54.0	-0.2	1.99 V	319	55.0	-1.2
5	4904.00	38.7 PK	74.0	-35.3	1.96 V	210	35.2	3.5
6	4904.00	26.8 AV	54.0	-27.2	1.96 V	210	23.3	3.5
7	7356.00	46.4 PK	74.0	-27.6	3.20 V	225	36.2	10.2
8	7356.00	34.8 AV	54.0	-19.2	3.20 V	225	24.6	10.2

REMARKS:

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

Below 1GHz Data:

802.11b

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	65.89	29.9 QP	40.0	-10.1	2.00 H	22	38.9	-9.0
2	125.01	39.0 QP	43.5	-4.5	1.26 H	113	48.4	-9.4
3	191.99	33.9 QP	43.5	-9.6	2.00 H	243	44.7	-10.8
4	262.80	39.9 QP	46.0	-6.1	1.50 H	179	48.5	-8.6
5	577.08	40.5 QP	46.0	-5.5	1.50 H	302	41.1	-0.6
6	962.17	40.1 QP	54.0	-13.9	1.00 H	143	35.0	5.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.40	35.9 QP	40.0	-4.1	1.00 V	241	43.8	-7.9
2	125.06	38.7 QP	43.5	-4.8	1.00 V	189	48.1	-9.4
3	191.99	35.0 QP	43.5	-8.5	1.00 V	206	45.8	-10.8
4	261.83	35.7 QP	46.0	-10.3	1.00 V	311	44.3	-8.6
5	399.57	36.7 QP	46.0	-9.3	1.10 V	251	41.3	-4.6
6	958.29	41.5 QP	46.0	-4.5	1.50 V	319	36.4	5.1

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Nov. 01, 2017	Oct. 31, 2018
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Nov. 15, 2016	Nov. 14, 2018
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 03, 2017	June 02, 2018
50 ohms Terminator	N/A	EMC-02	Sep. 22, 2017	Sep. 21, 2018
RF Cable	5D-FB	COCCAB-001	Sep. 29, 2017	Sep. 28, 2018
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 18, 2017	June 17, 2018
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3. Tested Date: Dec. 22, 2017

4.2.3 Test Procedures

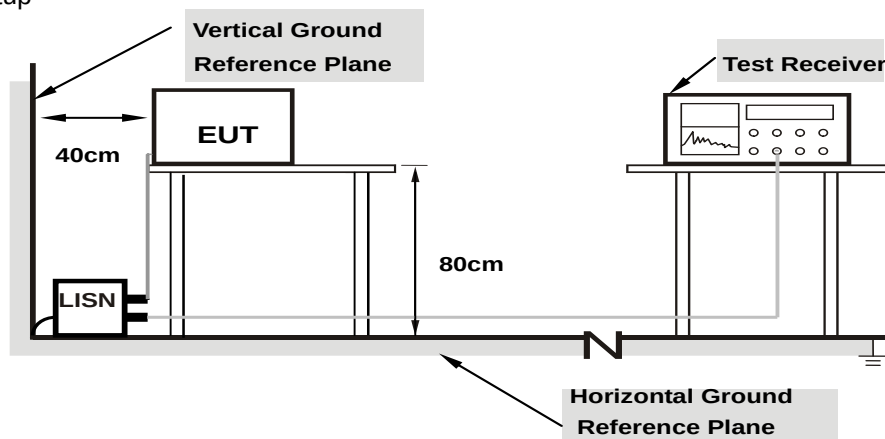
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

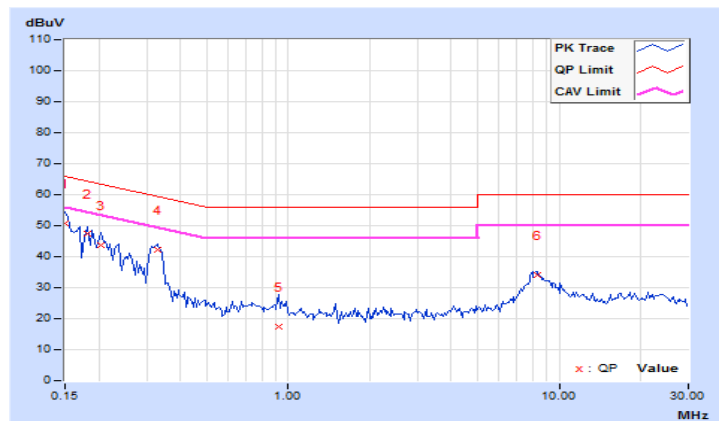
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.09	40.64	29.25	50.73	39.34	66.00	56.00	-15.27	-16.66
2	0.18125	10.08	37.21	23.92	47.29	34.00	64.43	54.43	-17.14	-20.43
3	0.20469	10.07	33.66	22.80	43.73	32.87	63.42	53.42	-19.69	-20.55
4	0.32969	10.10	32.05	26.82	42.15	36.92	59.46	49.46	-17.31	-12.54
5	0.92734	10.16	7.19	2.80	17.35	12.96	56.00	46.00	-38.65	-33.04
6	8.29688	10.67	23.34	17.56	34.01	28.23	60.00	50.00	-25.99	-21.77

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.

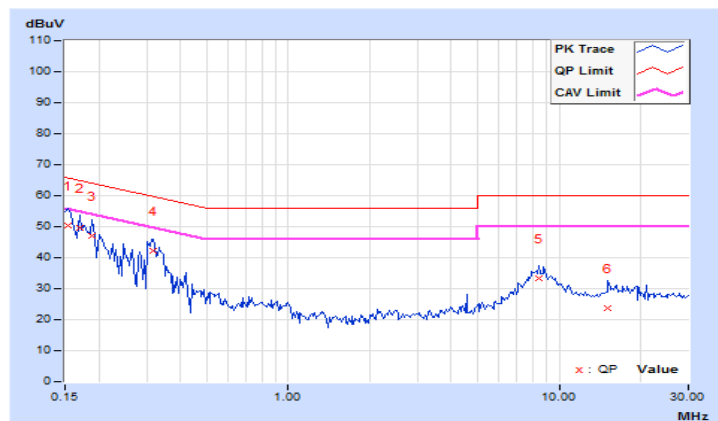


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	-----------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	10.07	40.30	28.94	50.37	39.01	65.79	55.79	-15.42	-16.78
2	0.16953	10.06	39.72	26.71	49.78	36.77	64.98	54.98	-15.20	-18.21
3	0.18906	10.05	37.08	25.47	47.13	35.52	64.08	54.08	-16.95	-18.56
4	0.31797	10.09	32.25	31.58	42.34	41.67	59.76	49.76	-17.42	-8.09
5	8.41797	10.59	22.64	17.00	33.23	27.59	60.00	50.00	-26.77	-22.41
6	15.10547	11.02	12.65	4.55	23.67	15.57	60.00	50.00	-36.33	-34.43

REMARKS:

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

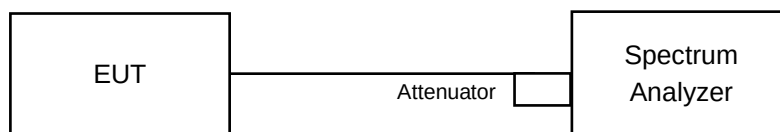


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

- Set resolution bandwidth (RBW) = 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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.59	8.60	0.5	PASS
6	2437	9.11	8.55	0.5	PASS
11	2462	8.56	9.03	0.5	PASS

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.10	16.41	0.5	PASS
2	2417	15.95	16.40	0.5	PASS
6	2437	16.33	16.38	0.5	PASS
10	2457	16.34	16.39	0.5	PASS
11	2462	16.33	16.39	0.5	PASS

802.11n (HT20)

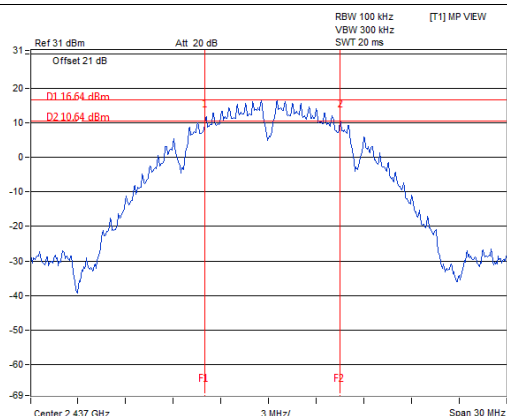
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.57	17.61	0.5	Pass
2	2417	17.56	17.65	0.5	Pass
6	2437	16.96	17.62	0.5	Pass
10	2457	16.96	17.63	0.5	Pass
11	2462	16.95	17.67	0.5	Pass

802.11n (HT40)

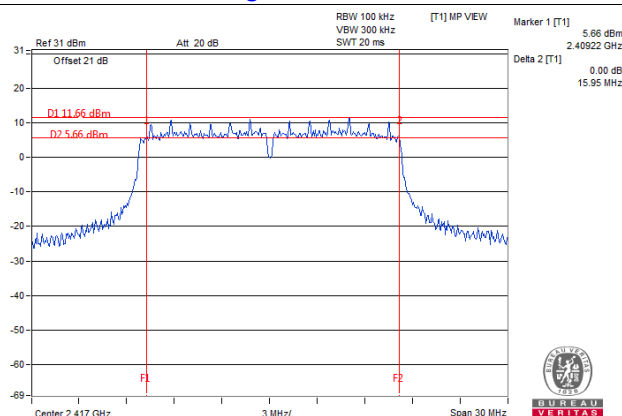
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.16	35.32	0.5	Pass
6	2437	35.31	35.31	0.5	Pass
9	2452	35.21	35.38	0.5	Pass

Spectrum Plot of Worst Value

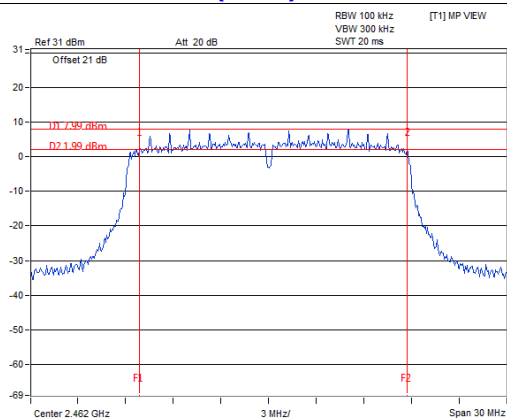
802.11b / Chain 1 : CH6



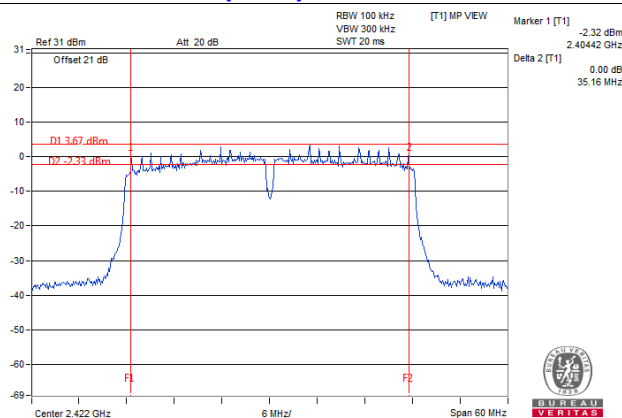
802.11g / Chain 0 : CH2



802.11n (HT20) / Chain 0 : CH11



802.11n (HT40) / Chain 0 : CH3



4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

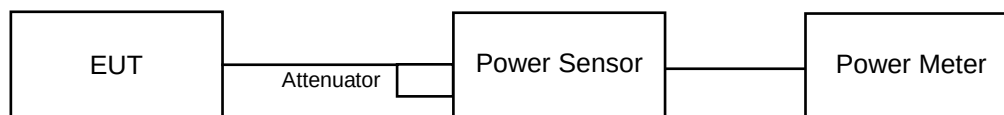
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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.

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

CDD Mode

802.11b

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.86	24.05	447.294	26.51	30.00	Pass
6	2437	24.23	24.78	565.458	27.52	30.00	Pass
11	2462	22.87	24.14	453.06	26.56	30.00	Pass

802.11g

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.59	20.44	201.653	23.05	30.00	Pass
2	2417	21.48	22.54	320.078	25.05	30.00	Pass
6	2437	23.69	24.43	511.216	27.09	30.00	Pass
10	2457	21.58	22.47	320.484	25.06	30.00	Pass
11	2462	18.77	19.41	162.633	22.11	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.07	18.85	140.857	21.49	30.00	Pass
2	2417	22.36	22.94	368.976	25.67	30.00	Pass
6	2437	24.12	24.61	547.294	27.38	30.00	Pass
10	2457	21.85	22.04	313.065	24.96	30.00	Pass
11	2462	18.21	18.87	143.312	21.56	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.41	17.25	96.84	19.86	30.00	Pass
6	2437	19.42	20.11	190.063	22.79	30.00	Pass
9	2452	17.42	18.19	121.125	20.83	30.00	Pass

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.07	18.85	140.857	21.49	30.00	Pass
2	2417	22.36	22.94	368.976	25.67	30.00	Pass
6	2437	24.12	24.61	547.294	27.38	30.00	Pass
10	2457	21.85	22.04	313.065	24.96	30.00	Pass
11	2462	18.21	18.87	143.312	21.56	30.00	Pass

Note: 1. Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power limit shall not be reduced.

802.11n (HT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.41	17.25	96.84	19.86	30.00	Pass
6	2437	19.42	20.11	190.063	22.79	30.00	Pass
9	2452	17.42	18.19	121.125	20.83	30.00	Pass

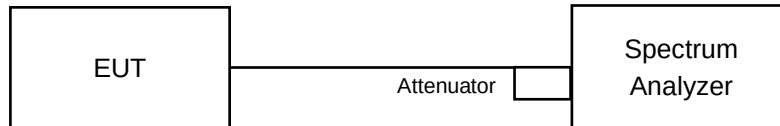
Note: 1. Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power limit shall not be reduced.

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

802.11b, 802.11n (HT20)

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

802.11g, 802.11n (HT40)

- Measure the duty cycle (x).
- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq 3 \times \text{RBW}$.
- Detector = power averaging (RMS) or sample detector (when RMS not available).
- Ensure that the number of measurement points in the sweep $\geq 2 \times \text{span/RBW}$.
- Sweep time = auto couple.
- Do not use sweep triggering. Allow sweep to "free run".
- Employ trace averaging (RMS) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-7.22	3.01	-4.21	8.00	Pass
	6	2437	-6.25	3.01	-3.24	8.00	Pass
	11	2462	-6.79	3.01	-3.78	8.00	Pass
1	1	2412	-6.62	3.01	-3.61	8.00	Pass
	6	2437	-5.92	3.01	-2.91	8.00	Pass
	11	2462	-6.56	3.01	-3.55	8.00	Pass

Note: 1. Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

802.11g

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-13.34	3.01	0.18	-10.15	8.00	Pass
	2	2417	-10.35	3.01	0.18	-7.16	8.00	Pass
	6	2437	-9.23	3.01	0.18	-6.04	8.00	Pass
	10	2457	-11.52	3.01	0.18	-8.33	8.00	Pass
	11	2462	-13.36	3.01	0.18	-10.17	8.00	Pass
1	1	2412	-12.80	3.01	0.18	-9.61	8.00	Pass
	2	2417	-10.45	3.01	0.18	-7.26	8.00	Pass
	6	2437	-8.64	3.01	0.18	-5.45	8.00	Pass
	10	2457	-11.03	3.01	0.18	-7.84	8.00	Pass
	11	2462	-13.50	3.01	0.18	-10.31	8.00	Pass

Note: 1. Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	1	2412	-14.50	3.01	-11.49	8.00	Pass
	2	2417	-10.01	3.01	-7.00	8.00	Pass
	6	2437	-8.82	3.01	-5.81	8.00	Pass
	10	2457	-11.98	3.01	-8.97	8.00	Pass
	11	2462	-14.19	3.01	-11.18	8.00	Pass
1	1	2412	-14.30	3.01	-11.29	8.00	Pass
	2	2417	-10.62	3.01	-7.61	8.00	Pass
	6	2437	-9.28	3.01	-6.27	8.00	Pass
	10	2457	-11.56	3.01	-8.55	8.00	Pass
	11	2462	-14.19	3.01	-11.18	8.00	Pass

Note: 1. Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

802.11n (HT40)

TX chain	Channel	Freq. (MHz)	PSD W/O Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	TOTAL PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
0	3	2422	-18.70	3.01	0.16	-15.53	8.00	Pass
	6	2437	-15.67	3.01	0.16	-12.50	8.00	Pass
	9	2452	-18.23	3.01	0.16	-15.06	8.00	Pass
1	3	2422	-17.86	3.01	0.16	-14.69	8.00	Pass
	6	2437	-15.23	3.01	0.16	-12.06	8.00	Pass
	9	2452	-17.92	3.01	0.16	-14.75	8.00	Pass

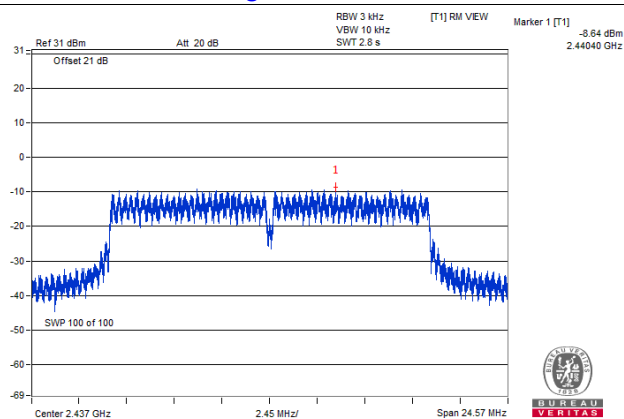
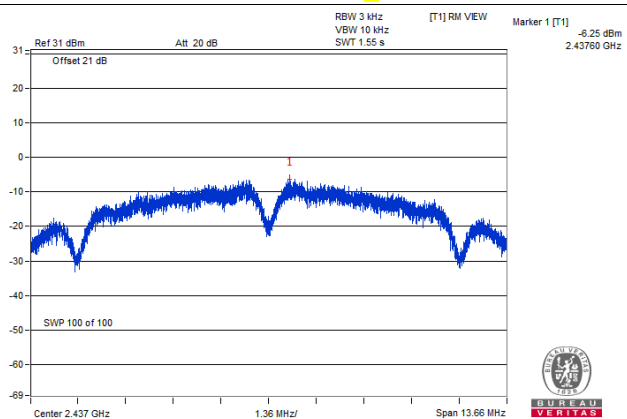
Note: 1. Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.86\text{dBi} < 6\text{dBi}$, so the power density limit shall not be reduced.

2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

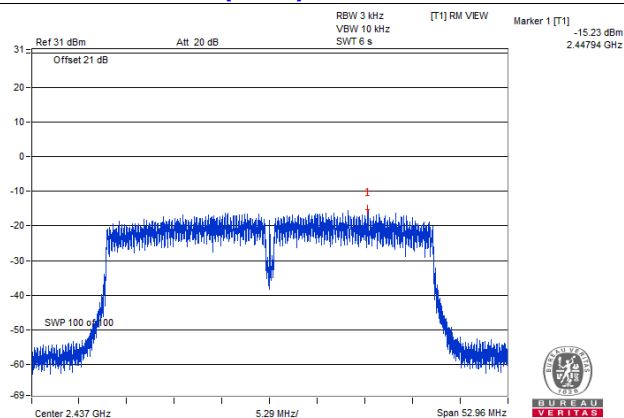
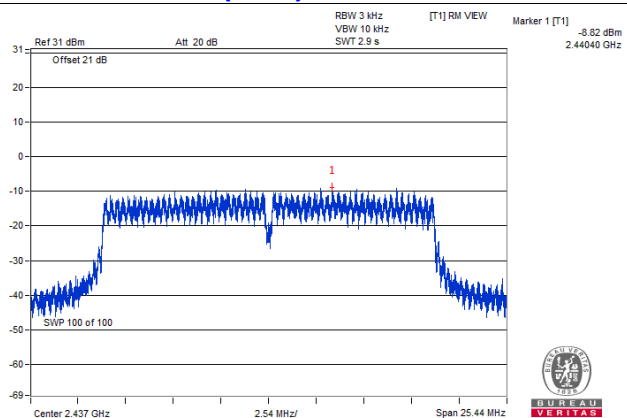
802.11b / Chain 0 : CH6

802.11g / Chain 1 : CH6



802.11n (HT20) / Chain 0 : CH6

802.11n (HT40) / Chain 1 : CH6

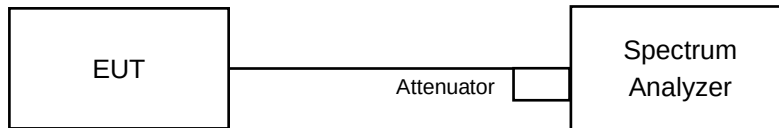


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

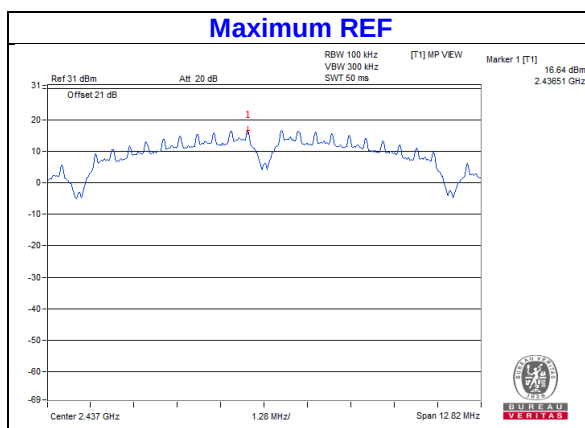
4.6.6 EUT Operating Condition

Same as Item 4.3.6

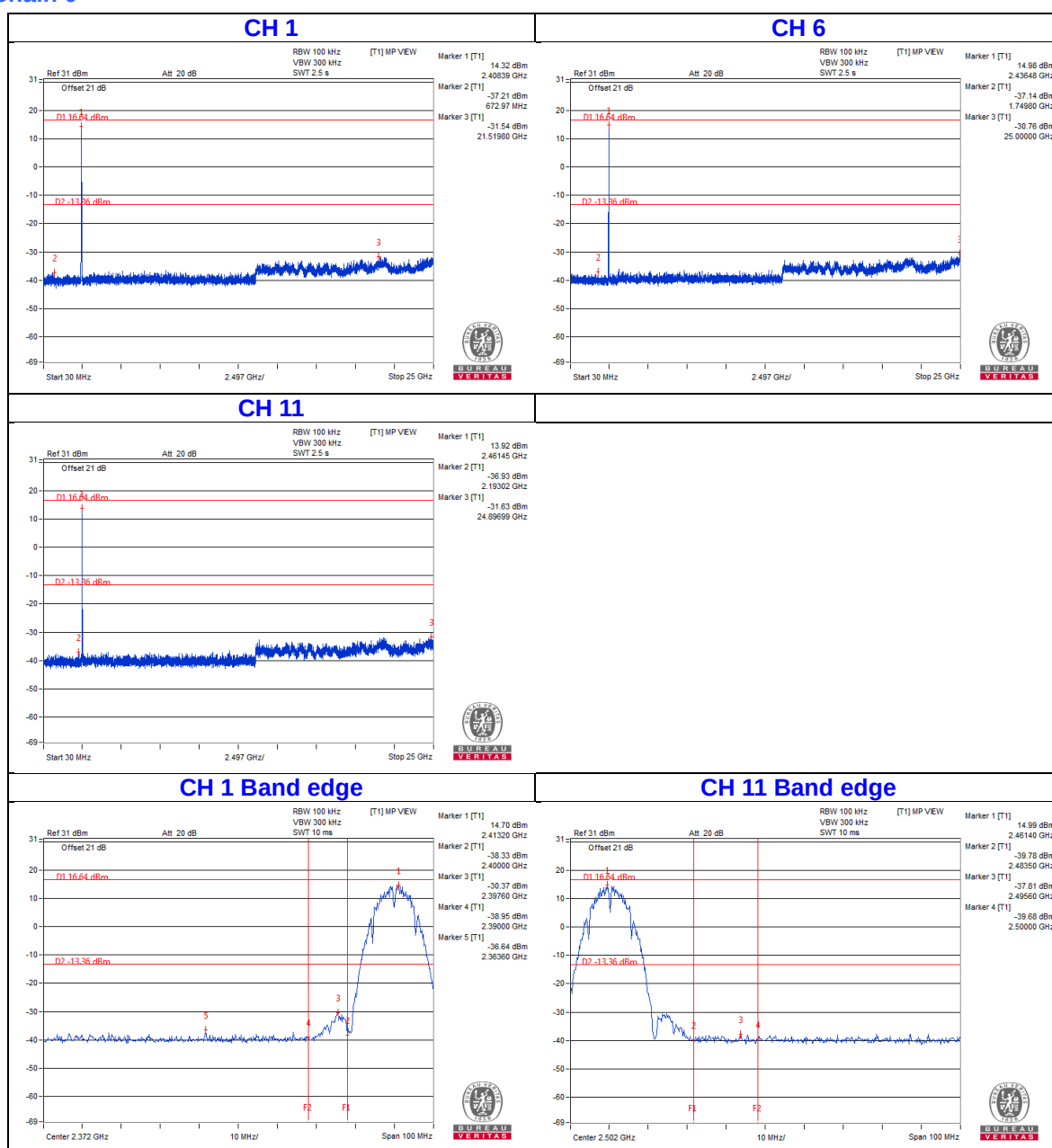
4.6.7 Test Results

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.

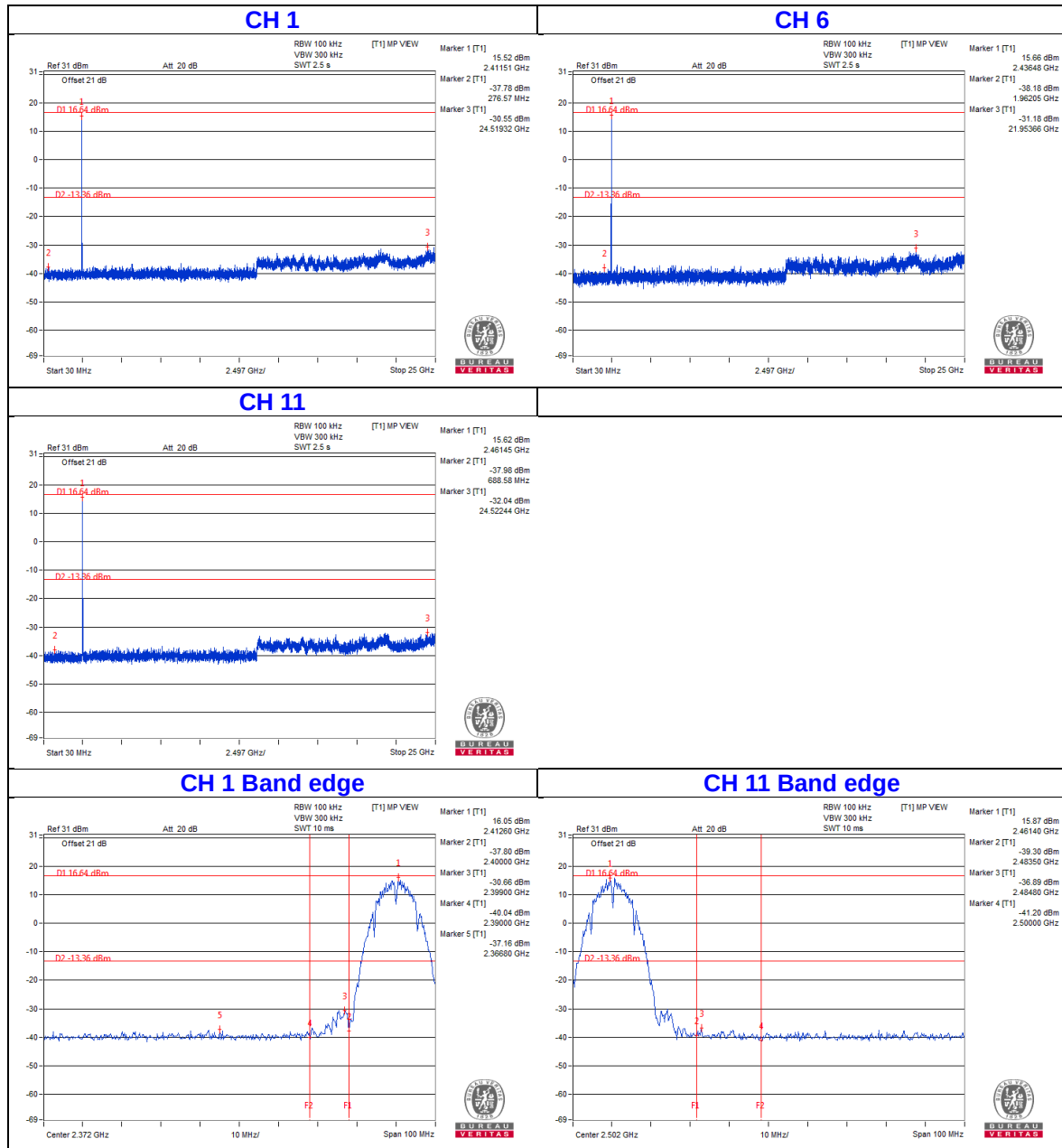
802.11b



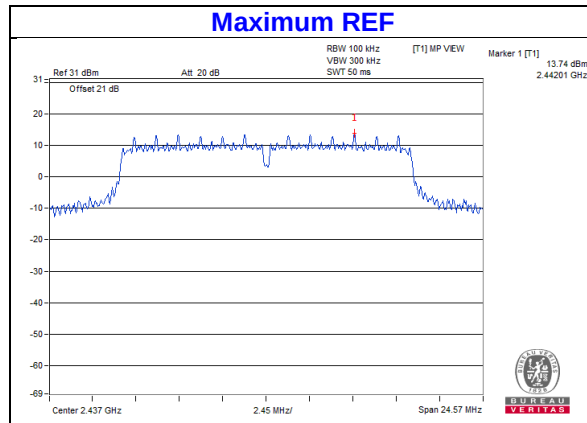
Chain 0



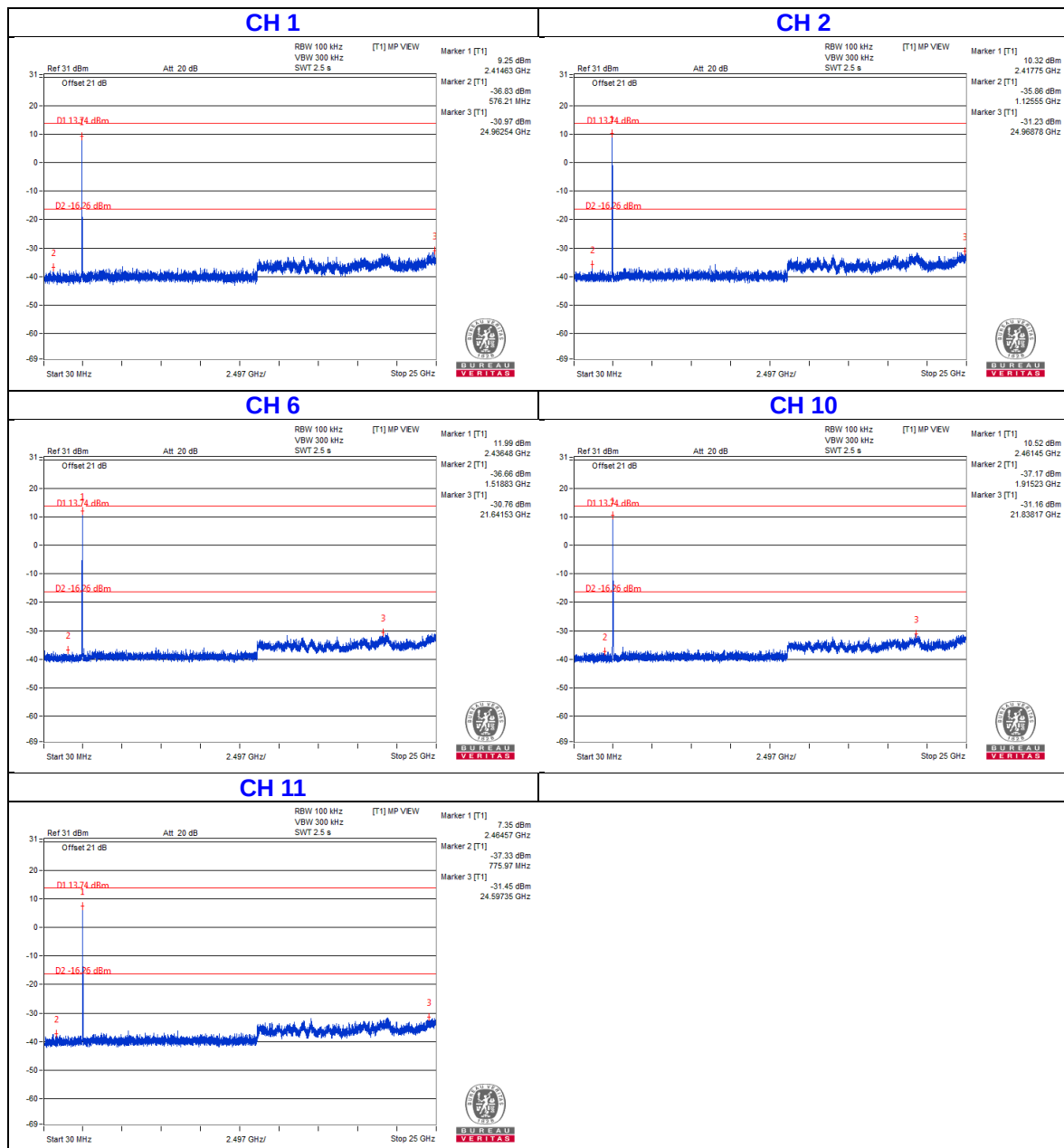
Chain 1

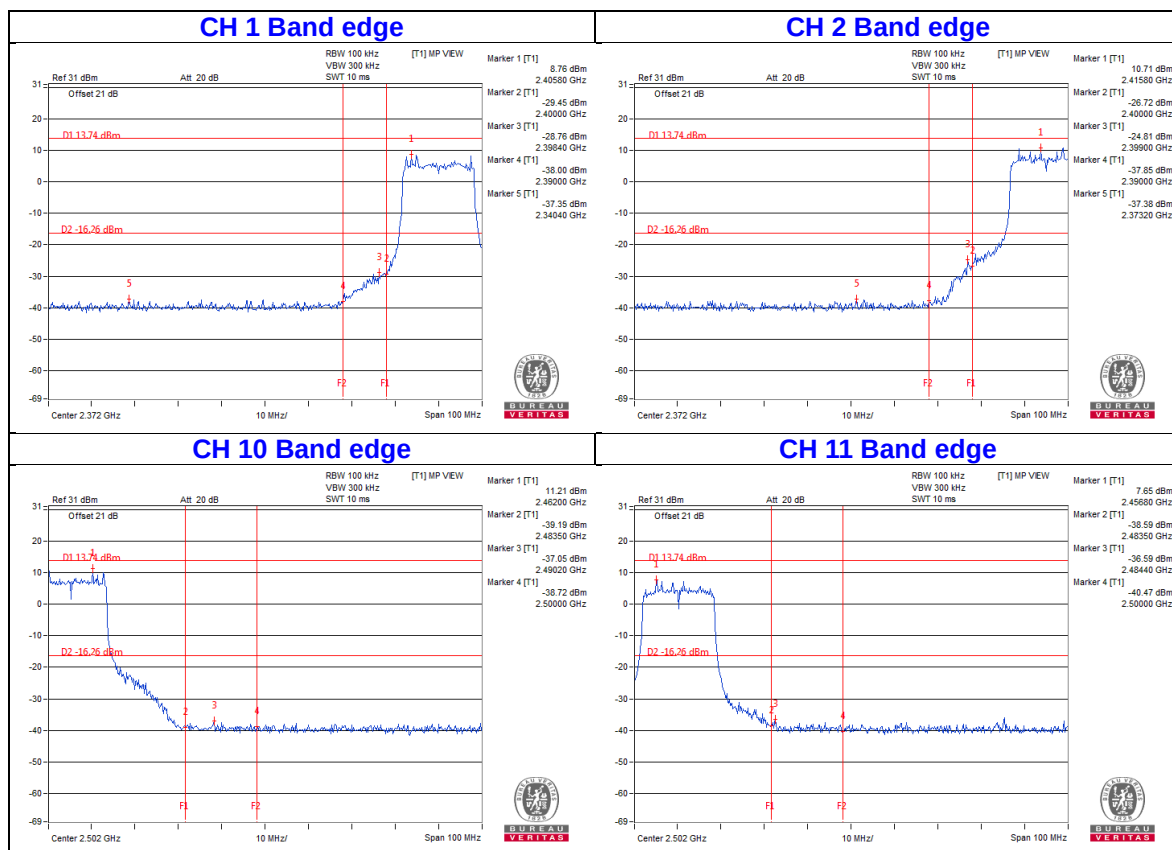


802.11g

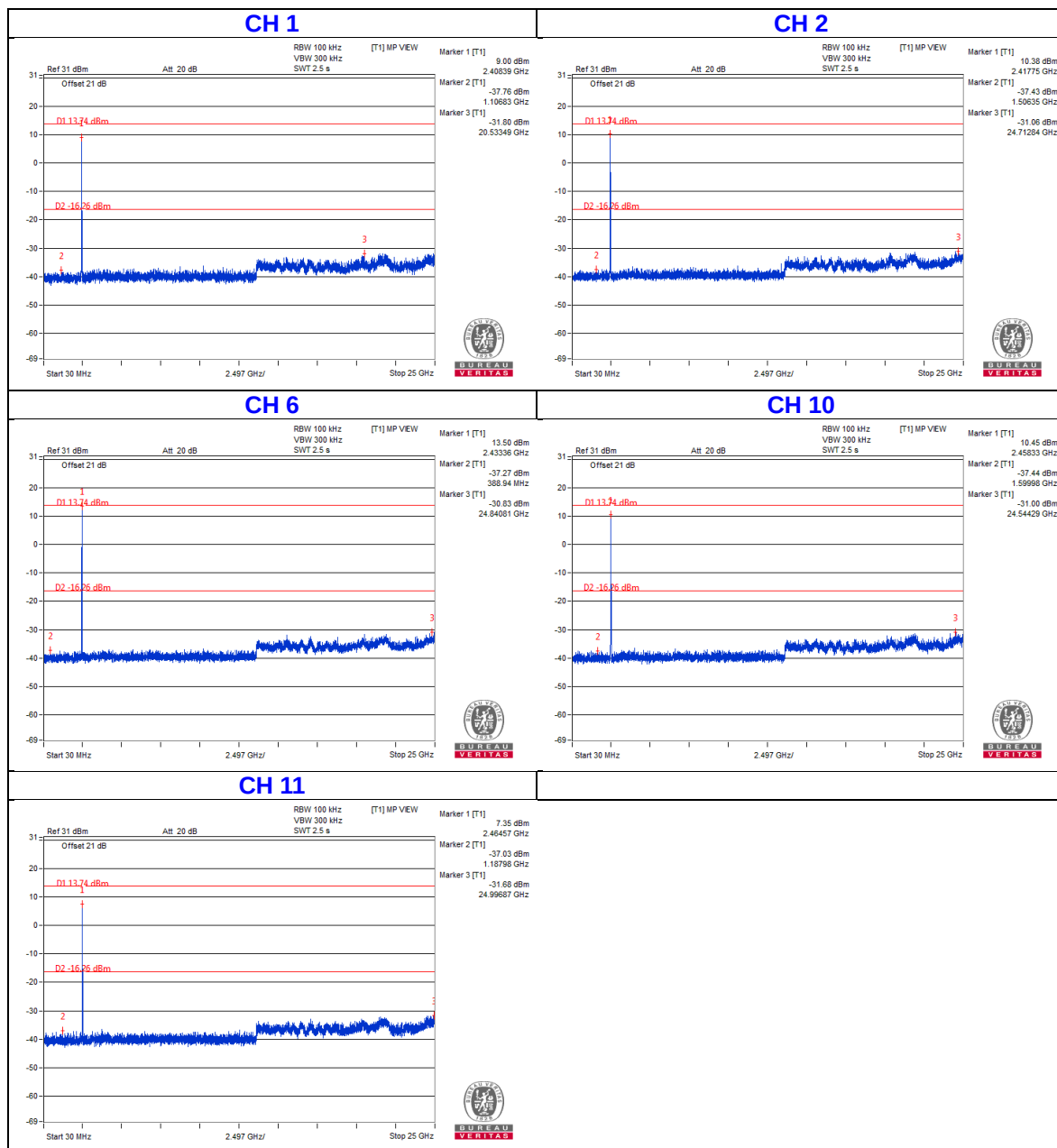


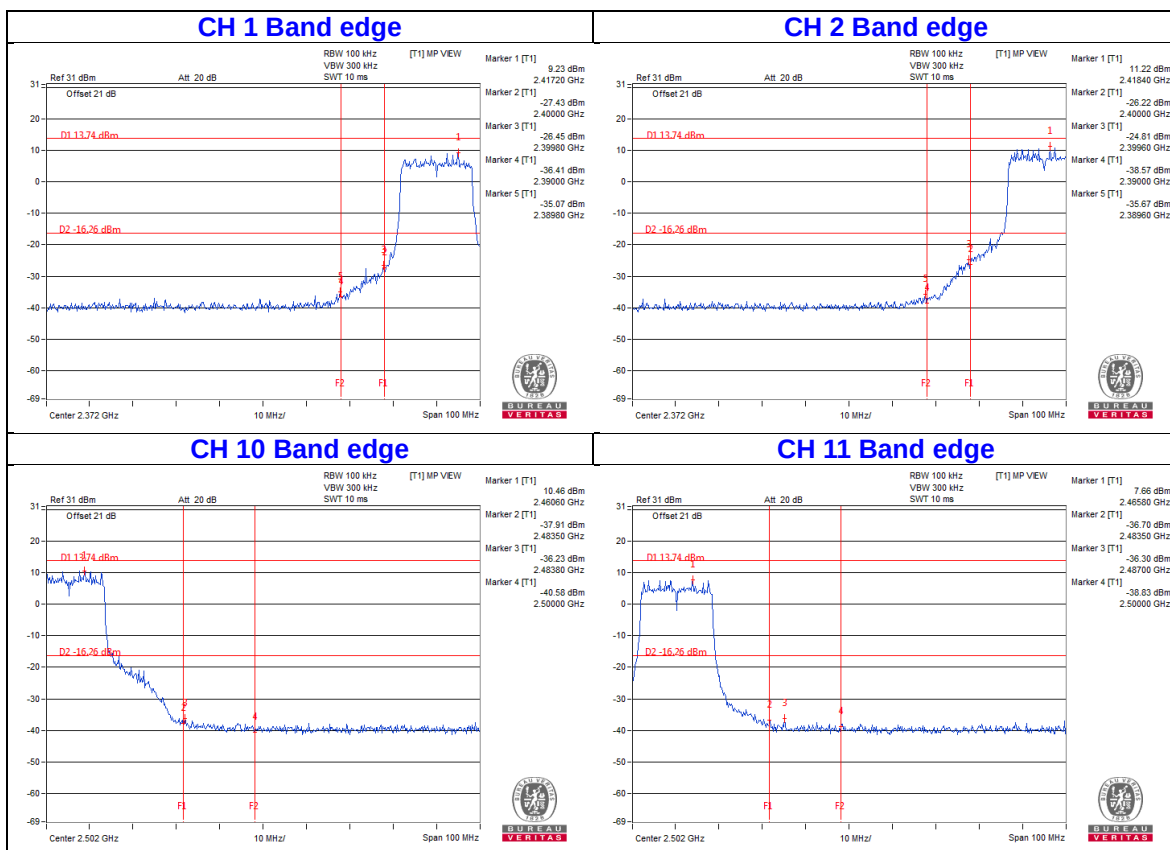
Chain 0



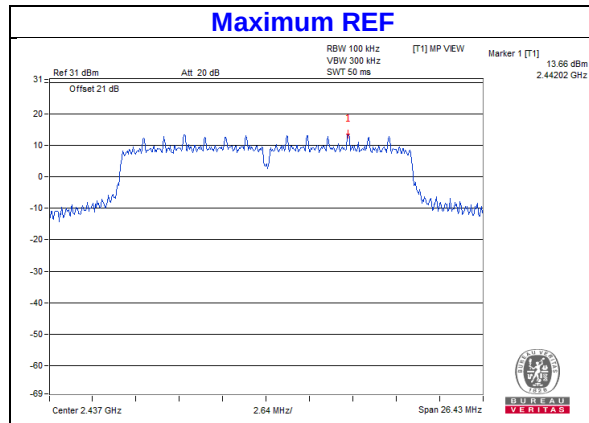


Chain 1

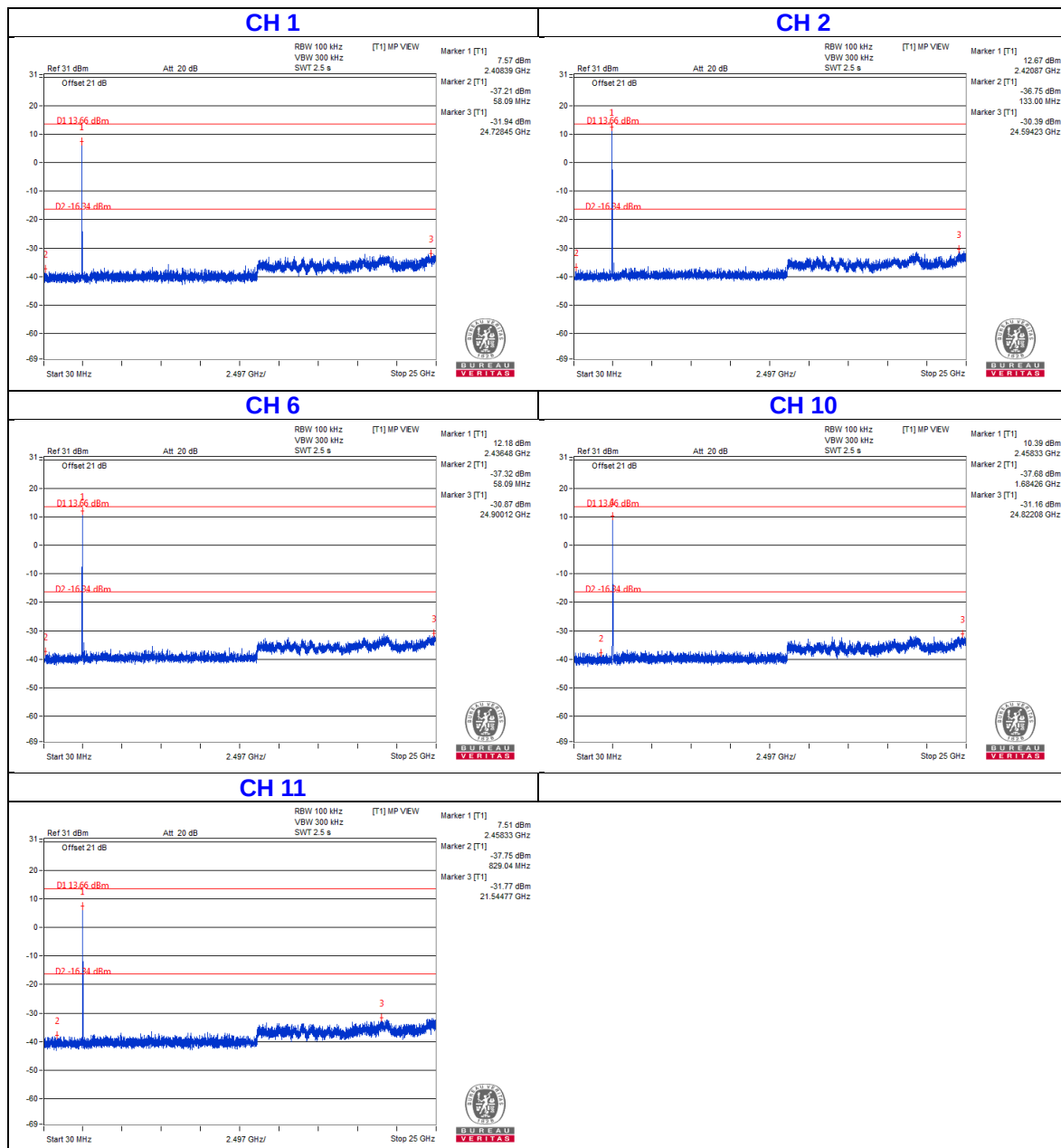


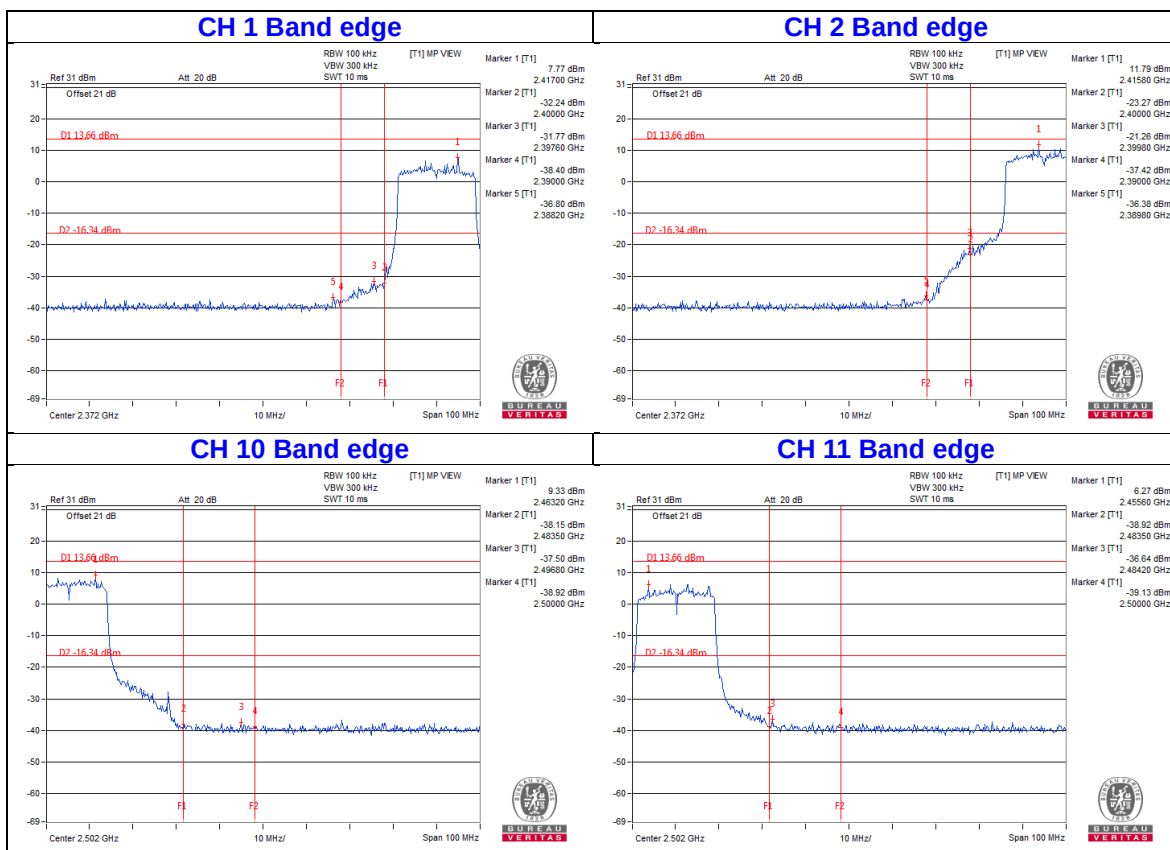


802.11n (HT20)

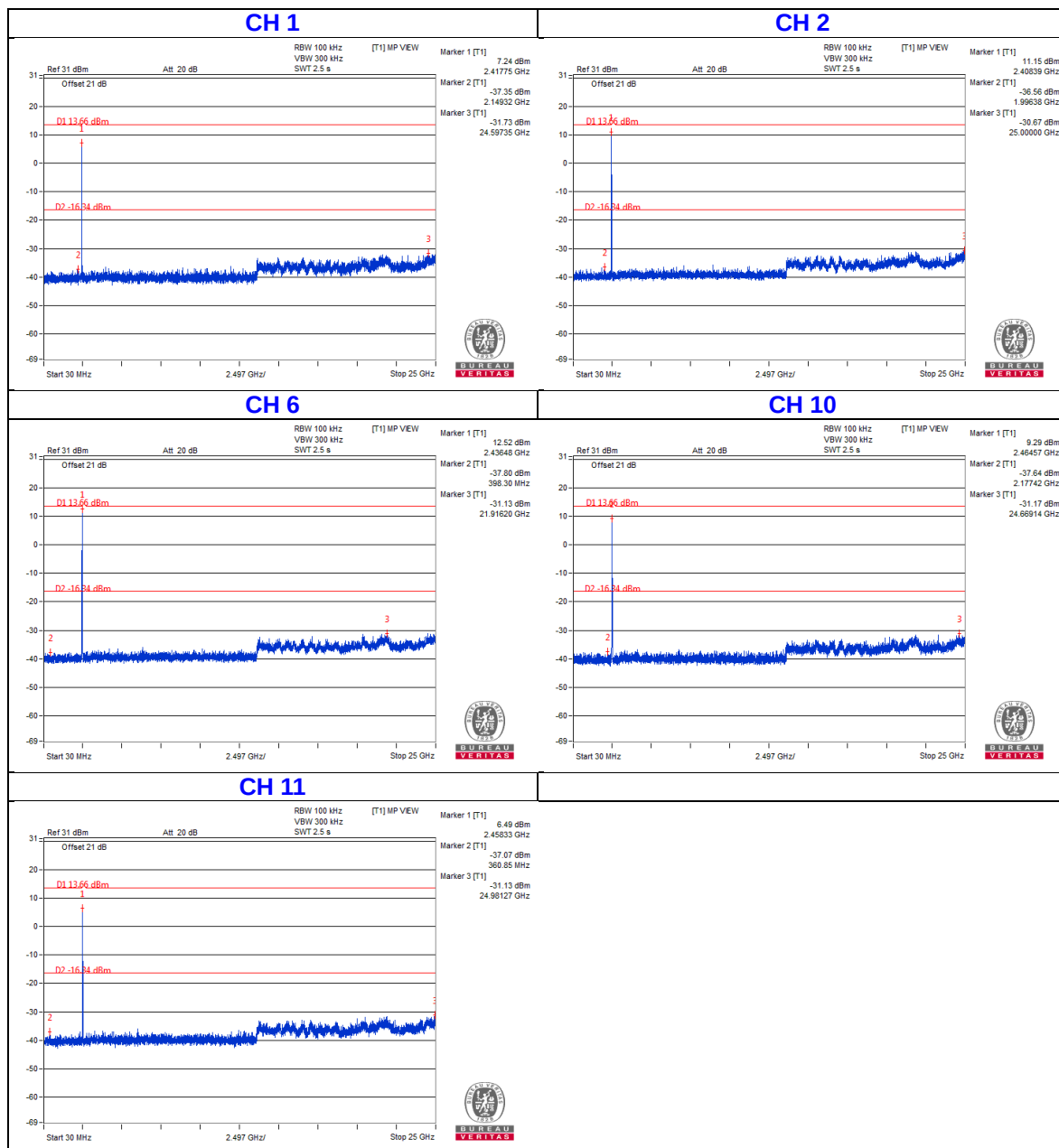


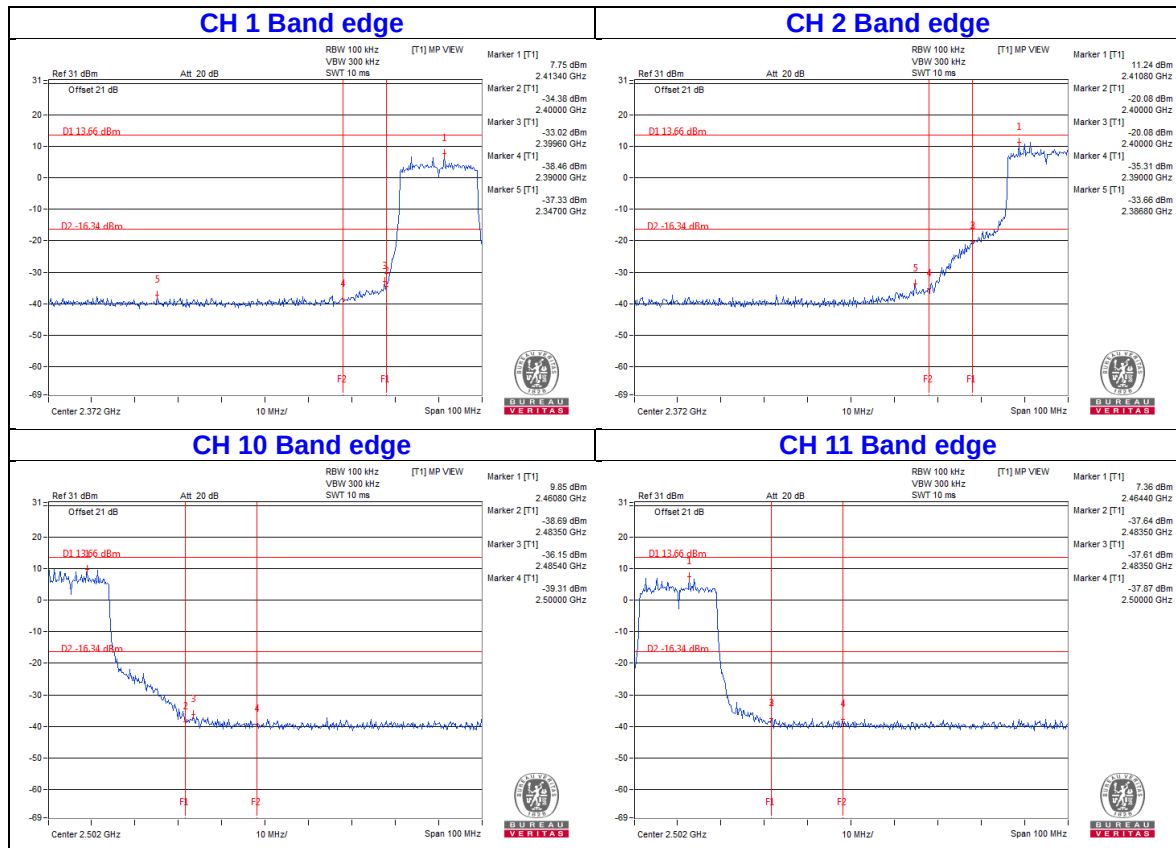
Chain 0



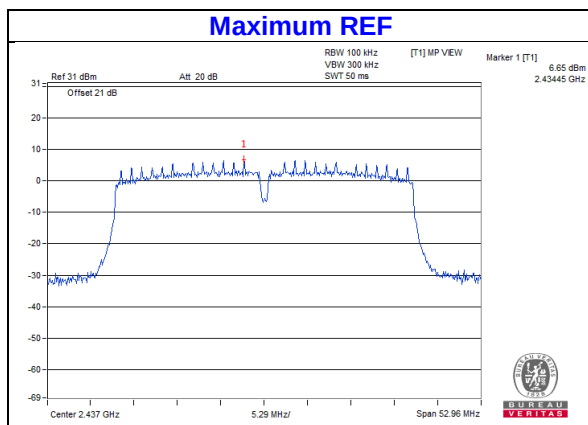


Chain 1

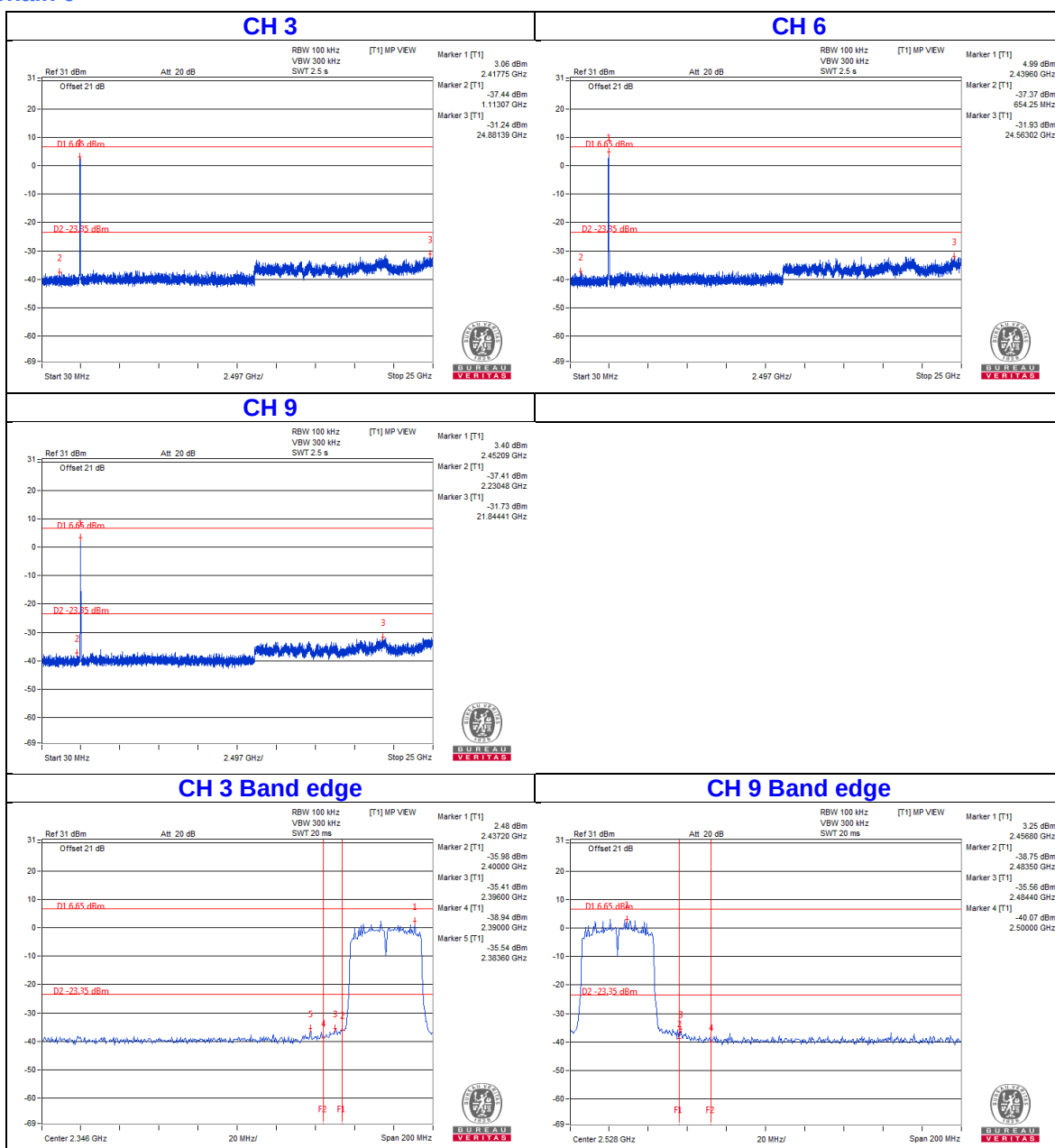




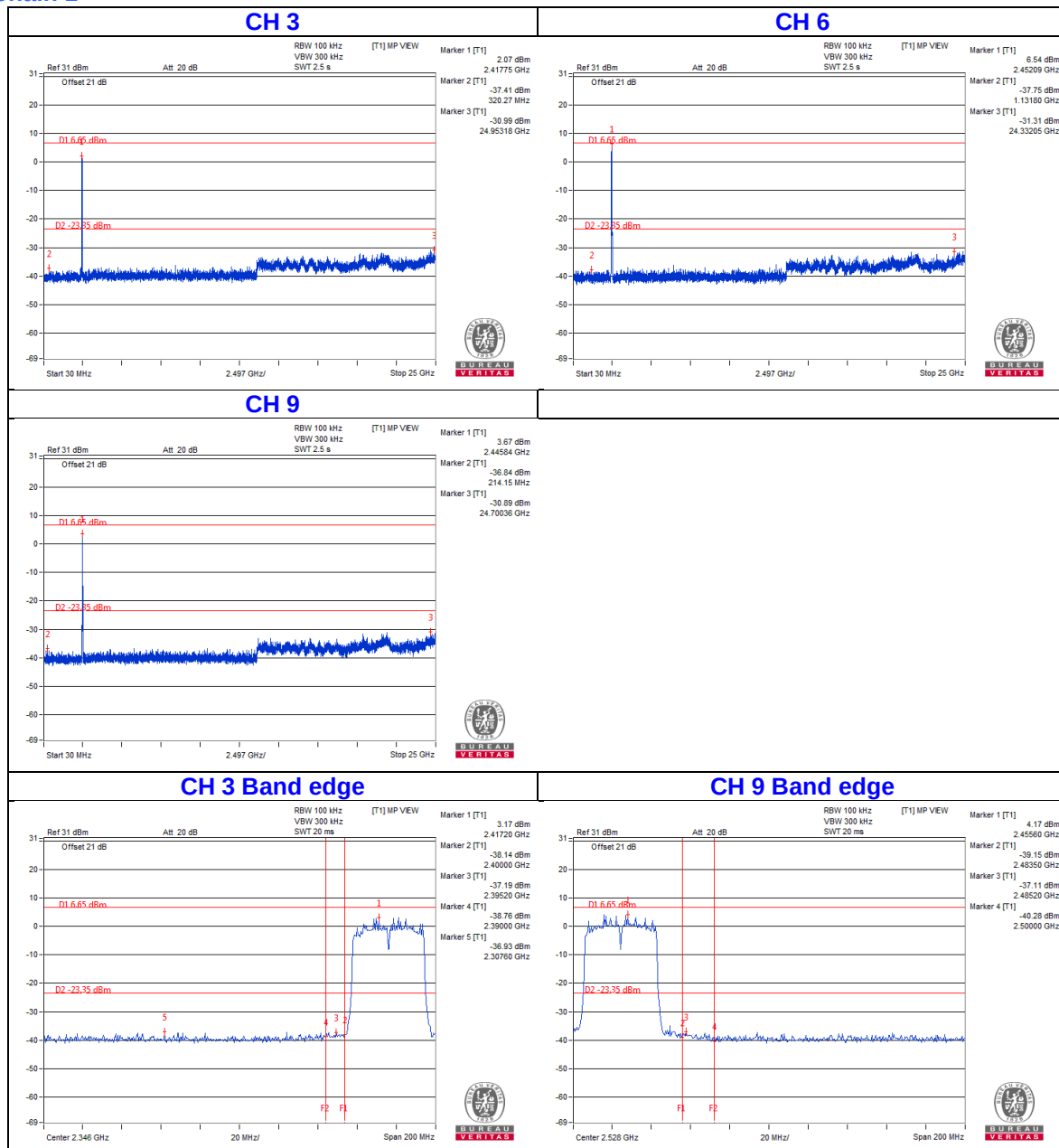
802.11n (HT40)



Chain 0



Chain 1



5 Pictures of Test Arrangements

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

Appendix – Information on 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.

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

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