

FCC Test Report

Report No.: RF190614C18

FCC ID: NDD9532311904

Test Model: IC-3231GOP

Series Model: IC-S200WB (refer to item 3.1 for more details)

Received Date: Jun. 21, 2019

Test Date: Jul. 10, 2019 ~ Jun. 17, 2020

Issued Date: Jun. 18, 2020

Applicant: EDIMAX TECHNOLOGY CO., LTD.

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FCC Registration / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
RF190614C18	Original release	Jun. 18, 2020

1 Certificate of Conformity

Product: 2MP WI-FI Bullet Cammera

Brand: EDIMAX

Test Model: IC-3231GOP

Series Model: IC-S200WB (refer to item 3.1 for more details)

Sample Status: Engineering sample

Applicant: EDIMAX TECHNOLOGY CO., LTD.

Test Date: Jul. 10, 2019 ~ Jun. 17, 2020

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 : Polly Chien , **Date:** Jun. 18, 2020
Polly Chien / Specialist

Approved by : Bruce Chen , **Date:** Jun. 18, 2020
Bruce Chen / Senior 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	Pass	Meet the requirement of limit. Minimum passing margin is -11.85dB at 0.63800MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.6dB at 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.

Note:

- For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
- 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	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.59 dB
	200MHz ~ 1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	2MP WI-FI Bullet Cammera
Brand	EDIMAX
Test Model	IC-3231GOP
Series Model	IC-S200WB
Model Difference	Refer to note
Sample Status	Engineering sample
Power Supply Rating	12Vdc from adapter
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	313.329mW
Antenna Type	Dipole antenna with 2dBi gain
Antenna Connector	i-pex(MHF)
Accessory Device	Adapter, antenna
Cable Supplied	1.5m shielded cable without core attached on EUT

Note:

1. All models are listed as below.

Brand	Model	Description
EDIMAX	IC-3231GOP	All models are electrically identical in RF and hardware, different model names are for marketing purpose only.
	IC-S200WB	

* The model of the IC-3231GOP was chosen for final test.

2. 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

3. The EUT consumes power from the following adapters.

Adapter 1	
Brand	AMIGO
Model	AMS159A-1201000FU
Input Power	100-240Vac, 50/60Hz, 0.5A
Output Power	12Vdc, 1A
Power Line	1.5m DC power cable without core attached on adapter

Adapter 2	
Brand	DVE
Model	DSA-12PFT-12 FUS 120100
Input Power	100-240Vac, 50/60Hz, 0.5A
Output Power	12Vdc, 1A
Power Line	1.45m DC power cable without core attached on adapter

Adapter 3	
Brand	DEE VAN ENTERPRISE CO., LTD
Model	DSA-12PF09-12FUS 120100
Input Power	100-240Vac, 50/60Hz, 0.5A
Output Power	12Vdc, 1A
Power Line	1.5m DC power cable without core attached on adapter

*After the evaluation of the above adapters, adapter 1 and adapter 3 were chosen for final test.

4. WLAN and BT LE technology cannot transmit simultaneously.

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				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter 1
B	-	√	√	-	Power from adapter 2

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. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
2. "-" 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.

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11b	1 to 11	6	DSSS	DBPSK	1.0

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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11b	1 to 11	6	DSSS	DBPSK	1.0

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.

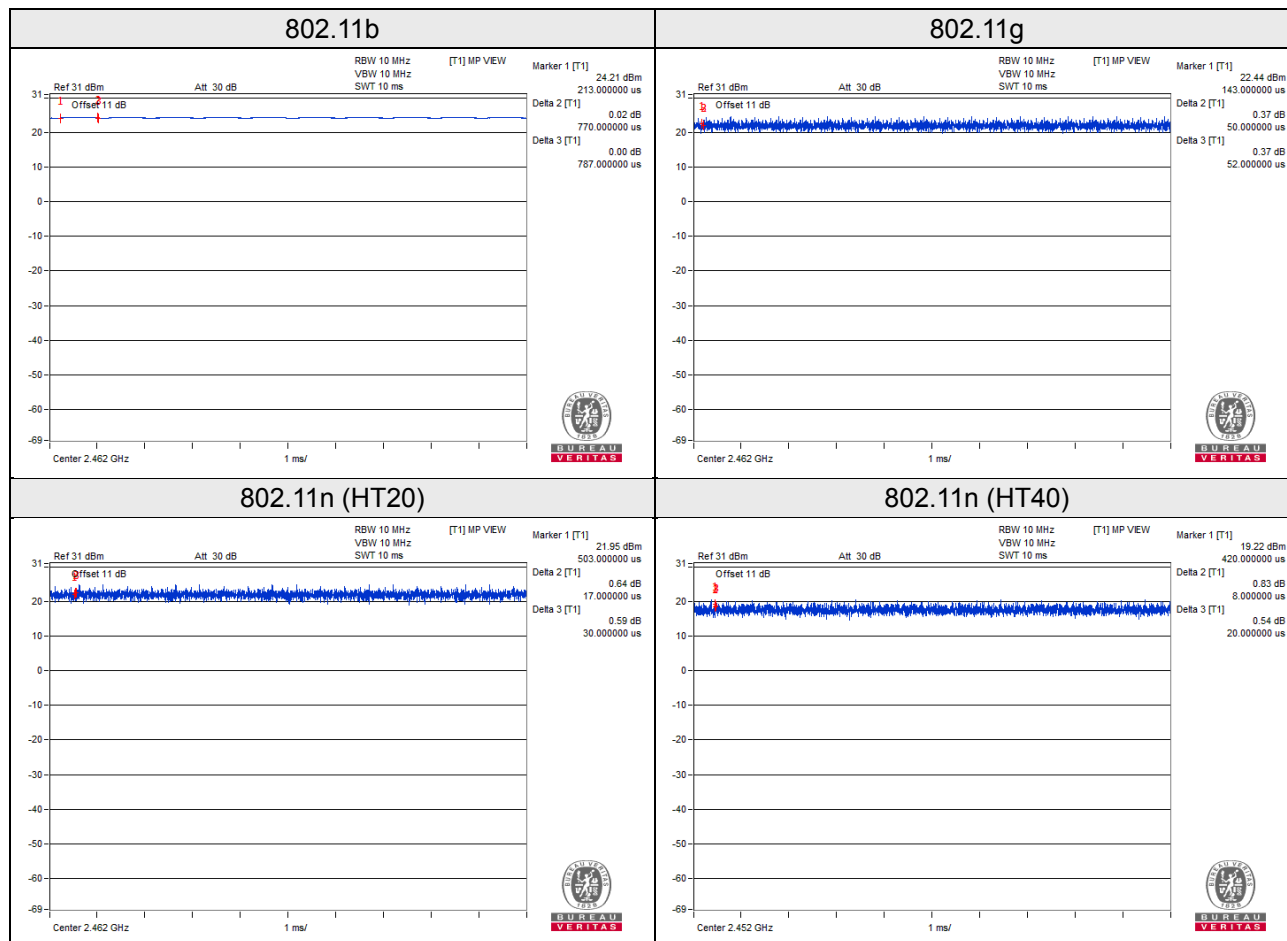
EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
A	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	22 deg. C, 68% RH	120Vac, 60Hz	Greg Lin
RE<1G	22 deg. C, 66% RH 22 deg. C, 68% RH	120Vac, 60Hz	Han Wu, Greg Lin
PLC	25 deg. C, 75% RH 23 deg. C, 66% RH	120Vac, 60Hz	Greg Lin, Titan Hsu
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Ted Chang

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.



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.

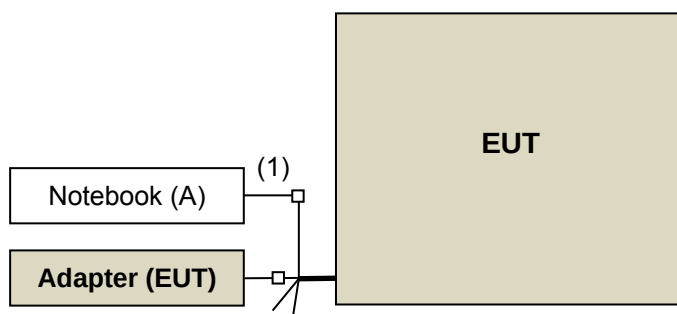
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5420	BPQ7MQ1	FCC DoC Approved	-

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Wi-Fi test USB cable	1	1	N	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

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 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

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 15, 2019	Apr. 14, 2020
			Apr. 16, 2020	Apr. 15, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 23, 2019	Sep. 22, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 21, 2018	Nov. 20, 2019
			Nov. 07, 2019	Nov. 06, 2020
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 25, 2018	Nov. 24, 2019
			Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
			Nov. 24, 2019	Nov. 23, 2020
Loop Antenna TESEQ	HLA 6121	45745	Jul. 01, 2019	Jun. 30, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2018	Aug. 07, 2019
			Jul. 11, 2019	Jul. 10, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 19, 2019	Feb. 18, 2020
			Feb. 18, 2020	Feb. 17, 2021
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM80 00	CABLE-CH9-02 (248780+171006)	Jan. 19, 2019	Jan. 18, 2020
			Jan. 18, 2020	Jan. 17, 2021
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Aug. 08, 2018	Aug. 07, 2019
			Jul. 11, 2019	Jul. 10, 2020
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 30, 2019	Jul. 29, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190 004/MY55190007/MY55 210005	Jul. 15, 2019	Jul. 14, 2020

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 HwaYa Chamber 9.

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. 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.

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 detect 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:

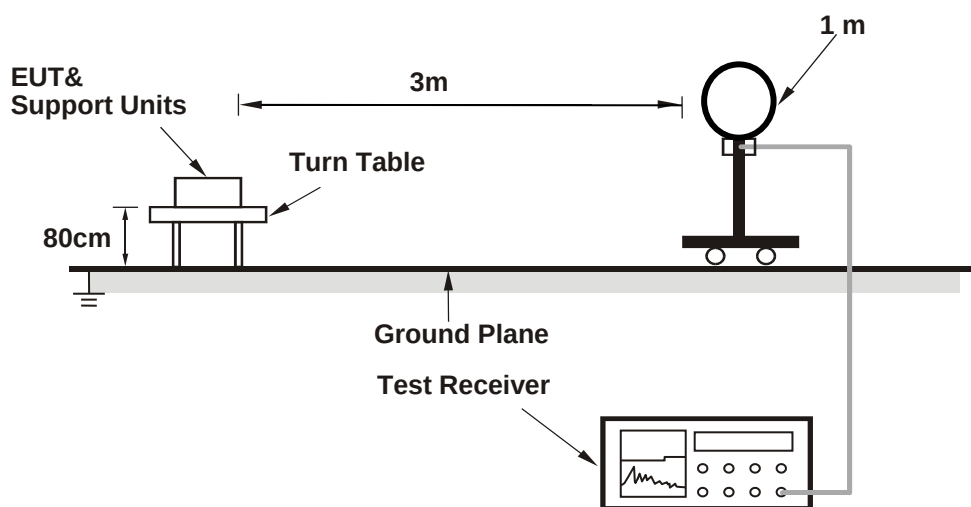
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

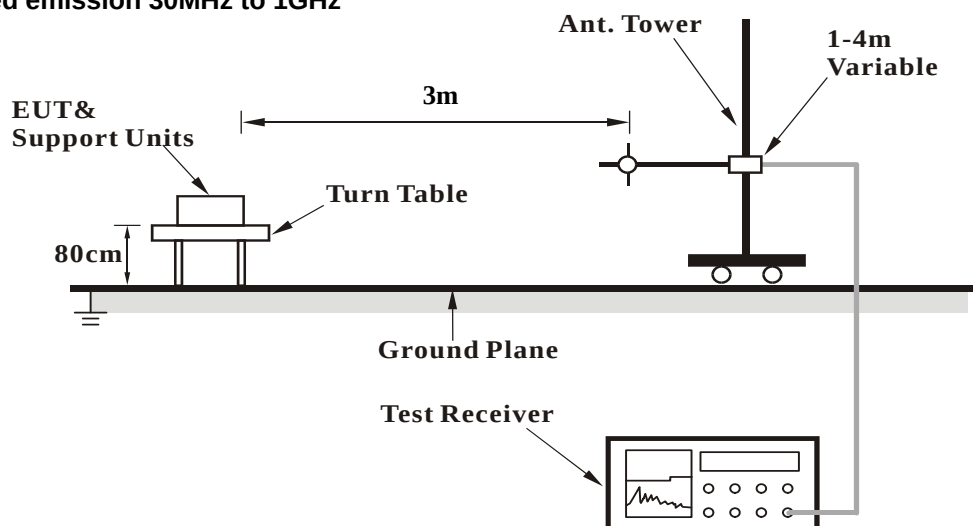
No deviation.

4.1.5 Test Setup

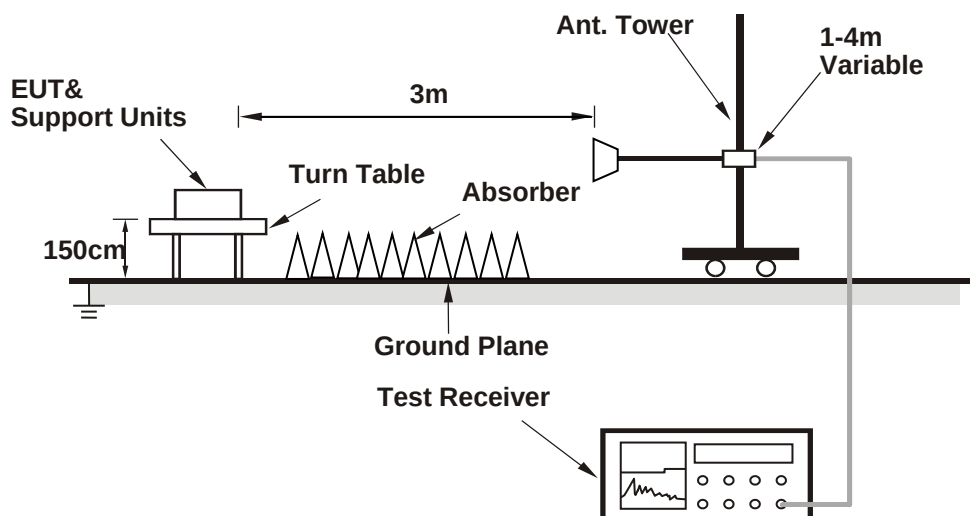
For Radiated emission below 30MHz



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

- Placed the EUT on the testing table.
- The EUT connected with notebook via a cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz Data:

802.11b

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

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	61.5 PK	74.0	-12.5	2.16 H	37	29.7	31.8
2	2390.00	53.3 AV	54.0	-0.7	2.16 H	37	21.5	31.8
3	*2412.00	111.9 PK			2.10 H	36	80.0	31.9
4	*2412.00	108.3 AV			2.10 H	36	76.4	31.9
5	4824.00	49.3 PK	74.0	-24.7	1.72 H	353	45.7	3.6
6	4824.00	45.9 AV	54.0	-8.1	1.72 H	353	42.3	3.6
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	60.3 PK	74.0	-13.7	3.58 V	311	28.5	31.8
2	2390.00	52.1 AV	54.0	-1.9	3.58 V	311	20.3	31.8
3	*2412.00	109.8 PK			3.52 V	318	77.9	31.9
4	*2412.00	106.2 AV			3.52 V	318	74.3	31.9
5	4824.00	52.3 PK	74.0	-21.7	2.23 V	302	48.7	3.6
6	4824.00	49.0 AV	54.0	-5.0	2.23 V	302	45.4	3.6

Remarks:

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

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

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	62.3 PK	74.0	-11.7	2.16 H	33	30.5	31.8
2	2390.00	53.2 AV	54.0	-0.8	2.16 H	33	21.4	31.8
3	*2437.00	115.8 PK			1.84 H	35	84.0	31.8
4	*2437.00	112.2 AV			1.84 H	35	80.4	31.8
5	4874.00	52.0 PK	74.0	-22.0	1.64 H	344	48.5	3.5
6	4874.00	48.7 AV	54.0	-5.3	1.64 H	344	45.2	3.5
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	61.2 PK	74.0	-12.8	3.42 V	303	29.4	31.8
2	2390.00	52.3 AV	54.0	-1.7	3.42 V	303	20.5	31.8
3	*2437.00	113.5 PK			3.49 V	316	81.7	31.8
4	*2437.00	109.9 AV			3.49 V	316	78.1	31.8
5	4874.00	53.9 PK	74.0	-20.1	2.16 V	295	50.4	3.5
6	4874.00	51.2 AV	54.0	-2.8	2.16 V	295	47.7	3.5

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.

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

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	112.6 PK			1.80 H	33	80.8	31.8
2	*2462.00	109.0 AV			1.80 H	33	77.2	31.8
3	2483.50	61.3 PK	74.0	-12.7	2.11 H	42	29.5	31.8
4	2483.50	52.8 AV	54.0	-1.2	2.11 H	42	21.0	31.8
5	4924.00	49.4 PK	74.0	-24.6	1.63 H	341	45.9	3.5
6	4924.00	45.9 AV	54.0	-8.1	1.63 H	341	42.4	3.5
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	110.9 PK			3.42 V	308	79.1	31.8
2	*2462.00	107.2 AV			3.42 V	308	75.4	31.8
3	2483.50	60.2 PK	74.0	-13.8	3.51 V	311	28.4	31.8
4	2483.50	51.6 AV	54.0	-2.4	3.51 V	311	19.8	31.8
5	4924.00	52.3 PK	74.0	-21.7	2.19 V	302	48.8	3.5
6	4924.00	49.1 AV	54.0	-4.9	2.19 V	302	45.6	3.5

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.

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

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	66.5 PK	74.0	-7.5	2.15 H	35	34.7	31.8
2	2390.00	52.7 AV	54.0	-1.3	2.15 H	35	20.9	31.8
3	*2412.00	109.1 PK			2.11 H	33	77.2	31.9
4	*2412.00	99.5 AV			2.11 H	33	67.6	31.9
5	4824.00	46.8 PK	74.0	-27.2	1.82 H	342	43.2	3.6
6	4824.00	33.2 AV	54.0	-20.8	1.82 H	342	29.6	3.6
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	65.6 PK	74.0	-8.4	3.52 V	304	33.8	31.8
2	2390.00	51.7 AV	54.0	-2.3	3.52 V	304	19.9	31.8
3	*2412.00	106.9 PK			3.46 V	311	75.0	31.9
4	*2412.00	97.3 AV			3.46 V	311	65.4	31.9
5	4824.00	45.4 PK	74.0	-28.6	2.23 V	292	41.8	3.6
6	4824.00	32.0 AV	54.0	-22.0	2.23 V	292	28.4	3.6

Remarks:

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

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

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	67.3 PK	74.0	-6.7	2.18 H	37	35.5	31.8
2	2390.00	53.0 AV	54.0	-1.0	2.18 H	37	21.2	31.8
3	*2437.00	115.2 PK			1.84 H	35	83.4	31.8
4	*2437.00	105.3 AV			1.84 H	35	73.5	31.8
5	4874.00	48.1 PK	74.0	-25.9	1.93 H	357	44.6	3.5
6	4874.00	35.0 AV	54.0	-19.0	1.93 H	357	31.5	3.5
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	66.3 PK	74.0	-7.7	3.44 V	318	34.5	31.8
2	2390.00	51.9 AV	54.0	-2.1	3.44 V	318	20.1	31.8
3	*2437.00	113.1 PK			3.38 V	324	81.3	31.8
4	*2437.00	103.2 AV			3.38 V	324	71.4	31.8
5	4874.00	46.1 PK	74.0	-27.9	2.26 V	293	42.6	3.5
6	4874.00	34.2 AV	54.0	-19.8	2.26 V	293	30.7	3.5

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.

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

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	110.3 PK			1.80 H	34	78.5	31.8
2	*2462.00	100.6 AV			1.80 H	34	68.8	31.8
3	2483.50	71.5 PK	74.0	-2.5	1.79 H	32	39.7	31.8
4	2483.50	53.1 AV	54.0	-0.9	1.79 H	32	21.3	31.8
5	4924.00	46.4 PK	74.0	-27.6	1.77 H	347	42.9	3.5
6	4924.00	32.8 AV	54.0	-21.2	1.77 H	347	29.3	3.5
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	108.1 PK			3.42 V	319	76.3	31.8
2	*2462.00	98.4 AV			3.42 V	319	66.6	31.8
3	2483.50	70.2 PK	74.0	-3.8	3.55 V	322	38.4	31.8
4	2483.50	51.9 AV	54.0	-2.1	3.55 V	322	20.1	31.8
5	4924.00	45.7 PK	74.0	-28.3	2.25 V	291	42.2	3.5
6	4924.00	31.6 AV	54.0	-22.4	2.25 V	291	28.1	3.5

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.

802.11n (HT20)

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

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	67.7 PK	74.0	-6.3	1.40 H	31	35.9	31.8
2	2390.00	53.1 AV	54.0	-0.9	1.40 H	31	21.3	31.8
3	*2412.00	109.3 PK			1.45 H	34	77.4	31.9
4	*2412.00	99.4 AV			1.45 H	34	67.5	31.9
5	4824.00	47.0 PK	74.0	-27.0	1.03 H	182	43.4	3.6
6	4824.00	33.7 AV	54.0	-20.3	1.03 H	182	30.1	3.6
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	66.0 PK	74.0	-8.0	3.73 V	297	34.2	31.8
2	2390.00	51.2 AV	54.0	-2.8	3.73 V	297	19.4	31.8
3	*2412.00	107.4 PK			3.86 V	309	75.5	31.9
4	*2412.00	97.5 AV			3.86 V	309	65.6	31.9
5	4824.00	44.9 PK	74.0	-29.1	2.46 V	122	41.3	3.6
6	4824.00	32.3 AV	54.0	-21.7	2.46 V	122	28.7	3.6

Remarks:

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

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

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	70.4 PK	74.0	-3.6	1.74 H	35	38.6	31.8
2	2390.00	52.9 AV	54.0	-1.1	1.74 H	35	21.1	31.8
3	*2437.00	115.4 PK			1.17 H	40	83.6	31.8
4	*2437.00	105.4 AV			1.17 H	40	73.6	31.8
5	4874.00	47.0 PK	74.0	-27.0	1.00 H	185	43.5	3.5
6	4874.00	33.8 AV	54.0	-20.2	1.00 H	185	30.3	3.5
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	3.82 V	307	36.5	31.8
2	2390.00	51.0 AV	54.0	-3.0	3.82 V	307	19.2	31.8
3	*2437.00	113.3 PK			3.89 V	304	81.5	31.8
4	*2437.00	103.4 AV			3.89 V	304	71.6	31.8
5	4874.00	44.9 PK	74.0	-29.1	2.37 V	116	41.4	3.5
6	4874.00	32.1 AV	54.0	-21.9	2.37 V	116	28.6	3.5

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.

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

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	110.4 PK			1.38 H	34	78.6	31.8
2	*2462.00	100.5 AV			1.38 H	34	68.7	31.8
3	2483.50	73.1 PK	74.0	-0.9	1.36 H	36	41.3	31.8
4	2483.50	52.8 AV	54.0	-1.2	1.36 H	36	21.0	31.8
5	4924.00	46.3 PK	74.0	-27.7	1.07 H	176	42.8	3.5
6	4924.00	32.9 AV	54.0	-21.1	1.07 H	176	29.4	3.5
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	108.5 PK			3.83 V	301	76.7	31.8
2	*2462.00	98.6 AV			3.83 V	301	66.8	31.8
3	2483.50	71.4 PK	74.0	-2.6	3.74 V	287	39.6	31.8
4	2483.50	51.0 AV	54.0	-3.0	3.74 V	287	19.2	31.8
5	4924.00	44.8 PK	74.0	-29.2	2.53 V	119	41.3	3.5
6	4924.00	31.7 AV	54.0	-22.3	2.53 V	119	28.2	3.5

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.

802.11n (HT40)

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

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	67.6 PK	74.0	-6.4	1.50 H	33	35.8	31.8
2	2390.00	53.4 AV	54.0	-0.6	1.50 H	33	21.6	31.8
3	*2422.00	103.4 PK			1.43 H	31	71.6	31.8
4	*2422.00	94.1 AV			1.43 H	31	62.3	31.8
5	4844.00	47.1 PK	74.0	-26.9	1.73 H	342	43.6	3.5
6	4844.00	33.8 AV	54.0	-20.2	1.73 H	342	30.3	3.5
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	66.3 PK	74.0	-7.7	3.37 V	302	34.5	31.8
2	2390.00	52.1 AV	54.0	-1.9	3.37 V	302	20.3	31.8
3	*2422.00	101.5 PK			3.42 V	310	69.7	31.8
4	*2422.00	92.0 AV			3.42 V	310	60.2	31.8
5	4844.00	45.9 PK	74.0	-28.1	2.05 V	287	42.4	3.5
6	4844.00	32.7 AV	54.0	-21.3	2.05 V	287	29.2	3.5

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.

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

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	68.1 PK	74.0	-5.9	1.46 H	48	36.3	31.8
2	2390.00	53.4 AV	54.0	-0.6	1.46 H	48	21.6	31.8
3	*2437.00	107.0 PK			1.44 H	31	75.2	31.8
4	*2437.00	97.7 AV			1.44 H	31	65.9	31.8
5	4874.00	47.3 PK	74.0	-26.7	1.81 H	349	43.8	3.5
6	4874.00	34.1 AV	54.0	-19.9	1.81 H	349	30.6	3.5
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	66.8 PK	74.0	-7.2	3.50 V	311	35.0	31.8
2	2390.00	52.1 AV	54.0	-1.9	3.50 V	311	20.3	31.8
3	*2437.00	105.1 PK			3.41 V	306	73.3	31.8
4	*2437.00	95.6 AV			3.41 V	306	63.8	31.8
5	4874.00	46.2 PK	74.0	-27.8	2.03 V	298	42.7	3.5
6	4874.00	33.0 AV	54.0	-21.0	2.03 V	298	29.5	3.5

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.

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

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	105.9 PK			1.87 H	32	74.1	31.8
2	*2452.00	96.5 AV			1.87 H	32	64.7	31.8
3	2483.50	66.9 PK	74.0	-7.1	2.02 H	31	35.1	31.8
4	2483.50	53.0 AV	54.0	-1.0	2.02 H	31	21.2	31.8
5	4904.00	46.2 PK	74.0	-27.8	1.86 H	351	42.8	3.4
6	4904.00	33.1 AV	54.0	-20.9	1.86 H	351	29.7	3.4
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	103.9 PK			3.39 V	312	72.1	31.8
2	*2452.00	94.4 AV			3.39 V	312	62.6	31.8
3	2483.50	65.7 PK	74.0	-8.3	3.53 V	307	33.9	31.8
4	2483.50	51.9 AV	54.0	-2.1	3.53 V	307	20.1	31.8
5	4904.00	45.7 PK	74.0	-28.3	2.13 V	298	42.3	3.4
6	4904.00	32.0 AV	54.0	-22.0	2.13 V	298	28.6	3.4

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.
5. " * ": Fundamental frequency.

Below 1GHz worst-case data:

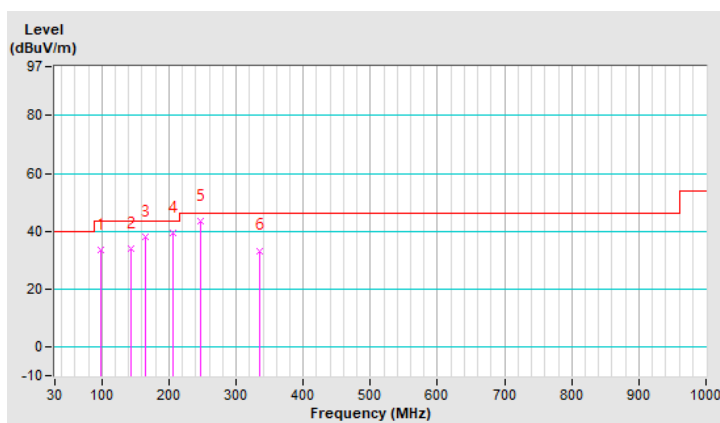
802.11b

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

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	98.88	33.6 QP	43.5	-9.9	1.49 H	15	47.5	-13.9
2	143.87	34.1 QP	43.5	-9.4	1.49 H	102	43.7	-9.6
3	164.96	38.1 QP	43.5	-5.4	1.49 H	125	47.5	-9.4
4	205.72	39.4 QP	43.5	-4.1	1.00 H	129	50.9	-11.5
5	247.90	43.5 QP	46.0	-2.5	1.00 H	131	53.3	-9.8
6	335.06	33.3 QP	46.0	-12.7	1.00 H	65	40.5	-7.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

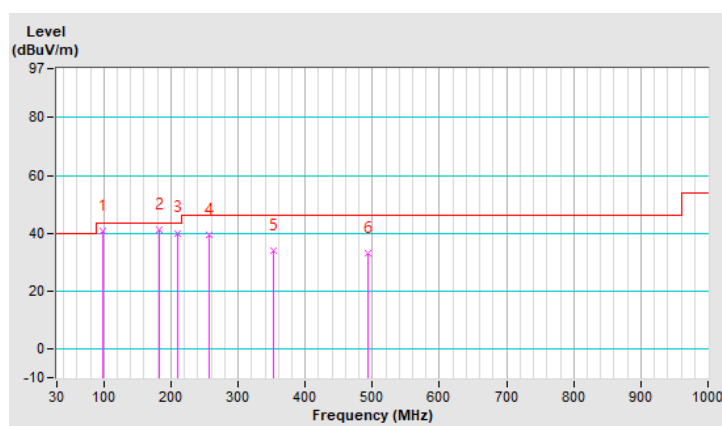


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	A

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	98.88	40.9 QP	43.5	-2.6	1.01 V	247	54.8	-13.9
2	181.83	41.1 QP	43.5	-2.4	1.01 V	272	51.8	-10.7
3	209.94	40.1 QP	43.5	-3.4	1.01 V	230	51.5	-11.4
4	257.74	39.6 QP	46.0	-6.4	1.50 V	255	49.0	-9.4
5	351.93	34.2 QP	46.0	-11.8	1.01 V	146	41.5	-7.3
6	493.91	33.1 QP	46.0	-12.9	1.01 V	15	37.8	-4.7

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

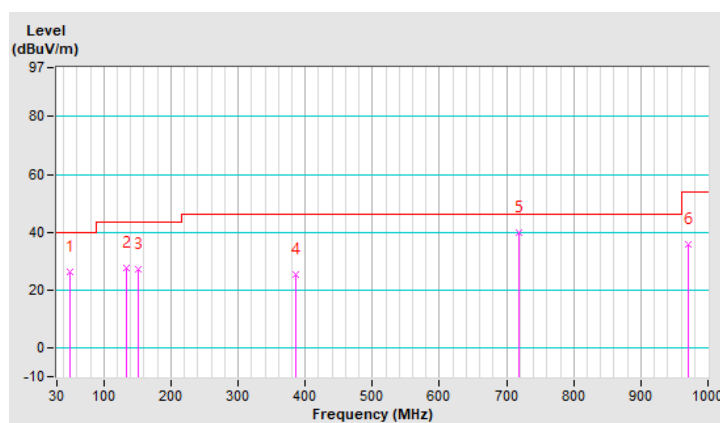


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

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	49.40	26.1 QP	40.0	-13.9	1.25 H	2	35.8	-9.7
2	132.82	27.6 QP	43.5	-15.9	1.00 H	211	38.0	-10.4
3	150.28	27.1 QP	43.5	-16.4	1.50 H	303	36.3	-9.2
4	385.02	25.4 QP	46.0	-20.6	1.50 H	310	31.4	-6.0
5	718.70	39.9 QP	46.0	-6.1	1.00 H	210	40.2	-0.3
6	970.90	35.6 QP	54.0	-18.4	1.25 H	107	30.7	4.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

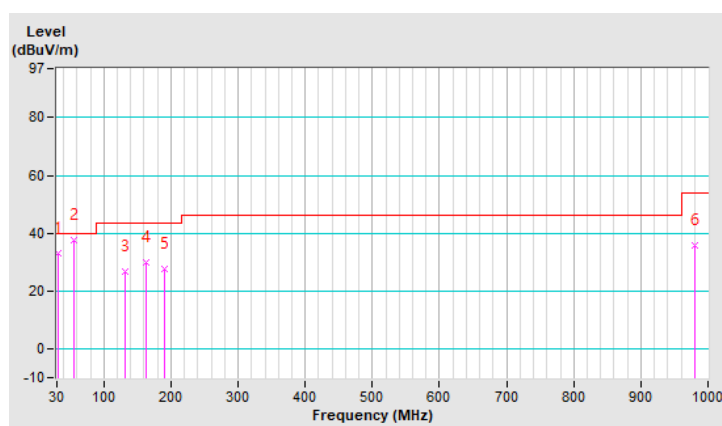


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

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	31.94	33.0 QP	40.0	-7.0	1.25 V	10	44.4	-11.4
2	55.22	37.7 QP	40.0	-2.3	1.00 V	36	47.6	-9.9
3	130.88	26.9 QP	43.5	-16.6	1.50 V	209	37.5	-10.6
4	163.86	29.7 QP	43.5	-13.8	1.50 V	188	39.0	-9.3
5	191.02	27.8 QP	43.5	-15.7	1.00 V	17	39.6	-11.8
6	980.60	36.0 QP	54.0	-18.0	1.00 V	321	31.0	5.0

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 10, 2018	Dec. 09, 2019
			Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
			Sep. 05, 2019	Sep. 04, 2020
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
			Feb. 20, 2020	Feb. 19, 2021
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
			Aug. 22, 2019	Aug. 21, 2020
Software ADT	BV ADT_Conc_ V7.3.7.4	NA	NA	NA

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 HwaYa Shielded Room 1 (Conduction 1).

3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

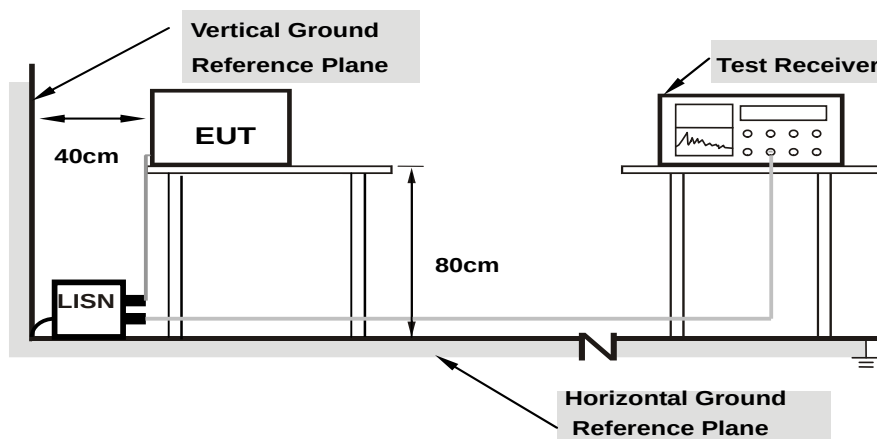
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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

Worst-case data:

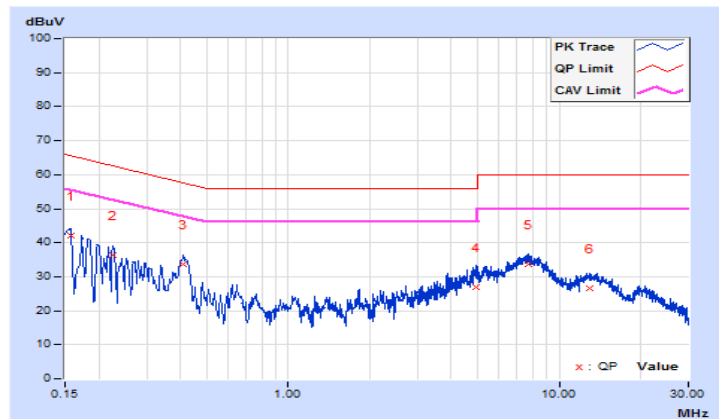
802.11b

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15719	9.69	32.45	18.91	42.14	28.60	65.61	55.61	-23.47	-27.01
2	0.22434	9.68	26.58	11.26	36.26	20.94	62.66	52.66	-26.40	-31.72
3	0.40800	9.68	23.90	18.53	33.58	28.21	57.69	47.69	-24.11	-19.48
4	4.96321	9.77	17.01	10.46	26.78	20.23	56.00	46.00	-29.22	-25.77
5	7.72758	9.82	23.95	18.01	33.77	27.83	60.00	50.00	-26.23	-22.17
6	12.89269	9.89	16.58	9.24	26.47	19.13	60.00	50.00	-33.53	-30.87

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.

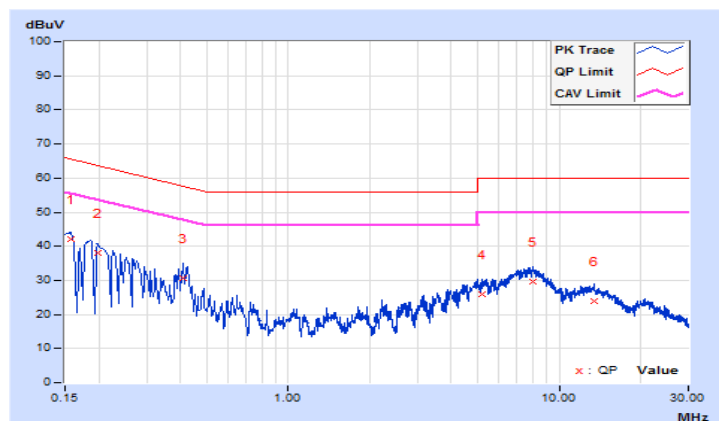


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	9.66	32.43	16.83	42.09	26.49	65.58	55.58	-23.49	-29.09
2	0.19717	9.66	28.47	10.73	38.13	20.39	63.73	53.73	-25.60	-33.34
3	0.40800	9.65	21.07	13.57	30.72	23.22	57.69	47.69	-26.97	-24.47
4	5.18217	9.75	16.28	7.93	26.03	17.68	60.00	50.00	-33.97	-32.32
5	8.03256	9.81	19.98	12.93	29.79	22.74	60.00	50.00	-30.21	-27.26
6	13.40099	9.90	13.85	6.58	23.75	16.48	60.00	50.00	-36.25	-33.52

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.

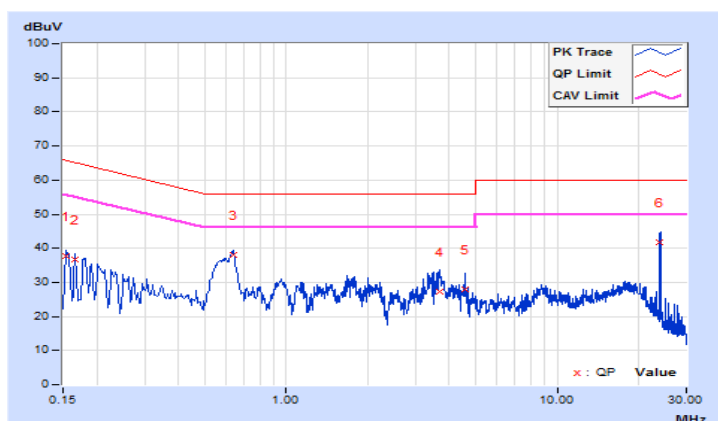


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.80	27.78	16.38	37.58	26.18	65.78	55.78	-28.20	-29.60
2	0.16600	9.80	27.02	16.15	36.82	25.95	65.16	55.16	-28.34	-29.21
3	0.63800	9.88	28.11	24.27	37.99	34.15	56.00	46.00	-18.01	-11.85
4	3.68600	10.04	17.07	8.90	27.11	18.94	56.00	46.00	-28.89	-27.06
5	4.56600	10.06	17.85	8.46	27.91	18.52	56.00	46.00	-28.09	-27.48
6	23.99800	10.25	31.37	21.23	41.62	31.48	60.00	50.00	-18.38	-18.52

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.

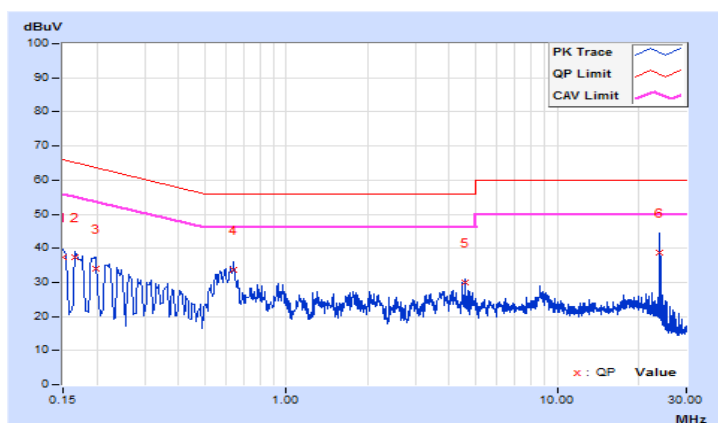


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.82	27.65	13.69	37.47	23.51	66.00	56.00	-28.53	-32.49
2	0.16600	9.82	27.70	14.41	37.52	24.23	65.16	55.16	-27.64	-30.93
3	0.19728	9.81	24.21	10.99	34.02	20.80	63.72	53.72	-29.70	-32.92
4	0.63800	9.91	23.63	18.89	33.54	28.80	56.00	46.00	-22.46	-17.20
5	4.57000	10.10	19.74	7.44	29.84	17.54	56.00	46.00	-26.16	-28.46
6	23.98200	10.38	28.32	8.92	38.70	19.30	60.00	50.00	-21.30	-30.70

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.

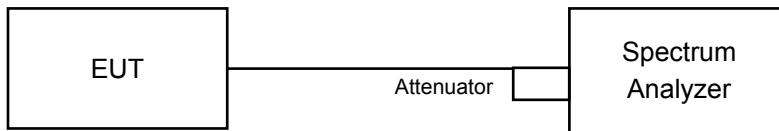


4.3 6dB Bandwidth Measurement

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
1	2412	10.11	0.5	Pass
6	2437	10.18	0.5	Pass
11	2462	10.10	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.66	0.5	Pass
6	2437	16.62	0.5	Pass
11	2462	16.66	0.5	Pass

802.11n (HT20)

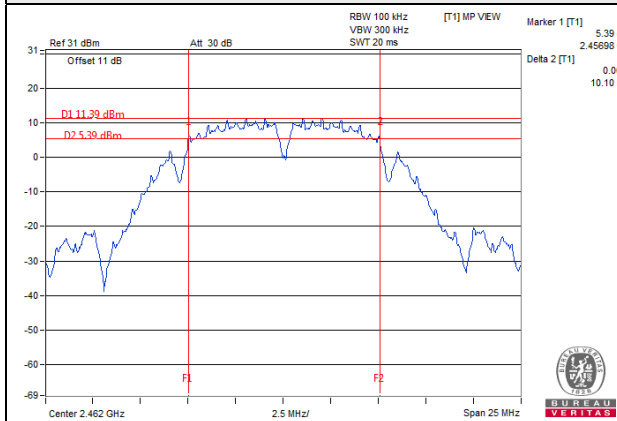
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.77	0.5	Pass
6	2437	17.87	0.5	Pass
11	2462	17.81	0.5	Pass

802.11n (HT40)

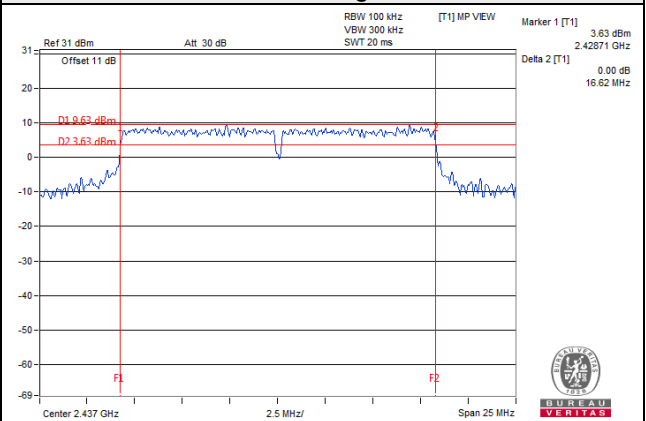
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	36.70	0.5	Pass
6	2437	36.67	0.5	Pass
9	2452	36.67	0.5	Pass

Spectrum Plot of Worst Value

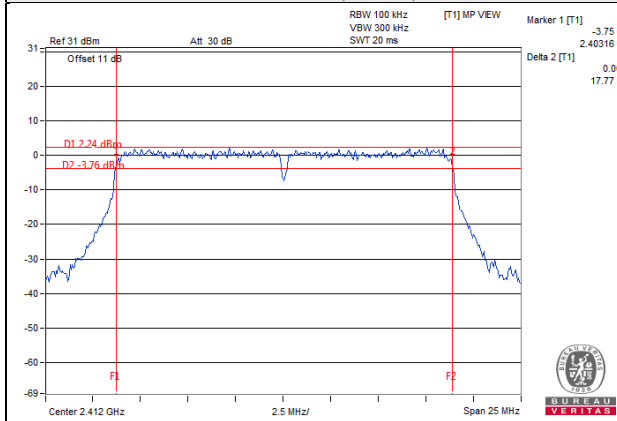
802.11b



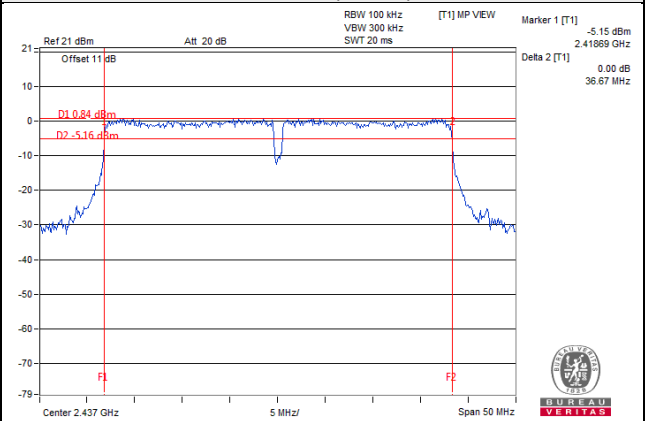
802.11g



802.11n (HT20)



802.11n (HT40)

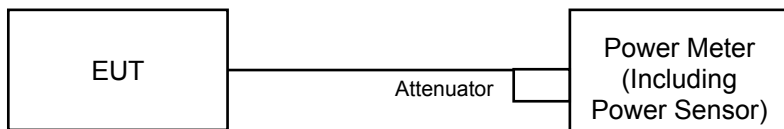


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

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

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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as item 4.3.6.

4.4.7 Test Results

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	123.595	20.92	30.00	Pass
6	2437	313.329	24.96	30.00	Pass
11	2462	146.893	21.67	30.00	Pass

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	45.814	16.61	30.00	Pass
6	2437	178.649	22.52	30.00	Pass
11	2462	62.373	17.95	30.00	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	36.224	15.59	30.00	Pass
6	2437	172.584	22.37	30.00	Pass
11	2462	59.293	17.73	30.00	Pass

802.11n (HT40)

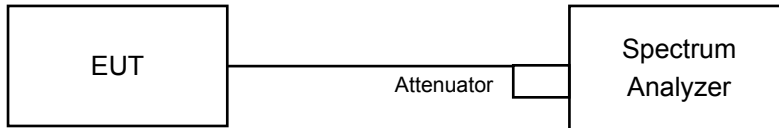
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	23.933	13.79	30.00	Pass
6	2437	55.081	17.41	30.00	Pass
9	2452	44.875	16.52	30.00	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

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

- 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 $\geq 2 \times \text{span}/\text{RBW}$.
- 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.

4.5.5 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

Channel	Frequency (MHz)	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-6.39	8.00	Pass
6	2437	-3.00	8.00	Pass
11	2462	-5.83	8.00	Pass

802.11g

Channel	Frequency (MHz)	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-12.13	8.00	Pass
6	2437	-6.31	8.00	Pass
11	2462	-10.56	8.00	Pass

802.11n (HT20)

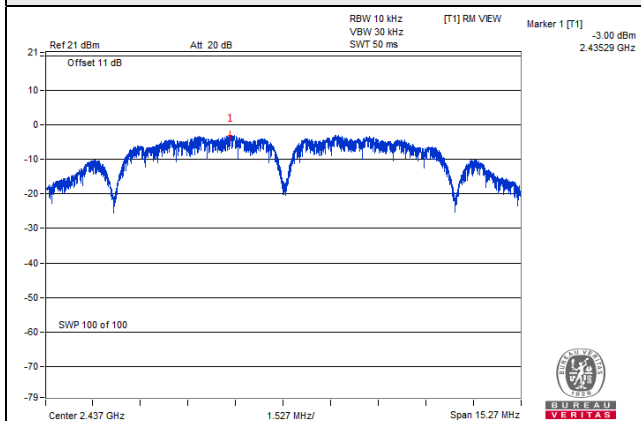
Channel	Frequency (MHz)	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-12.86	8.00	Pass
6	2437	-6.65	8.00	Pass
11	2462	-11.25	8.00	Pass

802.11n (HT40)

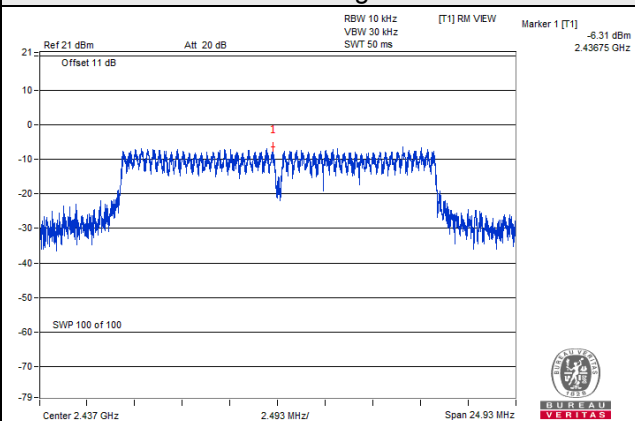
Channel	Frequency (MHz)	Total PSD (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
3	2422	-18.25	8.00	Pass
6	2437	-14.60	8.00	Pass
9	2452	-15.72	8.00	Pass

Spectrum Plot of Worst Value

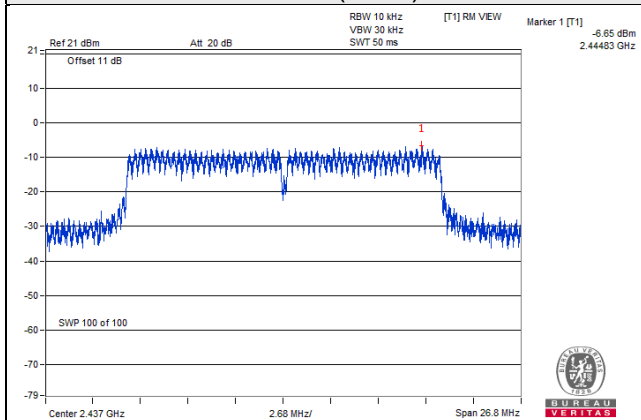
802.11b



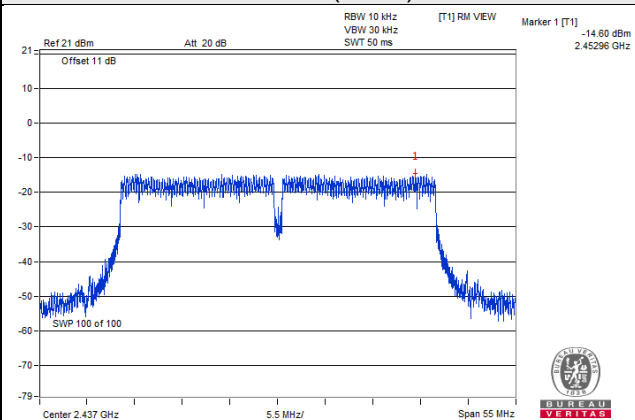
802.11g



802.11n (HT20)



802.11n (HT40)

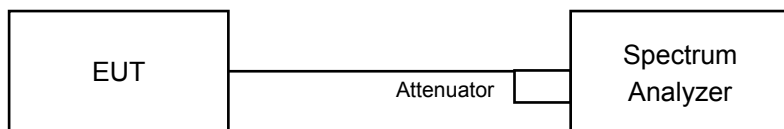


4.6 Conducted Out of Band Emission Measurement

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

- 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 OOB

- 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.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

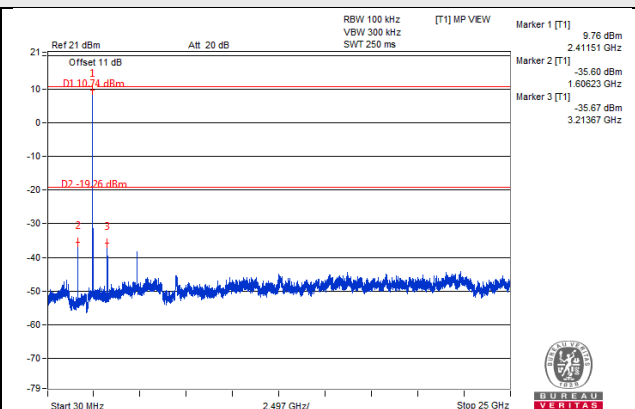
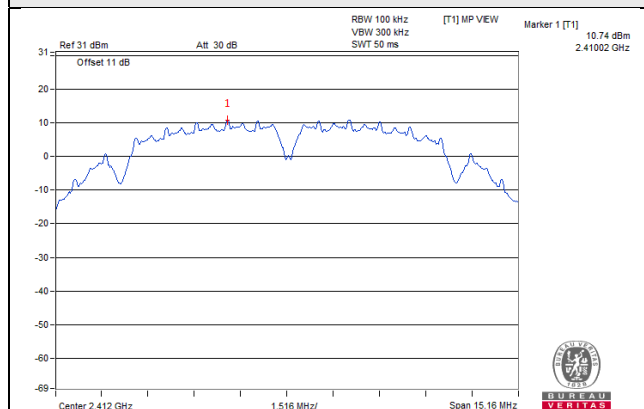
Same as item 4.3.6

4.6.7 Test Results

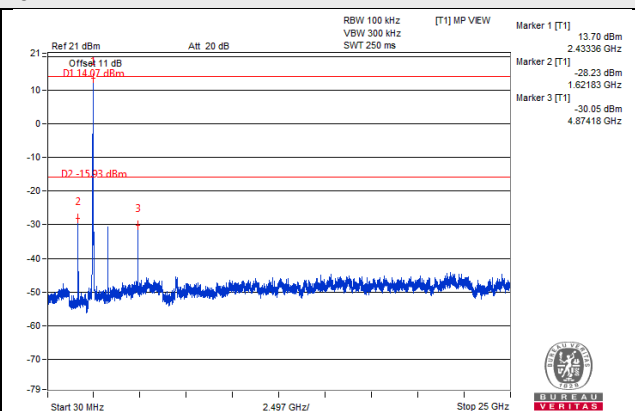
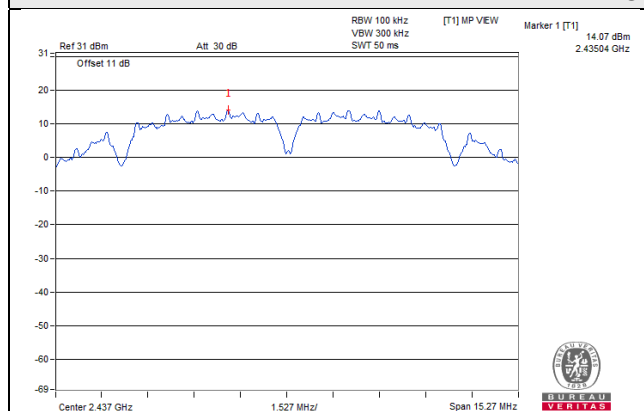
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

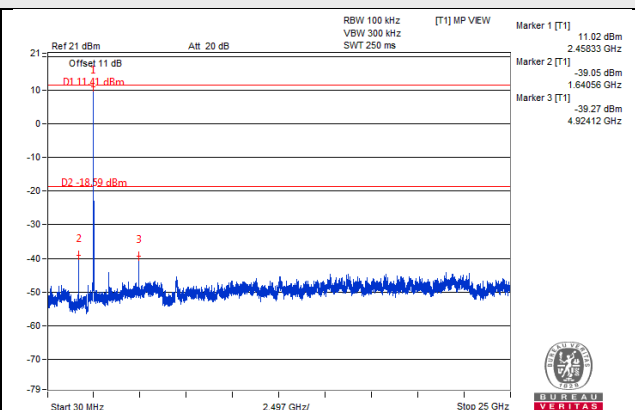
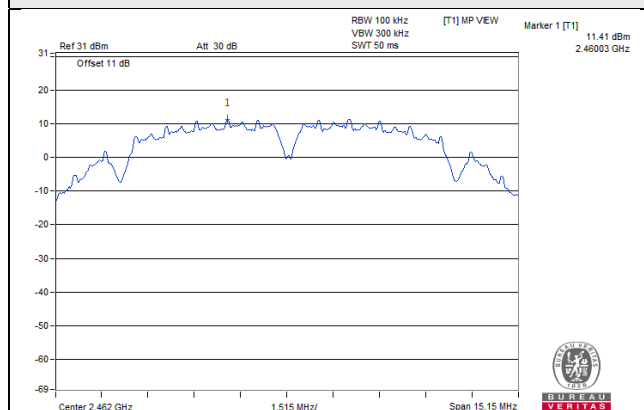
CH 1



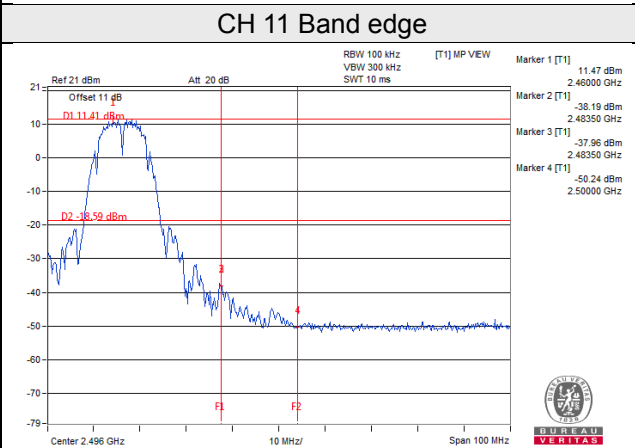
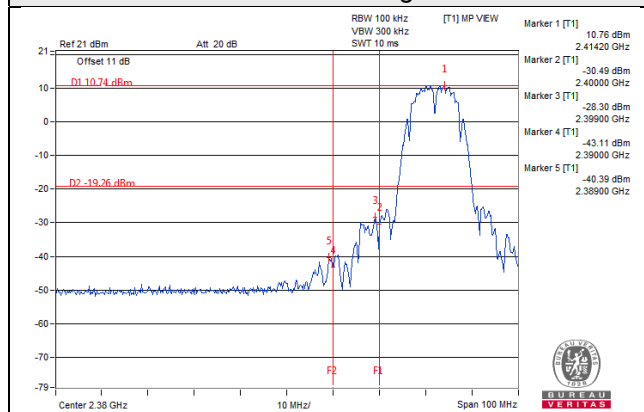
CH 6



CH 11

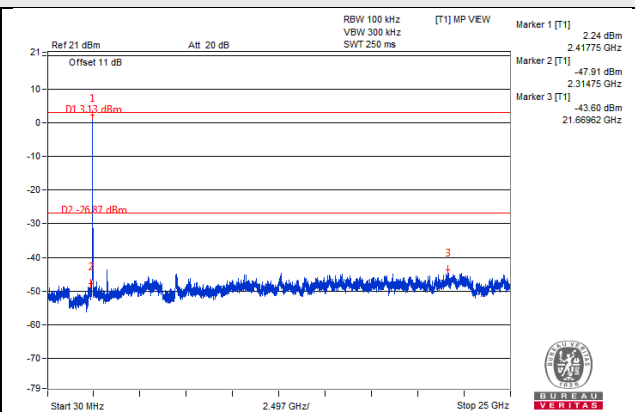
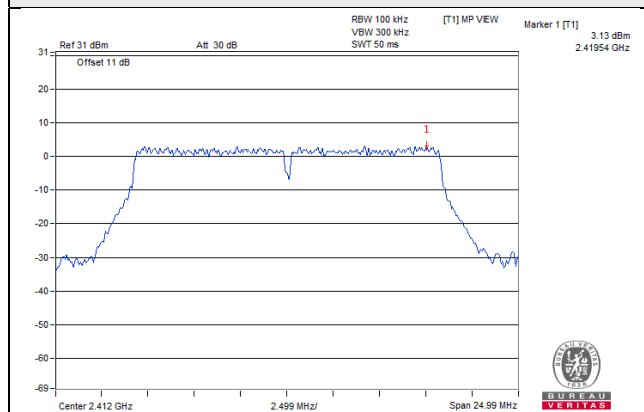


CH 1 Band edge

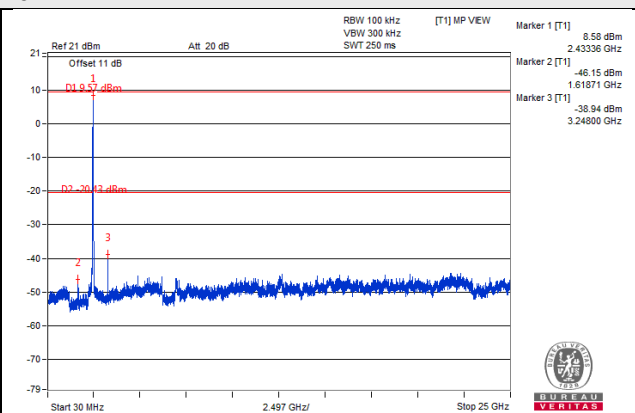
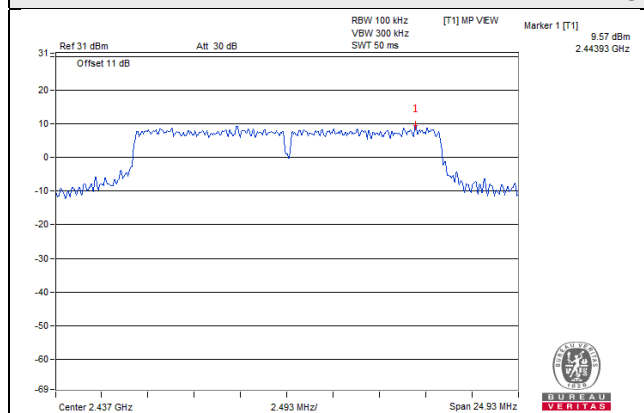


802.11g

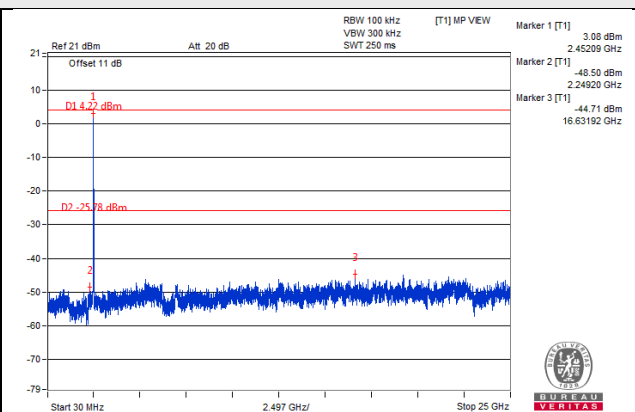
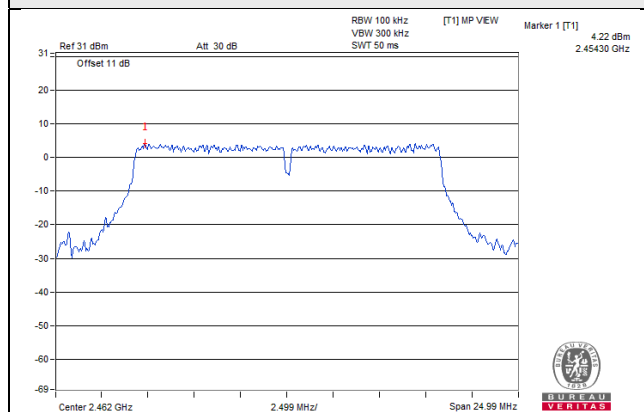
CH 1



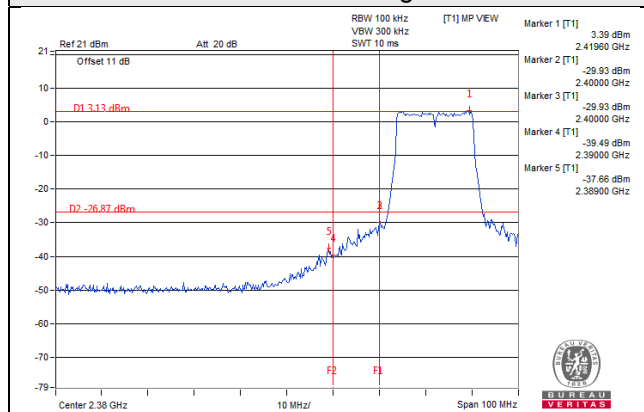
CH 6



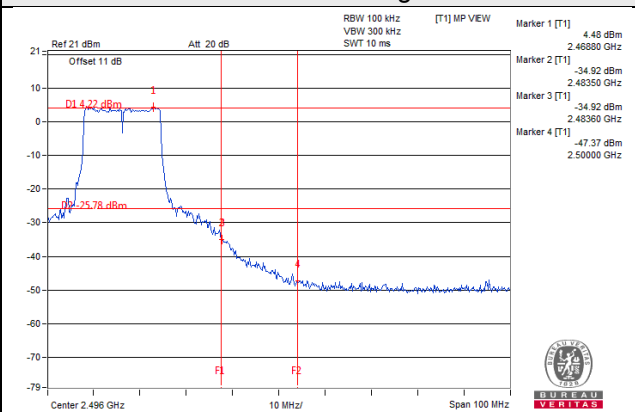
CH 11



CH 1 Band edge

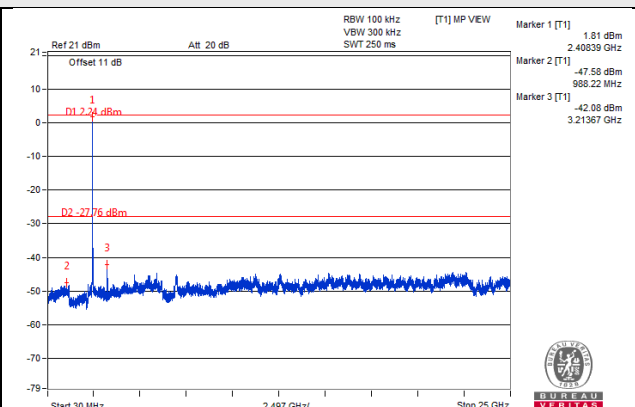
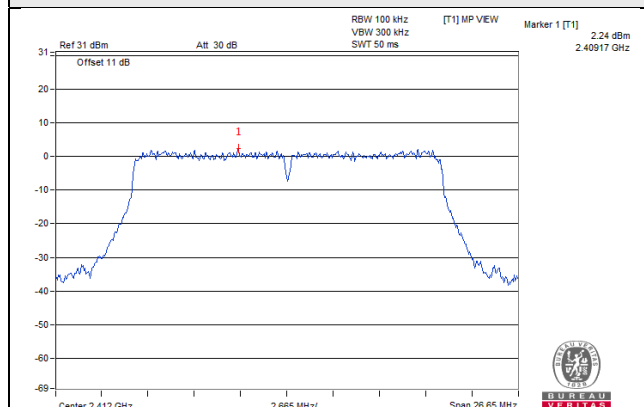


CH 11 Band edge

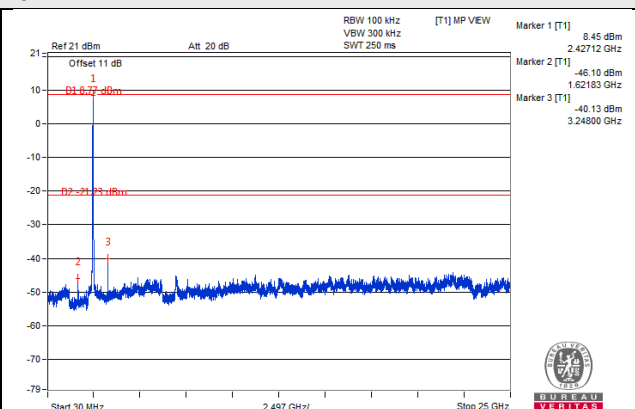
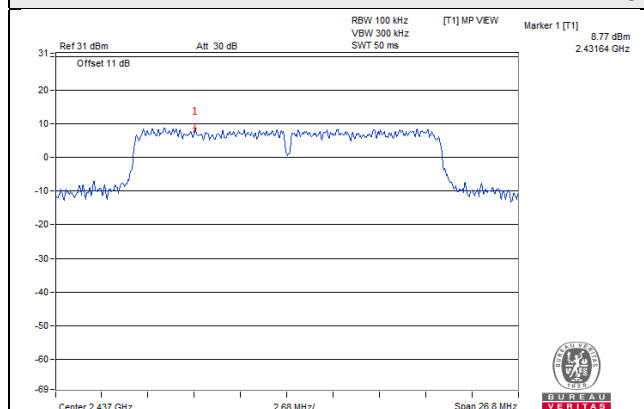


802.11n (HT20)

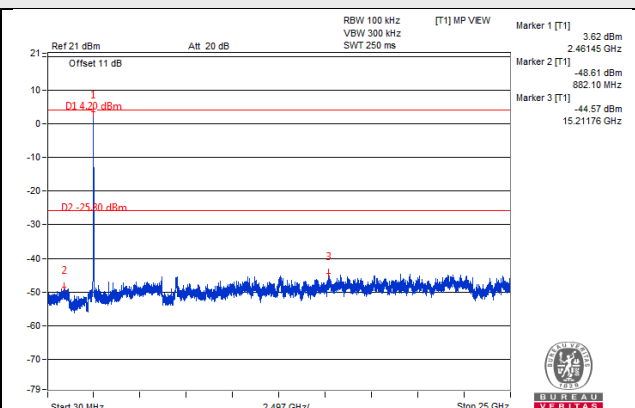
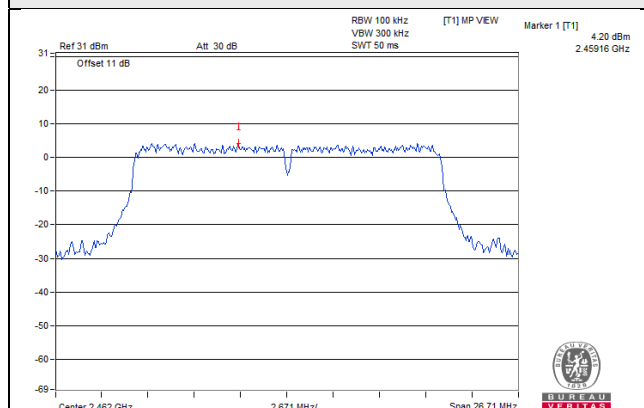
CH 1



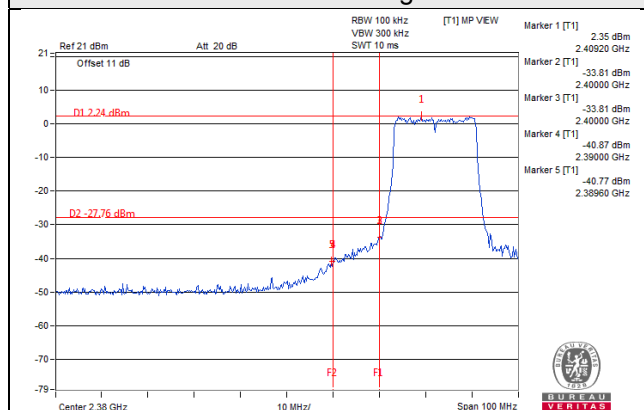
CH 6



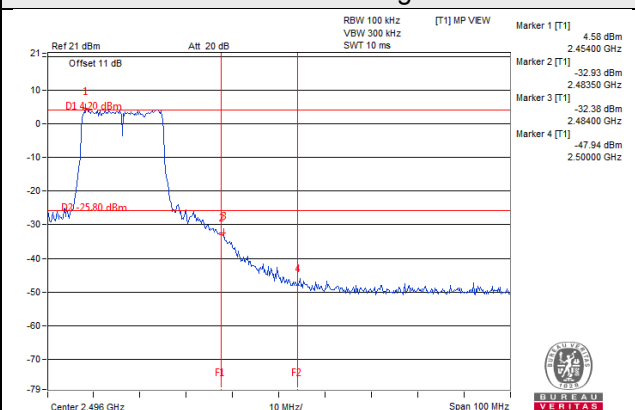
CH 11



CH 1 Band edge

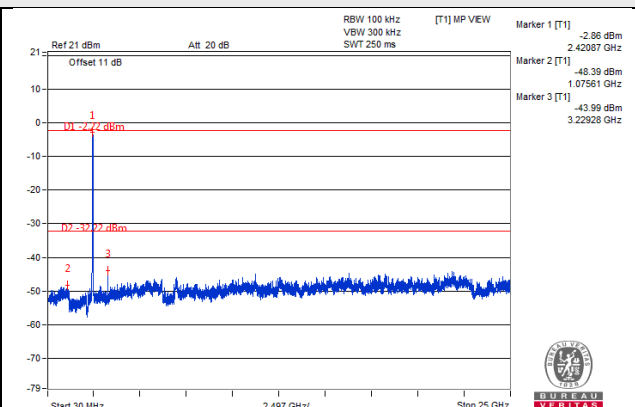
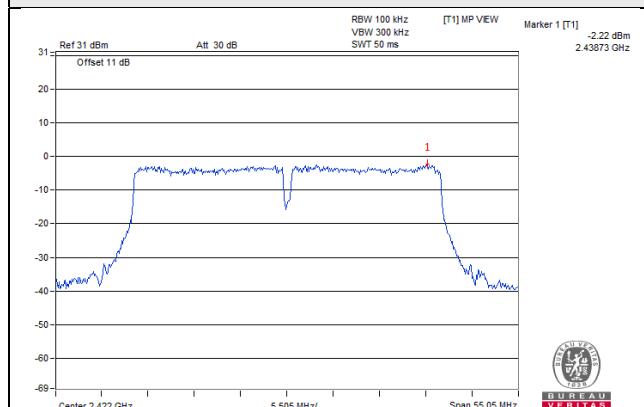


CH 11 Band edge

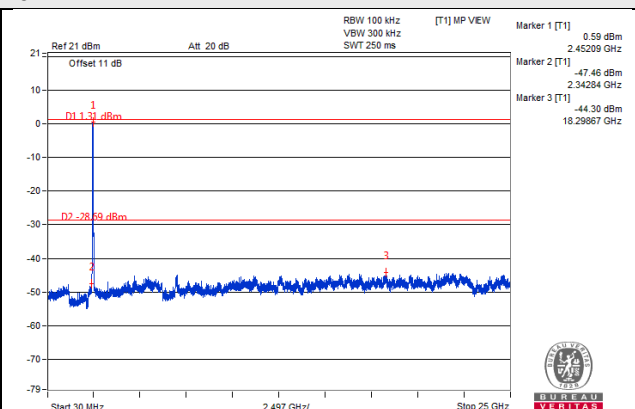
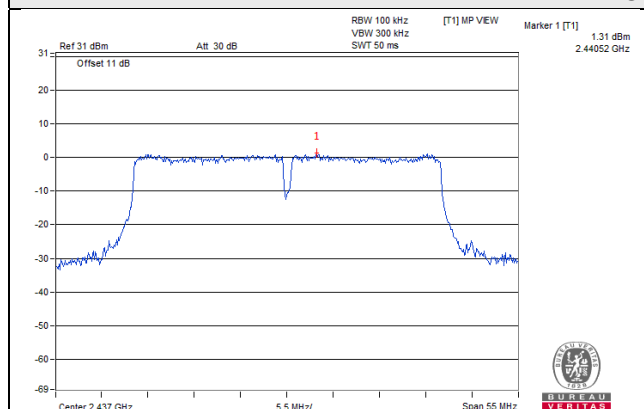


802.11n (HT40)

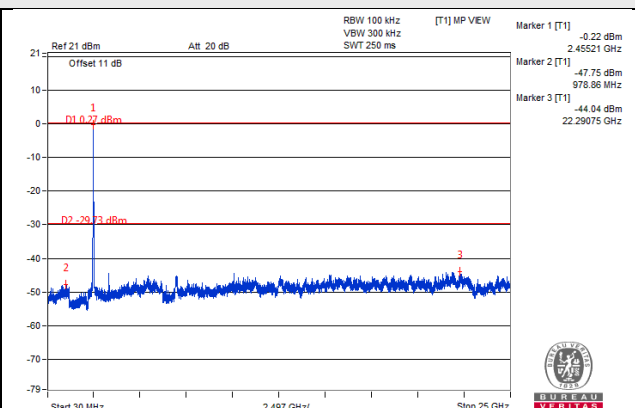
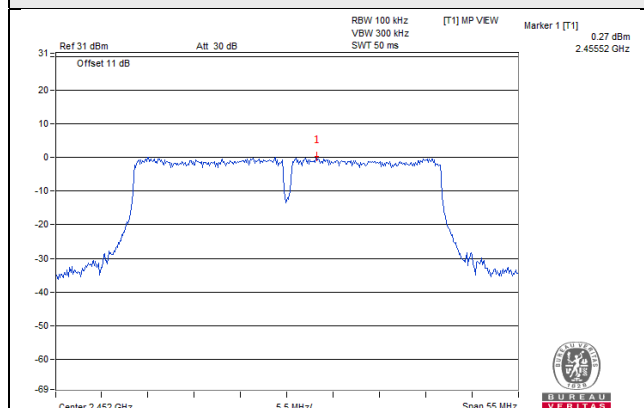
CH 3



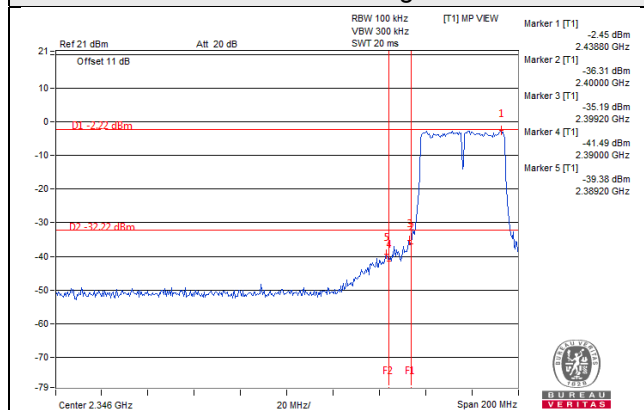
CH 6



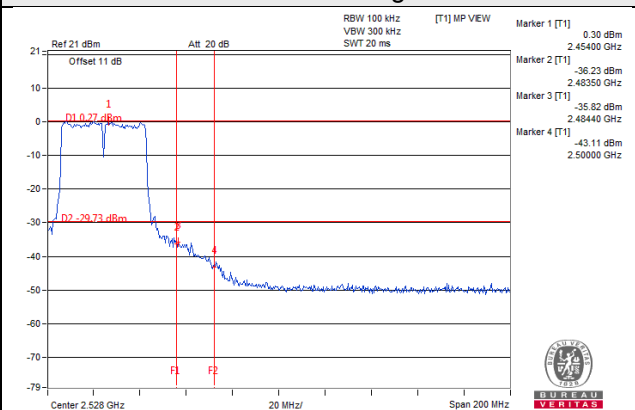
CH 9



CH 3 Band edge



CH 9 Band edge

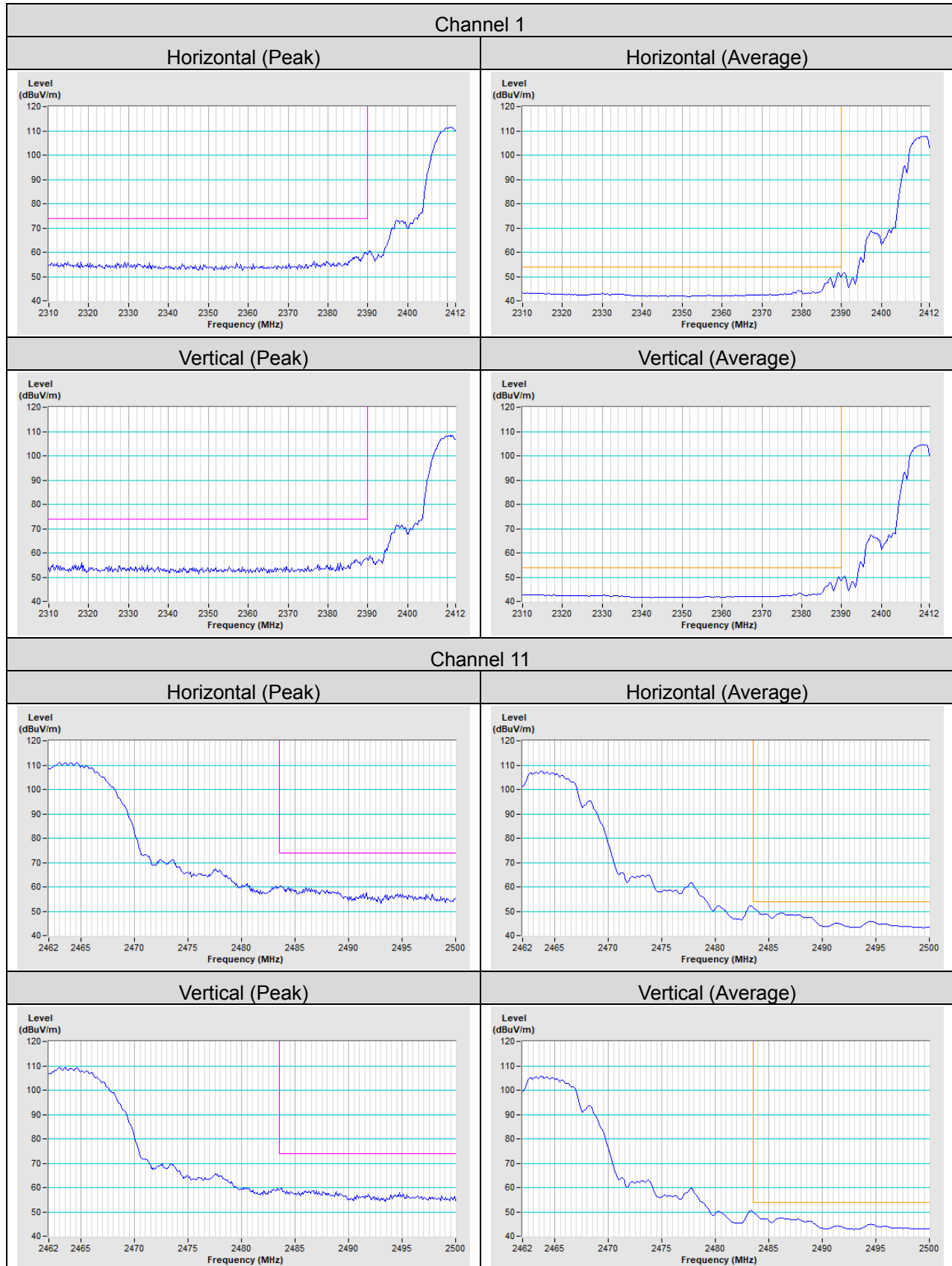


5 Pictures of Test Arrangements

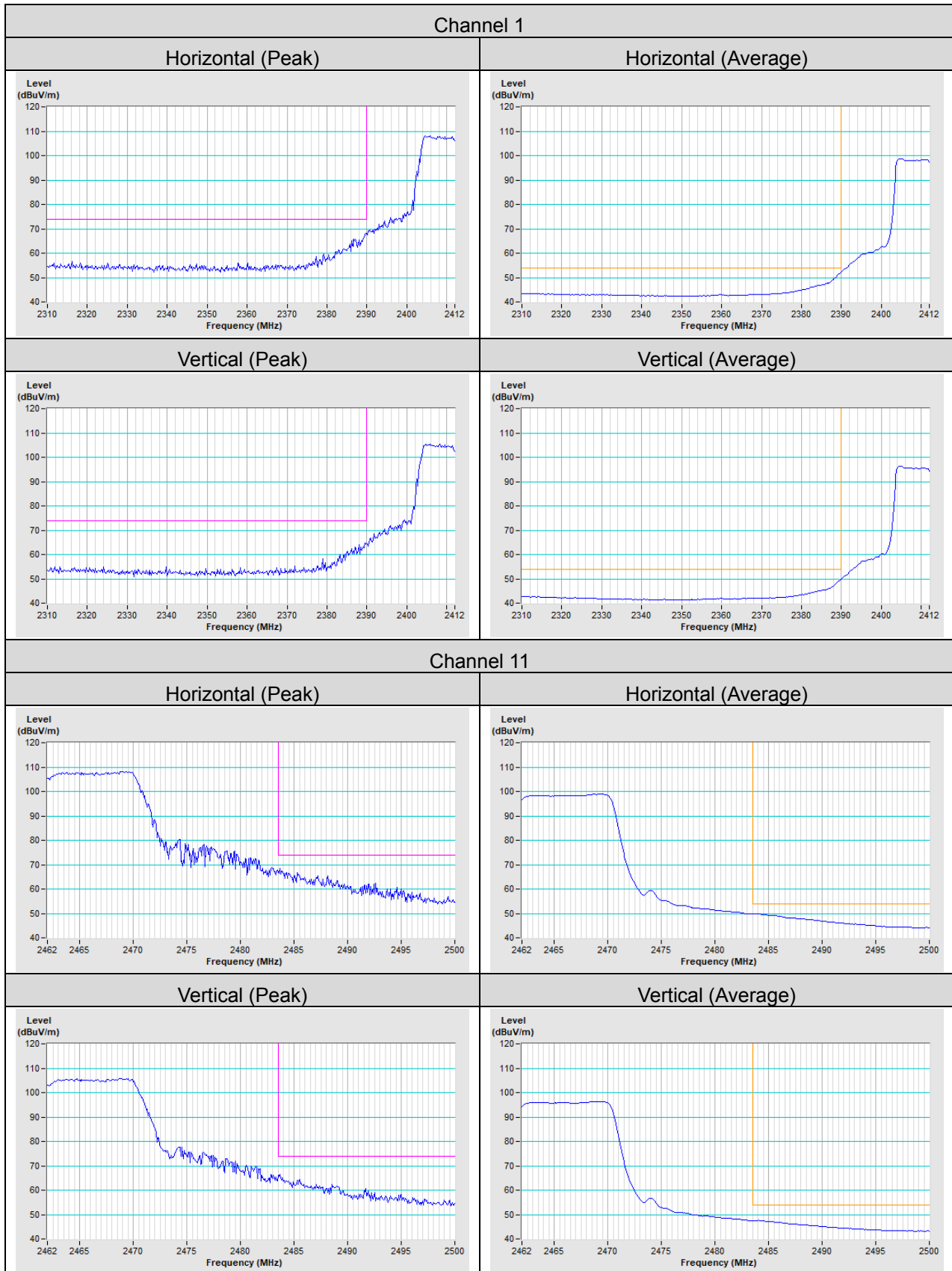
Please refer to the attached file (Test Setup Photo).

Annex A- Band Edge Measurement

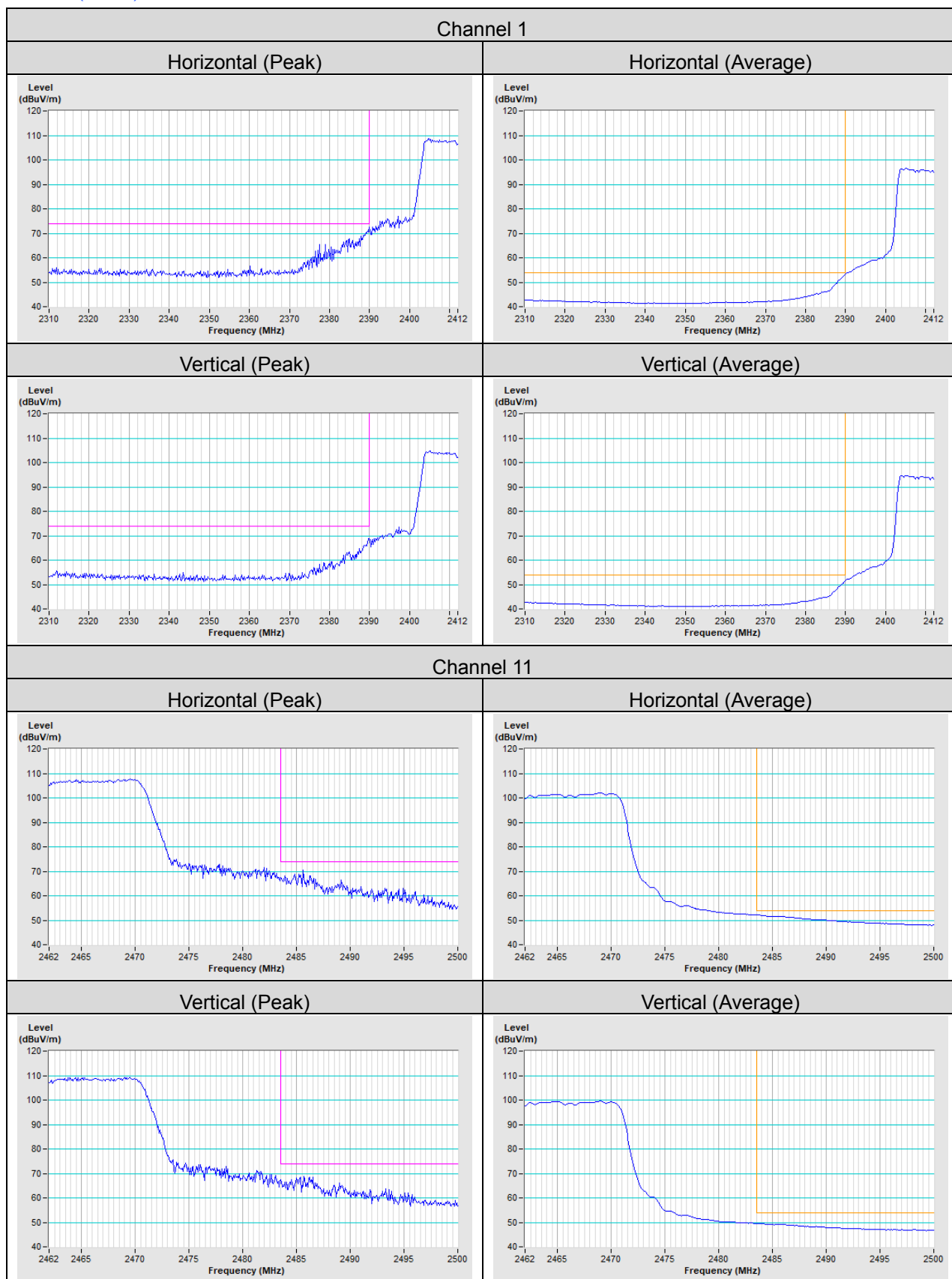
802.11b



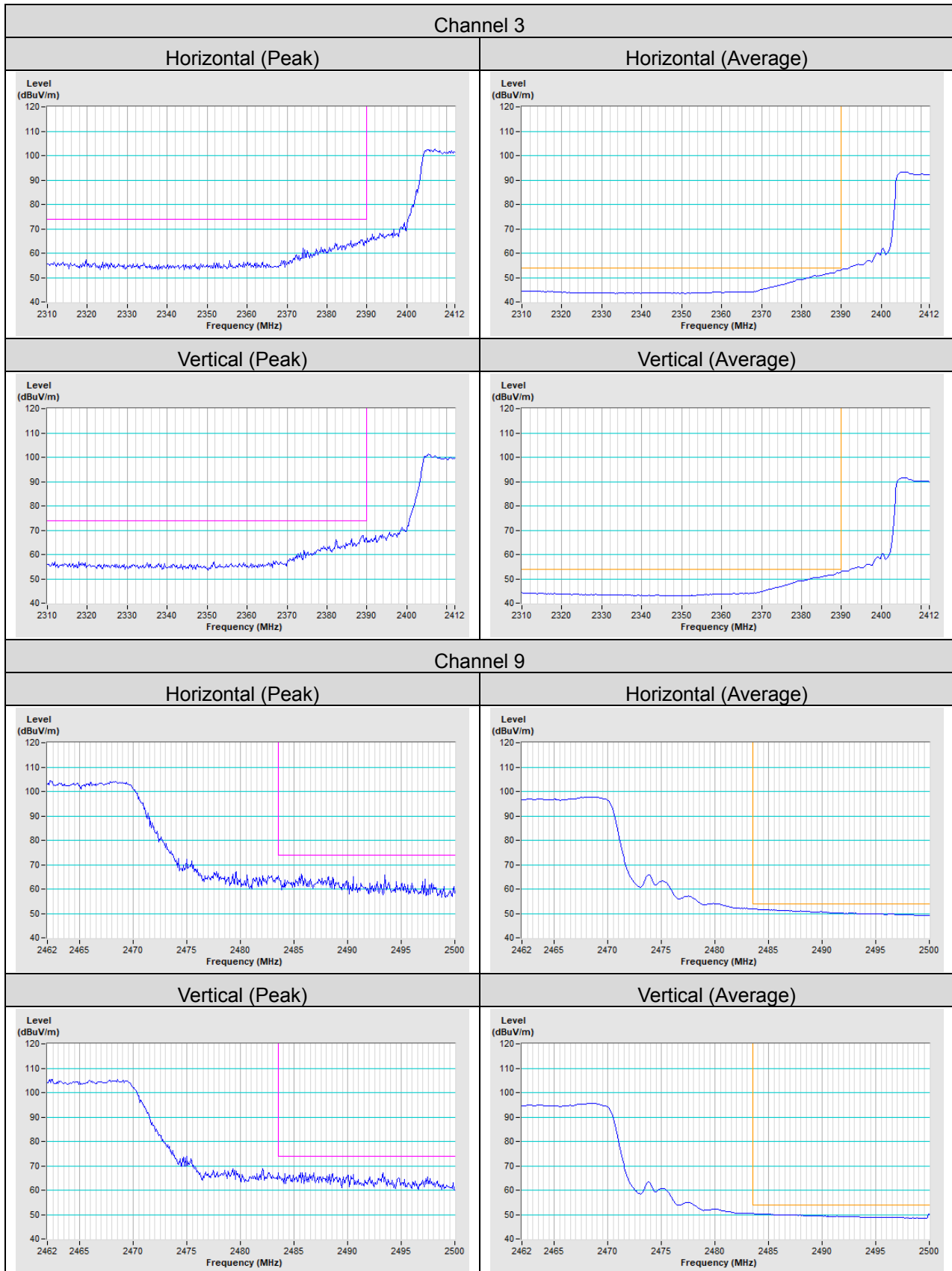
802.11g



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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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

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Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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