

FCC Test Report

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FCC ID: EHTPERS1

Test Model: 6920w

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Test Date: May 10 ~ Jun. 23, 2022

Issued Date: Jun. 28, 2022

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FCC Registration / 788550 / TW0003
Designation Number (1):

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Designation Number (2):



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Release Control Record

Issue No.	Description	Date Issued
RFBDGE-WTW-P22031218	Original release.	Jun. 28, 2022

1. Certificate of Conformity

Product: IP Phone

Brand: Mitel

Test Model: 6920w

Sample Status: Engineering sample

Applicant: Mitel Networks Corporation

Test Date: May 10 ~ Jun. 23, 2022

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

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

Prepared by : Polly Chien, **Date:** Jun. 28, 2022
Polly Chien / Specialist

Approved by : Jeremy Lin, **Date:** Jun. 28, 2022
Jeremy Lin / Project Engineer

2. Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -4.09dB at 13.50600MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.5dB 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	No antenna connector is used.

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	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~ 1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3. General Information

3.1 General Description of EUT

Product	IP Phone
Brand	Mitel
Test Model	6920w
Sample Status	Engineering sample
Power Supply Rating	48Vdc (Adapter) 56Vdc (PoE)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 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 72.2Mbps
Operating Frequency	2412~2462MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11
Output Power	85.507mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Refer to note
Cable Supplied	Refer to note

Note:

- The EUT provides one completed transmitter and one receiver.

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

- The EUT uses the following devices.

Item	Brand	Model	Specification	Remark
Adapter	FSP	FSP030-DFMN3	I/P: 100-240Vac, 50-60Hz, 1.2A O/P: 48Vdc, 0.625A DC Cable: 1.78m power cable with one core attached on adapter	Support unit
Network Cable (RJ45)	NA	NA	2.1m non-shielded RJ45 cable without core	Accessory
PoE	Phihong	POE15M-1AF	I/P: 100-240Vac, 50-60Hz, 0.8A O/P: 56Vdc, 0.275A, 15.4W	Support unit

- The following antenna was provided to the EUT.

Ant. Type	Connector	Antenna Gain(dBi)				
		2400~2500 MHz	5150~5250 MHz	5250~5350 MHz	5470~5725 MHz	5725~5850 MHz
Chip	NA	2.32	2.63	2.85	3.55	3.72

*The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

4. 2.4GHz & 5GHz & BT technology cannot transmit at same time.

3.2 Description of Test Modes

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT + adapter
B	-	√	√	-	EUT + PoE

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 2 axis (X & Z). The worst case was found when positioned on **Z-plane**.
2. For radiated emission (below 1GHz) and power line conducted emission test items chosen the worst maximum fundamental emission level channel.
3. "-" 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)	Remark
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	-
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	-
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0	-

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)	Remark
A, B	802.11g	1 to 11	1	OFDM	BPSK	6.0	-

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)	Remark
A, B	802.11g	1 to 11	1	OFDM	BPSK	6.0	-

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)	Remark
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	-
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	-
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0	-

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE $\geq$ 1G	23deg. C, 64%RH	48Vdc	Tim Chen
RE<1G	23deg. C, 64%RH, 23deg. C, 72%RH	48Vdc 56Vdc	Tim Chen, Vincent Chen
PLC	25deg. C, 75%RH, 23deg. C, 65%RH	48Vdc 56Vdc	Titan Hsu, Vincent Chen
APCM	25deg. C, 60%RH	48Vdc	Jisyoung Wang

3.3 Duty Cycle of Test Signal

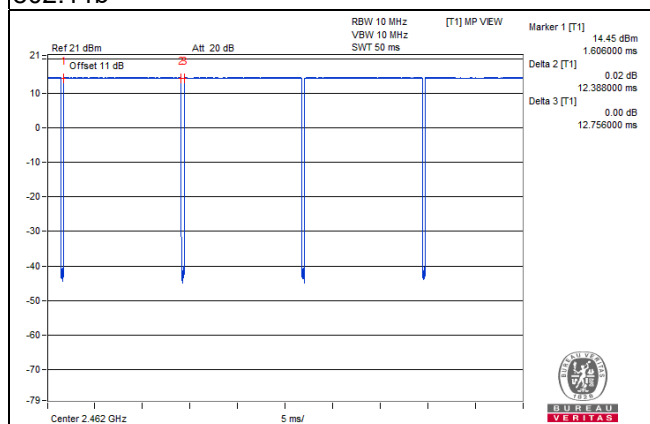
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = 12.388ms/12.756ms=0.971, Duty factor = $10 * \log(1/0.971) = 0.13$

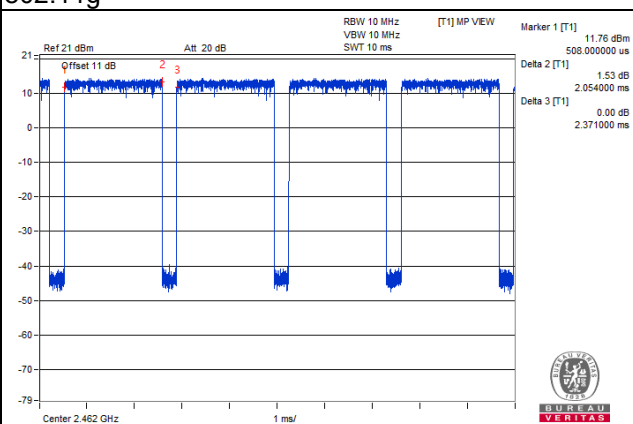
802.11g: Duty cycle = 2.054ms/2.371ms=0.866, Duty factor = $10 * \log(1/0.866) = 0.62$

802.11n (HT20): Duty cycle = 1.910ms/2.027ms=0.942, Duty factor = $10 * \log(1/0.942) = 0.26$

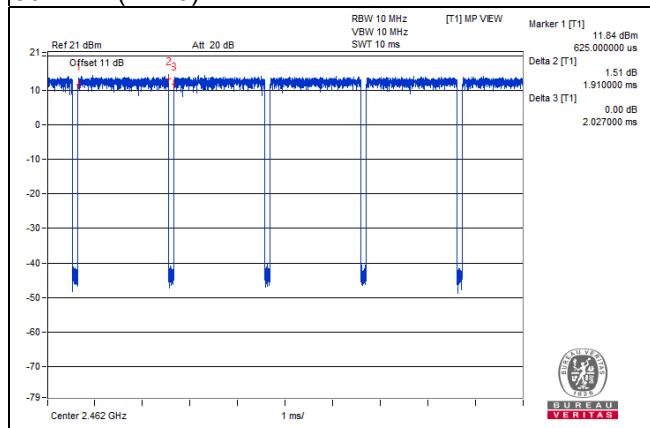
802.11b



802.11g



802.11n (HT20)



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.	USB Flash	SanDisk	SDDDC-032G	NA	NA	Provided by Lab. Type-A
B.	Load	NA	NA	NA	NA	Provided by Lab.
C.	Adapter	FSP	FSP030-DFMN3	NA	NA	Provided by client
D.	PoE	Phihong	POE15M-1AF	NA	NA	Provided by client
E.	Notebook	ELL	E5410	1HC2XM1	FCC DoC Approved	Provided by Lab.

Note:

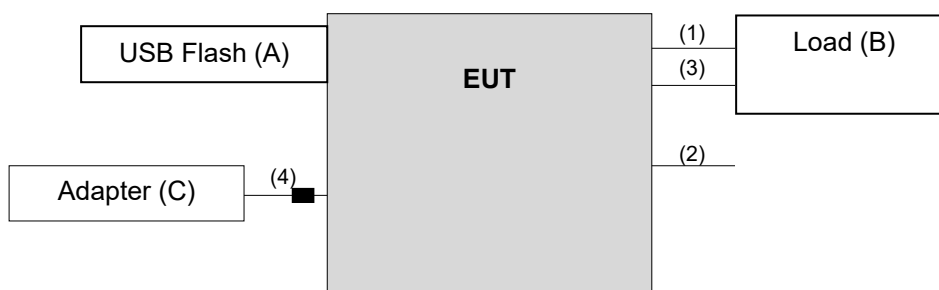
1. All power cords of the above support units are non-shielded (1.8m).
2. Item E acted as a communication partners to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	2.1	N	0	Provided by client
2.	RJ11 cable	1	1.6	N	0	Provided by Lab.
3.	LAN cable	1	1.5	N	0	Provided by Lab. RJ45, Cat.5e
4.	Power cable	1	1.78	N	1	Provided by client
5.	LAN cable	1	3	N	0	Provided by Lab. RJ45, Cat.5e

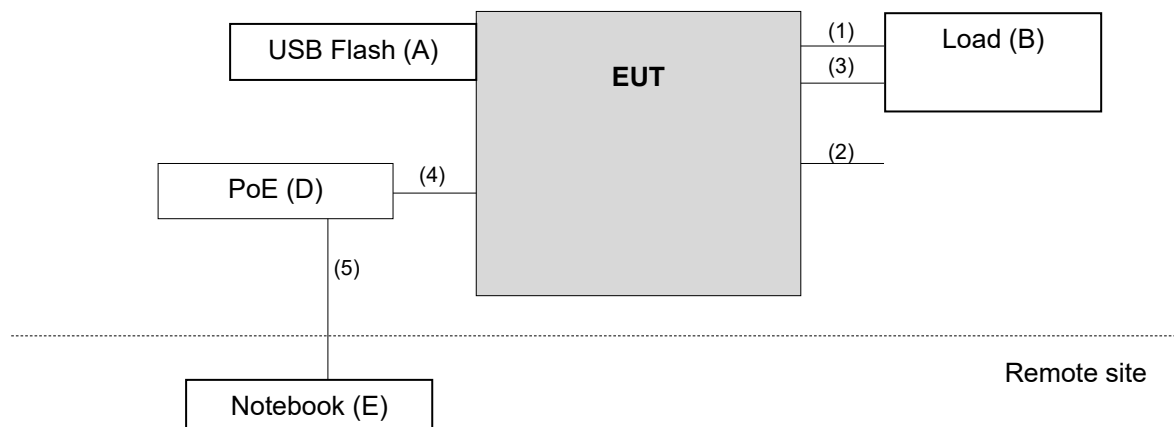
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

Mode A



Mode B



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

ANSI C63.10:2013

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 Rohde & Schwarz	ESR3	102783	Dec. 21, 2021	Dec. 20, 2022
Spectrum Analyzer KEYSIGHT	N9020B	MY60110513	Dec. 24, 2021	Dec. 23, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-1214	Oct. 27, 2021	Oct. 26, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1170	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	9170-995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC330N	980798	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980809	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980786	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM-(900 0+2000+1000)	201244+ 201232+ 210103	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM-NM- (9000+300+500)	201251+ 201249+ 201248	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM-(50 00+3000+2000)	201261+201258+ 201249	Jan. 17, 2022	Jan. 16, 2023
Software BV ADT	ADT_Radiated_V7.6.1 5.9.5	NA	NA	NA
Antenna Tower Max-Full	MFA-515BSN	NA	NA	NA
Turn Table Max-Full	MFT-201SS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208676	NA	NA
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 18, 2022	Jan. 17, 2023
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 17, 2022	Jan. 16, 2023

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

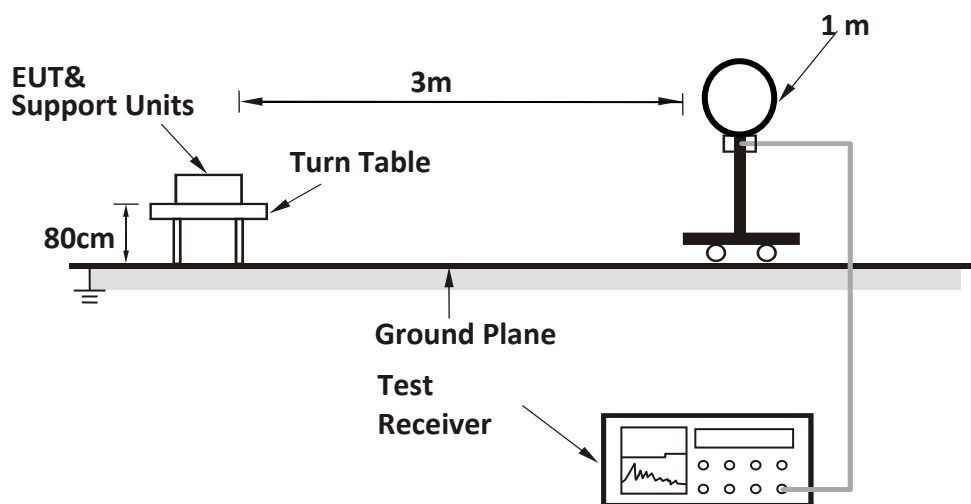
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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.
802.11b: RBW = 1MHz, VBW = 1kHz; 802.11g: RBW = 1MHz, VBW = 1kHz;
802.11n (HT20): RBW = 1MHz, VBW = 1kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

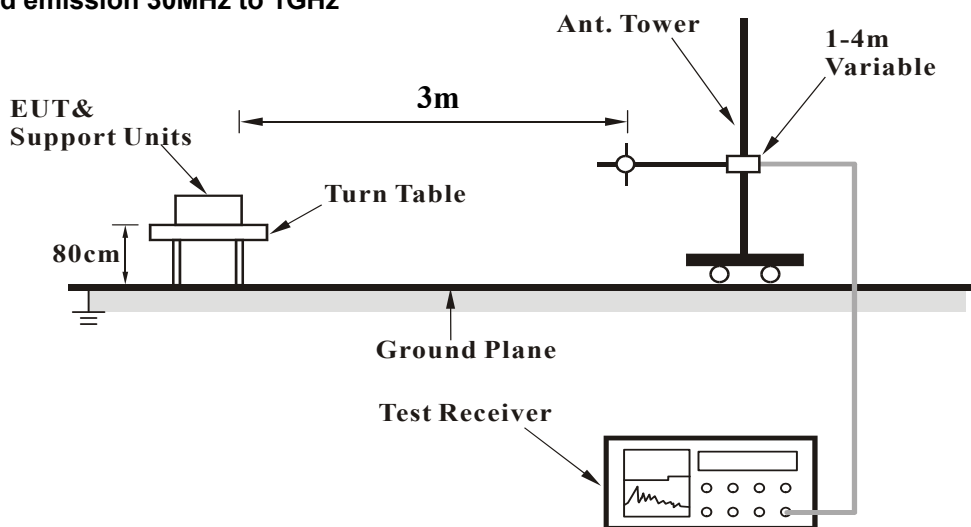
No deviation.

4.1.5 Test Set Up

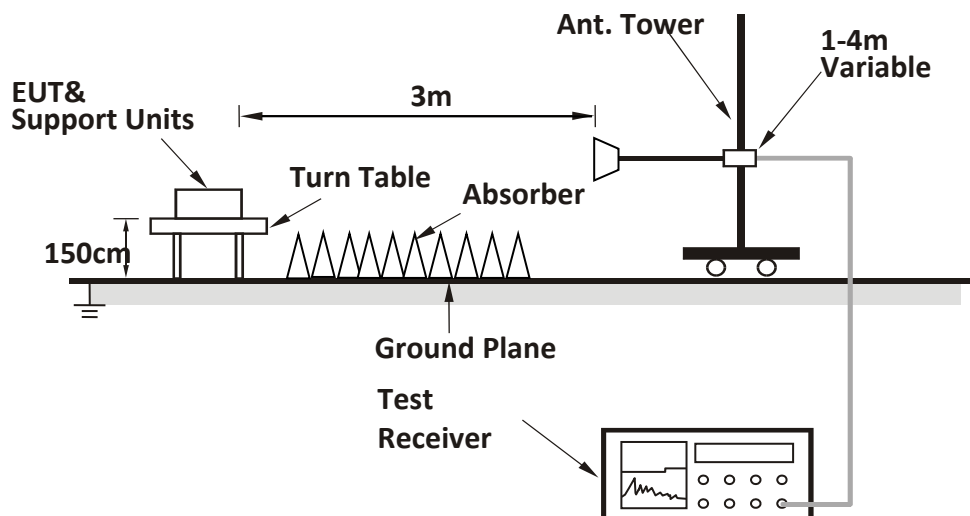
For Radiated emission below 30MHz



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

Mode A

- Placed the EUT on the testing table.
- Set the EUT under transmission condition continuously at specific channel frequency.

Mode B

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz data:

RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.6 PK	74.0	-11.4	3.16 H	180	30.6	32.0
2	2390.00	48.7 AV	54.0	-5.3	3.16 H	180	16.7	32.0
3	*2412.00	103.8 PK			3.16 H	180	71.7	32.1
4	*2412.00	101.9 AV			3.16 H	180	69.8	32.1
5	4824.00	48.7 PK	74.0	-25.3	3.00 H	21	45.6	3.1
6	4824.00	38.0 AV	54.0	-16.0	3.00 H	21	34.9	3.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	64.9 PK	74.0	-9.1	1.30 V	350	32.9	32.0
2	2390.00	50.4 AV	54.0	-3.6	1.30 V	350	18.4	32.0
3	*2412.00	106.2 PK			1.30 V	350	74.1	32.1
4	*2412.00	103.9 AV			1.30 V	350	71.8	32.1
5	4824.00	50.0 PK	74.0	-24.0	1.70 V	15	46.9	3.1
6	4824.00	42.1 AV	54.0	-11.9	1.70 V	15	39.0	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11b	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	103.8 PK			3.15 H	180	71.8	32.0
2	*2437.00	101.5 AV			3.15 H	180	69.5	32.0
3	4874.00	51.5 PK	74.0	-22.5	1.12 H	15	48.3	3.2
4	4874.00	43.1 AV	54.0	-10.9	1.12 H	15	39.9	3.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	105.8 PK			3.15 V	180	73.8	32.0
2	*2437.00	103.5 AV			3.15 V	180	71.5	32.0
3	4874.00	52.5 PK	74.0	-21.5	1.80 V	11	49.3	3.2
4	4874.00	46.2 AV	54.0	-7.8	1.80 V	11	43.0	3.2

Remarks:

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

RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	104.4 PK			2.31 H	256	72.4	32.0
2	*2462.00	102.2 AV			2.31 H	256	70.2	32.0
3	2483.50	60.7 PK	74.0	-13.3	2.31 H	256	28.7	32.0
4	2483.50	49.5 AV	54.0	-4.5	2.31 H	256	17.5	32.0
5	4924.00	51.8 PK	74.0	-22.2	1.35 H	15	48.5	3.3
6	4924.00	44.3 AV	54.0	-9.7	1.35 H	15	41.0	3.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	107.3 PK			1.25 V	340	75.3	32.0
2	*2462.00	105.1 AV			1.25 V	340	73.1	32.0
3	2483.50	65.3 PK	74.0	-8.7	1.25 V	340	33.3	32.0
4	2483.50	52.5 AV	54.0	-1.5	1.25 V	340	20.5	32.0
5	4924.00	52.9 PK	74.0	-21.1	1.45 V	25	49.6	3.3
6	4924.00	46.2 AV	54.0	-7.8	1.45 V	25	42.9	3.3

Remarks:

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

RF Mode	TX 802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	61.7 PK	74.0	-12.3	1.52 H	178	29.7	32.0
2	2390.00	50.2 AV	54.0	-3.8	1.52 H	178	18.2	32.0
3	*2412.00	104.0 PK			1.52 H	178	71.9	32.1
4	*2412.00	95.6 AV			1.52 H	178	63.5	32.1
5	4824.00	49.6 PK	74.0	-24.4	1.44 H	19	46.5	3.1
6	4824.00	37.9 AV	54.0	-16.1	1.44 H	19	34.8	3.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	65.4 PK	74.0	-8.6	1.30 V	344	33.4	32.0
2	2390.00	53.5 AV	54.0	-0.5	1.30 V	344	21.5	32.0
3	*2412.00	108.9 PK			1.30 V	344	76.8	32.1
4	*2412.00	100.8 AV			1.30 V	344	68.7	32.1
5	4824.00	49.5 PK	74.0	-24.5	1.00 V	60	46.4	3.1
6	4824.00	38.0 AV	54.0	-16.0	1.00 V	60	34.9	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11g	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	105.5 PK			3.13 H	176	73.5	32.0
2	*2437.00	97.2 AV			3.13 H	176	65.2	32.0
3	4874.00	50.1 PK	74.0	-23.9	2.94 H	26	46.9	3.2
4	4874.00	38.1 AV	54.0	-15.9	2.94 H	26	34.9	3.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	107.2 PK			1.58 V	344	75.2	32.0
2	*2437.00	99.0 AV			1.58 V	344	67.0	32.0
3	4874.00	50.0 PK	74.0	-24.0	1.32 V	26	46.8	3.2
4	4874.00	38.6 AV	54.0	-15.4	1.32 V	26	35.4	3.2

Remarks:

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

RF Mode	TX 802.11g	Channel	CH 11 : 2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	104.7 PK			2.23 H	232	72.7	32.0
2	*2462.00	95.3 AV			2.23 H	232	63.3	32.0
3	2483.50	61.8 PK	74.0	-12.2	2.23 H	232	29.8	32.0
4	2483.50	50.0 AV	54.0	-4.0	2.23 H	232	18.0	32.0
5	4924.00	50.5 PK	74.0	-23.5	1.52 H	177	47.2	3.3
6	4924.00	38.4 AV	54.0	-15.6	1.52 H	177	35.1	3.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	108.8 PK			1.17 V	343	76.8	32.0
2	*2462.00	100.6 AV			1.17 V	343	68.6	32.0
3	2483.50	62.5 PK	74.0	-11.5	1.17 V	343	30.5	32.0
4	2483.50	51.3 AV	54.0	-2.7	1.17 V	343	19.3	32.0
5	4924.00	50.9 PK	74.0	-23.1	2.01 V	10	47.6	3.3
6	4924.00	38.8 AV	54.0	-15.2	2.01 V	10	35.5	3.3

Remarks:

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

RF Mode	TX 802.11n (HT20)	Channel	CH 1 : 2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.5 PK	74.0	-10.5	1.86 H	220	31.5	32.0
2	2390.00	51.2 AV	54.0	-2.8	1.86 H	220	19.2	32.0
3	*2412.00	103.8 PK			1.86 H	220	71.7	32.1
4	*2412.00	95.1 AV			1.86 H	220	63.0	32.1
5	4824.00	48.9 PK	74.0	-25.1	1.62 H	203	45.8	3.1
6	4824.00	38.3 AV	54.0	-15.7	1.62 H	203	35.2	3.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	66.6 PK	74.0	-7.4	1.28 V	346	34.6	32.0
2	2390.00	53.5 AV	54.0	-0.5	1.28 V	346	21.5	32.0
3	*2412.00	108.6 PK			1.28 V	346	76.5	32.1
4	*2412.00	99.5 AV			1.28 V	346	67.4	32.1
5	4824.00	49.3 PK	74.0	-24.7	1.03 V	89	46.2	3.1
6	4824.00	38.3 AV	54.0	-15.7	1.03 V	89	35.2	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.

RF Mode	TX 802.11n (HT20)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	107.9 PK			2.26 H	234	75.9	32.0
2	*2437.00	99.1 AV			2.26 H	234	67.1	32.0
3	4874.00	49.3 PK	74.0	-24.7	3.50 H	47	46.1	3.2
4	4874.00	38.1 AV	54.0	-15.9	3.50 H	47	34.9	3.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	109.8 PK			1.11 V	340	77.8	32.0
2	*2437.00	101.1 AV			1.11 V	340	69.1	32.0
3	4874.00	49.3 PK	74.0	-24.7	1.60 V	261	46.1	3.2
4	4874.00	38.2 AV	54.0	-15.8	1.60 V	261	35.0	3.2

Remarks:

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

RF Mode	TX 802.11n (HT20)	Channel	CH 11 : 2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	107.8 PK			2.24 H	233	75.8	32.0
2	*2462.00	99.6 AV			2.24 H	233	67.6	32.0
3	2483.50	66.7 PK	74.0	-7.3	2.24 H	233	34.7	32.0
4	2483.50	51.3 AV	54.0	-2.7	2.24 H	233	19.3	32.0
5	4924.00	48.5 PK	74.0	-25.5	1.68 H	188	45.2	3.3
6	4924.00	38.1 AV	54.0	-15.9	1.68 H	188	34.8	3.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	109.6 PK			1.08 V	343	77.6	32.0
2	*2462.00	100.4 AV			1.08 V	343	68.4	32.0
3	2483.50	67.8 PK	74.0	-6.2	1.08 V	343	35.8	32.0
4	2483.50	51.8 AV	54.0	-2.2	1.08 V	343	19.8	32.0
5	4924.00	48.4 PK	74.0	-25.6	1.94 V	203	45.1	3.3
6	4924.00	38.0 AV	54.0	-16.0	1.94 V	203	34.7	3.3

Remarks:

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

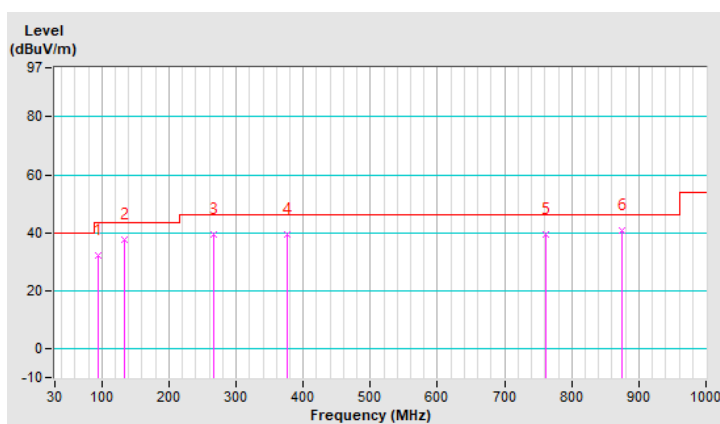
Below 1GHz worst-case data:
Mode A

RF Mode	TX 802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	94.02	32.2 QP	43.5	-11.3	2.99 H	81	50.7	-18.6
2	132.82	37.4 QP	43.5	-6.1	2.99 H	283	51.5	-14.1
3	265.71	39.4 QP	46.0	-6.6	1.00 H	162	53.0	-13.6
4	375.32	39.5 QP	46.0	-6.5	1.00 H	346	50.0	-10.5
5	762.35	39.4 QP	46.0	-6.6	1.00 H	78	42.5	-3.0
6	874.87	40.7 QP	46.0	-5.3	1.00 H	4	42.6	-1.9

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 20dB below the permissible value to be report.

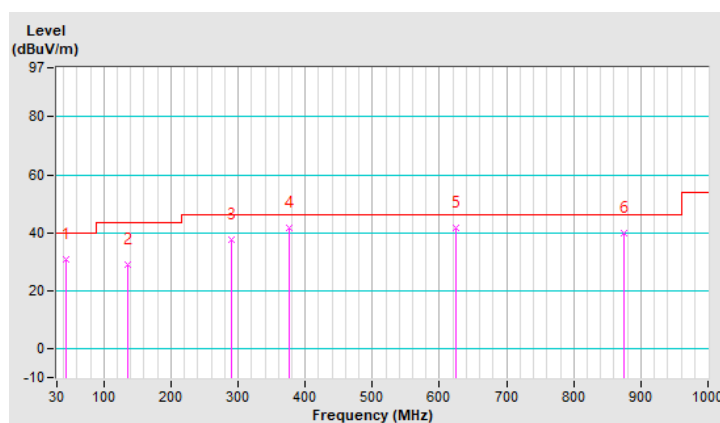


RF Mode	TX 802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	43.58	31.0 QP	40.0	-9.0	1.00 V	118	44.3	-13.3
2	135.73	28.8 QP	43.5	-14.7	2.99 V	208	42.6	-13.8
3	289.96	37.7 QP	46.0	-8.3	1.99 V	307	50.3	-12.7
4	375.32	41.6 QP	46.0	-4.4	1.99 V	18	52.1	-10.5
5	624.61	41.8 QP	46.0	-4.2	1.00 V	57	46.8	-5.1
6	874.87	39.8 QP	46.0	-6.2	1.00 V	83	41.7	-1.9

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 20dB below the permissible value to be report.



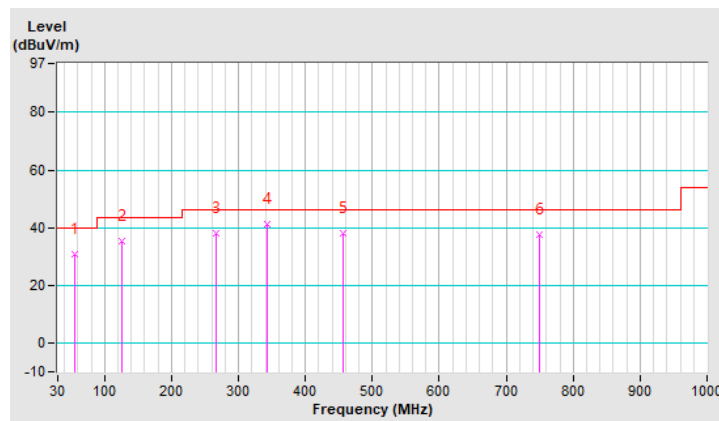
Mode B

RF Mode	TX 802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	56.19	30.7 QP	40.0	-9.3	2.00 H	19	43.6	-12.9
2	125.06	35.4 QP	43.5	-8.1	2.00 H	324	49.3	-13.9
3	265.71	38.1 QP	46.0	-7.9	1.01 H	198	51.9	-13.8
4	343.31	41.2 QP	46.0	-4.8	1.01 H	175	51.7	-10.5
5	455.83	38.1 QP	46.0	-7.9	2.00 H	156	45.3	-7.2
6	749.74	37.8 QP	46.0	-8.2	2.00 H	80	38.3	-0.5

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. 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 20dB below the permissible value to be report.

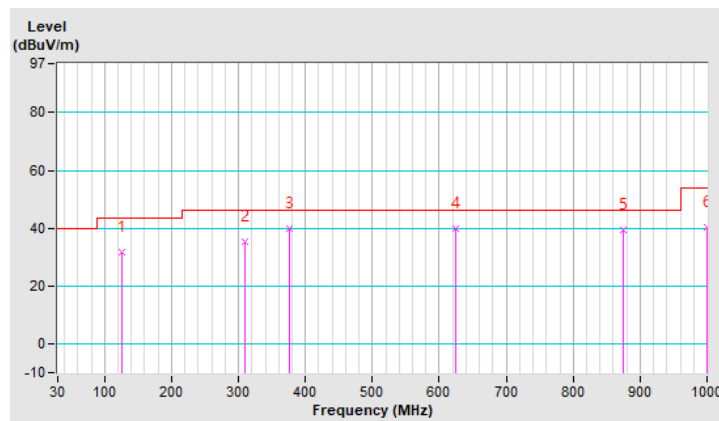


RF Mode	TX 802.11g	Channel	CH 1 : 2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	125.06	31.5 QP	43.5	-12.0	1.00 V	210	45.4	-13.9
2	309.36	35.3 QP	46.0	-10.7	1.99 V	53	47.0	-11.6
3	375.32	39.7 QP	46.0	-6.3	1.99 V	18	49.4	-9.7
4	624.61	39.9 QP	46.0	-6.1	1.00 V	196	42.7	-2.9
5	874.87	39.4 QP	46.0	-6.6	1.00 V	265	38.0	1.4
6	1000.00	40.4 QP	54.0	-13.6	1.00 V	265	37.3	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 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 20dB 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. 03, 2021	Dec. 02, 2022
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 15, 2022	Jan. 14, 2023
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Mar. 14, 2022	Mar. 13, 2023
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 07, 2021	Sep. 06, 2022
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. Tested date: May 18 ~ Jun. 23, 2022

4.2.3 Test Procedures

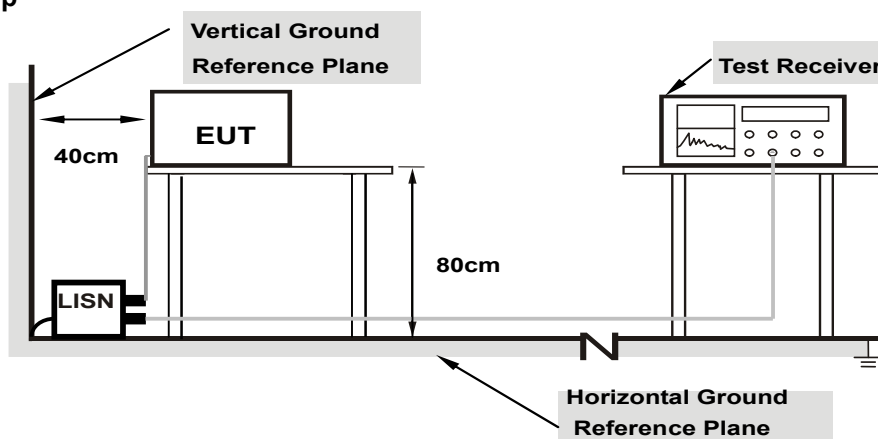
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance 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 item 4.1.6.

4.2.7 Test Results

Worst-case data: 802.11g

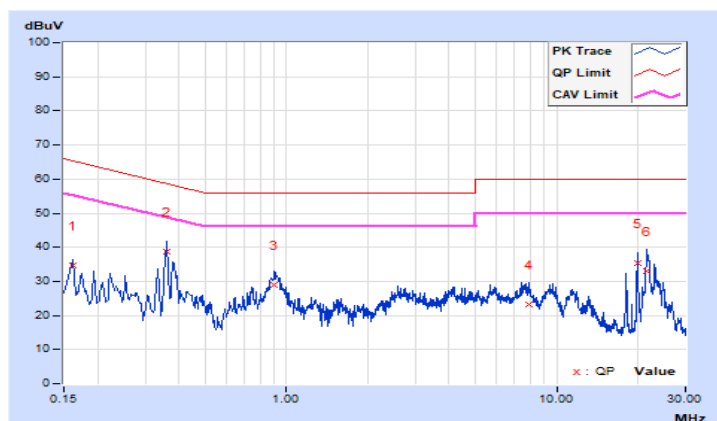
Mode A

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 1		

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	0.16200	9.69	24.83	10.48	34.52	20.17	65.36	55.36	-30.84	-35.19
2	0.36200	9.78	29.00	24.85	38.78	34.63	58.68	48.68	-19.90	-14.05
3	0.90200	9.83	19.22	14.40	29.05	24.23	56.00	46.00	-26.95	-21.77
4	7.94200	10.02	13.21	7.65	23.23	17.67	60.00	50.00	-36.77	-32.33
5	19.91400	10.16	25.19	20.30	35.35	30.46	60.00	50.00	-24.65	-19.54
6	21.65800	10.16	22.73	17.42	32.89	27.58	60.00	50.00	-27.11	-22.42

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.

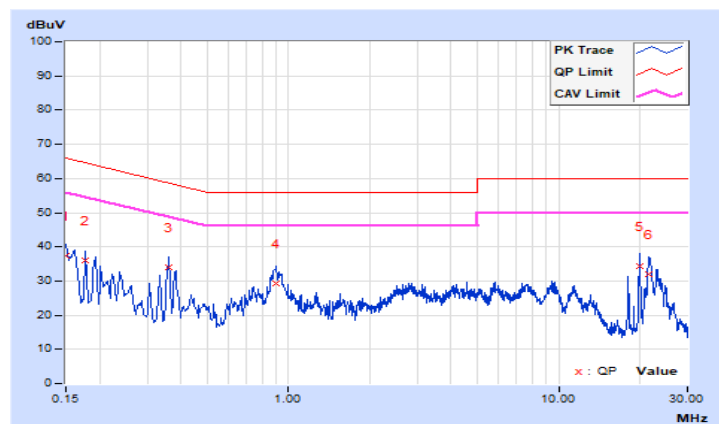


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 1		

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	9.68	27.80	12.29	37.48	21.97	66.00	56.00	-28.52	-34.03
2	0.17800	9.70	26.44	10.23	36.14	19.93	64.58	54.58	-28.44	-34.65
3	0.36200	9.79	24.36	18.66	34.15	28.45	58.68	48.68	-24.53	-20.23
4	0.89800	9.85	19.33	14.49	29.18	24.34	56.00	46.00	-26.82	-21.66
5	19.91000	10.20	24.15	19.16	34.35	29.36	60.00	50.00	-25.65	-20.64
6	21.51400	10.20	21.88	16.40	32.08	26.60	60.00	50.00	-27.92	-23.40

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.



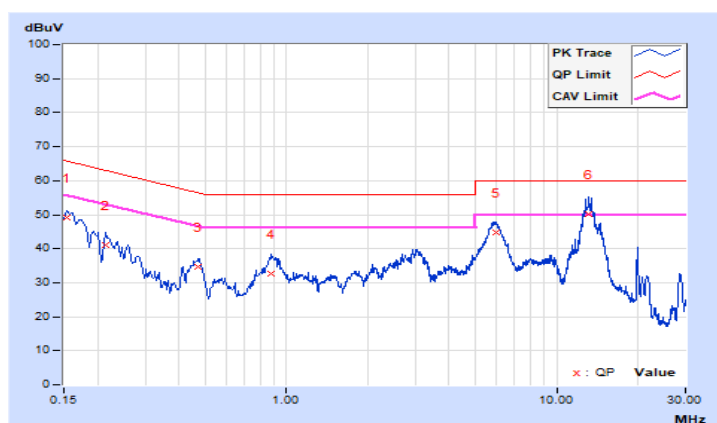
Mode B

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	TX Channel 1		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
	[MHz]		[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.62	39.48	21.16	49.10	30.78	65.78	55.78	-16.68	-25.00
2	0.21400	9.64	31.54	15.95	41.18	25.59	63.05	53.05	-21.87	-27.46
3	0.47309	9.69	24.83	19.67	34.52	29.36	56.46	46.46	-21.94	-17.10
4	0.88200	9.70	23.10	18.12	32.80	27.82	56.00	46.00	-23.20	-18.18
5	5.95400	9.77	35.11	30.94	44.88	40.71	60.00	50.00	-15.12	-9.29
6	13.19800	9.83	40.22	35.26	50.05	45.09	60.00	50.00	-9.95	-4.91

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)
Channel	TX Channel 1		

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	9.62	39.99	19.69	49.61	29.31	66.00	56.00	-16.39	-26.69
2	0.16600	9.63	37.50	17.39	47.13	27.02	65.16	55.16	-18.03	-28.14
3	0.93000	9.70	22.00	16.99	31.70	26.69	56.00	46.00	-24.30	-19.31
4	3.04600	9.74	25.52	18.24	35.26	27.98	56.00	46.00	-20.74	-18.02
5	5.97000	9.77	35.15	30.97	44.92	40.74	60.00	50.00	-15.08	-9.26
6	13.50600	9.85	41.74	36.06	51.59	45.91	60.00	50.00	-8.41	-4.09

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.

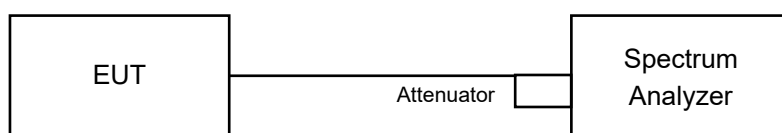


4.3 6dB Bandwidth Measurement

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	9.08	0.5	Pass
6	2437	9.08	0.5	Pass
11	2462	9.09	0.5	Pass

802.11g

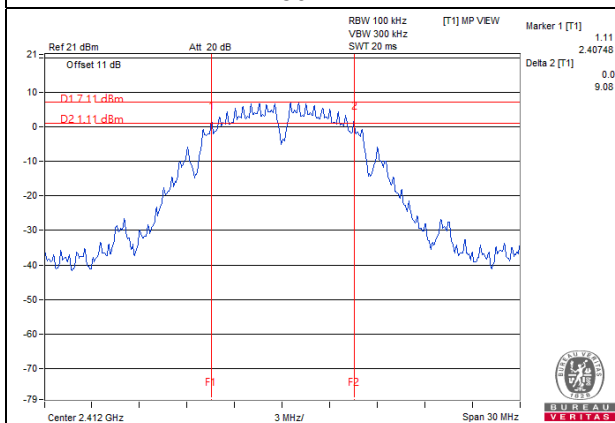
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.51	0.5	Pass
6	2437	15.48	0.5	Pass
11	2462	15.53	0.5	Pass

802.11n (HT20)

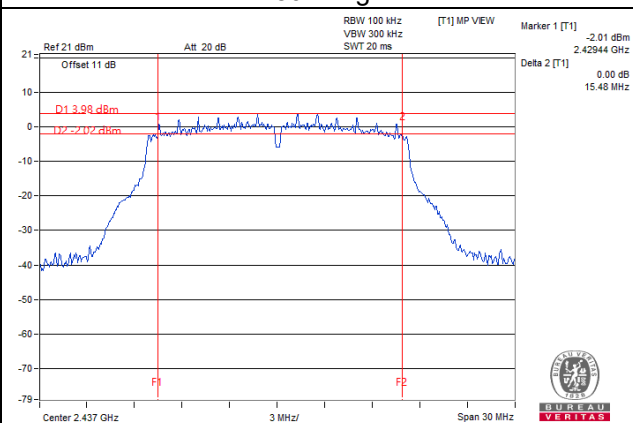
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.42	0.5	Pass
6	2437	15.56	0.5	Pass
11	2462	15.16	0.5	Pass

Spectrum Plot of Worst Value

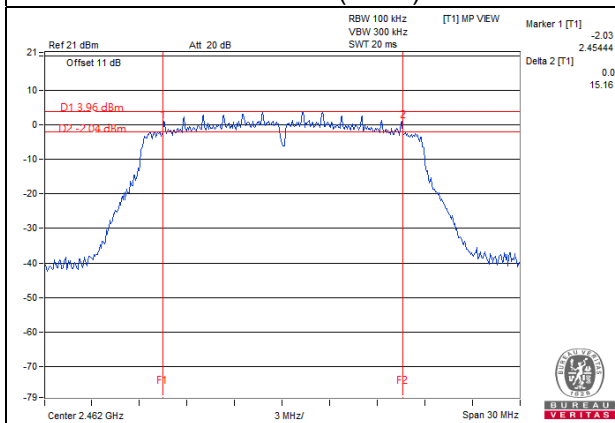
802.11b



802.11g



802.11n (HT20)

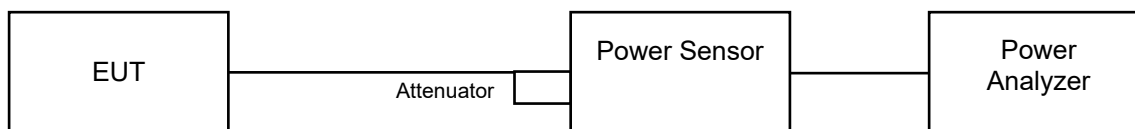


4.4 Conducted Output Power Measurement

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

Average Power

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	44.463	16.48	30	Pass
6	2437	85.507	19.32	30	Pass
11	2462	64.565	18.10	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	37.154	15.70	30	Pass
6	2437	36.392	15.61	30	Pass
11	2462	36.475	15.62	30	Pass

802.11n (HT20)

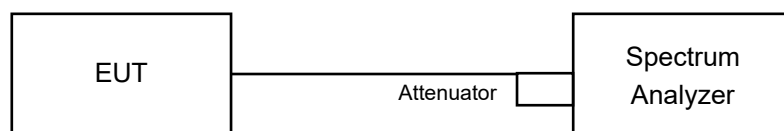
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	28.576	14.56	30	Pass
6	2437	35.318	15.48	30	Pass
11	2462	34.356	15.36	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm 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

For Average Power (Duty cycle < 98%)

- 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

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-17.38	0.13	-17.25	8.00	Pass
6	2437	-15.64	0.13	-15.51	8.00	Pass
11	2462	-16.54	0.13	-16.41	8.00	Pass

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

802.11g

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-19.10	0.62	-18.48	8.00	Pass
6	2437	-19.17	0.62	-18.55	8.00	Pass
11	2462	-19.39	0.62	-18.77	8.00	Pass

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

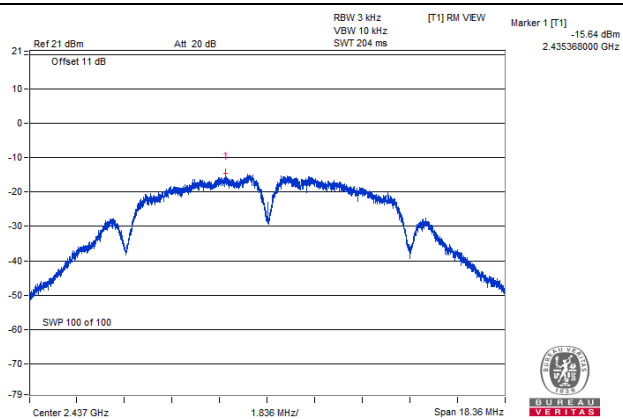
802.11n (HT20)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-21.19	0.26	-20.93	8.00	Pass
6	2437	-20.51	0.26	-20.25	8.00	Pass
11	2462	-19.99	0.26	-19.73	8.00	Pass

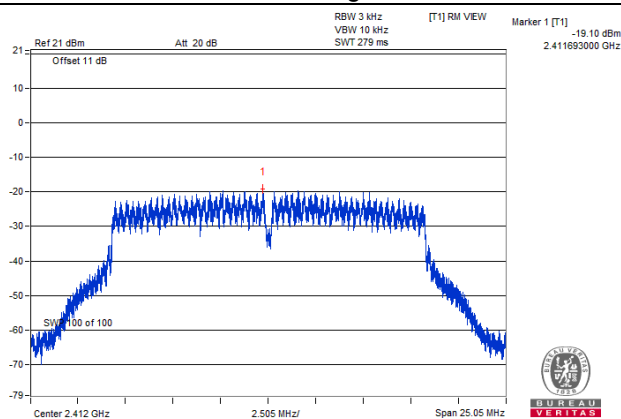
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

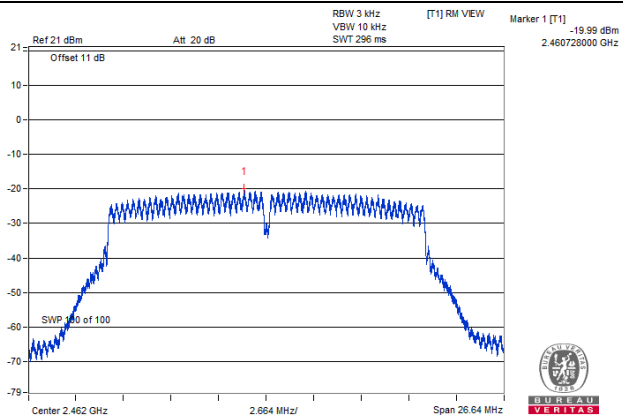
802.11b



802.11g



802.11n (HT20)

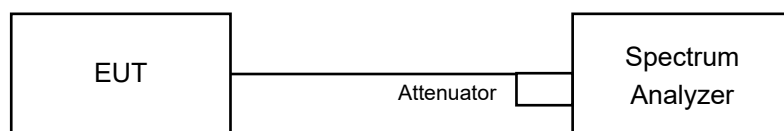


4.6 Conducted Out of Band Emission Measurement

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

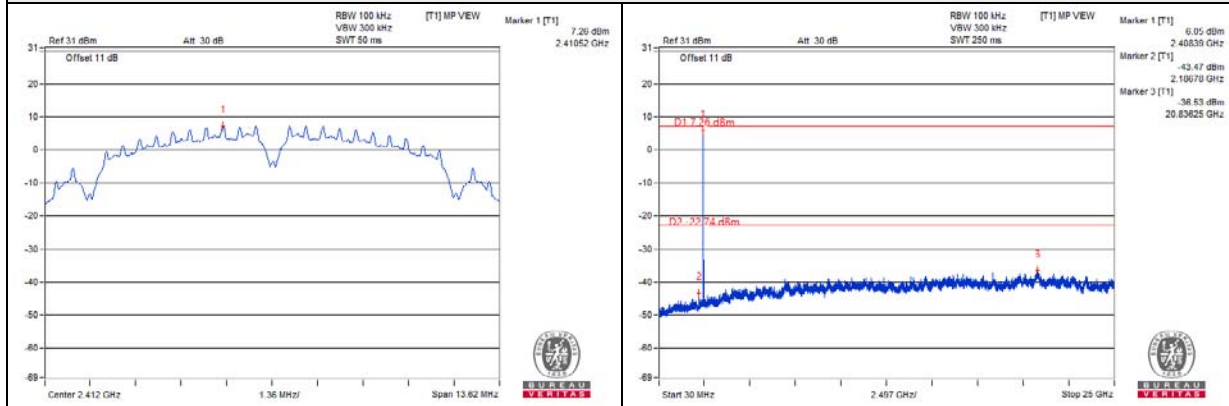
Same as item 4.3.6.

4.6.7 Test Results

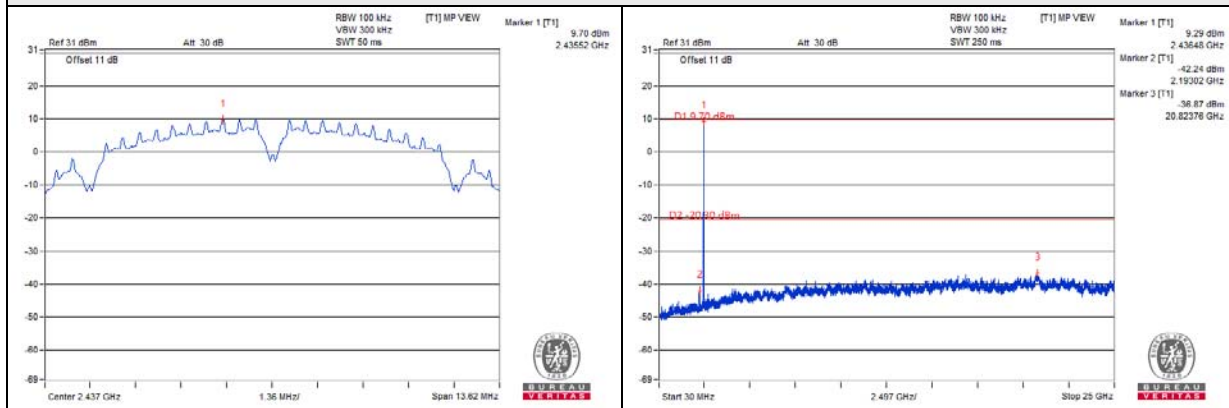
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

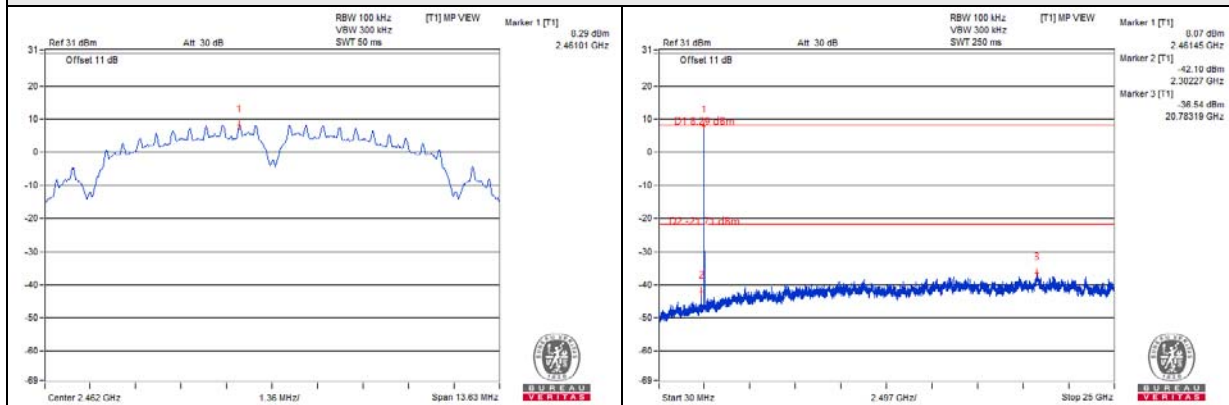
CH 1



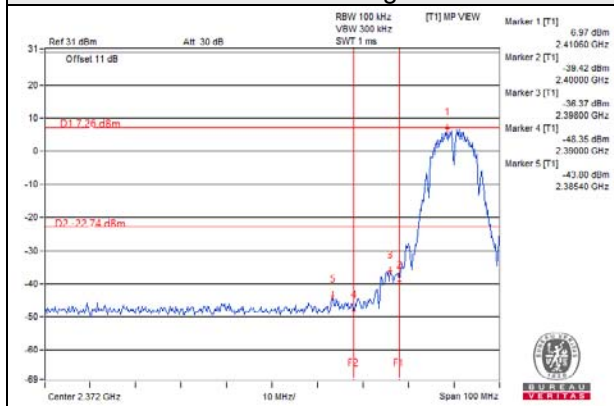
CH 6



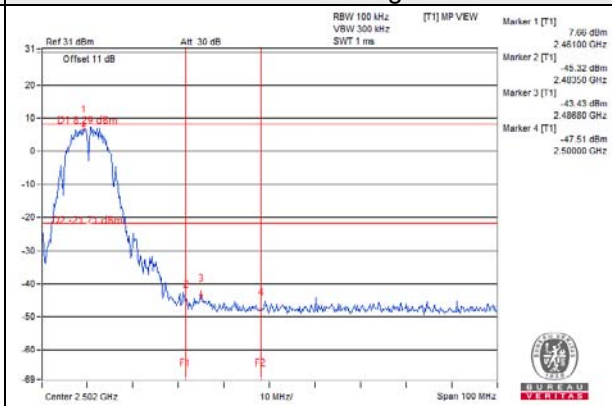
CH 11



CH 1 Band edge

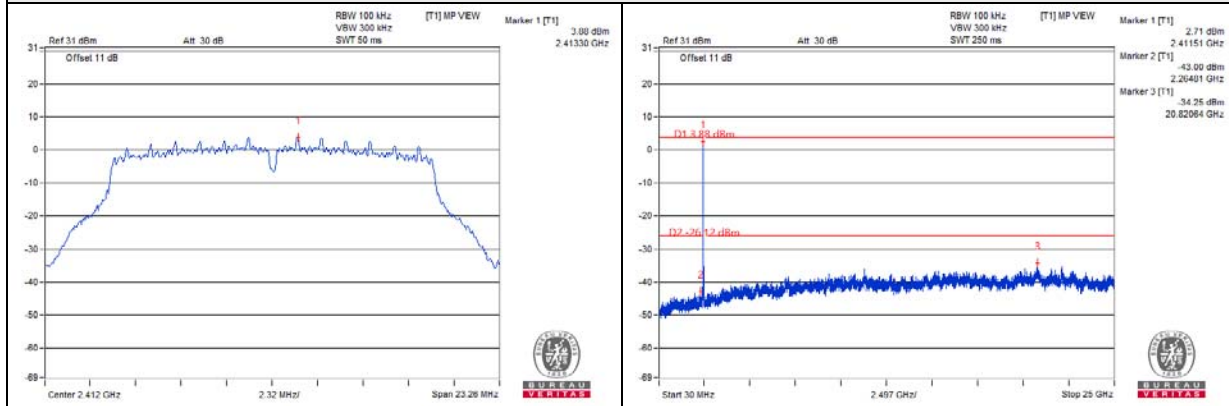


CH 11 Band edge

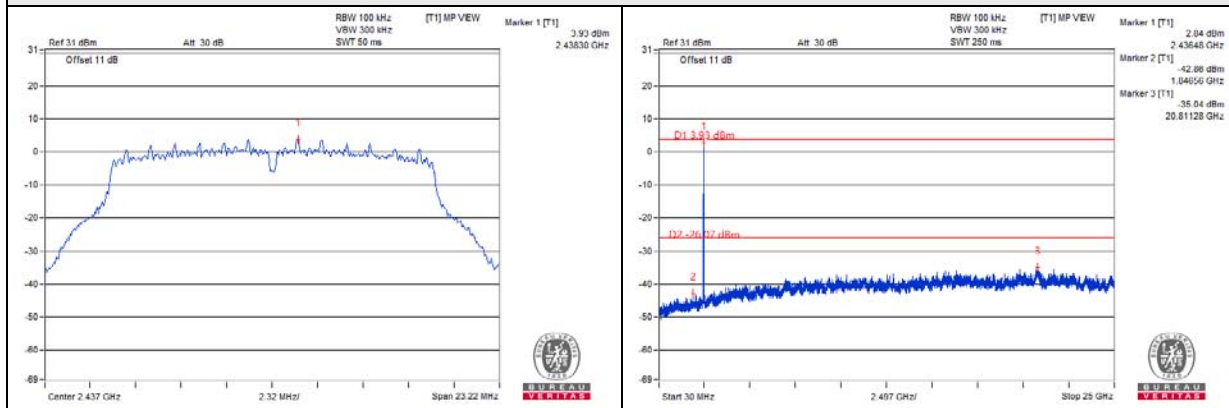


802.11g

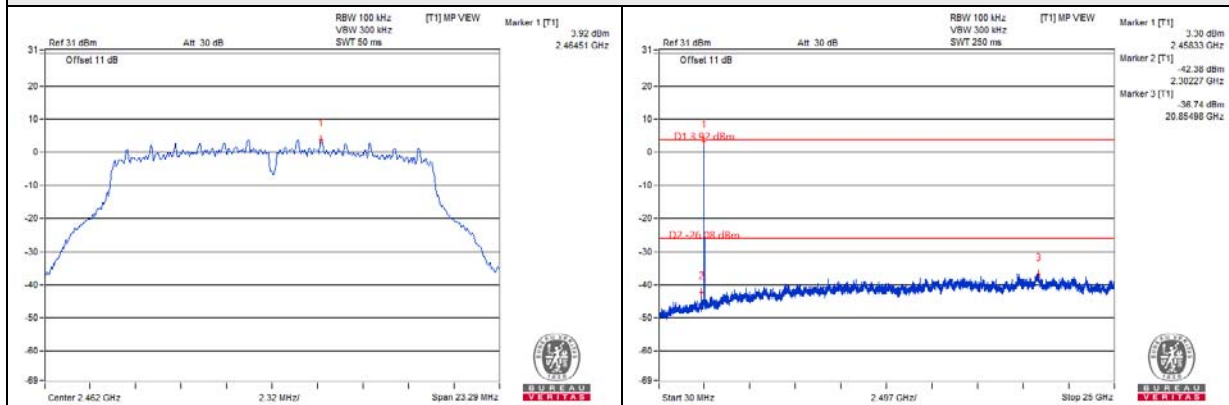
CH 1



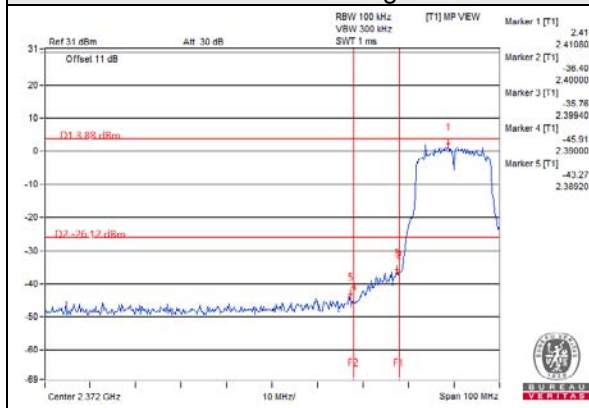
CH 6



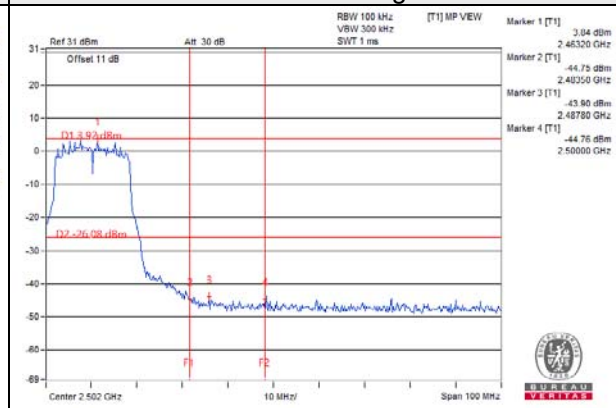
CH 11



CH 1 Band edge

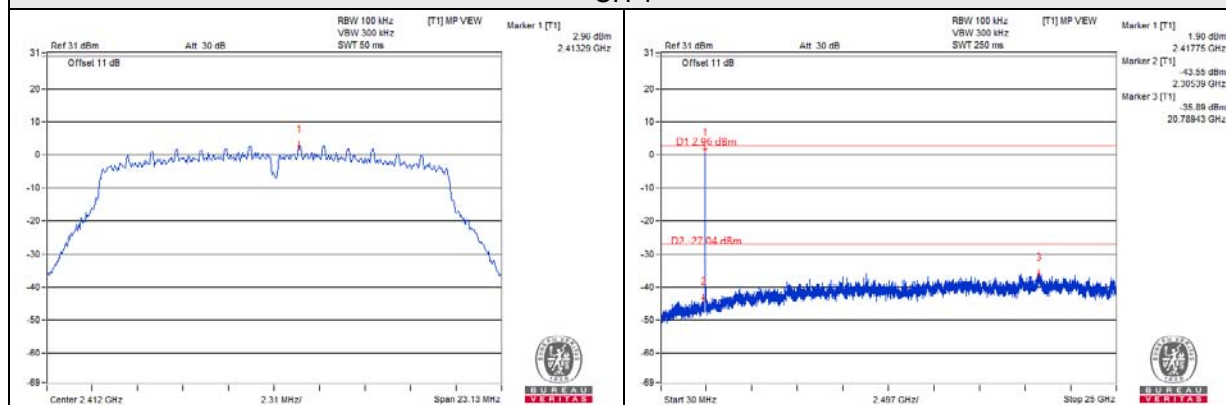


CH 11 Band edge

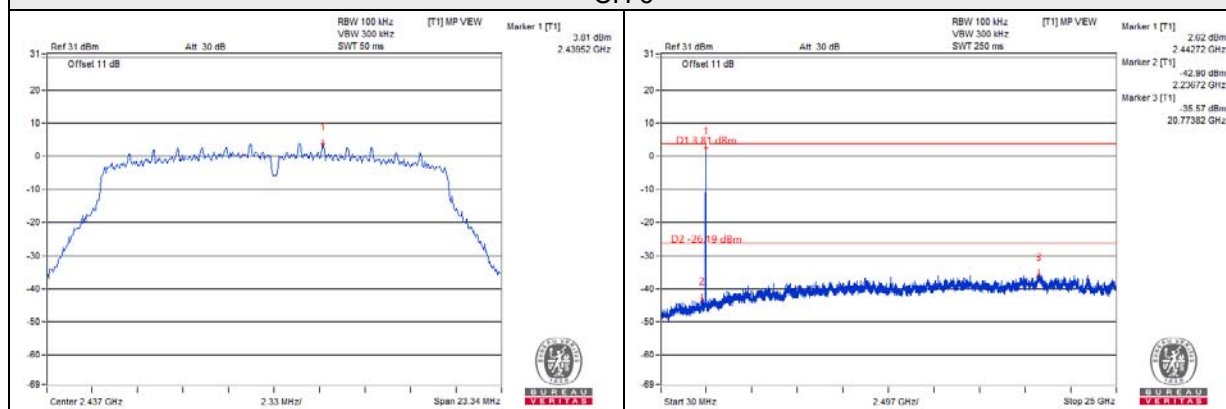


802.11n (HT20)

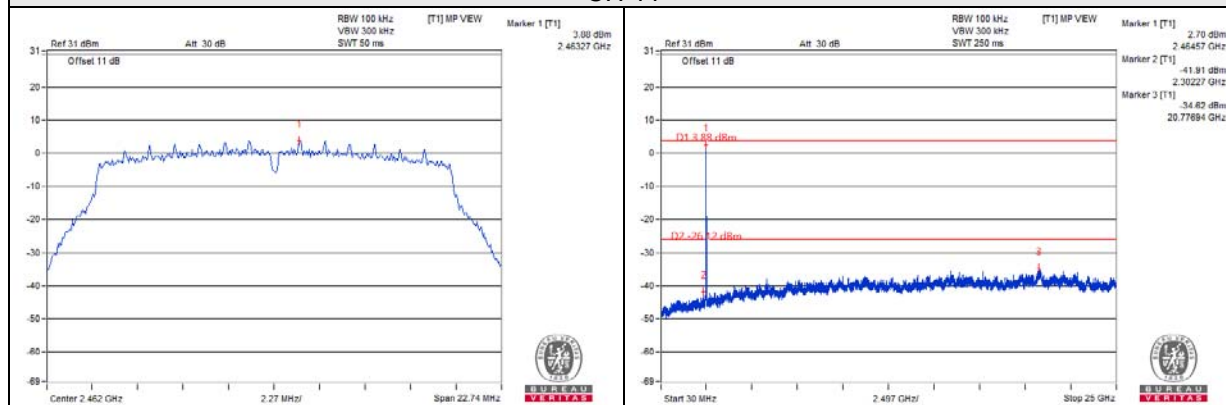
CH 1



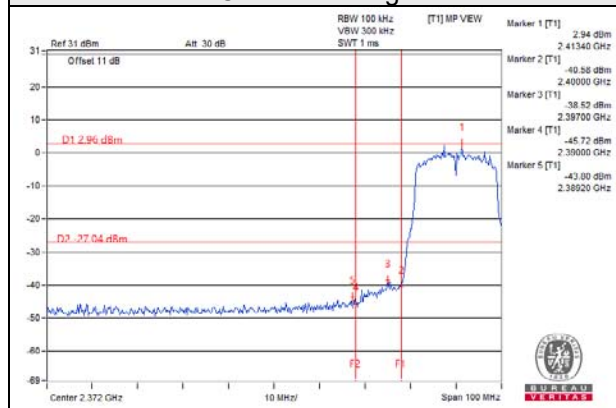
CH 6



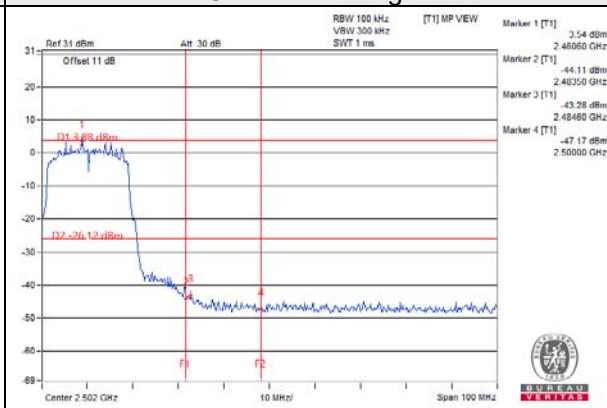
CH 11



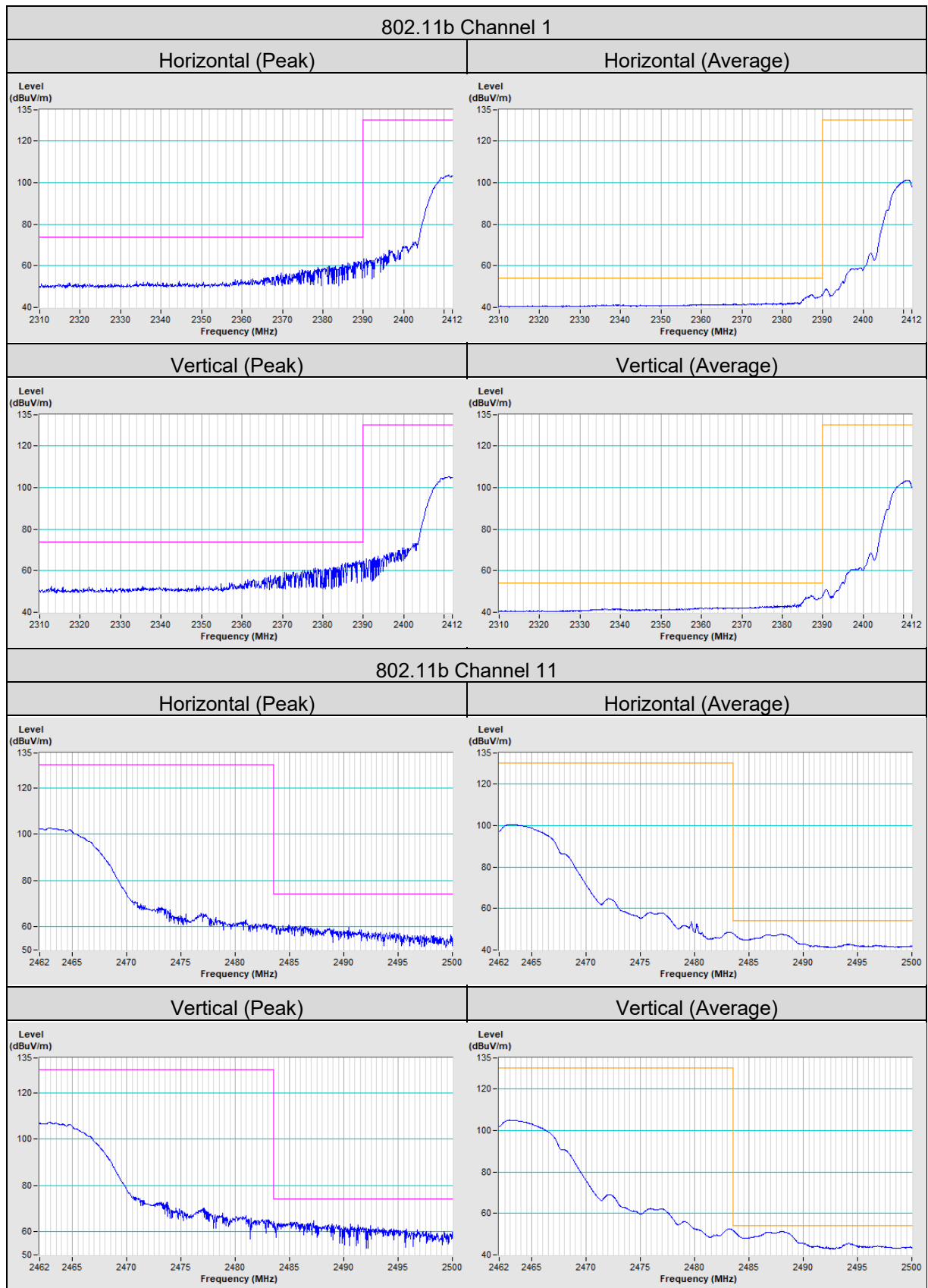
CH 1 Band edge

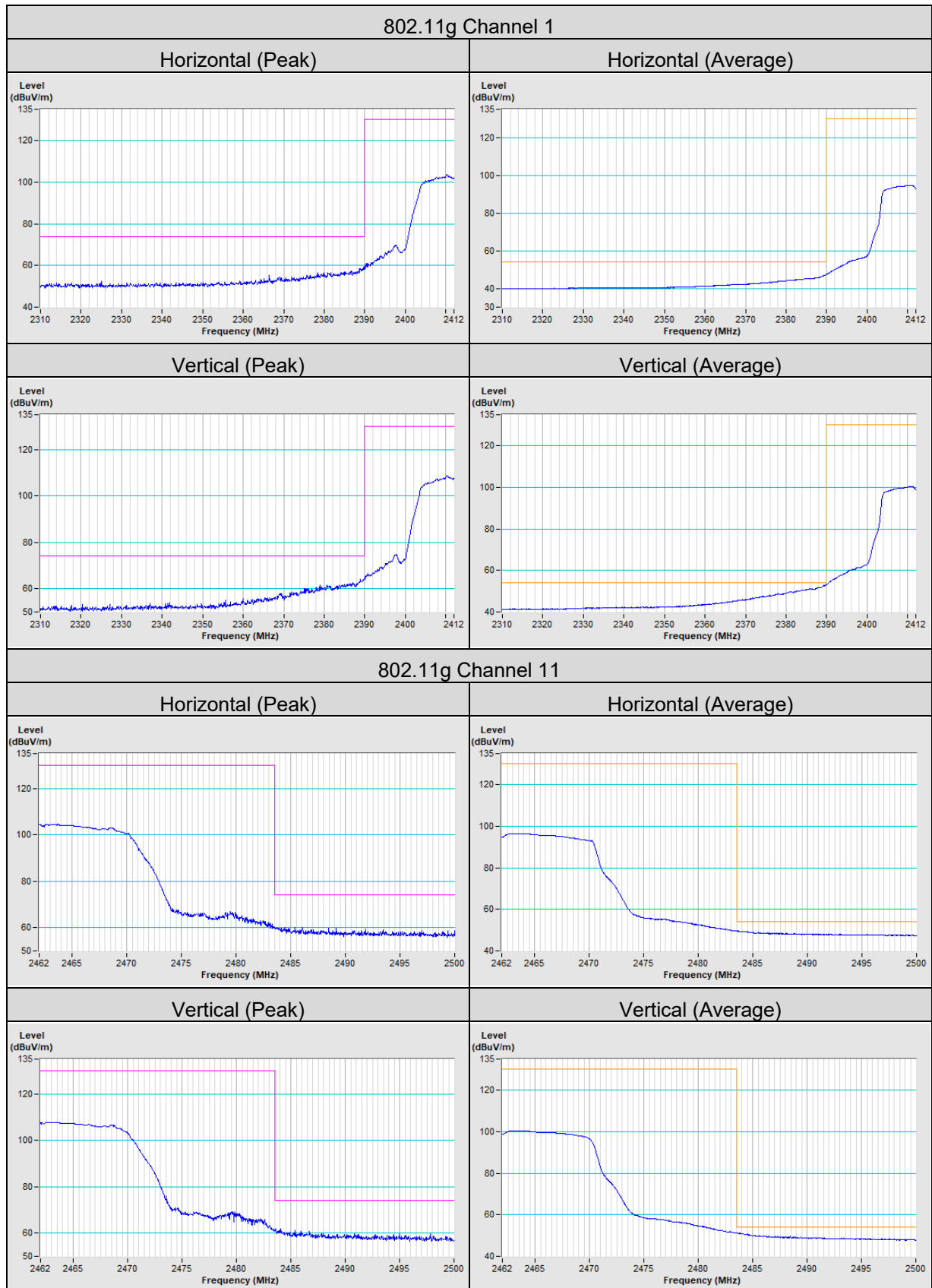


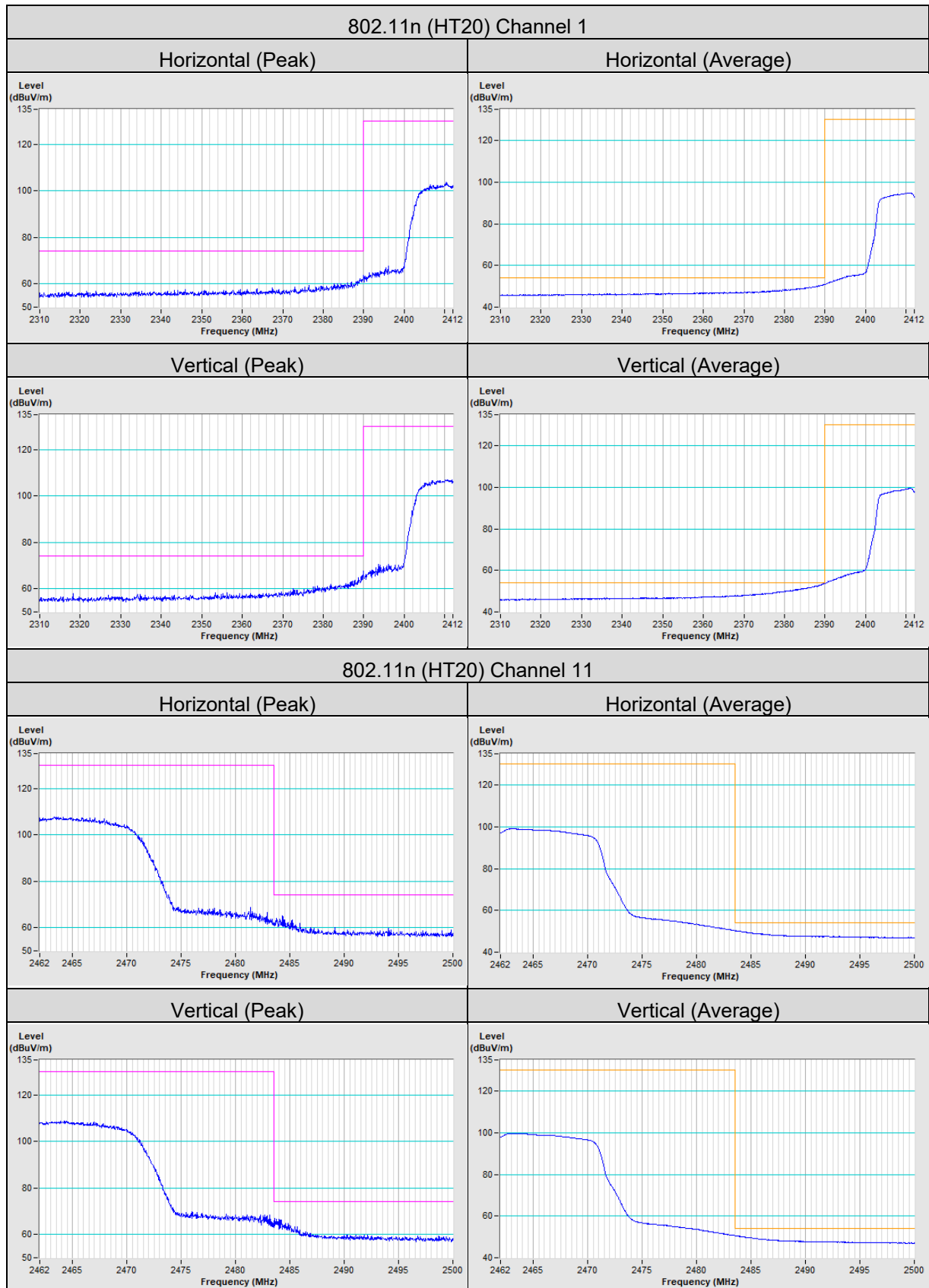
CH 11 Band edge



Annex A- Band Edge Measurement







5. Pictures of Test Arrangements

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

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:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@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.

--- END ---