

## FCC Test Report (WLAN)

**Report No.:** RF201006E04

**FCC ID:** NOIKBN604

**Test Model:** N604

**Received Date:** Oct. 06, 2020

**Test Date:** Oct. 27 to Nov. 20, 2020

**Issued Date:** Jan. 20, 2021

**Applicant:** NETRONIX, INC.

**Address:** No. 945, Boai St., Jubei City, Hsin-Chu,302,Taiwan, R.O.C.

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

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan

**Test Location:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan

**FCC Registration /  
Designation Number:** 723255 / TW2022



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

## Table of Contents

<b>Release Control Record</b> .....	<b>4</b>
<b>1 Certificate of Conformity</b> .....	<b>5</b>
<b>2 Summary of Test Results</b> .....	<b>6</b>
2.1 Measurement Uncertainty.....	6
2.2 Modification Record.....	6
<b>3 General Information</b> .....	<b>7</b>
3.1 General Description of EUT (WLAN).....	7
3.2 Description of Test Modes.....	9
3.2.1 Test Mode Applicability and Tested Channel Detail.....	10
3.3 Duty Cycle of Test Signal.....	12
3.4 Description of Support Units.....	13
3.4.1 Configuration of System under Test.....	13
3.5 General Description of Applied Standards and References.....	14
<b>4 Test Types and Results</b> .....	<b>15</b>
4.1 Radiated Emission and Bandedge Measurement.....	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement.....	15
4.1.2 Test Instruments.....	16
4.1.3 Test Procedures.....	18
4.1.4 Deviation from Test Standard.....	18
4.1.5 Test Setup.....	19
4.1.6 EUT Operating Conditions.....	20
4.1.7 Test Results.....	21
4.2 Conducted Emission Measurement.....	32
4.2.1 Limits of Conducted Emission Measurement.....	32
4.2.2 Test Instruments.....	32
4.2.3 Test Procedures.....	33
4.2.4 Deviation from Test Standard.....	33
4.2.5 Test Setup.....	33
4.2.6 EUT Operating Conditions.....	33
4.2.7 Test Results.....	34
4.3 6dB Bandwidth Measurement.....	36
4.3.1 Limits of 6dB Bandwidth Measurement.....	36
4.3.2 Test Setup.....	36
4.3.3 Test Instruments.....	36
4.3.4 Test Procedure.....	36
4.3.5 Deviation from Test Standard.....	36
4.3.6 EUT Operating Conditions.....	36
4.3.7 Test Result.....	37
4.4 Conducted Output Power Measurement.....	39
4.4.1 Limits of Conducted Output Power Measurement.....	39
4.4.2 Test Setup.....	39
4.4.3 Test Instruments.....	39
4.4.4 Test Procedures.....	39
4.4.5 Deviation from Test Standard.....	39
4.4.6 EUT Operating Conditions.....	39
4.4.7 Test Results.....	40
4.5 Power Spectral Density Measurement.....	41
4.5.1 Limits of Power Spectral Density Measurement.....	41
4.5.2 Test Setup.....	41
4.5.3 Test Instruments.....	41
4.5.4 Test Procedure.....	41
4.5.5 Deviation from Test Standard.....	41
4.5.6 EUT Operating Condition.....	41

4.5.7 Test Results .....	42
4.6 Conducted Out of Band Emission Measurement.....	44
4.6.1 Limits of Conducted Out of Band Emission Measurement .....	44
4.6.2 Test Setup.....	44
4.6.3 Test Instruments .....	44
4.6.4 Test Procedure .....	44
4.6.5 Deviation from Test Standard .....	44
4.6.6 EUT Operating Condition .....	44
4.6.7 Test Results .....	44
<b>5 Pictures of Test Arrangements.....</b>	<b>48</b>
<b>Annex A - Band-Edge Measurement.....</b>	<b>49</b>
<b>Appendix – Information of the Testing Laboratories .....</b>	<b>52</b>

### Release Control Record

Issue No.	Description	Date Issued
RF201006E04	Original release.	Jan. 20, 2021

## 1 Certificate of Conformity

**Product:** Electronic Display Device

**Brand:** Rakuten kobo

**Test Model:** N604

**Sample Status:** ENGINEERING SAMPLE

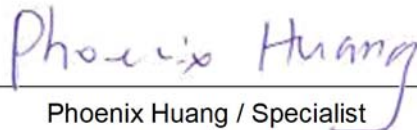
**Applicant:** NETRONIX, INC.

**Test Date:** Oct. 27 to Nov. 20, 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 EMC characteristics under the conditions specified in this report.

**Prepared by :**

  
Phoenix Huang / Specialist

**Date:**

Jan. 20, 2021

**Approved by :**



Clark Lin / Technical Manager

**Date:**

Jan. 20, 2021

## 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 -10.97 dB at 0.58194 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.2 dB at 2487.78 MHz.
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 2.4 GHz band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A.
- 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) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Conducted emissions	-	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.1 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.1 dB
	18GHz ~ 40GHz	5.3 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT (WLAN)

Product	Electronic Display Device
Brand	Rakuten kobo
Test Model	N604
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	3.7 Vdc from battery or 5 Vdc from USB interface
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 150 Mbps 802.11ac: up to 433.3 Mbps
Operating Frequency	<b>2.4GHz:</b> 2.412 ~ 2.462 GHz <b>5GHz:</b> 5.18 ~ 5.24 GHz, 5.745 ~ 5.825 GHz
Number of Channel	<b>2.4GHz:</b> 802.11b, 802.11g, 802.11n (HT20): 11 <b>5GHz:</b> 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	<b>2.412 ~ 2.462GHz:</b> 228.034 mW <b>5.18 ~ 5.24GHz:</b> 8.166 mW <b>5.745 ~ 5.825GHz:</b> 22.131 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	USB Cable x1 (Shielded, 1m)

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	Bluetooth
2	WLAN 5GHz	Bluetooth

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

2. Two eMMC provided to the EUT, please refer to the following table:

No.	Model	Remark
1	EMMC32G-TA28	1 <sup>st</sup> source eMMC
2	KLMBG2JETD-B041	2 <sup>nd</sup> source eMMC

3. The antenna provided to the EUT, please refer to the following table:

Model No.	Antenna Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
RFFPA360906EMLB101	3.95	2.4~2.4835	Dipole	i-pex(MHF)	55
	4.64	5.15~5.85			

4. The EUT was pre-tested under the following modes:

For Radiated Emission test	
Test Mode	Description
Mode A	EUT with 2 <sup>nd</sup> source eMMC and power from adapter
<b>Mode B</b>	<b>EUT with 1<sup>st</sup> source eMMC and power from adapter</b>
Mode C	EUT with 1 <sup>st</sup> source eMMC and power from battery
Note: From the above modes, the worst case were found in <b>Mode B</b> . Therefore only the test data of the mode was recorded in this report.	
For AC Power Conducted Emission	
Test Mode	Description
<b>Mode D</b>	<b>EUT with 1<sup>st</sup> source eMMC and power from adapter</b>
Mode E	EUT with 1 <sup>st</sup> source eMMC and power from Laptop
Note: From the above modes, the worst case were found in <b>Mode D</b> . Therefore only the test data of the mode was recorded in this report.	

5. The EUT incorporates a SISO function.

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
802.11ac (VHT20)	1TX	1RX
802.11ac (VHT40)	1TX	1RX
802.11ac (VHT80)	1TX	1RX

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

7. 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.



### 3.2 Description of Test Modes

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

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

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE $<$ 1G	PLC	APCM	
-	√	√	√	√	-

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

#### 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

#### 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.

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

#### Power Line Conducted Emission Test:

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

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

**Antenna Port Conducted Measurement:**

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

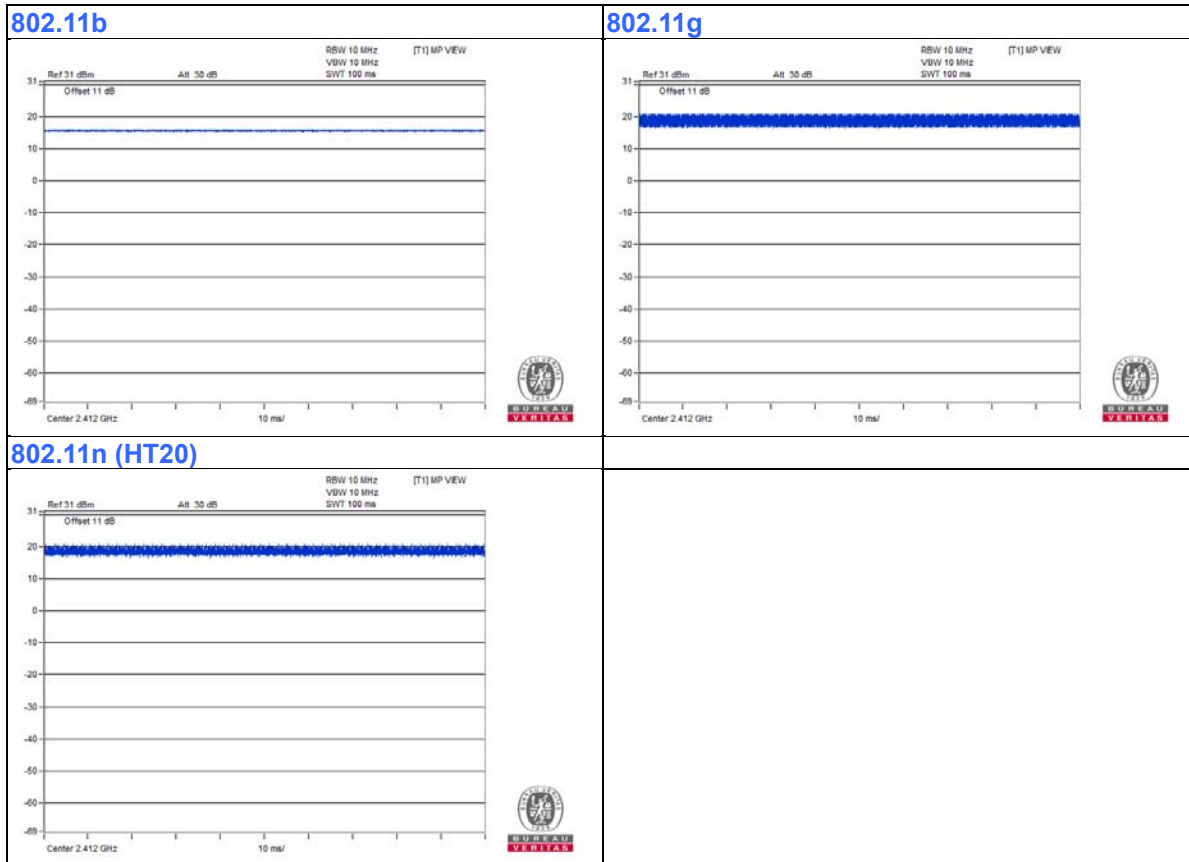
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5

**Test Condition:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
<b>RE≥1G</b>	25deg. C, 67%RH, 25deg. C, 75%RH	120Vac, 60Hz	Benson Chao, Benson Chao
<b>RE&lt;1G</b>	20deg. C, 68%RH	120Vac, 60Hz	Benson Chao
<b>PLC</b>	25deg. C, 68%RH	120Vac, 60Hz	Tom Yang
<b>APCM</b>	25deg. C, 60%RH	120Vac, 60Hz	Kevin Ko

### 3.3 Duty Cycle of Test Signal

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



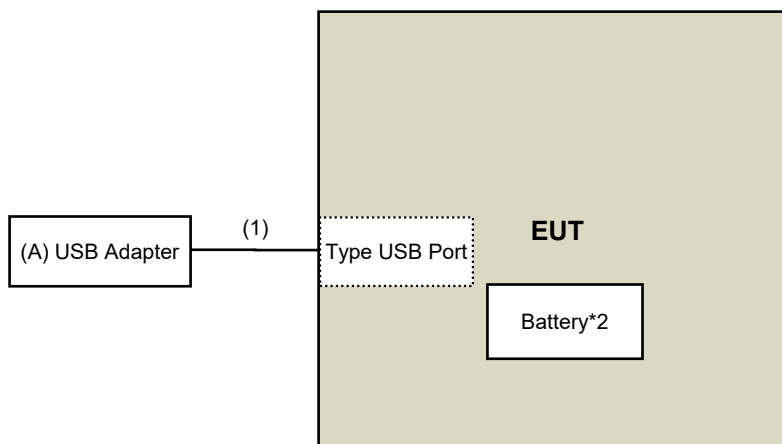
### 3.4 Description of Support Units

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.	USB Adapter	ASUS	EXA1205UA	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable	1	1	Yes	0	Supplied 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 20dB below the highest level of the desired power:

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

**Note:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

## 4.1.2 Test Instruments

**For Radiated Emission test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESR7	102026	Apr. 22, 2020	Apr. 21, 2021
Spectrum Analyzer Keysight	N9030B	MY57141948	May 22, 2020	May 21, 2021
Pre-Amplifier EMCi	EMC001340	980142	May 25, 2020	May 24, 2021
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier EMCi	EMC330N	980538	Apr. 28, 2020	Apr. 27, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB9168	9168-0842	Nov. 08, 2019	Nov. 07, 2020
RF Cable	8D	966-5-1	Apr. 29, 2020	Apr. 28, 2021
RF Cable	8D	966-5-2	Apr. 29, 2020	Apr. 28, 2021
RF Cable	8D	966-5-3	Apr. 29, 2020	Apr. 28, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	Jan. 14, 2020	Jan. 13, 2021
Horn Antenna SCHWARZBECK	BBHA 9120D	9120D-1819	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCi	EMC12630SE	980509	Apr. 29, 2020	Apr. 28, 2021
RF Cable EMCi	EMC104-SM-SM-1500	180503	Apr. 29, 2020	Apr. 28, 2021
RF Cable EMCi	EMC104-SM-SM-2000	180501	Apr. 29, 2020	Apr. 28, 2021
RF Cable EMCi	EMC104-SM-SM-6000	180506	Apr. 29, 2020	Apr. 28, 2021
Pre-Amplifier EMCi	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	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 966 Chamber No. 5.
3. Tested Date: Oct. 27 to Nov. 04, 2020



**For other test items:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	May 29, 2020	May 28, 2021
Power meter Anritsu	ML2495A	1529002	July 22, 2020	July 21, 2021
Power sensor Anritsu	MA2411B	1339443	July 22, 2020	July 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

- NOTE:**
1. The test was performed in Oven room 2.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. Tested Date: Nov. 20, 2020

#### 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 detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

##### **Note:**

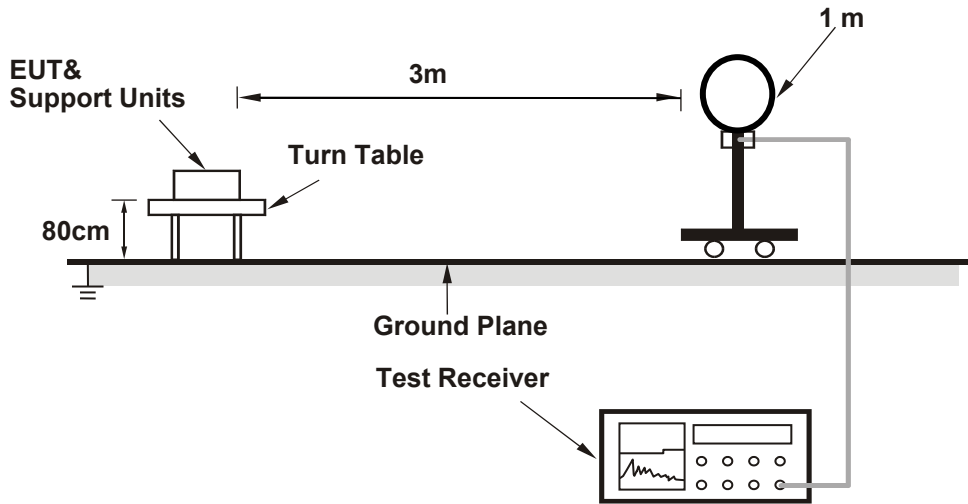
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.1.4 Deviation from Test Standard

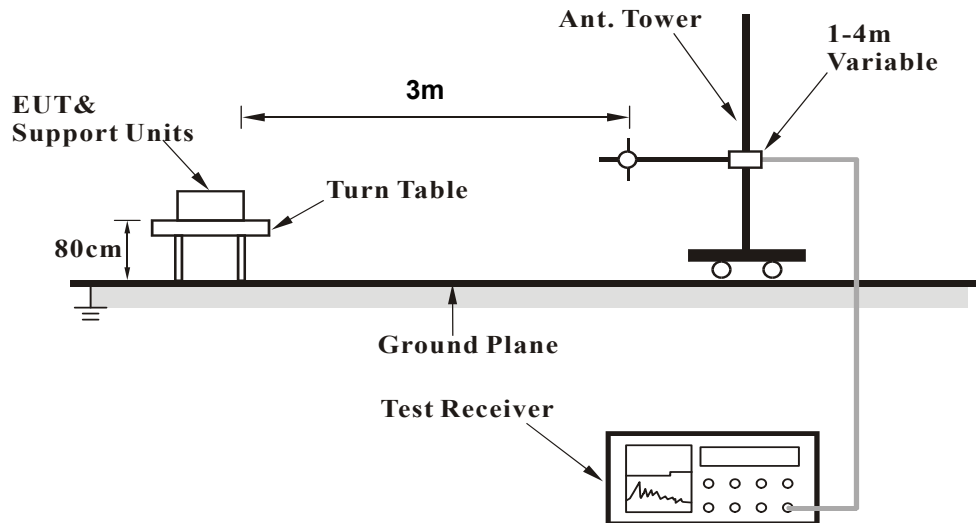
No deviation.

#### 4.1.5 Test Setup

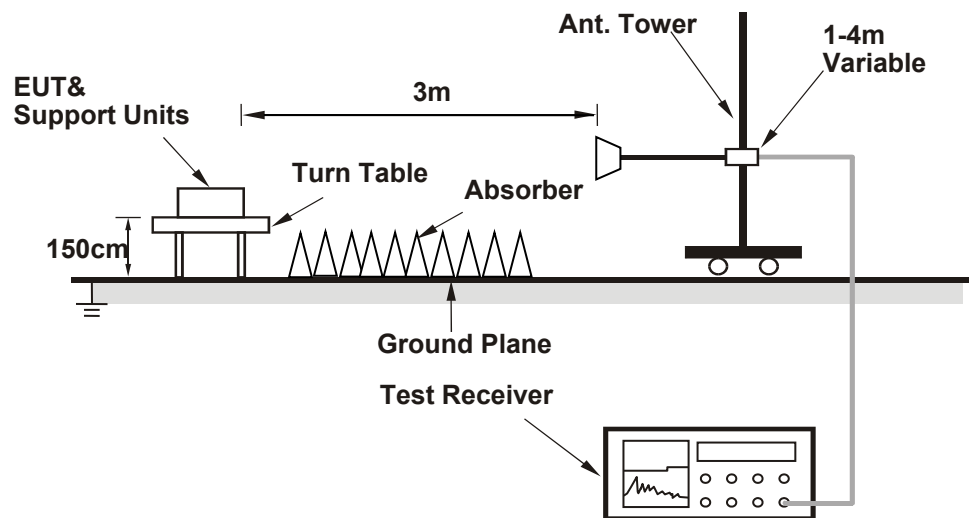
##### For Radiated emission below 30MHz



##### For Radiated emission 30MHz to 1GHz



### For Radiated emission above 1GHz



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

#### 4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Controlling software (Hyperterminal paste SOP.txt command) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

##### Above 1GHz Data:

<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	2386.00	62.3 PK	74.0	-11.7	1.63 H	190	65.4	-3.1
2	2386.00	53.6 AV	54.0	-0.4	1.63 H	190	56.7	-3.1
3	*2412.00	109.8 PK			1.63 H	190	112.8	-3.0
4	*2412.00	106.1 AV			1.63 H	190	109.1	-3.0
5	4824.00	52.9 PK	74.0	-21.1	1.85 H	342	51.9	1.0
6	4824.00	50.9 AV	54.0	-3.1	1.85 H	342	49.9	1.0
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	2386.00	57.0 PK	74.0	-17.0	2.73 V	264	60.1	-3.1
2	2386.00	46.0 AV	54.0	-8.0	2.73 V	264	49.1	-3.1
3	*2412.00	99.5 PK			2.73 V	264	102.5	-3.0
4	*2412.00	96.0 AV			2.73 V	264	99.0	-3.0
5	4824.00	52.4 PK	74.0	-21.6	1.43 V	283	51.4	1.0
6	4824.00	50.3 AV	54.0	-3.7	1.43 V	283	49.3	1.0

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

<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	61.5 PK	74.0	-12.5	2.93 H	315	64.6	-3.1
2	2390.00	53.5 AV	54.0	-0.5	2.93 H	315	56.6	-3.1
3	*2437.00	107.4 PK			2.93 H	315	110.4	-3.0
4	*2437.00	103.2 AV			2.93 H	315	106.2	-3.0
5	2483.50	60.5 PK	74.0	-13.5	2.93 H	315	63.6	-3.1
6	2483.50	50.6 AV	54.0	-3.4	2.93 H	315	53.7	-3.1
7	4874.00	54.7 PK	74.0	-19.3	1.83 H	342	53.8	0.9
8	4874.00	53.3 AV	54.0	-0.7	1.83 H	342	52.4	0.9
9	7311.00	45.3 PK	74.0	-28.7	3.71 H	306	38.3	7.0
10	7311.00	32.8 AV	54.0	-21.2	3.71 H	306	25.8	7.0

**Antenna Polarity & Test Distance : Vertical at 3 m**

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	59.4 PK	74.0	-14.6	3.40 V	110	62.5	-3.1
2	2390.00	51.2 AV	54.0	-2.8	3.40 V	110	54.3	-3.1
3	*2437.00	105.3 PK			3.40 V	110	108.3	-3.0
4	*2437.00	98.8 AV			3.40 V	110	101.8	-3.0
5	2483.50	58.7 PK	74.0	-15.3	3.40 V	110	61.8	-3.1
6	2483.50	49.6 AV	54.0	-4.4	3.40 V	110	52.7	-3.1
7	4874.00	54.4 PK	74.0	-19.6	1.58 V	275	53.5	0.9
8	4874.00	52.9 AV	54.0	-1.1	1.58 V	275	52.0	0.9
9	7311.00	44.7 PK	74.0	-29.3	3.65 V	285	37.7	7.0
10	7311.00	31.8 AV	54.0	-22.2	3.65 V	285	24.8	7.0

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

<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	108.0 PK			2.32 H	32	111.1	-3.1
2	*2462.00	104.8 AV			2.32 H	32	107.9	-3.1
3	2487.00	61.9 PK	74.0	-12.1	2.32 H	32	65.0	-3.1
4	2487.00	53.2 AV	54.0	-0.8	2.32 H	32	56.3	-3.1
5	4924.00	54.4 PK	74.0	-19.6	1.80 H	342	53.4	1.0
6	4924.00	52.8 AV	54.0	-1.2	1.80 H	342	51.8	1.0
7	7386.00	46.0 PK	74.0	-28.0	1.40 H	17	38.9	7.1
8	7386.00	33.3 AV	54.0	-20.7	1.40 H	17	26.2	7.1

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	*2462.00	107.6 PK			3.63 V	278	110.7	-3.1
2	*2462.00	103.9 AV			3.63 V	278	107.0	-3.1
3	2487.78	61.0 PK	74.0	-13.0	3.63 V	278	64.1	-3.1
<b>4</b>	<b>2487.78</b>	<b>53.8 AV</b>	<b>54.0</b>	<b>-0.2</b>	<b>3.63 V</b>	<b>278</b>	<b>56.9</b>	<b>-3.1</b>
5	4924.00	54.0 PK	74.0	-20.0	1.54 V	215	53.0	1.0
6	4924.00	51.7 AV	54.0	-2.3	1.54 V	215	50.7	1.0
7	7386.00	48.6 PK	74.0	-25.4	1.31 V	113	41.5	7.1
8	7386.00	38.5 AV	54.0	-15.5	1.31 V	113	31.4	7.1

**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.

<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	2389.62	69.8 PK	74.0	-4.2	2.82 H	331	72.9	-3.1
2	2389.62	52.8 AV	54.0	-1.2	2.82 H	331	55.9	-3.1
3	*2412.00	108.0 PK			2.32 H	331	111.0	-3.0
4	*2412.00	97.9 AV			2.32 H	331	100.9	-3.0
5	4824.00	50.4 PK	74.0	-23.6	2.99 H	340	49.4	1.0
6	4824.00	36.8 AV	54.0	-17.2	2.99 H	340	35.8	1.0

**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	2389.65	67.6 PK	74.0	-6.4	3.24 V	262	70.7	-3.1
2	2389.65	52.3 AV	54.0	-1.7	3.24 V	262	55.4	-3.1
3	*2412.00	106.6 PK			3.24 V	262	109.6	-3.0
4	*2412.00	96.5 AV			3.24 V	262	99.5	-3.0
5	4824.00	47.2 PK	74.0	-26.8	2.66 V	196	46.2	1.0
6	4824.00	31.6 AV	54.0	-22.4	2.66 V	196	30.6	1.0

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



<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	61.6 PK	74.0	-12.4	2.68 H	337	64.7	-3.1
2	2390.00	47.1 AV	54.0	-6.9	2.68 H	337	50.2	-3.1
3	*2437.00	113.4 PK			2.68 H	337	116.4	-3.0
4	*2437.00	103.4 AV			2.68 H	337	106.4	-3.0
5	2483.50	67.9 PK	74.0	-6.1	2.68 H	337	71.0	-3.1
6	2483.50	49.3 AV	54.0	-4.7	2.68 H	337	52.4	-3.1
7	4874.00	43.3 PK	74.0	-30.7	2.84 H	171	42.4	0.9
8	4874.00	30.9 AV	54.0	-23.1	2.84 H	171	30.0	0.9
9	7311.00	45.3 PK	74.0	-28.7	1.52 H	337	38.3	7.0
10	7311.00	32.9 AV	54.0	-21.1	1.52 H	337	25.9	7.0

**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	57.7 PK	74.0	-16.3	3.25 V	282	60.8	-3.1
2	2390.00	44.0 AV	54.0	-10.0	3.25 V	282	47.1	-3.1
3	*2437.00	107.2 PK			3.25 V	282	110.2	-3.0
4	*2437.00	97.1 AV			3.25 V	282	100.1	-3.0
5	2483.50	58.5 PK	74.0	-15.5	3.25 V	282	61.6	-3.1
6	2483.50	45.2 AV	54.0	-8.8	3.25 V	282	48.3	-3.1
7	4874.00	40.5 PK	74.0	-33.5	1.14 V	143	39.6	0.9
8	4874.00	27.1 AV	54.0	-26.9	1.14 V	143	26.2	0.9
9	7311.00	44.3 PK	74.0	-29.7	2.61 V	354	37.3	7.0
10	7311.00	31.0 AV	54.0	-23.0	2.61 V	354	24.0	7.0

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

<b>RF Mode</b>	TX 802.11g	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	107.5 PK			2.70 H	329	110.6	-3.1
2	*2462.00	97.2 AV			2.70 H	329	100.3	-3.1
3	2483.64	69.5 PK	74.0	-4.5	2.70 H	329	72.6	-3.1
4	2483.64	53.4 AV	54.0	-0.6	2.70 H	329	56.5	-3.1
5	4924.00	47.3 PK	74.0	-26.7	2.92 H	335	46.3	1.0
6	4924.00	34.9 AV	54.0	-19.1	2.92 H	335	33.9	1.0
7	7386.00	45.1 PK	74.0	-28.9	1.55 H	347	38.0	7.1
8	7386.00	32.5 AV	54.0	-21.5	1.55 H	347	25.4	7.1

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	*2462.00	105.7 PK			3.35 V	276	108.8	-3.1
2	*2462.00	95.4 AV			3.35 V	276	98.5	-3.1
3	2483.67	61.6 PK	74.0	-12.4	3.35 V	276	64.7	-3.1
4	2483.67	48.1 AV	54.0	-5.9	3.35 V	276	51.2	-3.1
5	4924.00	41.7 PK	74.0	-32.3	2.74 V	314	40.7	1.0
6	4924.00	29.1 AV	54.0	-24.9	2.74 V	314	28.1	1.0
7	7386.00	45.5 PK	74.0	-28.5	2.68 V	317	38.4	7.1
8	7386.00	31.7 AV	54.0	-22.3	2.68 V	317	24.6	7.1

**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.

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 1 : 2412 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	2389.80	70.7 PK	74.0	-3.3	2.78 H	330	73.8	-3.1
2	2389.80	52.9 AV	54.0	-1.1	2.78 H	330	56.0	-3.1
3	*2412.00	106.8 PK			2.78 H	330	109.8	-3.0
4	*2412.00	96.6 AV			2.78 H	330	99.6	-3.0
5	4824.00	45.6 PK	74.0	-28.4	2.84 H	333	44.6	1.0
6	4824.00	32.1 AV	54.0	-21.9	2.84 H	333	31.1	1.0

**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	2389.94	68.6 PK	74.0	-5.4	3.38 V	274	71.7	-3.1
2	2389.94	52.8 AV	54.0	-1.2	3.38 V	274	55.9	-3.1
3	*2412.00	104.3 PK			3.38 V	274	107.3	-3.0
4	*2412.00	95.9 AV			3.38 V	274	98.9	-3.0
5	4824.00	41.4 PK	74.0	-32.6	1.82 V	285	40.4	1.0
6	4824.00	29.9 AV	54.0	-24.1	1.82 V	285	28.9	1.0

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 6 : 2437 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	62.1 PK	74.0	-11.9	2.72 H	335	65.2	-3.1
2	2390.00	47.6 AV	54.0	-6.4	2.72 H	335	50.7	-3.1
3	*2437.00	113.7 PK			2.72 H	335	116.7	-3.0
4	*2437.00	103.3 AV			2.72 H	335	106.3	-3.0
5	2483.50	67.3 PK	74.0	-6.7	2.72 H	335	70.4	-3.1
6	2483.50	49.4 AV	54.0	-4.6	2.72 H	335	52.5	-3.1
7	4874.00	53.1 PK	74.0	-20.9	3.00 H	338	52.2	0.9
8	4874.00	41.2 AV	54.0	-12.8	3.00 H	338	40.3	0.9
9	7311.00	45.9 PK	74.0	-28.1	2.38 H	356	38.9	7.0
10	7311.00	33.2 AV	54.0	-20.8	2.38 H	356	26.2	7.0

**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	61.2 PK	74.0	-12.8	3.35 V	278	64.3	-3.1
2	2390.00	46.6 AV	54.0	-7.4	3.35 V	278	49.7	-3.1
3	*2437.00	112.2 PK			3.35 V	278	115.2	-3.0
4	*2437.00	102.0 AV			3.35 V	278	105.0	-3.0
5	2483.50	66.8 PK	74.0	-7.2	3.35 V	278	69.9	-3.1
6	2483.50	47.3 AV	54.0	-6.7	3.35 V	278	50.4	-3.1
7	4874.00	50.1 PK	74.0	-23.9	1.50 V	291	49.2	0.9
8	4874.00	39.8 AV	54.0	-14.2	1.50 V	291	38.9	0.9
9	7311.00	43.3 PK	74.0	-30.7	2.94 V	309	36.3	7.0
10	7311.00	30.6 AV	54.0	-23.4	2.94 V	309	23.6	7.0

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

<b>RF Mode</b>	TX 802.11n (HT20)	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	1GHz ~ 25GHz	<b>Detector Function</b>	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	108.6 PK			2.66 H	336	111.7	-3.1
2	*2462.00	97.4 AV			2.66 H	336	100.5	-3.1
3	2484.15	71.1 PK	74.0	-2.9	2.66 H	336	74.2	-3.1
4	2484.15	52.3 AV	54.0	-1.7	2.66 H	336	55.4	-3.1
5	4924.00	47.5 PK	74.0	-26.5	2.83 H	20	46.5	1.0
6	4924.00	35.0 AV	54.0	-19.0	2.83 H	20	34.0	1.0
7	7386.00	46.7 PK	74.0	-27.3	1.94 H	55	39.6	7.1
8	7386.00	33.5 AV	54.0	-20.5	1.94 H	55	26.4	7.1

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	*2462.00	106.6 PK			3.28 V	278	109.7	-3.1
2	*2462.00	96.4 AV			3.28 V	278	99.5	-3.1
3	2483.63	68.0 PK	74.0	-6.0	3.28 V	278	71.1	-3.1
4	2483.63	50.8 AV	54.0	-3.2	3.28 V	278	53.9	-3.1
5	4924.00	43.1 PK	74.0	-30.9	1.77 V	200	42.1	1.0
6	4924.00	32.8 AV	54.0	-21.2	1.77 V	200	31.8	1.0
7	7386.00	44.6 PK	74.0	-29.4	2.46 V	211	37.5	7.1
8	7386.00	31.9 AV	54.0	-22.1	2.46 V	211	24.8	7.1

**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.

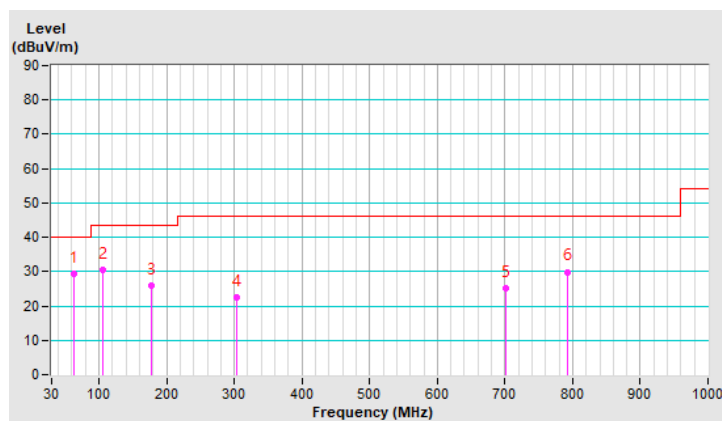
### Below 1GHz Data:

<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	9kHz ~ 1GHz	<b>Detector Function</b>	Quasi-Peak (QP)

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	62.21	29.5 QP	40.0	-10.5	2.00 H	0	43.0	-13.5
2	105.37	30.6 QP	43.5	-12.9	3.00 H	0	46.8	-16.2
3	177.88	25.9 QP	43.5	-17.6	1.50 H	360	39.8	-13.9
4	302.83	22.5 QP	46.0	-23.5	1.00 H	56	34.4	-11.9
5	700.79	25.1 QP	46.0	-20.9	1.00 H	99	28.7	-3.6
6	792.02	29.9 QP	46.0	-16.1	1.00 H	298	32.2	-2.3

### 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 of frequency range 30MHz~1000MHz.
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.



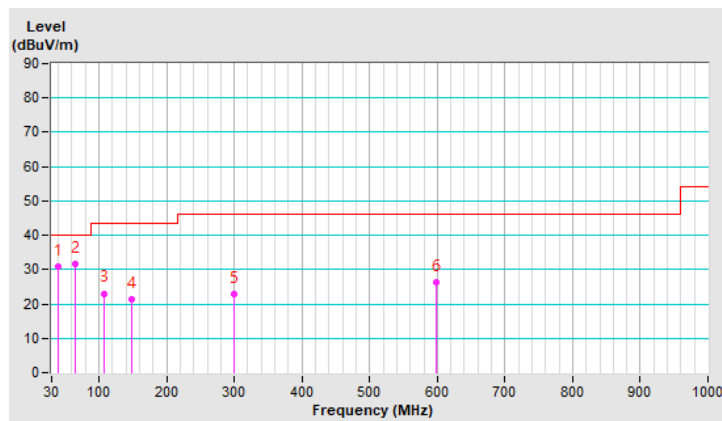
<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	9kHz ~ 1GHz	<b>Detector Function</b>	Quasi-Peak (QP)

**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	39.60	30.8 QP	40.0	-9.2	1.00 V	187	43.9	-13.1
2	64.58	31.7 QP	40.0	-8.3	1.00 V	1	45.6	-13.9
3	107.80	23.1 QP	43.5	-20.4	2.00 V	113	38.9	-15.8
4	148.83	21.5 QP	43.5	-22.0	1.00 V	40	34.0	-12.5
5	300.21	22.9 QP	46.0	-23.1	2.00 V	0	34.8	-11.9
6	597.62	26.3 QP	46.0	-19.7	1.00 V	282	31.2	-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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 20, 2020	Oct. 19, 2021
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 27, 2020	Oct. 26, 2021
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 26, 2020	Oct. 25, 2021
RF Cable	5D-FB	COCCAB-001	Sep. 26, 2020	Sep. 25, 2021
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 29, 2020	Aug. 28, 2021
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

**Note:**

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
- 3 Tested Date: Nov. 03, 2020



#### 4.2.3 Test Procedures

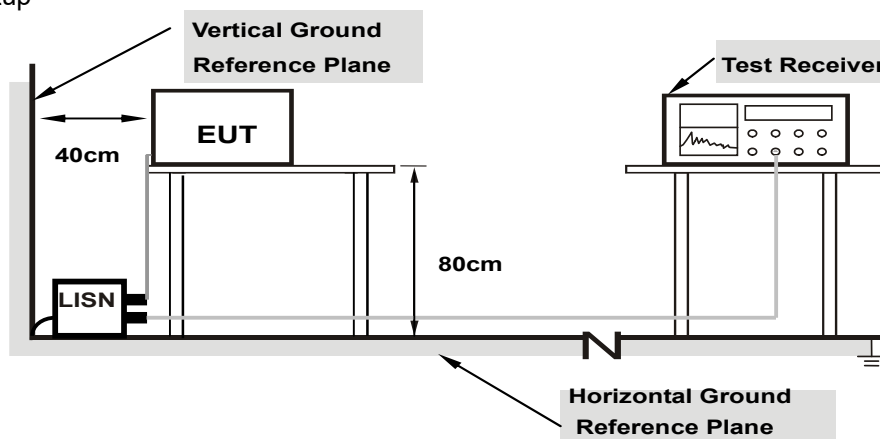
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. 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.

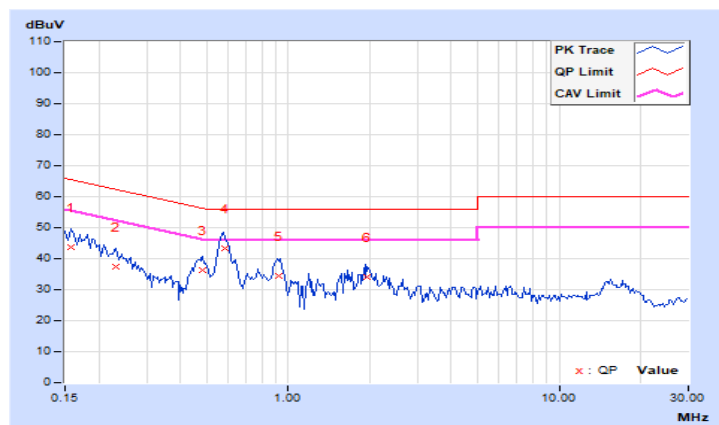
#### 4.2.7 Test Results

<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	150kHz ~ 30MHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.92	33.80	20.69	43.72	30.61	65.58	55.58	-21.86	-24.97
2	0.23203	9.95	27.33	18.55	37.28	28.50	62.38	52.38	-25.10	-23.88
3	0.47978	9.99	26.35	17.88	36.34	27.87	56.34	46.34	-20.00	-18.47
<b>4</b>	<b>0.58194</b>	<b>9.99</b>	<b>33.32</b>	<b>25.04</b>	<b>43.31</b>	<b>35.03</b>	<b>56.00</b>	<b>46.00</b>	<b>-12.69</b>	<b>-10.97</b>
5	0.92866	10.02	24.25	16.33	34.27	26.35	56.00	46.00	-21.73	-19.65
6	1.96094	10.10	23.98	16.83	34.08	26.93	56.00	46.00	-21.92	-19.07

**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

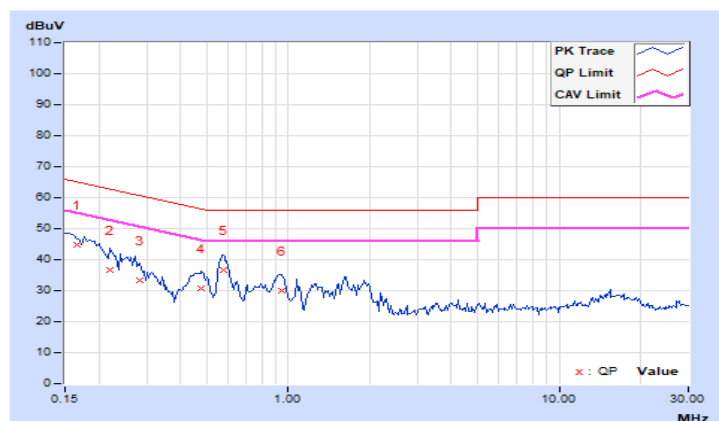


<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	150kHz ~ 30MHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16681	9.94	34.99	19.24	44.93	29.18	65.12	55.12	-20.19	-25.94
2	0.22081	9.96	26.70	12.21	36.66	22.17	62.79	52.79	-26.13	-30.62
3	0.28281	9.98	23.39	9.85	33.37	19.83	60.73	50.73	-27.36	-30.90
4	0.47422	10.01	20.63	9.31	30.64	19.32	56.44	46.44	-25.80	-27.12
5	0.57747	10.02	26.61	16.67	36.63	26.69	56.00	46.00	-19.37	-19.31
6	0.94297	10.05	20.12	8.57	30.17	18.62	56.00	46.00	-25.83	-27.38

**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

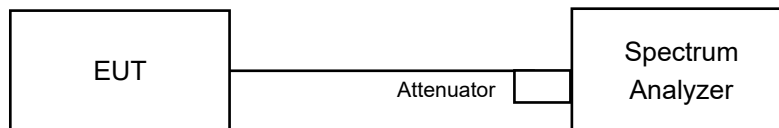


### 4.3 6dB Bandwidth Measurement

#### 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

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. 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	10.16	0.5	Pass
6	2437	10.17	0.5	Pass
11	2462	10.17	0.5	Pass

##### 802.11g

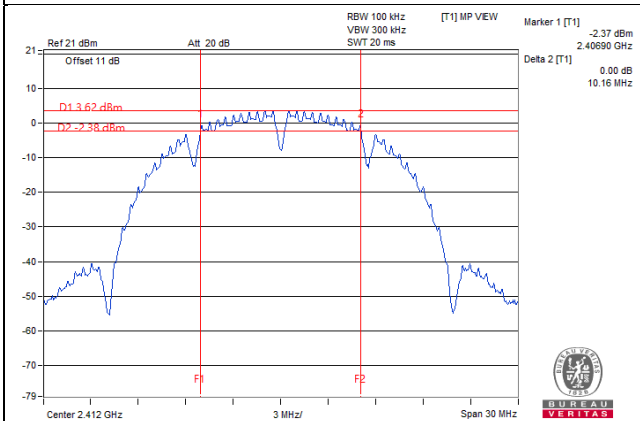
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.62	0.5	Pass
6	2437	16.61	0.5	Pass
11	2462	16.62	0.5	Pass

##### 802.11n (HT20)

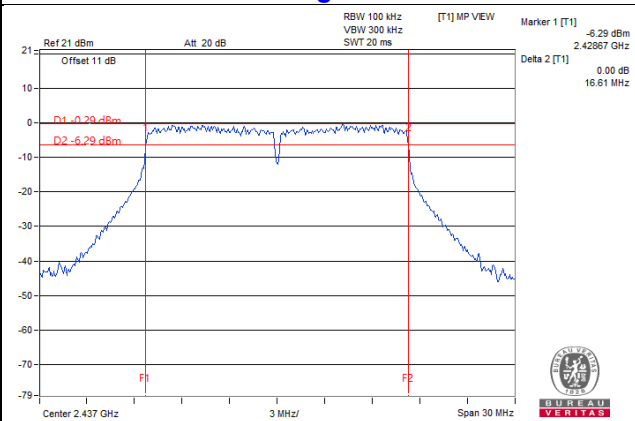
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.73	0.5	Pass
6	2437	17.75	0.5	Pass
11	2462	17.74	0.5	Pass

Spectrum Plot of Worst Value

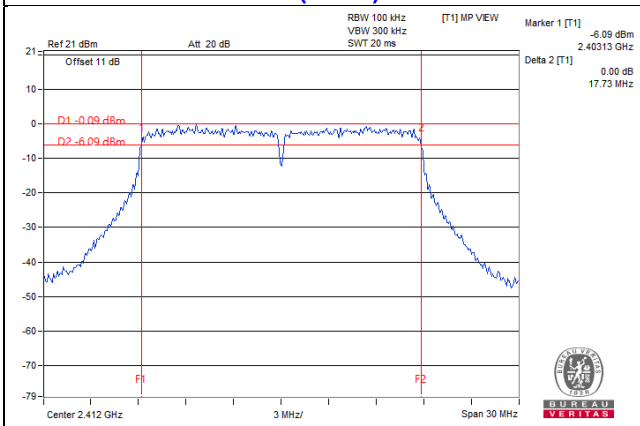
802.11b / CH1



802.11g / CH6



802.11n (HT20) / CH1

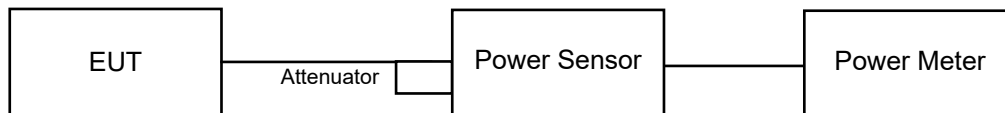


## 4.4 Conducted Output Power Measurement

### 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

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

Average power 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

##### For Peak Power

###### 802.11b

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	50.003	16.99	30.00	Pass
6	2437	50.234	17.01	30.00	Pass
11	2462	50.699	17.05	30.00	Pass

###### 802.11g

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	182.39	22.61	30.00	Pass
6	2437	207.97	23.18	30.00	Pass
11	2462	228.034	23.58	30.00	Pass

###### 802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	174.181	22.41	30.00	Pass
6	2437	184.927	22.67	30.00	Pass
11	2462	185.78	22.69	30.00	Pass

##### For Average Power

###### 802.11b

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	28.184	14.50
6	2437	28.379	14.53
11	2462	28.84	14.60

###### 802.11g

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	28.184	14.50
6	2437	28.314	14.52
11	2462	27.925	14.46

###### 802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	27.669	14.42
6	2437	27.99	14.47
11	2462	27.353	14.37

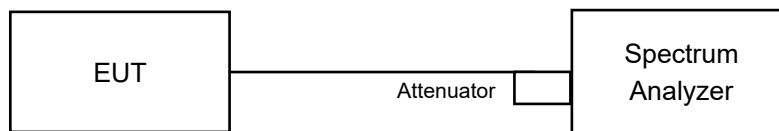


## 4.5 Power Spectral Density Measurement

### 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

- a. Set analyzer center frequency to DTS channel center frequency.
- b. Set the span to 1.5 times the DTS bandwidth.
- c. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- d. Set the VBW  $\geq 3 \times \text{RBW}$ .
- e. Detector = peak.
- f. Sweep time = auto couple.
- g. Trace mode = max hold.
- h. Allow trace to fully stabilize.
- i. Use the peak marker function to determine the maximum amplitude level within the RBW.

### 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

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
1	2412	-16.44	8.00	Pass
6	2437	-16.41	8.00	Pass
11	2462	-16.44	8.00	Pass

##### 802.11g

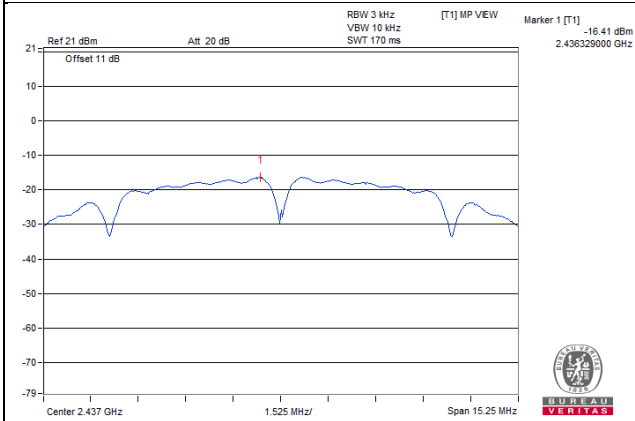
Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
1	2412	-14.07	8.00	Pass
6	2437	-15.00	8.00	Pass
11	2462	-15.06	8.00	Pass

##### 802.11n (HT20)

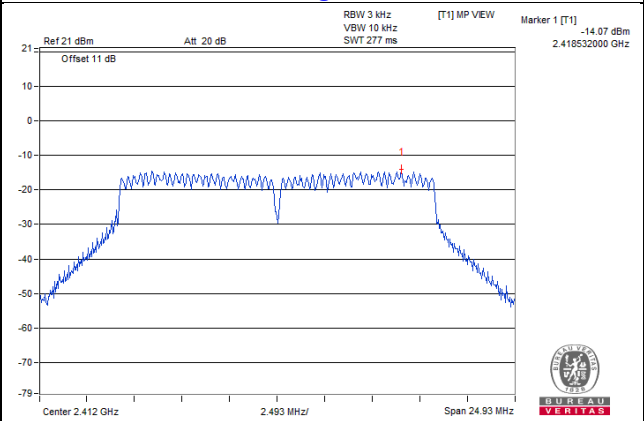
Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
1	2412	-14.05	8.00	Pass
6	2437	-14.32	8.00	Pass
11	2462	-13.69	8.00	Pass

### Spectrum Plot of Worst Value

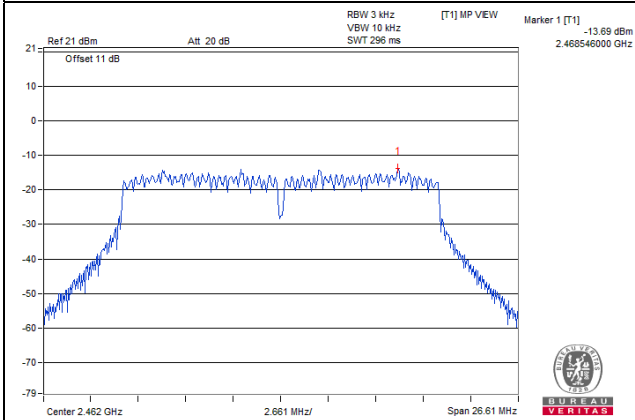
#### 802.11b / CH6



#### 802.11g / CH1



#### 802.11n (HT20) / CH11

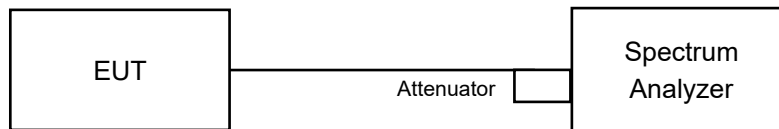


## 4.6 Conducted Out of Band Emission Measurement

### 4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB 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

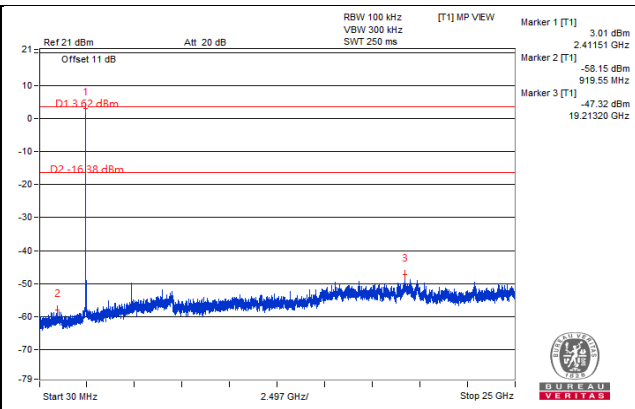
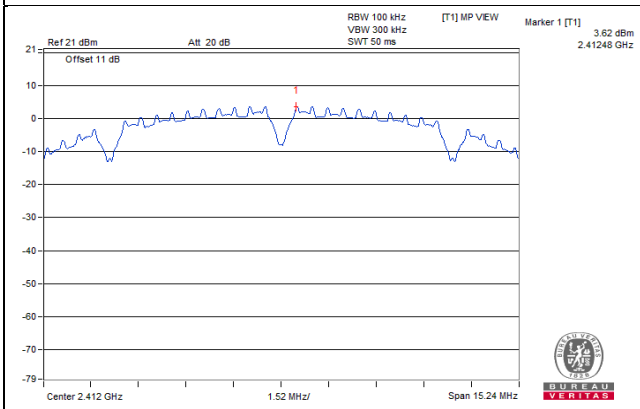
Same as Item 4.3.6

### 4.6.7 Test Results

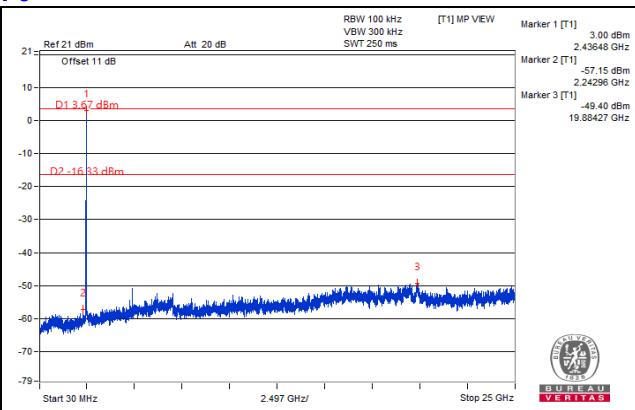
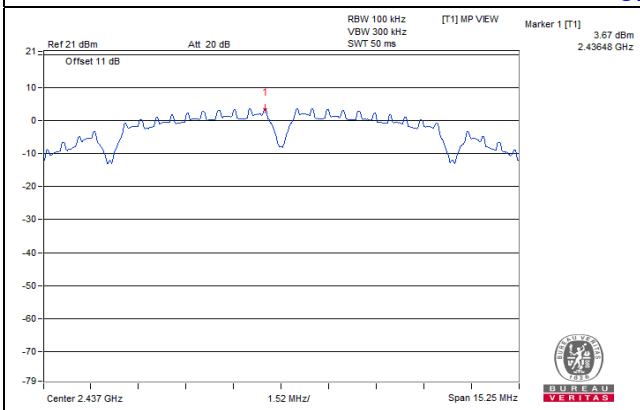
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

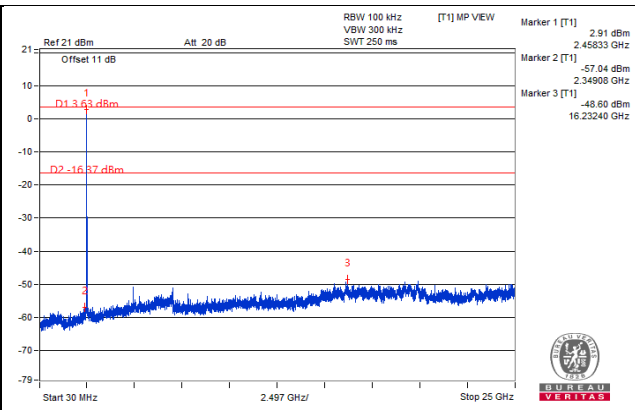
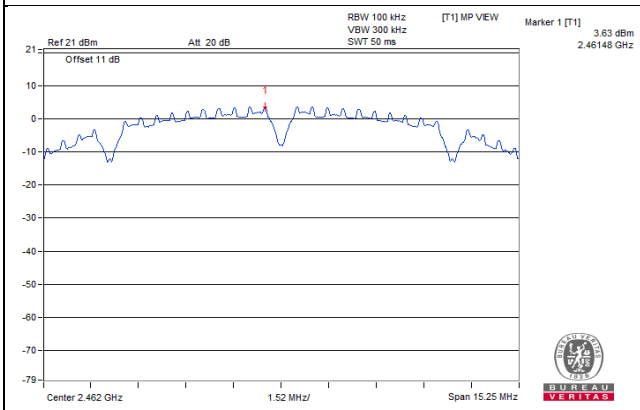
CH 1



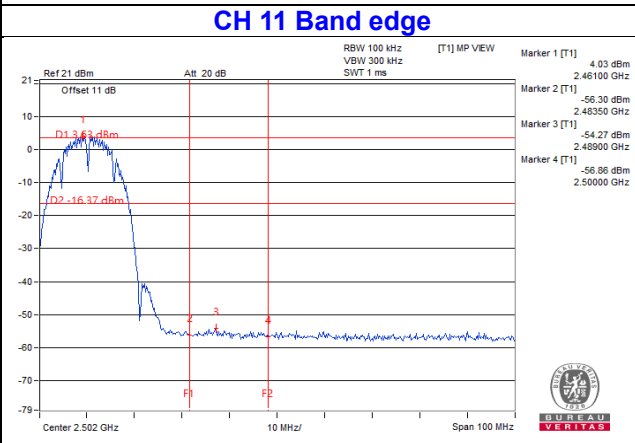
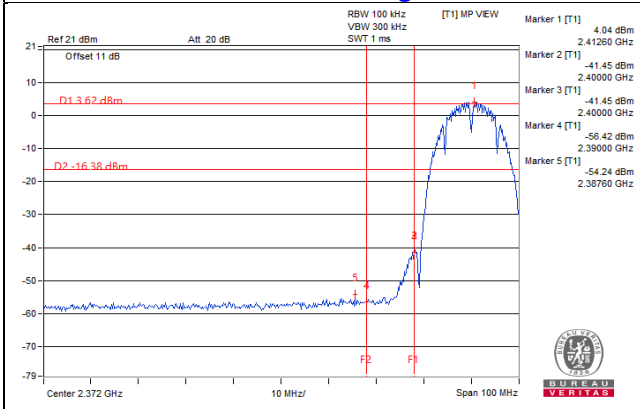
CH 6



CH 11

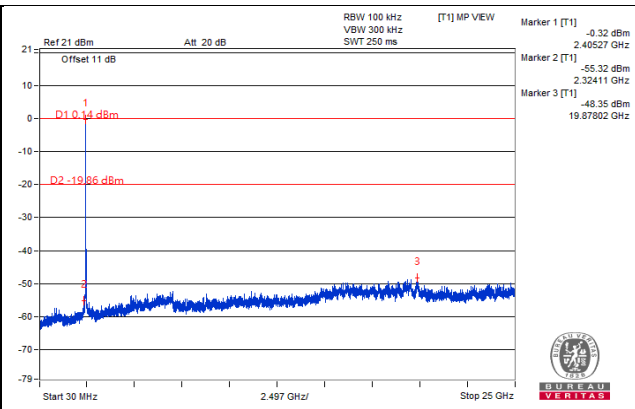
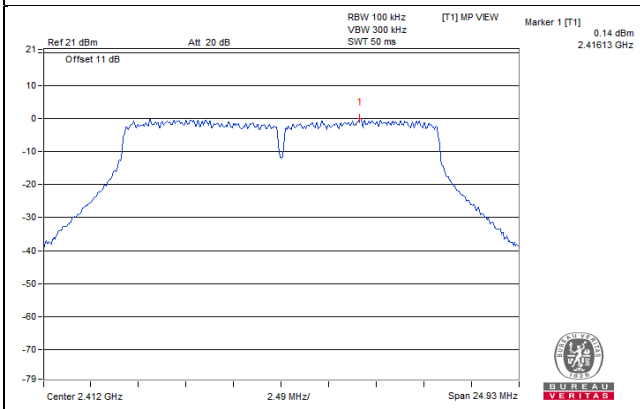


CH 1 Band edge

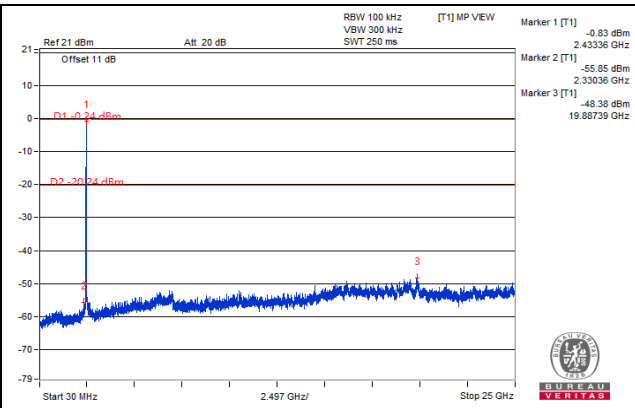
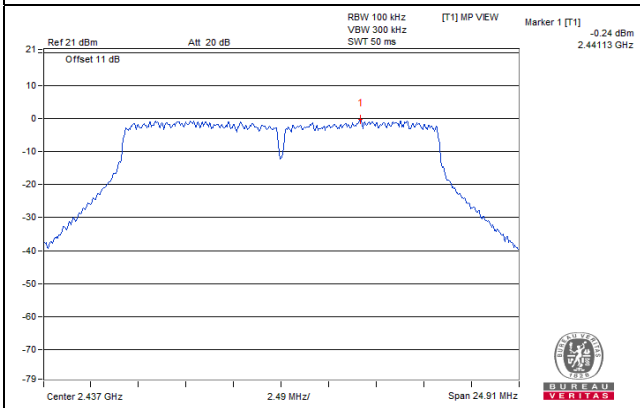


# 802.11g

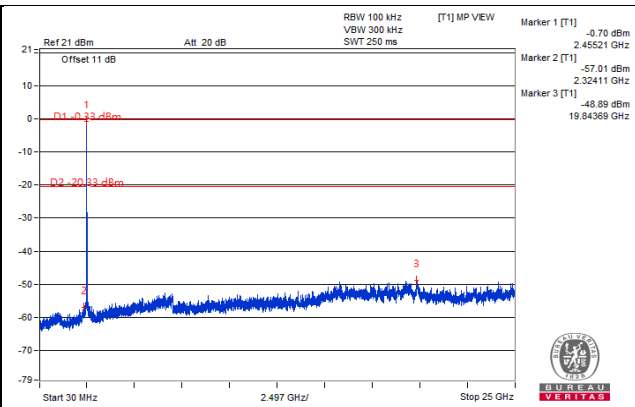
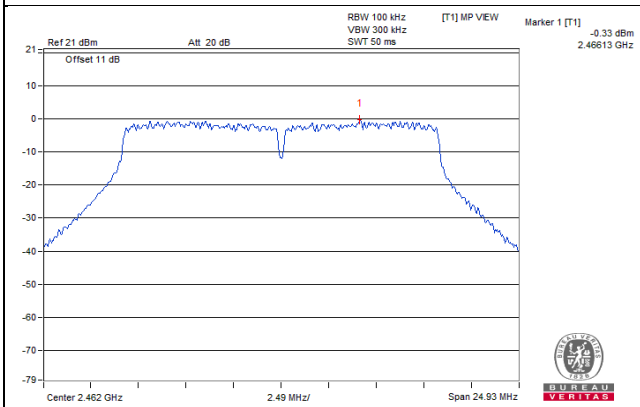
## CH 1



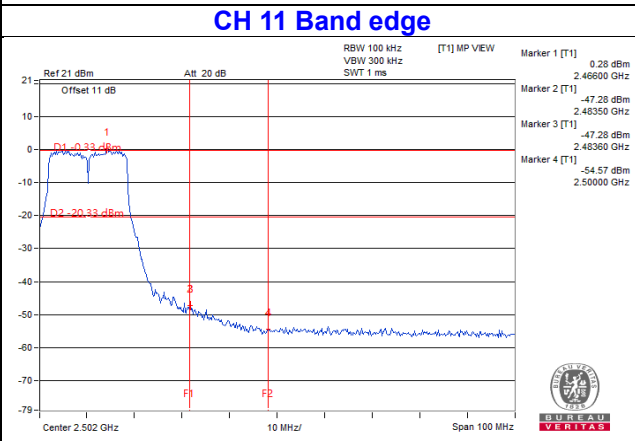
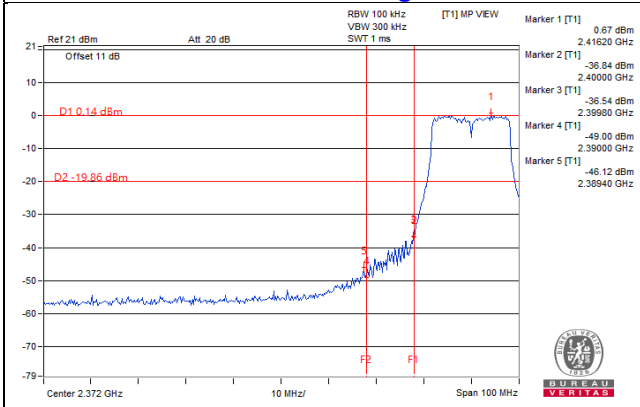
## CH 6



## CH 11

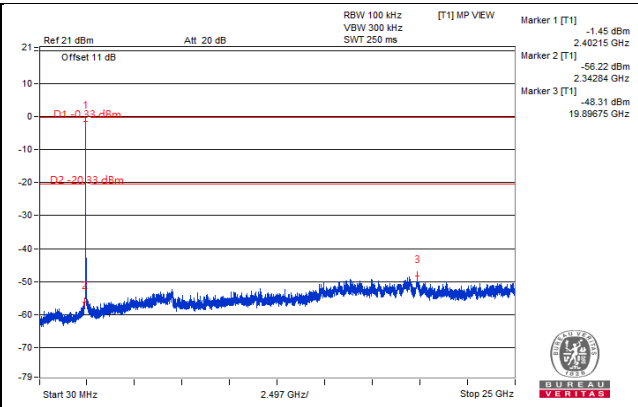
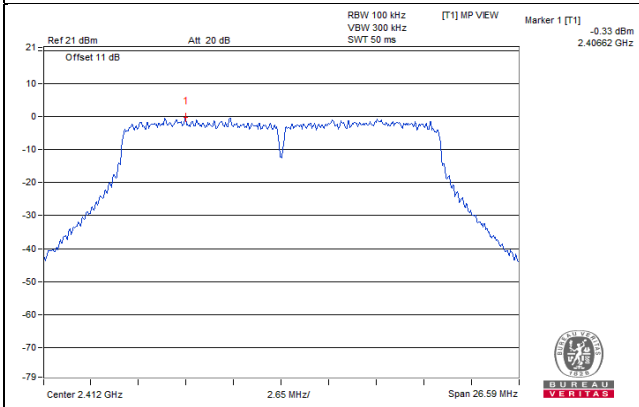


## CH 1 Band edge

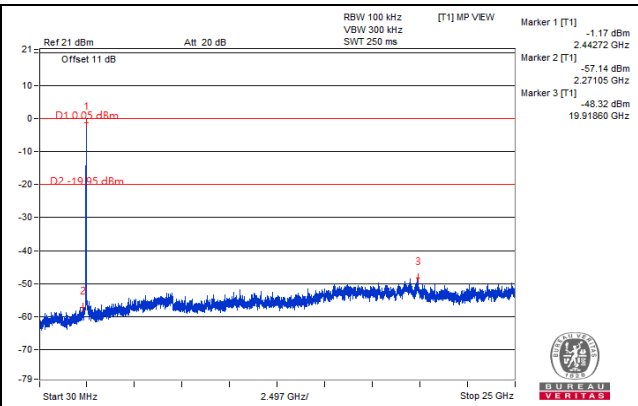
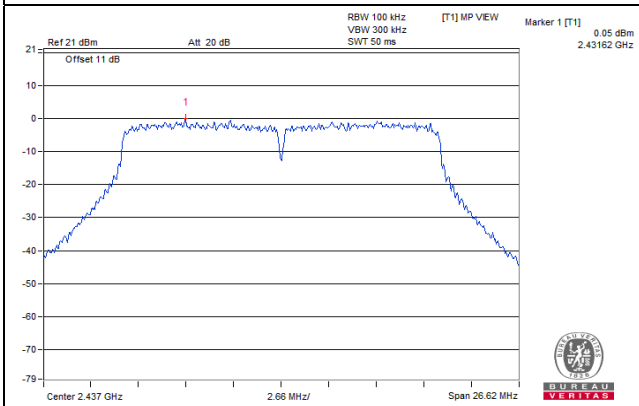


# 802.11n (HT20)

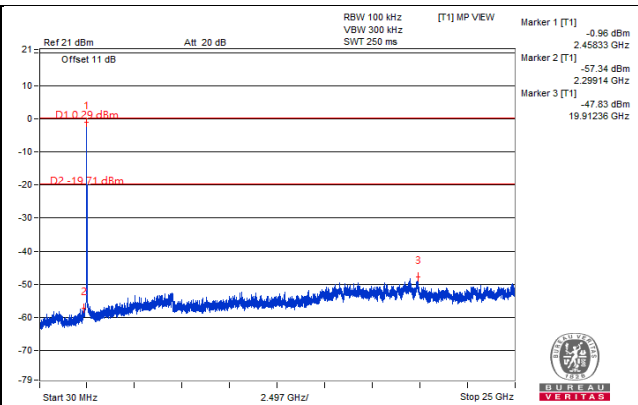
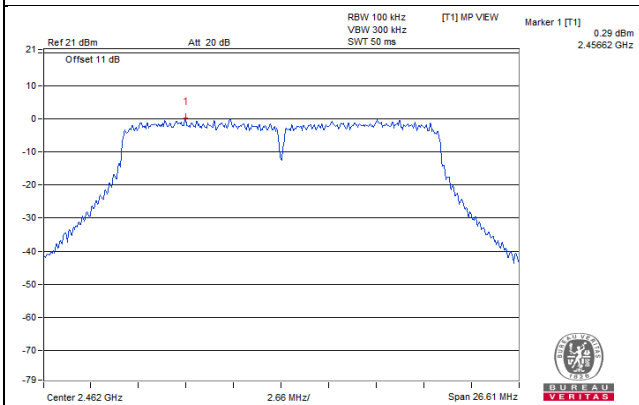
## CH 1



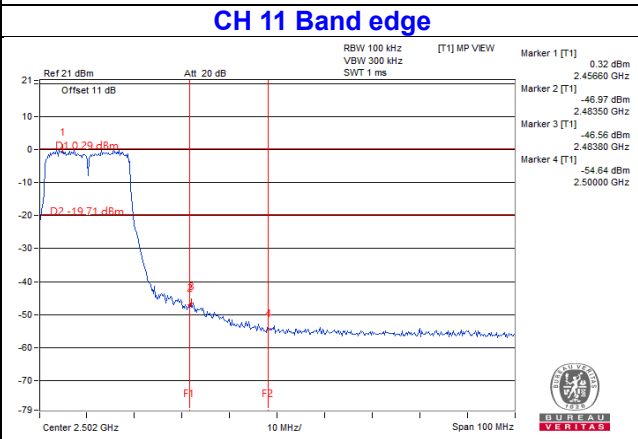
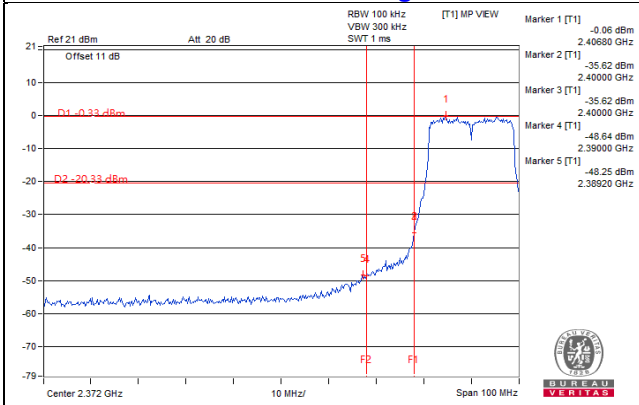
## CH 6



## CH 11



## CH 1 Band edge

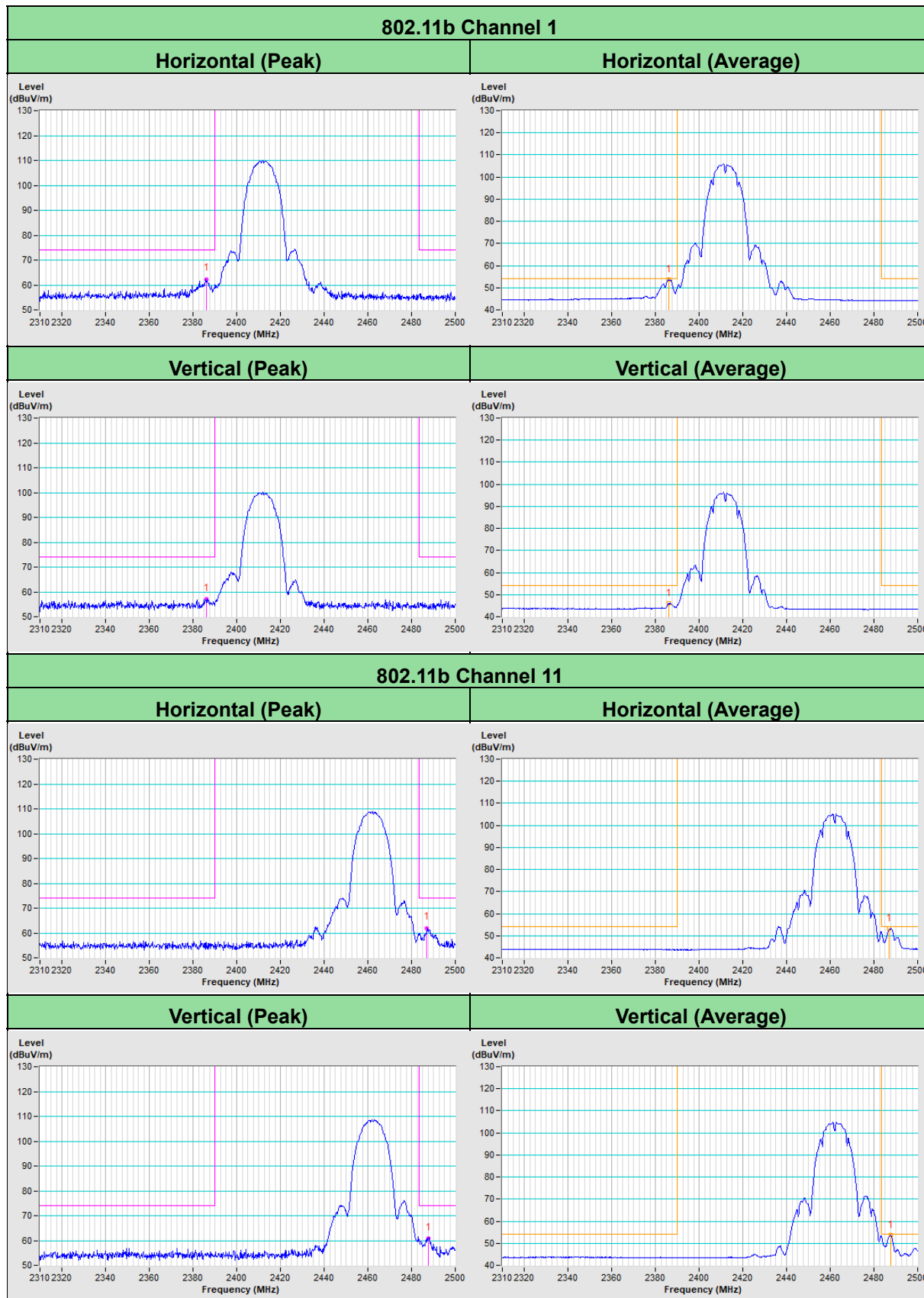


## 5 Pictures of Test Arrangements

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

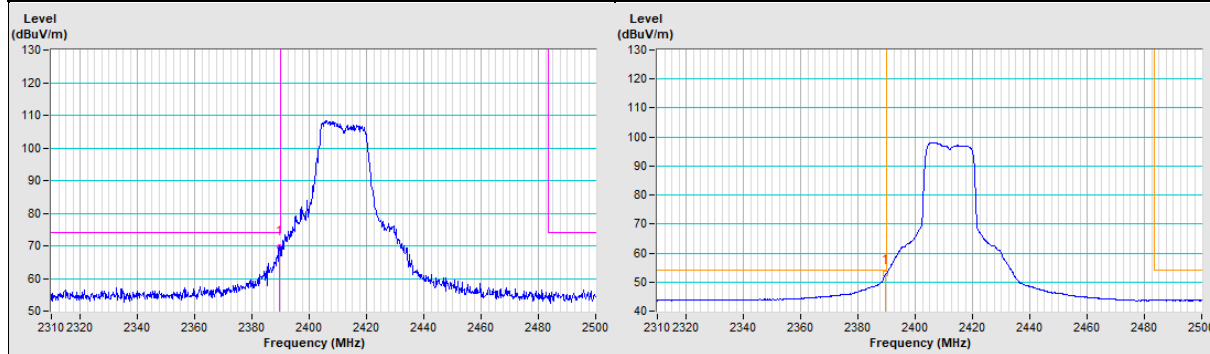


### Annex A - Band-Edge Measurement

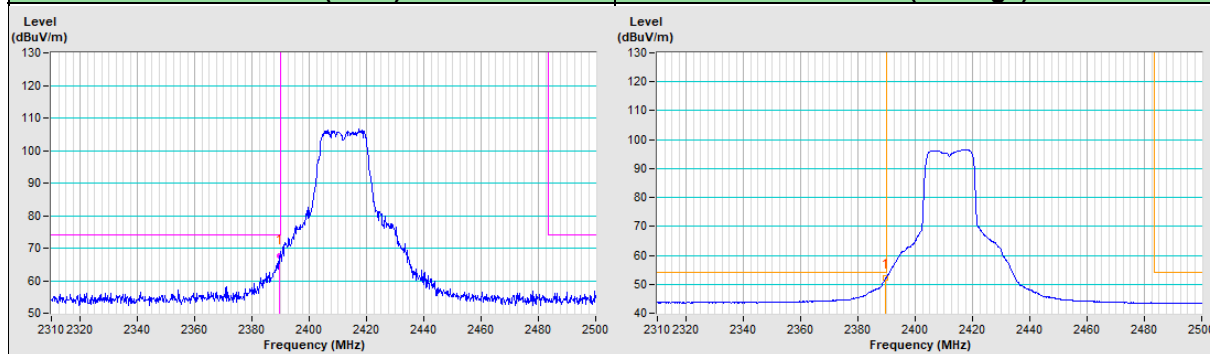


### 802.11g Channel 1

Horizontal (Peak)	Horizontal (Average)
-------------------	----------------------

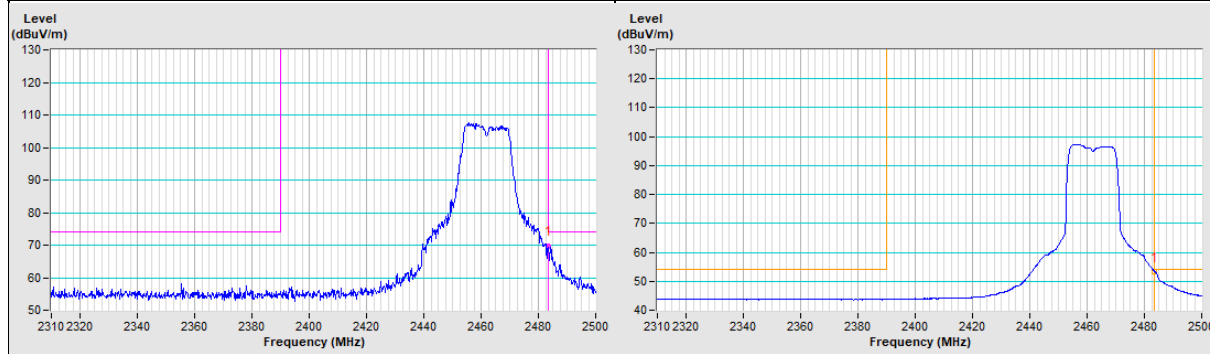


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

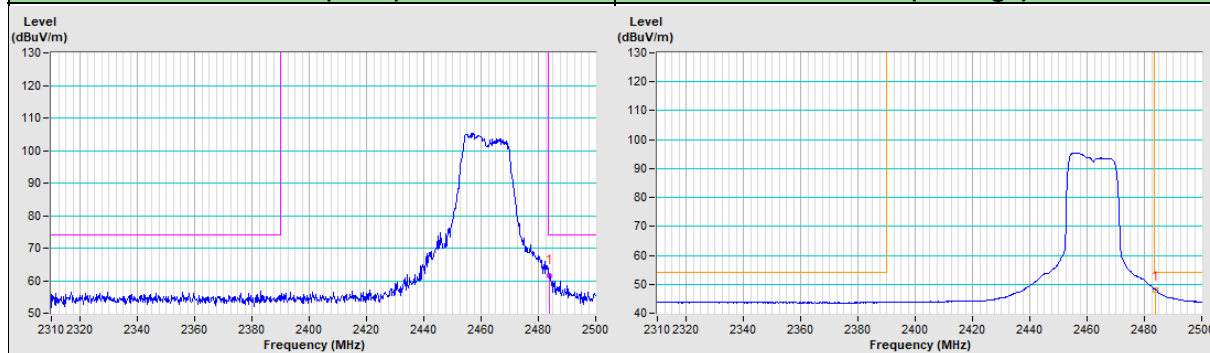


### 802.11g Channel 11

Horizontal (Peak)	Horizontal (Average)
-------------------	----------------------

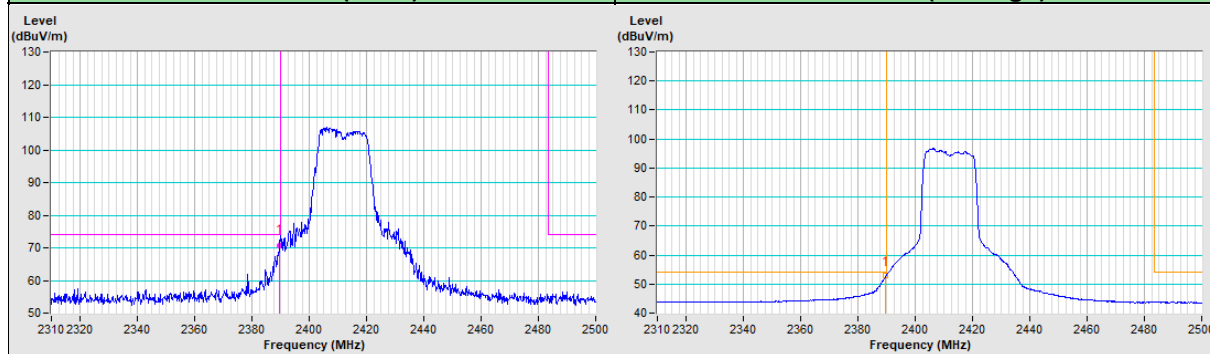


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

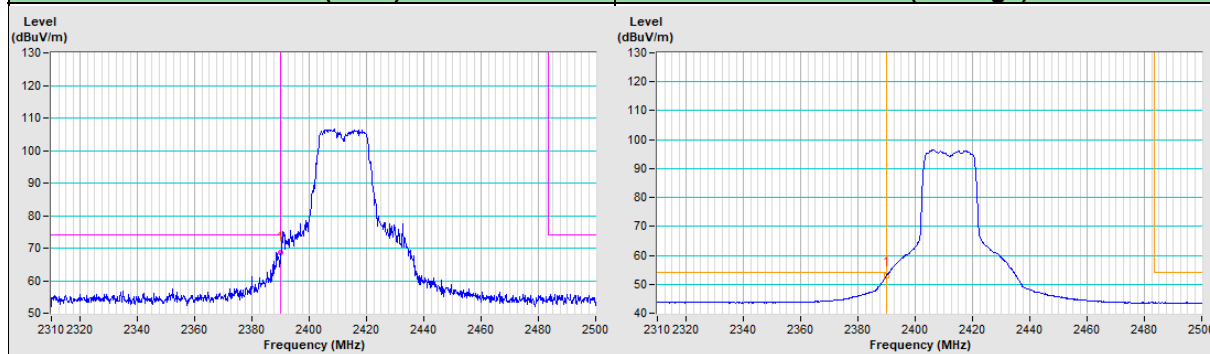


### 802.11n (HT20) Channel 1

Horizontal (Peak)	Horizontal (Average)
-------------------	----------------------

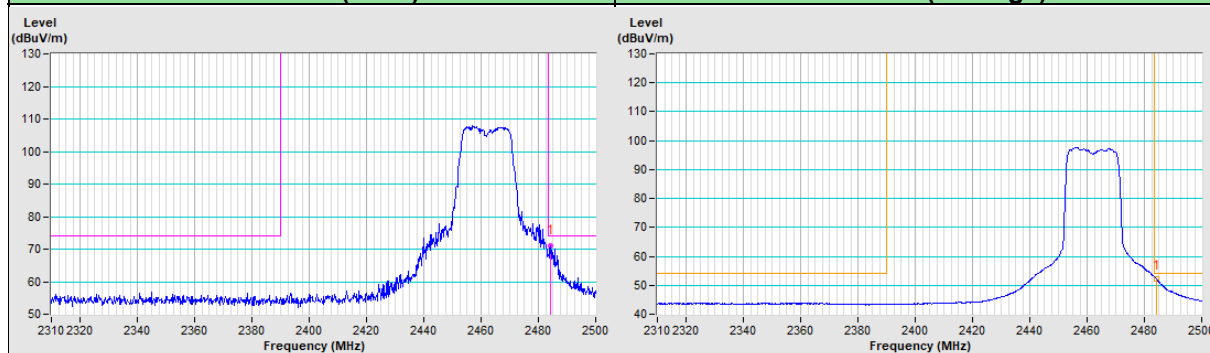


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

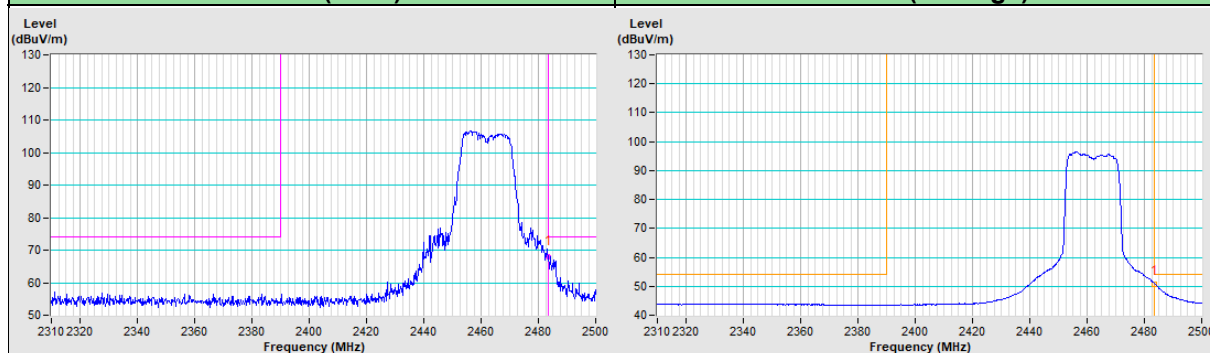


### 802.11n (HT20) Channel 11

Horizontal (Peak)	Horizontal (Average)
-------------------	----------------------



Vertical (Peak)	Vertical (Average)
-----------------	--------------------



## 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 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](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

--- END ---