

## FCC Test Report

**Report No.:** RFBAOZ-WTW-P21060679

**FCC ID:** 2AHKM-ARIA3411

**Test Model:** ARIA3411

**Series Model:** OS3411

**Received Date:** 2021/6/22

**Test Date:** 2021/8/30 ~ 2021/9/27

**Issued Date:** 2021/11/30

**Applicant:** Hitron Technologies Inc.

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

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Taiwan

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



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### Release Control Record

Issue No.	Description	Date Issued
RFBAOZ-WTW-P21060679	Original release.	2021/11/30

## 1 Certificate of Conformity

**Product:** Tri-band WiFi Extender

**Brand:** hitron

**Test Model:** ARIA3411

**Series Model:** OS3411

**Sample Status:** Engineering sample

**Applicant:** Hitron Technologies Inc.

**Test Date:** 2021/8/30 ~ 2021/9/27

**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 :** Vivian Huang , **Date:** 2021/11/30  
Vivian Huang / Specialist

**Approved by :** Clark Lin , **Date:** 2021/11/30  
Clark Lin / Technical Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -12.74 dB at 19.26172 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.3 dB at 2483.50 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 ipex(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	5.5 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

Product	Tri-band WiFi Extender
Brand	hitron
Test Model	ARIA3411
Series Model	OS3411
Status of EUT	Engineering sample
Power Supply Rating	12 Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT (20/40) mode 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ax: up to 573.5 Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7
Output Power	<b>CDD Mode:</b> <b>2.412 ~ 2.462 GHz:</b> 990.903 mW <b>Beamforming Mode:</b> <b>2.412 ~ 2.462 GHz:</b> 790.276 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter x1
Data Cable Supplied	Yellow RJ45 Cable for ARIA3411 (Unshielded, 1.5M) x 1 White RJ45 Cable for OS3411 (Unshielded, 1.5M) x 1

Note:

1. The EUT has two model names which are identical to each other in all aspects except for the followings:

Model Name	Difference
ARIA3411	with black housing
OS3411	with white housing

Note: From the above models, model: **ARIA3411** was selected as representative model for the test and its data are recorded in this report.

2. The EUT has below radios as following table:

Radio 1	Radio 2	Radio 3	Radio 4
Bluetooth	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz

3. Simultaneously transmission condition.

Condition	Technology			
1	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz	Bluetooth

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

4. For radiated emissions, the EUT was pre-tested under the following table:

Test Mode	Description
Mode A	Yellow RJ45 Cable
Mode B	White RJ45 Cable

For the above modes, the worst radiated emissions was found in **Mode A**. Therefore only the test data of the modes were recorded in this report.

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

Antenna NO.	Model	Antenna Net Gain(dBi)	Frequency range (GHz)	Antenna Type	Connector Type	Cable Length
1	RFPCA252525IMLB901	2.63	2.4~2.4835	printed PCB	ipex(MHF)	24cm
		4.02	5.15~5.85			
2	RFPCA282525IMLB901	2.6	2.4~2.4835	printed PCB	ipex(MHF)	24cm
		3.81	5.15~5.85			
3	RFPCA212009IMMB901	3.59	5.85~7.125	printed PCB	ipex(MHF)	10cm
4	RFPCA221508IMMB901	4.71	5.85~7.125	printed PCB	ipex(MHF)	7.5cm
5	RFPCA221514IMMB901	4.7	5.85~7.125	printed PCB	ipex(MHF)	13.5cm
6	RFPCA212009IMMB902	4.59	5.85~7.125	printed PCB	ipex(MHF)	8.5cm
7 (for BT)	RFPCA381007IMAB301	4.77	2.4~2.4835	printed PCB	ipex(MHF)	6.5cm

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

Brand	Model No.	Spec.	Description
APD	WA-30P12FU	Input: 100-240 Vac, 0.9 A Max, 50-60 Hz Output: 12 Vdc, 2.5 A DC output cable (Unshielded, 1.5 m)	Black (for model: ARIA3411), White (for model: OS3411)

7. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
VHT20	2TX	2RX
VHT40	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX

Note:

- All of modulation mode support beamforming function except 802.11b/g modulation mode.
- The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
- The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), VHT mode for 20MHz (40MHz) and 802.11ax mode for 20MHz (40MHz), therefore the manufacturer will control the power for 802.11n/ VHT mode is the same as the 802.11ax mode or more lower than it and investigated worst case to representative mode in test report.



8. 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.
9. 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, 802.11n (HT20), VHT20, 802.11ax (HE20):

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

7 channels are provided for 802.11n (HT40), VHT40, 802.11ax (HE40):

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

### 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

#### **Radiated Emission Test (Above 1GHz):**

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

CDD Mode					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1Mb/s
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6Mb/s
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	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.

CDD Mode					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11b	1 to 11	11	DSSS	DBPSK	1Mb/s

#### **Power Line Conducted Emission Test:**

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

CDD Mode					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11b	1 to 11	11	DSSS	DBPSK	1Mb/s

### 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.

<b>CDD Mode</b>					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1Mb/s
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6Mb/s
VHT20 (output power only)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
VHT40 (output power only)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0
<b>Beamforming Mode (output power only)</b>					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
VHT40	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

### Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE $\geq$ 1G	25deg. C, 67%RH	120Vac, 60Hz	Sampson Chen
RE $<$ 1G	24deg. C, 63%RH	120Vac, 60Hz	Sampson Chen
PLC	29deg. C, 66%RH	120Vac, 60Hz	Sampson Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leon Dai

### 3.3 Duty Cycle of Test Signal

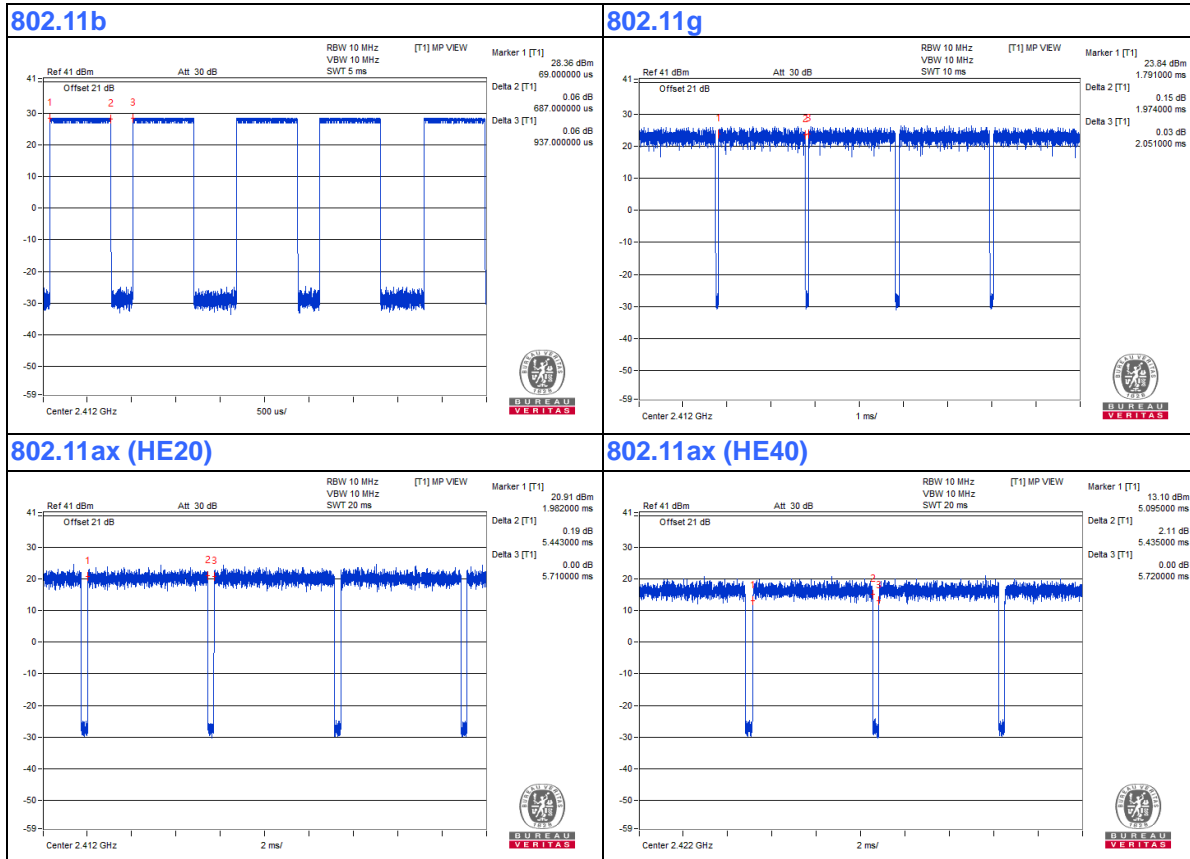
Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 0.687 ms/0.937 ms = 0.733, Duty factor = 10 \* log (1/Duty cycle) = 1.35 dB

802.11g: Duty cycle = 1.974 ms/2.051 ms = 0.962, Duty factor = 10 \* log (1/Duty cycle) = 0.17 dB

802.11ax (HE20): Duty cycle = 5.443 ms/5.71 ms = 0.953, Duty factor = 10 \* log (1/Duty cycle) = 0.21 dB

802.11ax (HE40): Duty cycle = 5.435 ms/5.72 ms = 0.95, Duty factor = 10 \* log (1/Duty cycle) = 0.22 dB



### 3.4 Description of Support Units

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

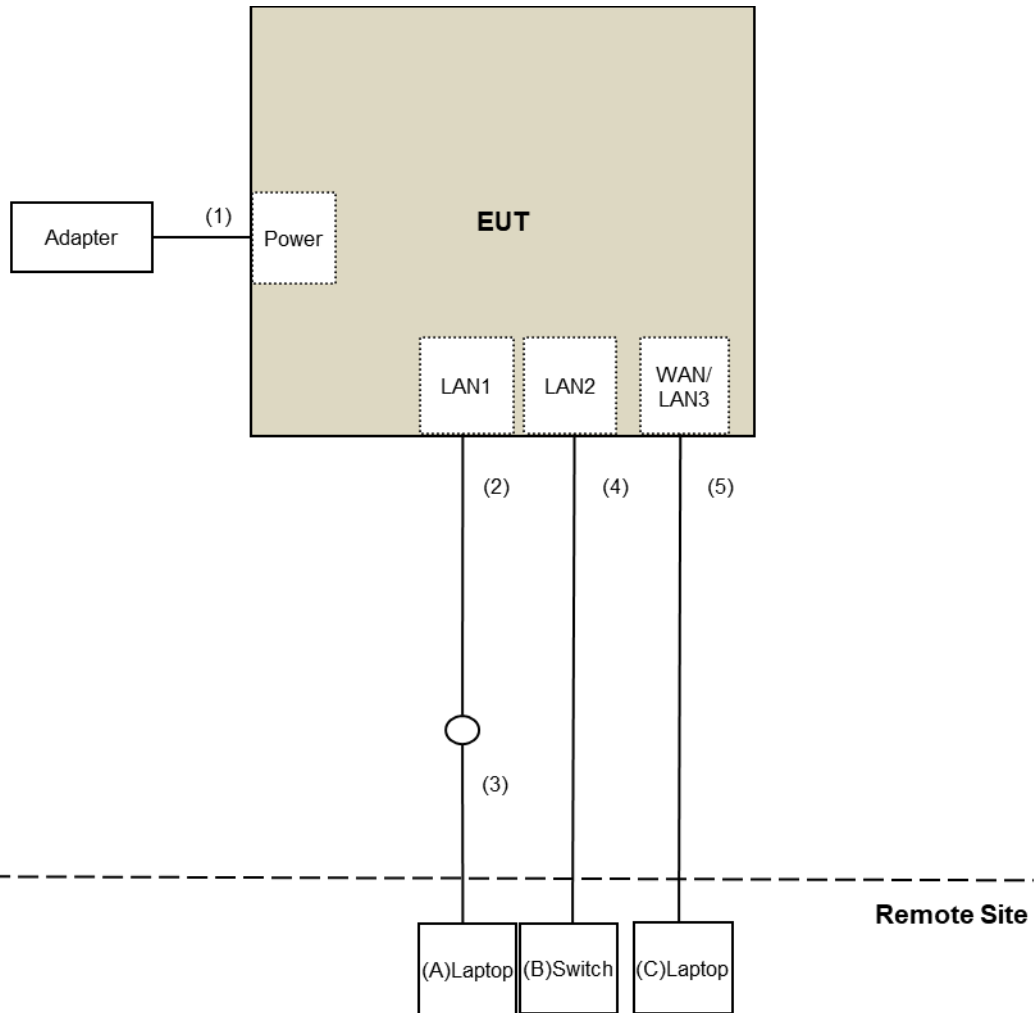
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Lenovo	20U5S01X00 L14	PF-1ANPYA	N/A	Provided by Lab
B.	Switch	D-Link	DGS-1005D	DR8WC92000523	NA	Provided by Lab
C.	Laptop	Lenovo	20U5S01X00 L14	PF-28LKK7	N/A	Provided by Lab

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	No	0	Supplied by client
2.	RJ-45 Cable	1	1.5	No	0	Supplied by client
3.	RJ-45 Cable	1	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	RJ-45 Cable	1	10	No	0	Provided by Lab

### 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**

**KDB 662911 D01 Multiple Transmitter Output v02r01**

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

**For Radiated emission & Bandedge test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	2020/12/1	2021/11/30
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Pre_Amplifier EMCI	EMC001340	980142	2021/5/24	2022/5/23
LOOP ANTENNA Electro-Metrics	EM-6879	264	2021/3/5	2022/3/4
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2021/1/7	2022/1/6
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-002	2021/1/7	2022/1/6
Pre_Amplifier EMCI	EMC330N	980701	2021/3/10	2022/3/9
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-406	2020/11/6	2021/11/5
RF Coaxial Cable COMMATE/PEWC	8D	966-4-1	2021/3/17	2022/3/16
RF Coaxial Cable COMMATE/PEWC	8D	966-4-2	2021/3/17	2022/3/16
RF Coaxial Cable COMMATE/PEWC	8D	966-4-3	2021/3/17	2022/3/16
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	2021/1/11	2022/1/10
Horn Antenna SCHWARZBECK	BBHA 9120D	9120D-783	2020/11/22	2021/11/21
Pre_Amplifier EMCI	EMC 12630 SE	980638	2021/4/7	2022/4/6
RF Cable-Frequency Range : 1-26.5GHz EMCI	EMC104-SM-SM-1200	160922	2020/12/25	2021/12/24
RF Coaxial Cable EMCI	EMC104-SM-SM-2000	180502	2021/4/26	2022/4/25
RF Coaxial Cable EMCI	EMC104-SM-SM-6000	180418	2021/4/26	2022/4/25
Pre_Amplifier EMCI	EMC184045SE	980387	2021/1/11	2022/1/10
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170519	2020/11/22	2021/11/21
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2021/1/11	2022/1/10
RF cable (40GHz) EMCI	EMC-KM-KM-4000	200214	2021/3/10	2022/3/9

**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. 4.
3. Tested Date: 2021/8/30 ~ 2021/9/13

**For other test items test:**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	101516	2021/3/8	2022/3/7
Power Meter Anritsu	ML2495A	1529002	2021/6/21	2022/6/20
Pulse Power Sensor Anritsu	MA2411B	1339443	2021/5/31	2022/5/30
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2021/4/13	2022/4/12
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: 2021/9/27

#### 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:**

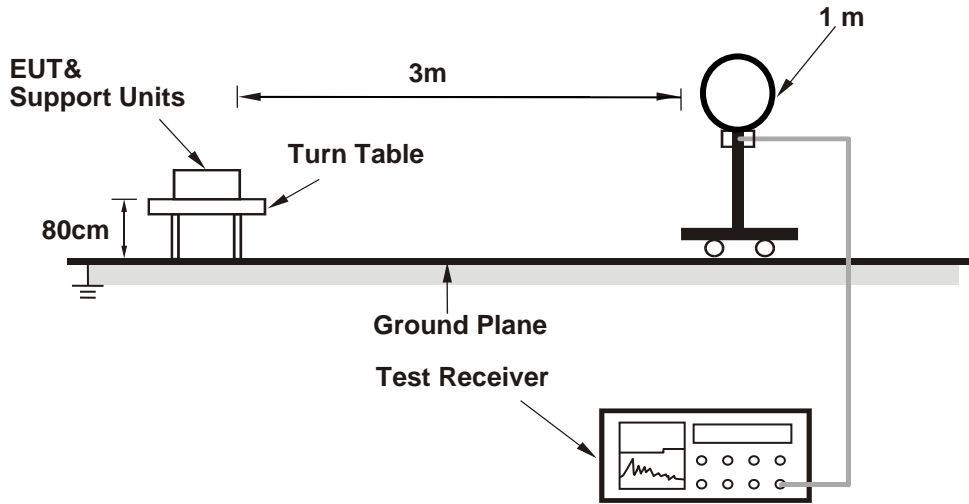
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

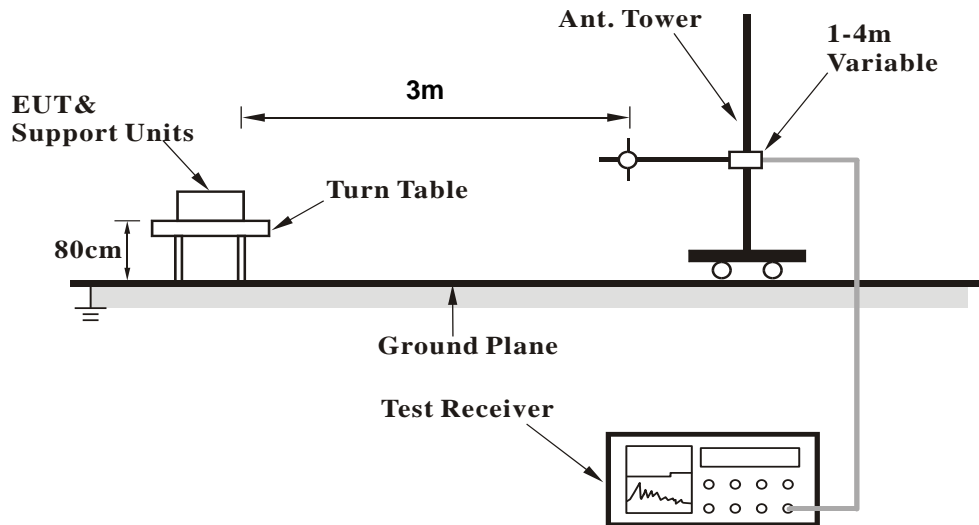
No deviation.

#### 4.1.5 Test Setup

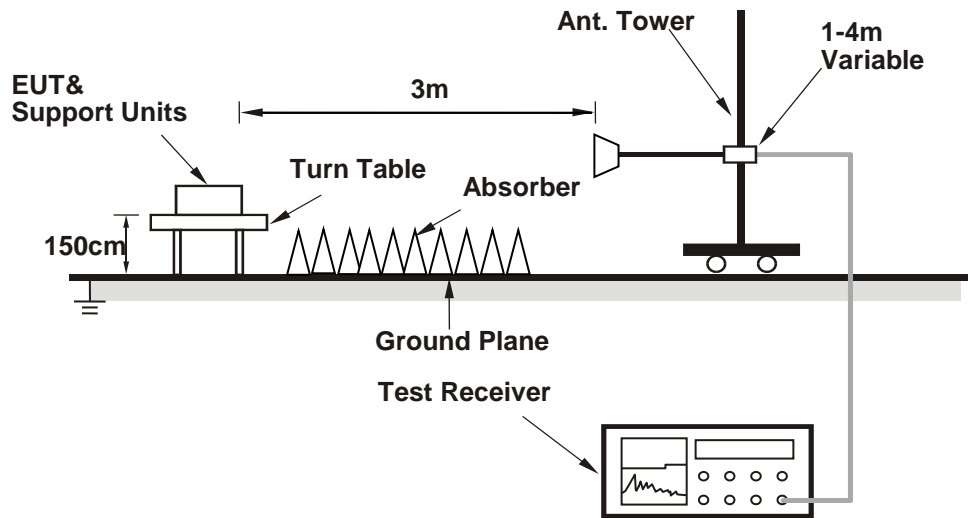
##### For Radiated emission below 30MHz



##### 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

- Connected the EUT with the Laptop Computer which is placed on remote site.
- Controlling software (qdart\_conn.win.1.0\_installer\_00076.1) 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	2387.20	58.6 PK	74.0	-15.4	1.05 H	92	62.8	-4.2
2	2387.20	51.1 AV	54.0	-2.9	1.05 H	92	55.3	-4.2
3	*2412.00	116.8 PK			1.05 H	92	121.1	-4.3
4	*2412.00	114.9 AV			1.05 H	92	119.2	-4.3
5	4824.00	43.4 PK	74.0	-30.6	3.70 H	343	42.9	0.5
6	4824.00	39.7 AV	54.0	-14.3	3.70 H	343	39.2	0.5
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	2387.20	60.1 PK	74.0	-13.9	2.69 V	233	64.3	-4.2
2	2387.20	53.6 AV	54.0	-0.4	2.69 V	233	57.8	-4.2
3	*2412.00	119.4 PK			2.69 V	233	123.7	-4.3
4	*2412.00	117.4 AV			2.69 V	233	121.7	-4.3
5	4824.00	46.0 PK	74.0	-28.0	1.00 V	28	45.5	0.5
6	4824.00	44.2 AV	54.0	-9.8	1.00 V	28	43.7	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. 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	57.1 PK	74.0	-16.9	1.08 H	76	61.4	-4.3
2	2390.00	50.6 AV	54.0	-3.4	1.08 H	76	54.9	-4.3
3	*2437.00	119.2 PK			1.08 H	76	123.5	-4.3
4	*2437.00	116.1 AV			1.08 H	76	120.4	-4.3
5	2483.50	55.3 PK	74.0	-18.7	1.08 H	76	59.7	-4.4
6	2483.50	47.1 AV	54.0	-6.9	1.08 H	76	51.5	-4.4
7	4874.00	43.8 PK	74.0	-30.2	3.68 H	357	43.3	0.5
8	4874.00	40.2 AV	54.0	-13.8	3.68 H	357	39.7	0.5
9	7311.00	44.6 PK	74.0	-29.4	3.34 H	66	37.8	6.8
10	7311.00	36.5 AV	54.0	-17.5	3.34 H	66	29.7	6.8

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	59.7 PK	74.0	-14.3	2.62 V	236	64.0	-4.3
2	2390.00	53.6 AV	54.0	-0.4	2.62 V	236	57.9	-4.3
3	*2437.00	121.5 PK			2.62 V	236	125.8	-4.3
4	*2437.00	119.4 AV			2.62 V	236	123.7	-4.3
5	2483.50	59.1 PK	74.0	-14.9	2.62 V	236	63.5	-4.4
6	2483.50	50.4 AV	54.0	-3.6	2.62 V	236	54.8	-4.4
7	4874.00	45.9 PK	74.0	-28.1	1.00 V	23	45.4	0.5
8	4874.00	43.8 AV	54.0	-10.2	1.00 V	23	43.3	0.5
9	7311.00	44.2 PK	74.0	-29.8	1.53 V	124	37.4	6.8
10	7311.00	36.2 AV	54.0	-17.8	1.53 V	124	29.4	6.8

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	115.7 PK			1.79 H	166	120.0	-4.3
2	*2462.00	113.1 AV			1.79 H	166	117.4	-4.3
3	2484.80	55.3 PK	74.0	-18.7	1.79 H	166	59.7	-4.4
4	2484.80	48.3 AV	54.0	-5.7	1.79 H	166	52.7	-4.4
5	4924.00	43.5 PK	74.0	-30.5	3.64 H	354	42.8	0.7
6	4924.00	39.9 AV	54.0	-14.1	3.64 H	354	39.2	0.7
7	7386.00	44.5 PK	74.0	-29.5	3.33 H	59	37.3	7.2
8	7386.00	36.1 AV	54.0	-17.9	3.33 H	59	28.9	7.2

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	*2462.00	121.8 PK			2.06 V	239	126.1	-4.3
2	*2462.00	119.6 AV			2.06 V	239	123.9	-4.3
3	2484.80	60.8 PK	74.0	-13.2	2.06 V	239	65.2	-4.4
4	2484.80	53.2 AV	54.0	-0.8	2.06 V	239	57.6	-4.4
5	4924.00	45.4 PK	74.0	-28.6	1.04 V	11	44.7	0.7
6	4924.00	43.4 AV	54.0	-10.6	1.04 V	11	42.7	0.7
7	7386.00	44.3 PK	74.0	-29.7	1.54 V	134	37.1	7.2
8	7386.00	36.4 AV	54.0	-17.6	1.54 V	134	29.2	7.2

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	2390.00	60.7 PK	74.0	-13.3	1.05 H	287	65.0	-4.3
2	2390.00	49.4 AV	54.0	-4.6	1.05 H	287	53.7	-4.3
3	*2412.00	115.2 PK			1.05 H	287	119.5	-4.3
4	*2412.00	105.3 AV			1.05 H	287	109.6	-4.3
5	4824.00	41.6 PK	74.0	-32.4	3.62 H	346	41.1	0.5
6	4824.00	30.6 AV	54.0	-23.4	3.62 H	346	30.1	0.5

**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	66.7 PK	74.0	-7.3	1.00 V	154	71.0	-4.3
2	2390.00	53.6 AV	54.0	-0.4	1.00 V	154	57.9	-4.3
3	*2412.00	116.8 PK			1.00 V	154	121.1	-4.3
4	*2412.00	107.3 AV			1.00 V	154	111.6	-4.3
5	4824.00	41.6 PK	74.0	-32.4	1.11 V	19	41.1	0.5
6	4824.00	30.2 AV	54.0	-23.8	1.11 V	19	29.7	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. 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	64.3 PK	74.0	-9.7	1.03 H	283	68.6	-4.3
2	2390.00	50.1 AV	54.0	-3.9	1.03 H	283	54.4	-4.3
3	*2437.00	119.8 PK			1.03 H	283	124.1	-4.3
4	*2437.00	110.1 AV			1.03 H	283	114.4	-4.3
5	2483.50	60.3 PK	74.0	-13.7	1.03 H	283	64.7	-4.4
6	2483.50	47.6 AV	54.0	-6.4	1.03 H	283	52.0	-4.4
7	4874.00	41.3 PK	74.0	-32.7	3.67 H	359	40.8	0.5
8	4874.00	30.2 AV	54.0	-23.8	3.67 H	359	29.7	0.5
9	7311.00	42.3 PK	74.0	-31.7	3.39 H	51	35.5	6.8
10	7311.00	31.0 AV	54.0	-23.0	3.39 H	51	24.2	6.8

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	66.9 PK	74.0	-7.1	1.06 V	151	71.2	-4.3
2	2390.00	52.7 AV	54.0	-1.3	1.06 V	151	57.0	-4.3
3	*2437.00	122.3 PK			1.06 V	151	126.6	-4.3
4	*2437.00	112.2 AV			1.06 V	151	116.5	-4.3
5	2483.50	63.4 PK	74.0	-10.6	1.06 V	151	67.8	-4.4
6	2483.50	50.6 AV	54.0	-3.4	1.06 V	151	55.0	-4.4
7	4874.00	41.3 PK	74.0	-32.7	1.07 V	27	40.8	0.5
8	4874.00	30.1 AV	54.0	-23.9	1.07 V	27	29.6	0.5
9	7311.00	42.3 PK	74.0	-31.7	1.47 V	116	35.5	6.8
10	7311.00	31.2 AV	54.0	-22.8	1.47 V	116	24.4	6.8

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	116.2 PK			1.23 H	282	120.5	-4.3
2	*2462.00	106.5 AV			1.23 H	282	110.8	-4.3
3	2484.13	64.9 PK	74.0	-9.1	1.23 H	282	69.3	-4.4
4	2484.13	52.8 AV	54.0	-1.2	1.23 H	282	57.2	-4.4
5	4924.00	41.0 PK	74.0	-33.0	3.70 H	348	40.3	0.7
6	4924.00	30.0 AV	54.0	-24.0	3.70 H	348	29.3	0.7
7	7386.00	42.6 PK	74.0	-31.4	3.36 H	40	35.4	7.2
8	7386.00	31.5 AV	54.0	-22.5	3.36 H	40	24.3	7.2

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	*2462.00	118.2 PK			1.04 V	153	122.5	-4.3
2	*2462.00	108.7 AV			1.04 V	153	113.0	-4.3
3	2484.20	66.7 PK	74.0	-7.3	1.04 V	153	71.1	-4.4
4	2484.20	53.2 AV	54.0	-0.8	1.04 V	153	57.6	-4.4
5	4924.00	41.2 PK	74.0	-32.8	1.08 V	20	40.5	0.7
6	4924.00	29.8 AV	54.0	-24.2	1.08 V	20	29.1	0.7
7	7386.00	42.5 PK	74.0	-31.5	1.42 V	119	35.3	7.2
8	7386.00	31.1 AV	54.0	-22.9	1.42 V	119	23.9	7.2

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 802.11ax (HE20)	<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	2390.00	58.4 PK	74.0	-15.6	1.07 H	291	62.7	-4.3
2	2390.00	47.2 AV	54.0	-6.8	1.07 H	291	51.5	-4.3
3	*2412.00	112.5 PK			1.07 H	291	116.8	-4.3
4	*2412.00	100.4 AV			1.07 H	291	104.7	-4.3
5	4824.00	41.9 PK	74.0	-32.1	3.65 H	336	41.4	0.5
6	4824.00	30.6 AV	54.0	-23.4	3.65 H	336	30.1	0.5

**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	64.4 PK	74.0	-9.6	1.00 V	157	68.7	-4.3
2	2390.00	53.5 AV	54.0	-0.5	1.00 V	157	57.8	-4.3
3	*2412.00	115.9 PK			1.00 V	157	120.2	-4.3
4	*2412.00	104.6 AV			1.00 V	157	108.9	-4.3
5	4824.00	41.1 PK	74.0	-32.9	1.11 V	41	40.6	0.5
6	4824.00	29.8 AV	54.0	-24.2	1.11 V	41	29.3	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. 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 802.11ax (HE20)	<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	59.8 PK	74.0	-14.2	1.01 H	303	64.1	-4.3
2	2390.00	49.5 AV	54.0	-4.5	1.01 H	303	53.8	-4.3
3	*2437.00	120.8 PK			1.01 H	303	125.1	-4.3
4	*2437.00	109.8 AV			1.01 H	303	114.1	-4.3
5	2483.50	58.9 PK	74.0	-15.1	1.01 H	303	63.3	-4.4
6	2483.50	47.6 AV	54.0	-6.4	1.01 H	303	52.0	-4.4
7	4874.00	41.3 PK	74.0	-32.7	3.65 H	353	40.8	0.5
8	4874.00	30.1 AV	54.0	-23.9	3.65 H	353	29.6	0.5
9	7311.00	42.3 PK	74.0	-31.7	3.44 H	44	35.5	6.8
10	7311.00	30.8 AV	54.0	-23.2	3.44 H	44	24.0	6.8

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	63.0 PK	74.0	-11.0	1.25 V	137	67.3	-4.3
2	2390.00	53.4 AV	54.0	-0.6	1.25 V	137	57.7	-4.3
3	*2437.00	124.6 PK			1.25 V	137	128.9	-4.3
4	*2437.00	113.2 AV			1.25 V	137	117.5	-4.3
5	2483.50	62.3 PK	74.0	-11.7	1.25 V	137	66.7	-4.4
6	2483.50	50.4 AV	54.0	-3.6	1.25 V	137	54.8	-4.4
7	4874.00	41.1 PK	74.0	-32.9	1.02 V	42	40.6	0.5
8	4874.00	29.8 AV	54.0	-24.2	1.02 V	42	29.3	0.5
9	7311.00	41.9 PK	74.0	-32.1	1.44 V	120	35.1	6.8
10	7311.00	31.0 AV	54.0	-23.0	1.44 V	120	24.2	6.8

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 802.11ax (HE20)	<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	116.5 PK			1.01 H	292	120.8	-4.3
2	*2462.00	105.3 AV			1.01 H	292	109.6	-4.3
3	2483.50	61.2 PK	74.0	-12.8	1.01 H	292	65.6	-4.4
4	2483.50	47.7 AV	54.0	-6.3	1.01 H	292	52.1	-4.4
5	4924.00	41.3 PK	74.0	-32.7	3.63 H	344	40.6	0.7
6	4924.00	30.1 AV	54.0	-23.9	3.63 H	344	29.4	0.7
7	7386.00	42.5 PK	74.0	-31.5	3.41 H	56	35.3	7.2
8	7386.00	31.4 AV	54.0	-22.6	3.41 H	56	24.2	7.2

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	*2462.00	119.7 PK			2.32 V	222	124.0	-4.3
2	*2462.00	108.1 AV			2.32 V	222	112.4	-4.3
3	2483.50	64.8 PK	74.0	-9.2	2.32 V	222	69.2	-4.4
4	<b>2483.50</b>	<b>53.7 AV</b>	<b>54.0</b>	<b>-0.3</b>	<b>2.32 V</b>	<b>222</b>	<b>58.1</b>	<b>-4.4</b>
5	4924.00	41.0 PK	74.0	-33.0	1.12 V	24	40.3	0.7
6	4924.00	30.0 AV	54.0	-24.0	1.12 V	24	29.3	0.7
7	7386.00	41.6 PK	74.0	-32.4	1.42 V	101	34.4	7.2
8	7386.00	30.7 AV	54.0	-23.3	1.42 V	101	23.5	7.2

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 802.11ax (HE40)	<b>Channel</b>	CH 3 : 2422 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	2388.00	58.9 PK	74.0	-15.1	1.09 H	292	63.1	-4.2
2	2388.00	47.6 AV	54.0	-6.4	1.09 H	292	51.8	-4.2
3	*2422.00	108.8 PK			1.09 H	292	113.1	-4.3
4	*2422.00	96.6 AV			1.09 H	292	100.9	-4.3
5	4844.00	41.9 PK	74.0	-32.1	3.72 H	360	41.4	0.5
6	4844.00	30.7 AV	54.0	-23.3	3.72 H	360	30.2	0.5
7	7266.00	42.4 PK	74.0	-31.6	3.39 H	62	35.7	6.7
8	7266.00	31.1 AV	54.0	-22.9	3.39 H	62	24.4	6.7

**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	2388.00	64.8 PK	74.0	-9.2	1.59 V	139	69.0	-4.2
2	2388.00	53.2 AV	54.0	-0.8	1.59 V	139	57.4	-4.2
3	*2422.00	111.2 PK			1.59 V	139	115.5	-4.3
4	*2422.00	100.2 AV			1.59 V	139	104.5	-4.3
5	4844.00	41.1 PK	74.0	-32.9	1.09 V	31	40.6	0.5
6	4844.00	30.1 AV	54.0	-23.9	1.09 V	31	29.6	0.5
7	7266.00	41.9 PK	74.0	-32.1	1.43 V	103	35.2	6.7
8	7266.00	30.9 AV	54.0	-23.1	1.43 V	103	24.2	6.7

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 802.11ax (HE40)	<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	60.2 PK	74.0	-13.8	1.12 H	287	64.5	-4.3
2	2390.00	50.6 AV	54.0	-3.4	1.12 H	287	54.9	-4.3
3	*2437.00	112.8 PK			1.12 H	287	117.1	-4.3
4	*2437.00	101.2 AV			1.12 H	287	105.5	-4.3
5	2483.50	59.7 PK	74.0	-14.3	1.12 H	287	64.1	-4.4
6	2483.50	47.5 AV	54.0	-6.5	1.12 H	287	51.9	-4.4
7	4874.00	41.5 PK	74.0	-32.5	3.69 H	341	41.0	0.5
8	4874.00	30.6 AV	54.0	-23.4	3.69 H	341	30.1	0.5
9	7311.00	41.6 PK	74.0	-32.4	3.45 H	65	34.8	6.8
10	7311.00	30.5 AV	54.0	-23.5	3.45 H	65	23.7	6.8

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	63.2 PK	74.0	-10.8	1.05 V	118	67.5	-4.3
2	2390.00	53.5 AV	54.0	-0.5	1.05 V	118	57.8	-4.3
3	*2437.00	114.8 PK			1.05 V	118	119.1	-4.3
4	*2437.00	103.3 AV			1.05 V	118	107.6	-4.3
5	2483.50	62.3 PK	74.0	-11.7	1.05 V	118	66.7	-4.4
6	2483.50	50.2 AV	54.0	-3.8	1.05 V	118	54.6	-4.4
7	4874.00	41.6 PK	74.0	-32.4	1.10 V	28	41.1	0.5
8	4874.00	30.6 AV	54.0	-23.4	1.10 V	28	30.1	0.5
9	7311.00	42.1 PK	74.0	-31.9	1.48 V	106	35.3	6.8
10	7311.00	31.2 AV	54.0	-22.8	1.48 V	106	24.4	6.8

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 802.11ax (HE40)	<b>Channel</b>	CH 9 : 2452 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	*2452.00	112.1 PK			1.01 H	289	116.4	-4.3
2	*2452.00	101.0 AV			1.01 H	289	105.3	-4.3
3	2488.50	62.1 PK	74.0	-11.9	1.01 H	289	66.5	-4.4
4	2488.50	50.8 AV	54.0	-3.2	1.01 H	289	55.2	-4.4
5	4904.00	41.2 PK	74.0	-32.8	3.65 H	351	40.6	0.6
6	4904.00	30.2 AV	54.0	-23.8	3.65 H	351	29.6	0.6
7	7356.00	41.6 PK	74.0	-32.4	3.41 H	36	34.6	7.0
8	7356.00	30.5 AV	54.0	-23.5	3.41 H	36	23.5	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	*2452.00	113.8 PK			1.00 V	115	118.1	-4.3
2	*2452.00	102.6 AV			1.00 V	115	106.9	-4.3
3	2486.40	66.4 PK	74.0	-7.6	1.00 V	115	70.8	-4.4
4	2486.40	53.4 AV	54.0	-0.6	1.00 V	115	57.8	-4.4
5	4904.00	41.5 PK	74.0	-32.5	1.02 V	13	40.9	0.6
6	4904.00	30.5 AV	54.0	-23.5	1.02 V	13	29.9	0.6
7	7356.00	42.0 PK	74.0	-32.0	1.45 V	104	35.0	7.0
8	7356.00	30.9 AV	54.0	-23.1	1.45 V	104	23.9	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.

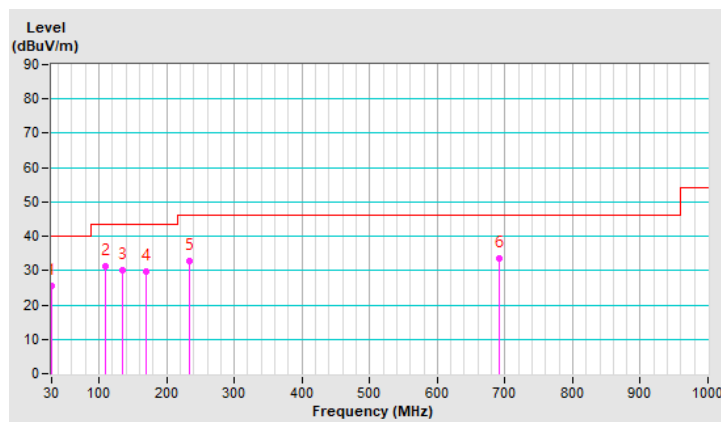
### Below 1GHz Data:

<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	30.58	25.4 QP	40.0	-14.6	1.00 H	252	39.0	-13.6
2	109.44	31.3 QP	43.5	-12.2	3.00 H	286	46.4	-15.1
3	134.61	30.0 QP	43.5	-13.5	1.50 H	274	42.8	-12.8
4	170.41	29.6 QP	43.5	-13.9	1.50 H	288	42.1	-12.5
5	233.75	32.8 QP	46.0	-13.2	1.00 H	106	46.4	-13.6
6	692.27	33.6 QP	46.0	-12.4	2.00 H	199	34.3	-0.7

### Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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.



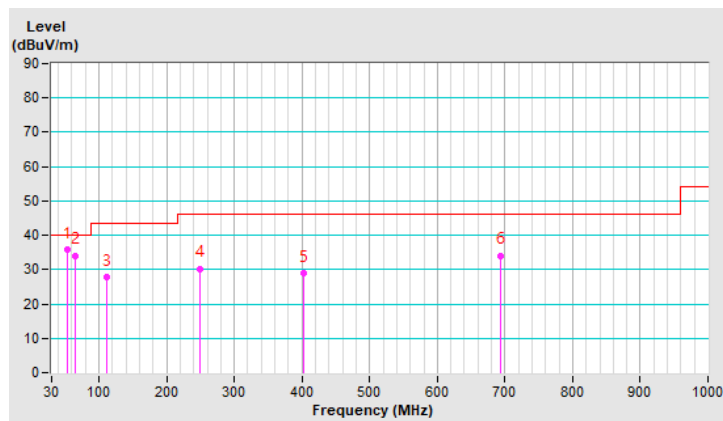
RF Mode	TX 802.11b	Channel	CH 11 : 2462 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

**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	54.10	35.7 QP	40.0	-4.3	1.00 V	292	48.4	-12.7
2	64.77	34.1 QP	40.0	-5.9	1.00 V	16	48.1	-14.0
3	110.80	27.7 QP	43.5	-15.8	1.50 V	295	42.8	-15.1
4	248.90	30.3 QP	46.0	-15.7	1.50 V	176	43.0	-12.7
5	403.26	29.1 QP	46.0	-16.9	1.00 V	277	36.9	-7.8
6	692.80	34.1 QP	46.0	-11.9	2.00 V	275	34.8	-0.7

**Remarks:**

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	2020/10/20	2021/10/19
LISN R&S	ESH3-Z5	848773/004	2020/10/27	2021/10/26
LISN R & S	ESH3-Z5	835239/001	2021/3/26	2022/3/25
50 ohms Terminator	50	3	2020/10/26	2021/10/25
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2020/9/26	2021/9/25
Fixed attenuator STI	STI02-2200-10	005	2021/8/27	2022/8/26
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: 2021/8/31

#### 4.2.3 Test Procedures

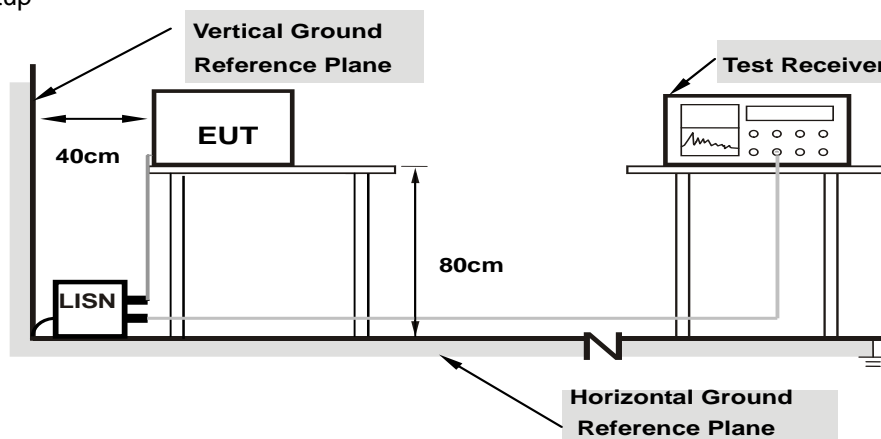
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

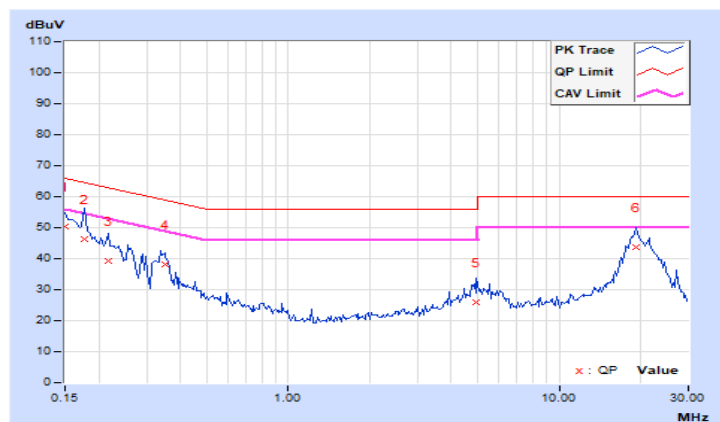
## 4.2.7 Test Results

<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	0.15000	9.97	40.44	26.74	50.41	36.71	66.00	56.00	-15.59	-19.29
2	0.17734	9.99	36.34	23.14	46.33	33.13	64.61	54.61	-18.28	-21.48
3	0.21641	10.00	29.32	16.05	39.32	26.05	62.96	52.96	-23.64	-26.91
4	0.34922	10.02	27.95	21.15	37.97	31.17	58.98	48.98	-21.01	-17.81
5	4.96484	10.33	15.58	6.44	25.91	16.77	56.00	46.00	-30.09	-29.23
<b>6</b>	<b>19.26172</b>	<b>11.41</b>	<b>32.23</b>	<b>25.85</b>	<b>43.64</b>	<b>37.26</b>	<b>60.00</b>	<b>50.00</b>	<b>-16.36</b>	<b>-12.74</b>

## 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

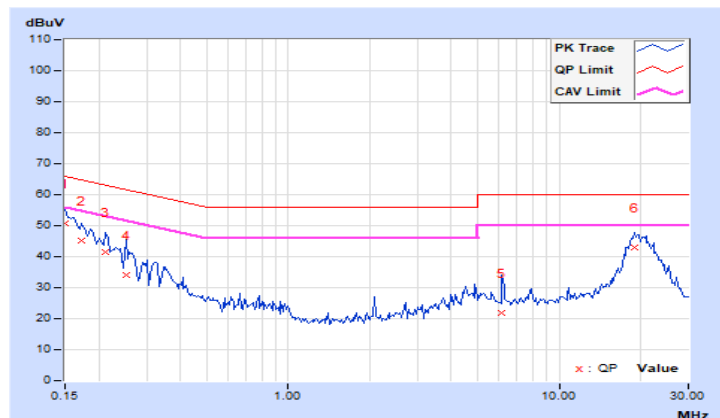


<b>RF Mode</b>	TX 802.11b	<b>Channel</b>	CH 11 : 2462 MHz
<b>Frequency Range</b>	150kHz ~ 30MHz	<b>Detector Function &amp; Resolution Bandwidth</b>	Quasi-Peak (QP) / Average (AV), 9kHz

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	0.15000	9.95	40.85	26.72	50.80	36.67	66.00	56.00	-15.20	-19.33
2	0.17344	9.97	35.32	21.61	45.29	31.58	64.79	54.79	-19.50	-23.21
3	0.21250	10.00	31.43	17.29	41.43	27.29	63.11	53.11	-21.68	-25.82
4	0.25156	10.01	23.94	8.46	33.95	18.47	61.71	51.71	-27.76	-33.24
5	6.12891	10.37	11.58	4.21	21.95	14.58	60.00	50.00	-38.05	-35.42
6	19.03906	11.13	32.01	25.24	43.14	36.37	60.00	50.00	-16.86	-13.63

**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



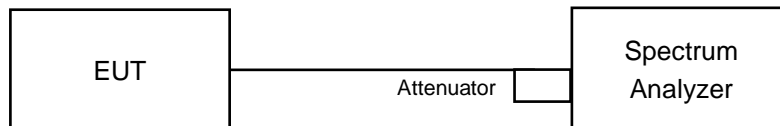


### 4.3 6dB Bandwidth Measurement

#### 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
		Chain 0	Chain 1		
1	2412	8.07	8.07	0.5	Pass
6	2437	8.13	8.05	0.5	Pass
11	2462	8.11	8.09	0.5	Pass

##### 802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.99	15.69	0.5	Pass
6	2437	16.34	15.63	0.5	Pass
11	2462	15.77	15.93	0.5	Pass

##### 802.11ax (HE20)

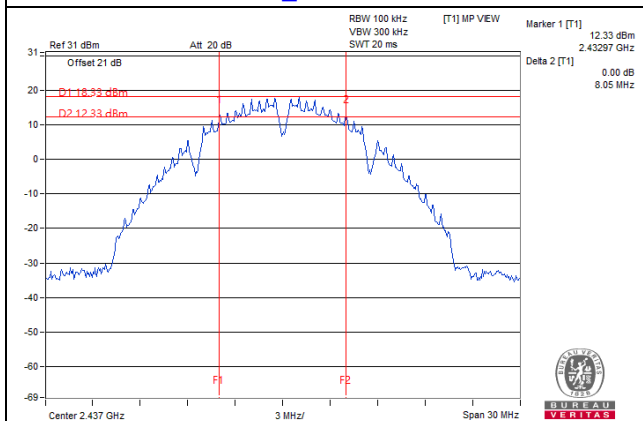
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	18.76	18.47	0.5	Pass
6	2437	18.59	18.49	0.5	Pass
11	2462	18.42	18.39	0.5	Pass

##### 802.11ax (HE40)

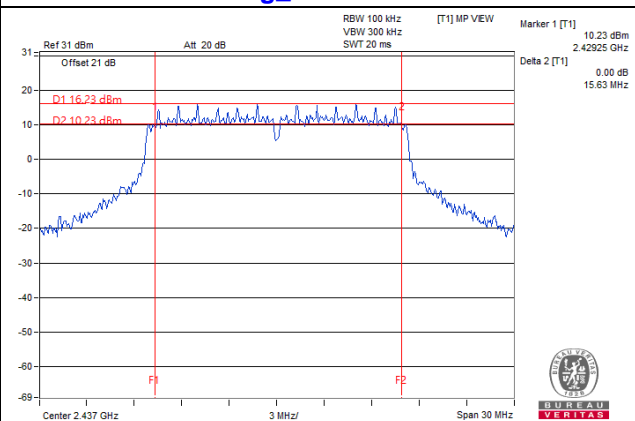
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	37.99	37.69	0.5	Pass
6	2437	37.38	37.99	0.5	Pass
9	2452	38.06	37.96	0.5	Pass

### Spectrum Plot of Worst Value

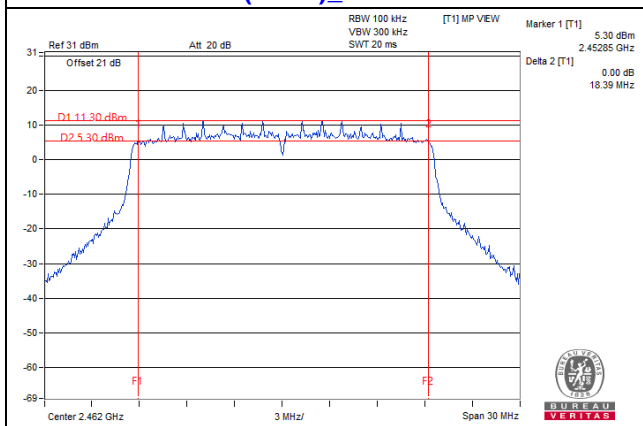
#### 802.11b\_Chain 1 / CH6



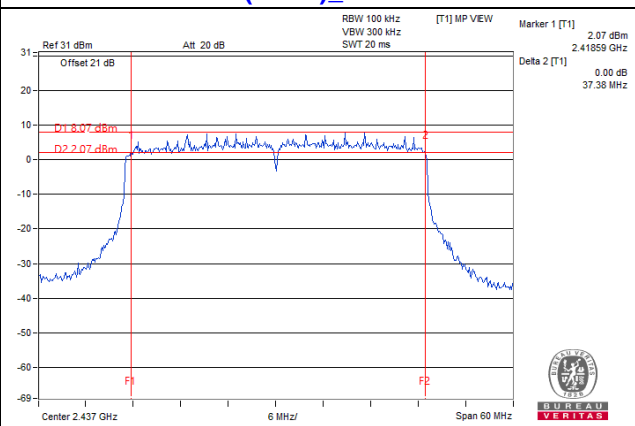
#### 802.11g\_Chain 1 / CH6



#### 802.11ax (HE20)\_Chain 1 / CH11



#### 802.11ax (HE40)\_Chain 0 / CH6



## 4.4 Conducted Output Power Measurement

### 4.4.1 Limits of Conducted Output Power Measurement

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

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

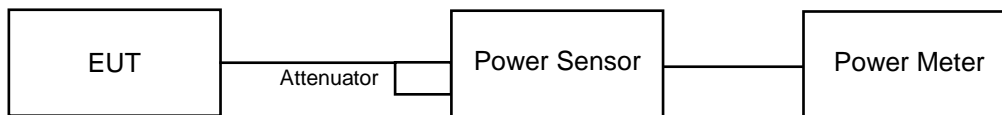
Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

Array Gain =  $5 \log(N_{ANT}/N_{SS})$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $N_{ANT} \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

### 4.4.2 Test Setup



### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 Test Procedures

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

##### CDD Mode:

##### 802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	25.55	25.21	690.816	28.39	30	Pass
6	2437	26.93	26.95	988.624	29.95	30	Pass
11	2462	26.96	26.94	990.903	29.96	30	Pass

##### 802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.41	20.98	263.671	24.21	30	Pass
6	2437	26.71	26.03	869.68	29.39	30	Pass
11	2462	23.57	23.74	464.102	26.67	30	Pass

##### VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.59	17.11	108.816	20.37	30	Pass
6	2437	25.83	25.27	719.336	28.57	30	Pass
11	2462	20.93	20.88	246.341	23.92	30	Pass

##### VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.78	16.31	90.399	19.56	30	Pass
6	2437	21.16	20.82	251.398	24.00	30	Pass
9	2452	19.73	19.47	182.484	22.61	30	Pass

##### 802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.94	17.72	121.386	20.84	30	Pass
6	2437	26.34	25.56	790.276	28.98	30	Pass
11	2462	21.41	21.22	270.791	24.33	30	Pass

##### 802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.85	16.53	93.395	19.70	30	Pass
6	2437	21.33	20.85	257.45	24.11	30	Pass
9	2452	19.83	19.62	187.783	22.74	30	Pass

### Beamforming Mode:

#### VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.59	17.11	108.816	20.37	30	Pass
6	2437	25.83	25.27	719.336	28.57	30	Pass
11	2462	20.93	20.88	246.341	23.92	30	Pass

Note: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.63 \text{ dBi} < 6 \text{ dBi}$ , so the power limit shall not be reduced.

#### VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.78	16.31	90.399	19.56	30	Pass
6	2437	21.16	20.82	251.398	24.00	30	Pass
9	2452	19.73	19.47	182.484	22.61	30	Pass

Note: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.63 \text{ dBi} < 6 \text{ dBi}$ , so the power limit shall not be reduced.

#### 802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.94	17.72	121.386	20.84	30	Pass
6	2437	26.34	25.56	790.276	28.98	30	Pass
11	2462	21.41	21.22	270.791	24.33	30	Pass

Note: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.63 \text{ dBi} < 6 \text{ dBi}$ , so the power limit shall not be reduced.

#### 802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.85	16.53	93.395	19.70	30	Pass
6	2437	21.33	20.85	257.45	24.11	30	Pass
9	2452	19.83	19.62	187.783	22.74	30	Pass

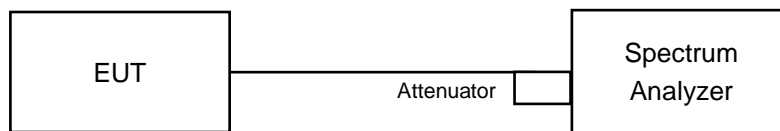
Note: The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.63 \text{ dBi} < 6 \text{ dBi}$ , so the power limit shall not be reduced.

## 4.5 Power Spectral Density Measurement

### 4.5.1 Limits of Power Spectral Density Measurement

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

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedure

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

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Condition

Same as Item 4.3.6

#### 4.5.7 Test Results

##### 802.11b

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1				
1	2412	-4.81	-3.45	1.35	0.28	8.00	Pass
6	2437	-4.16	-1.87	1.35	1.49	8.00	Pass
11	2462	-2.33	-4.80	1.35	0.97	8.00	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.  
 2. The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2]$  = 5.63 dBi < 6dBi, so the power density limit shall not be reduced.  
 3. Refer to section 3.3 for duty cycle spectrum plot.

##### 802.11g

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1				
1	2412	-10.62	-10.66	0.17	-7.46	8.00	Pass
6	2437	-5.10	-5.91	0.17	-2.31	8.00	Pass
11	2462	-8.56	-8.62	0.17	-5.41	8.00	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.  
 2. The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2]$  = 5.63 dBi < 6dBi, so the power density limit shall not be reduced.  
 3. Refer to section 3.3 for duty cycle spectrum plot.

##### 802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1				
1	2412	-16.34	-15.96	0.21	-12.93	8.00	Pass
6	2437	-7.46	-7.87	0.21	-4.44	8.00	Pass
11	2462	-12.16	-12.85	0.21	-9.27	8.00	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.  
 2. The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2]$  = 5.63 dBi < 6dBi, so the power density limit shall not be reduced.  
 3. Refer to section 3.3 for duty cycle spectrum plot.

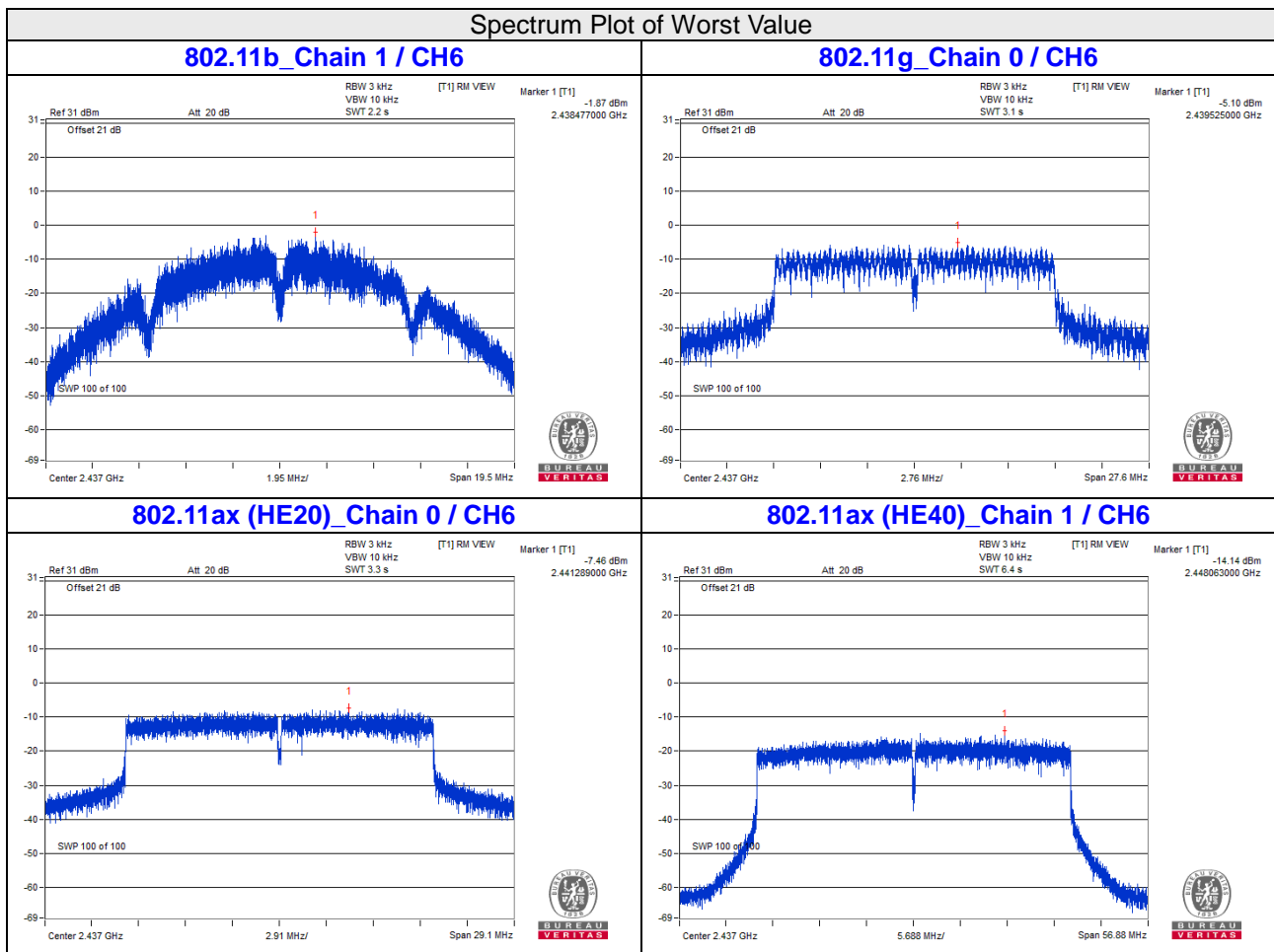


### 802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1				
3	2422	-19.69	-19.19	0.22	-16.20	8.00	Pass
6	2437	-14.92	-14.14	0.22	-11.28	8.00	Pass
9	2452	-15.84	-17.11	0.22	-13.20	8.00	Pass

- Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.  
 2. The directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 5.63 \text{ dBi} < 6 \text{ dBi}$ , so the power density limit shall not be reduced.  
 3. Refer to section 3.3 for duty cycle spectrum plot.

#### Spectrum Plot of Worst Value

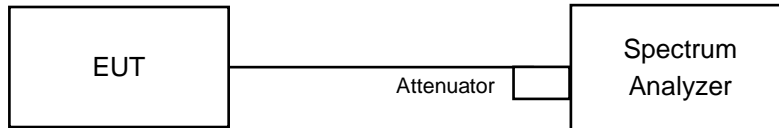


## 4.6 Conducted Out of Band Emission Measurement

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

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

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

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

#### MEASUREMENT PROCEDURE OOB

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

### 4.6.5 Deviation from Test Standard

No deviation.

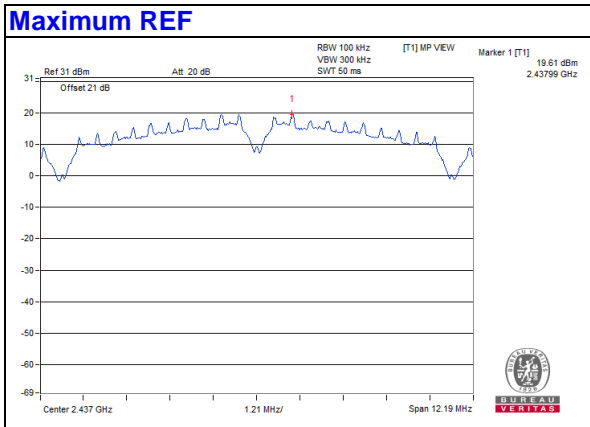
### 4.6.6 EUT Operating Condition

Same as Item 4.3.6

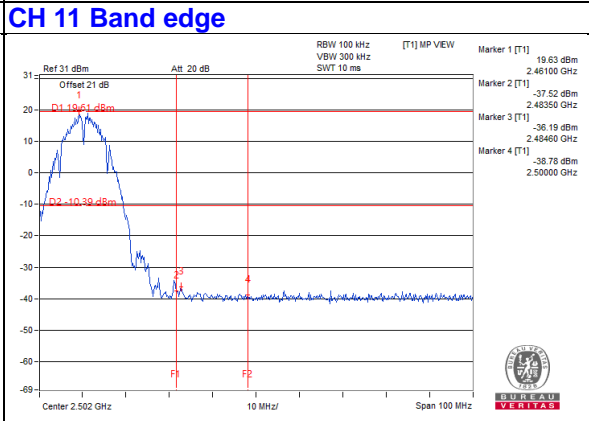
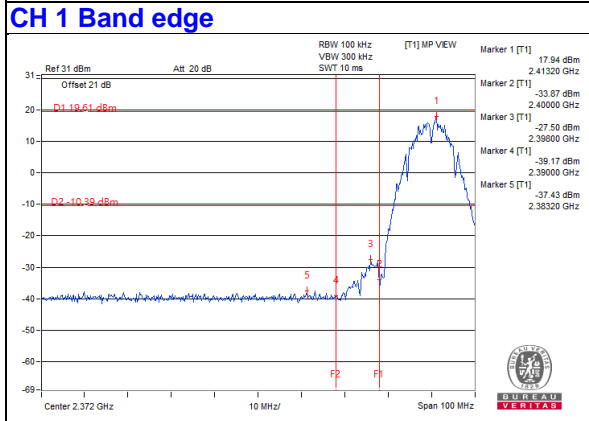
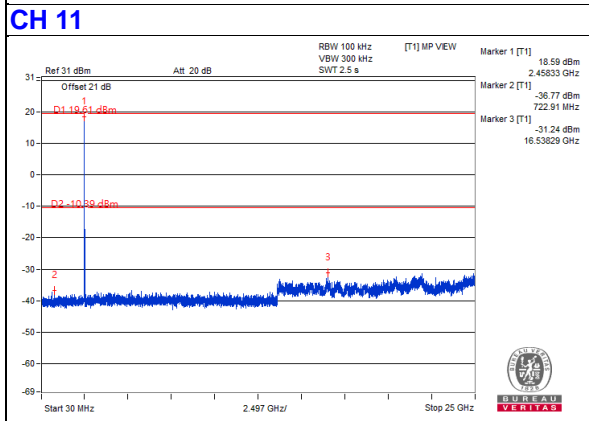
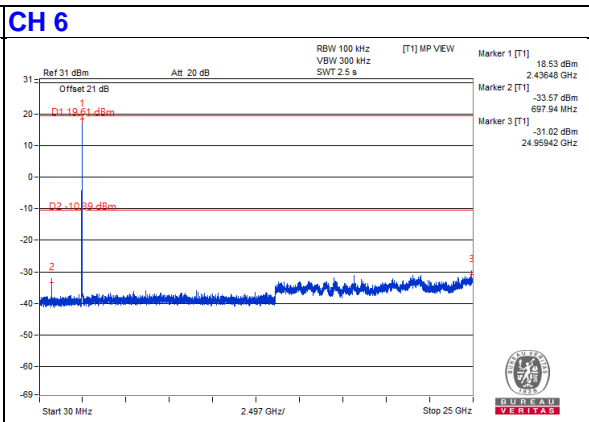
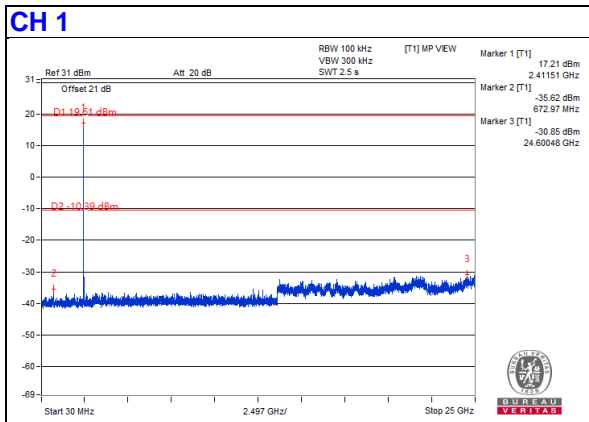
### 4.6.7 Test Results

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

802.11b

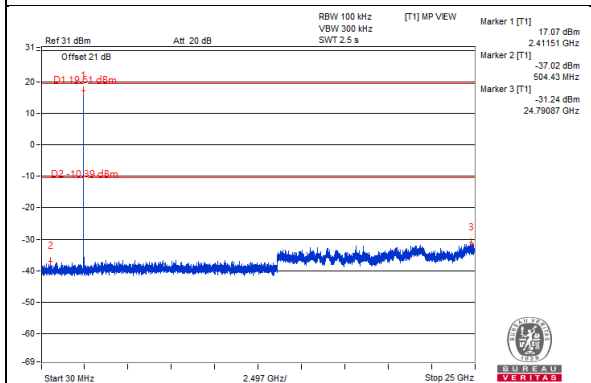


Chain 0

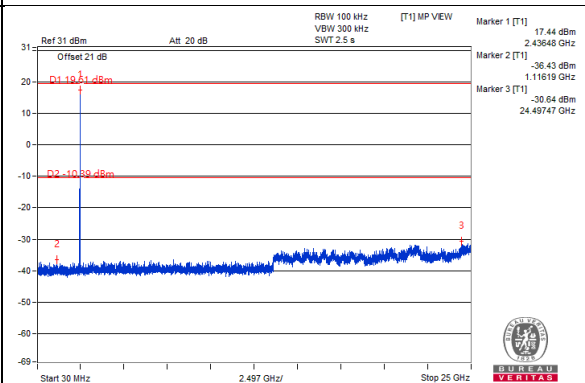


Chain 1

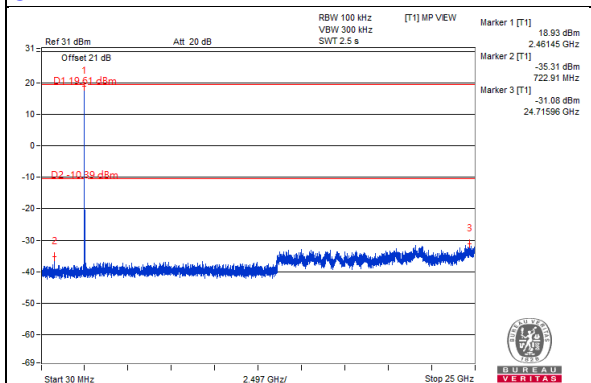
CH 1



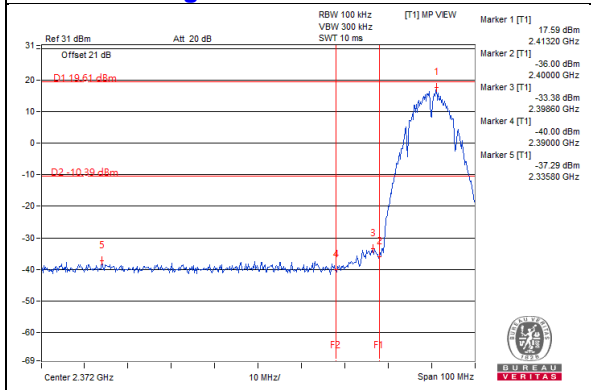
CH 6



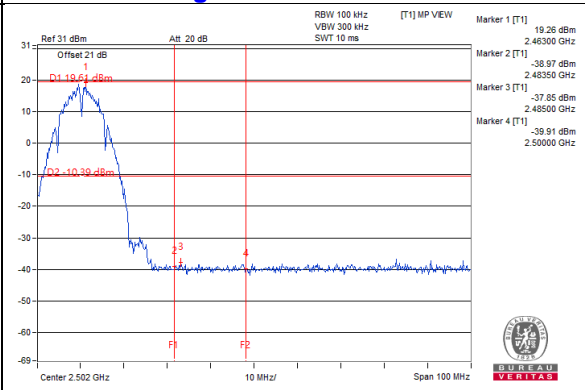
CH 11



CH 1 Band edge

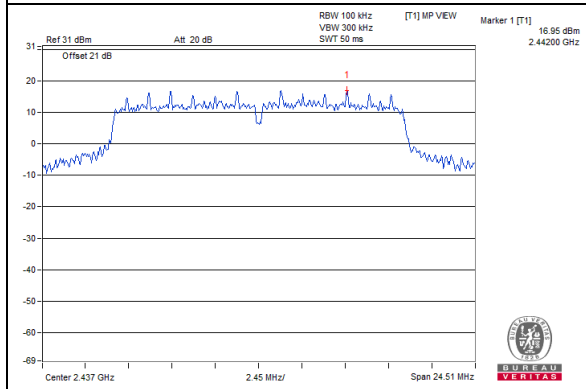


CH 11 Band edge



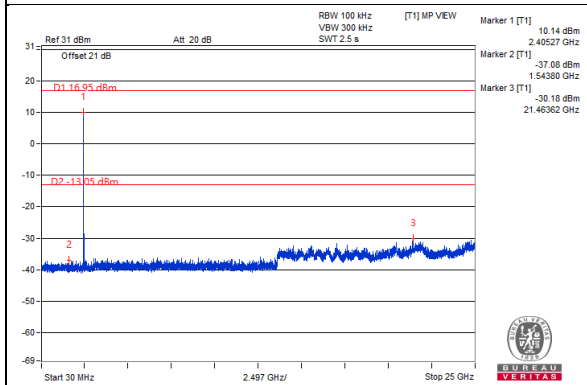
802.11g

**Maximum REF**

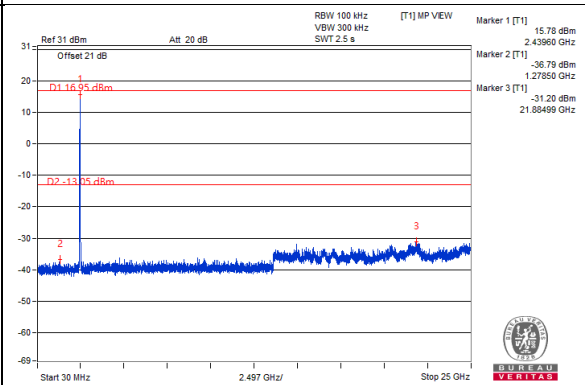


**Chain 0**

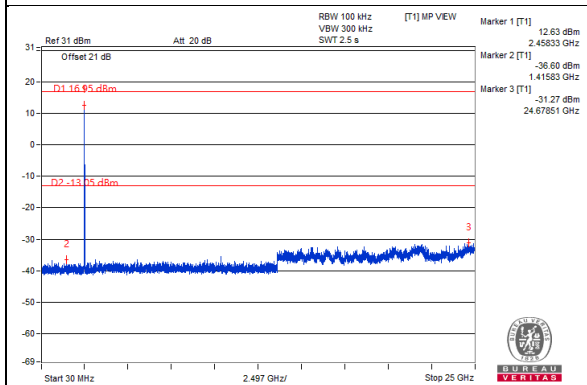
**CH 1**



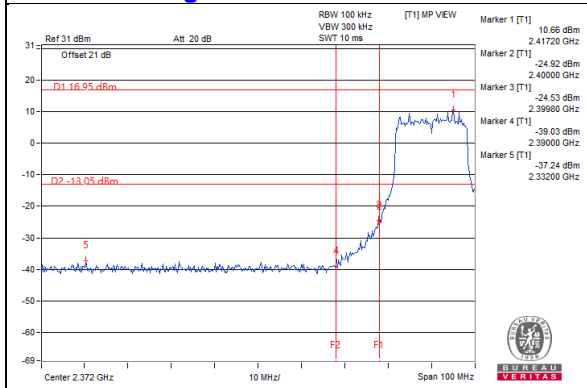
**CH 6**



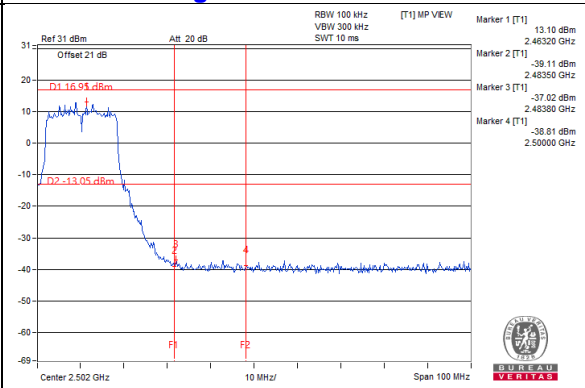
**CH 11**



**CH 1 Band edge**

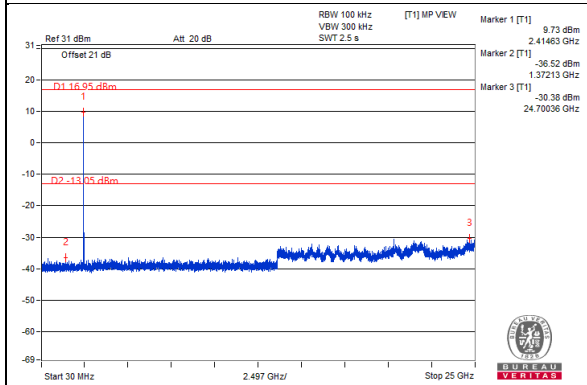


**CH 11 Band edge**

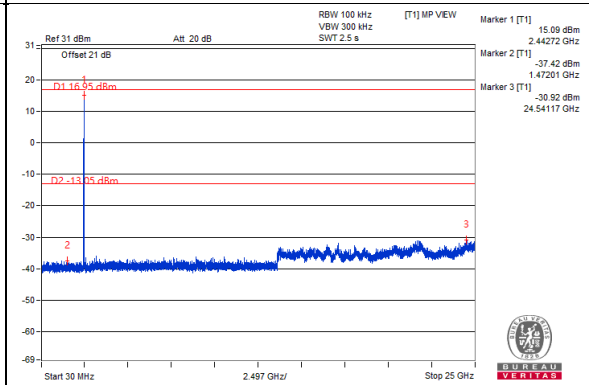


# Chain 1

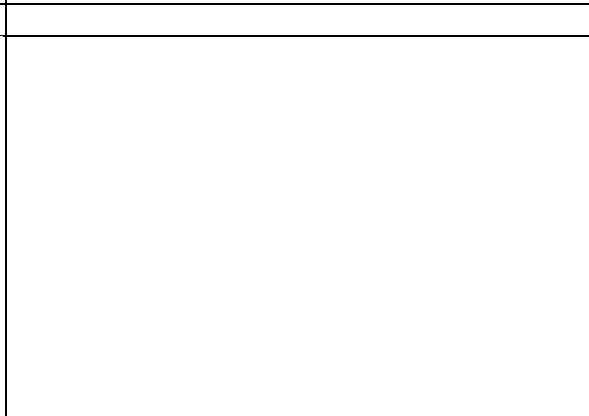
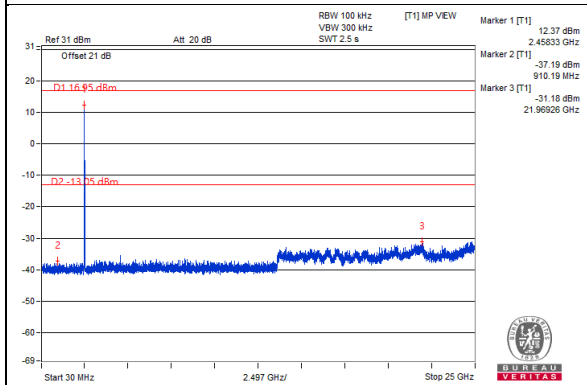
## CH 1



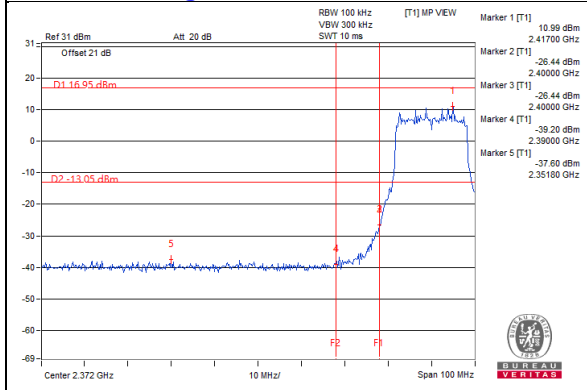
## CH 6



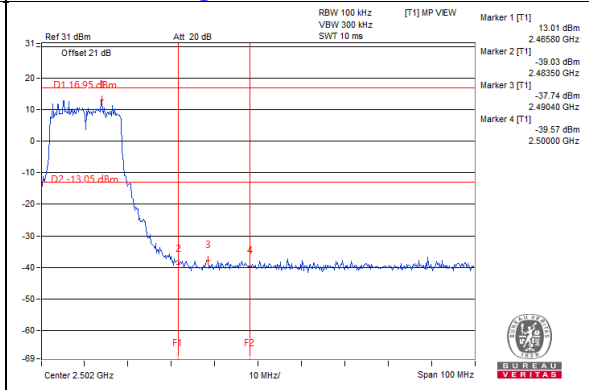
## CH 11



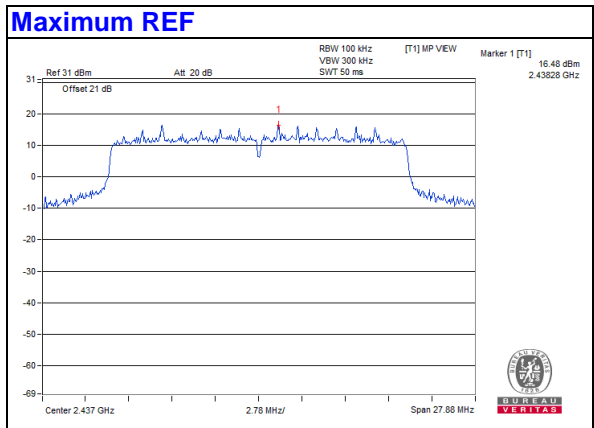
## CH 1 Band edge



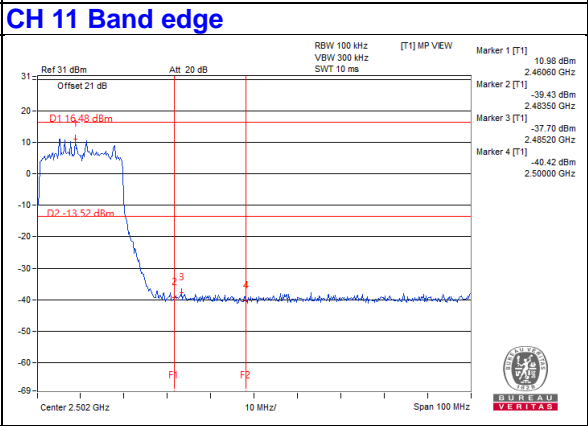
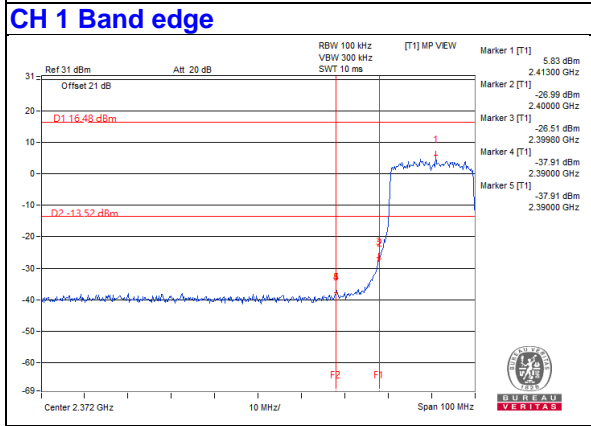
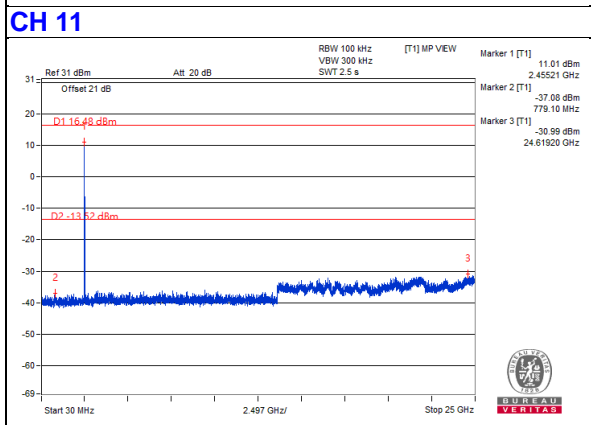
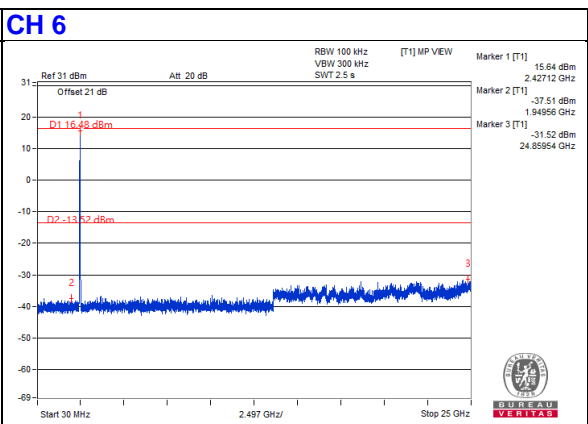
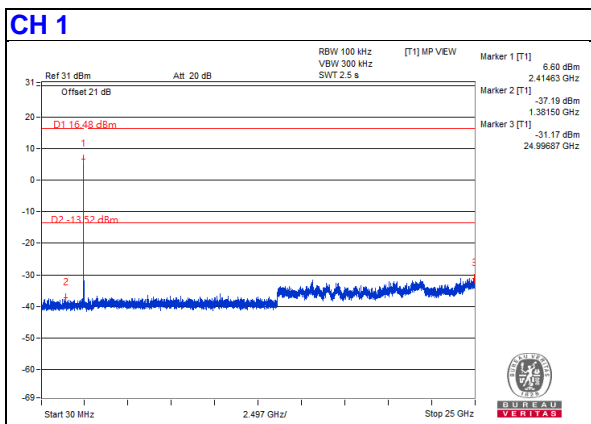
## CH 11 Band edge



802.11ax (HE20)

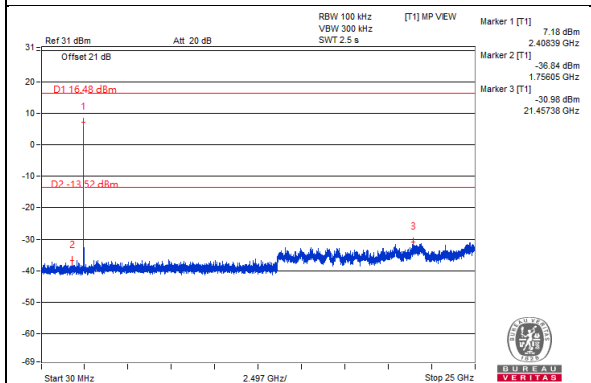


Chain 0

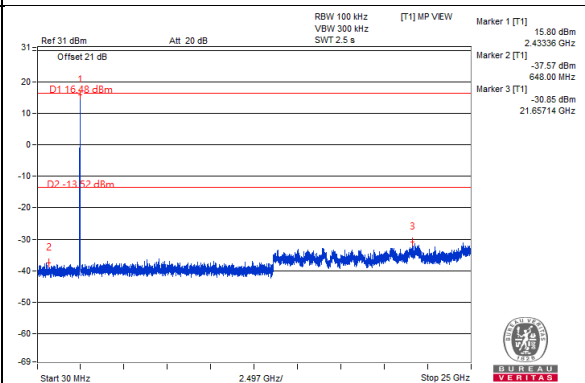


Chain 1

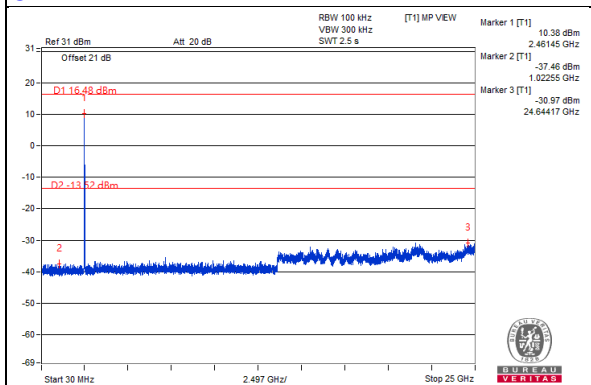
CH 1



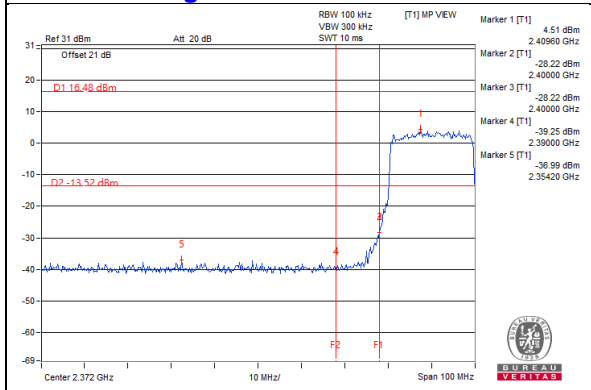
CH 6



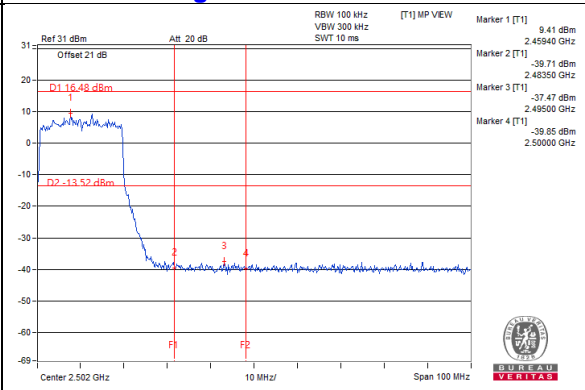
CH 11



CH 1 Band edge

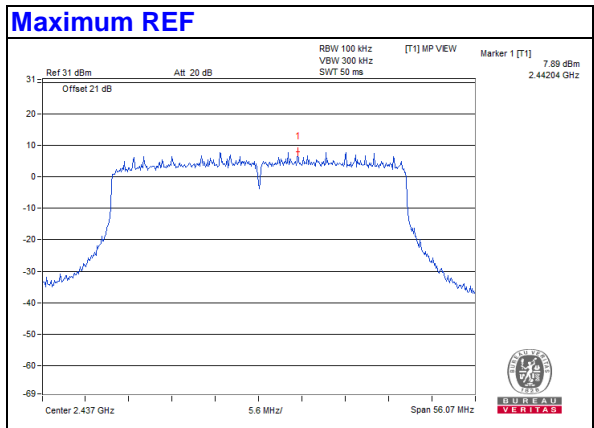


CH 11 Band edge



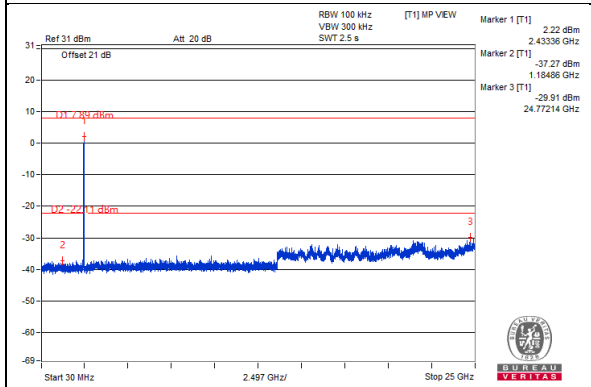


802.11ax (HE40)

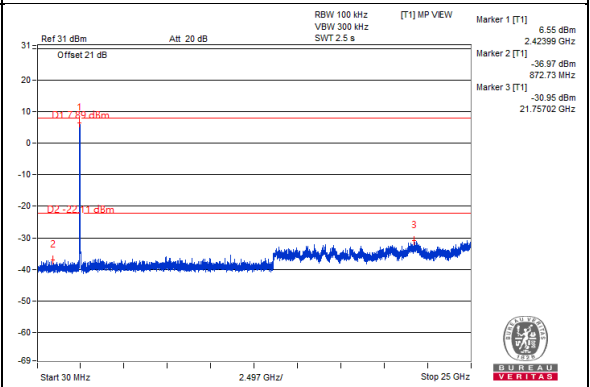


Chain 0

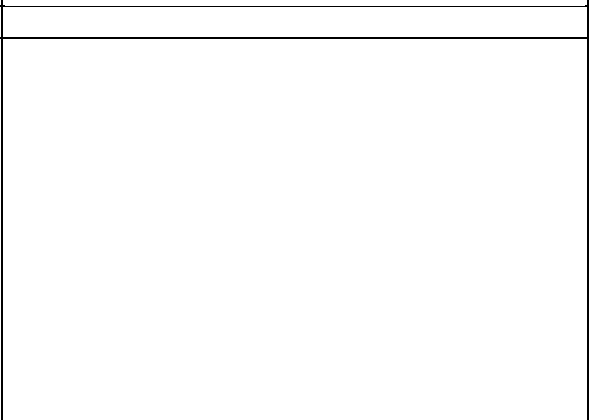
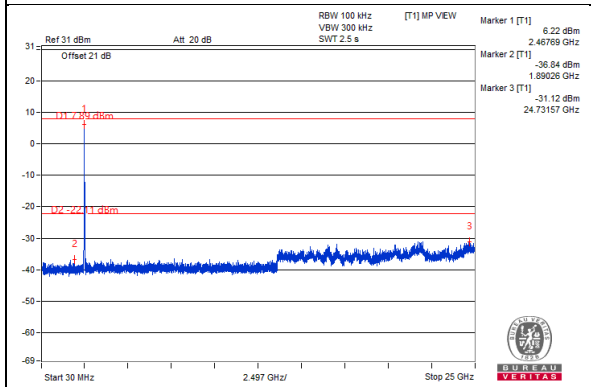
CH 3



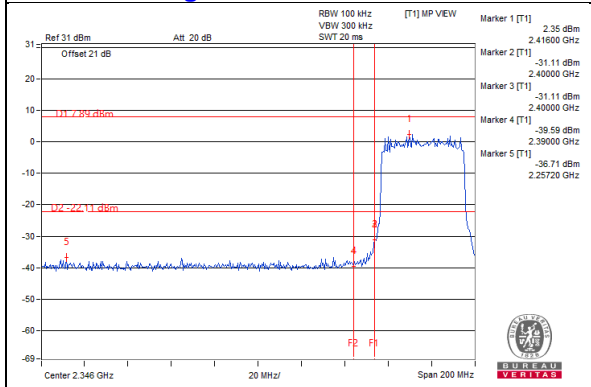
CH 6



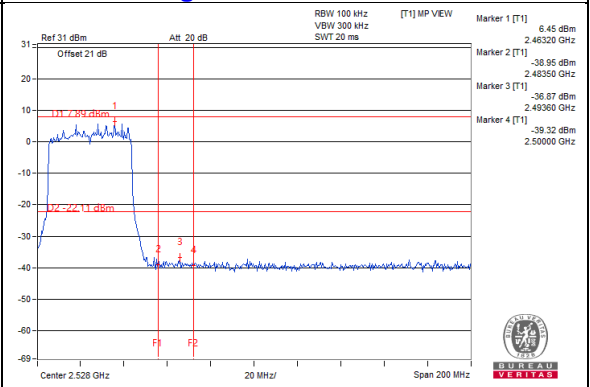
CH 9



CH 3 Band edge

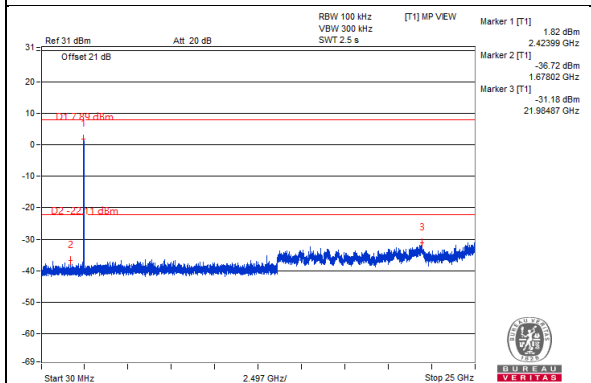


CH 9 Band edge

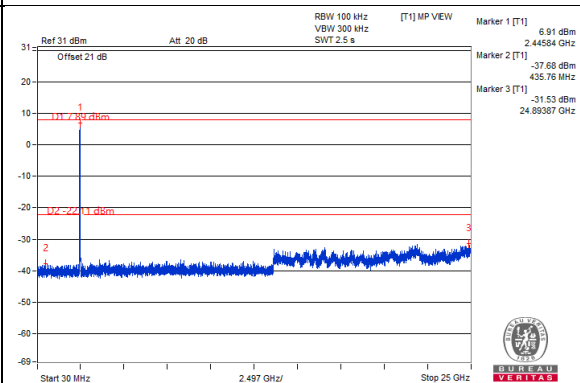


### Chain 1

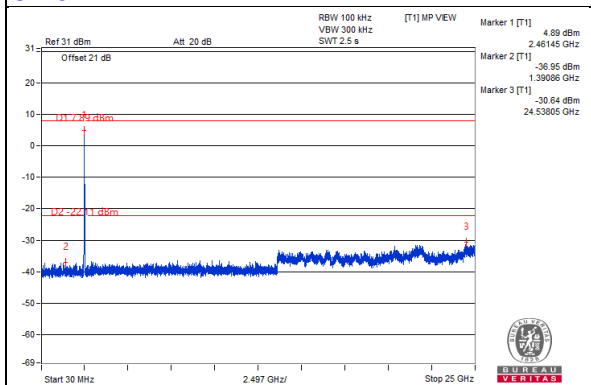
#### CH 3



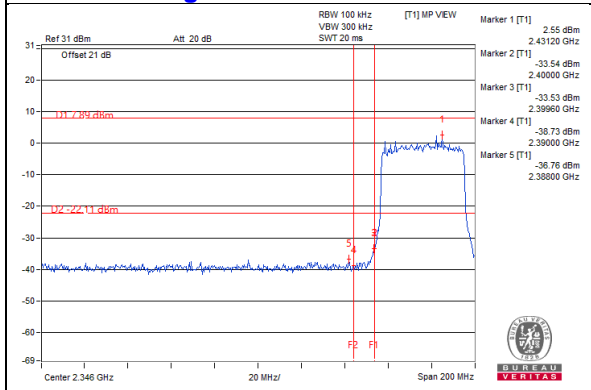
#### CH 6



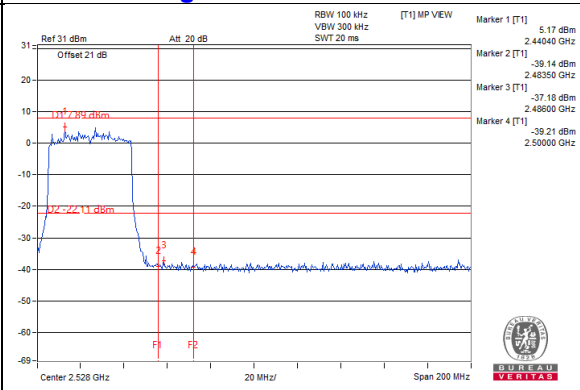
#### CH 9



#### CH 3 Band edge



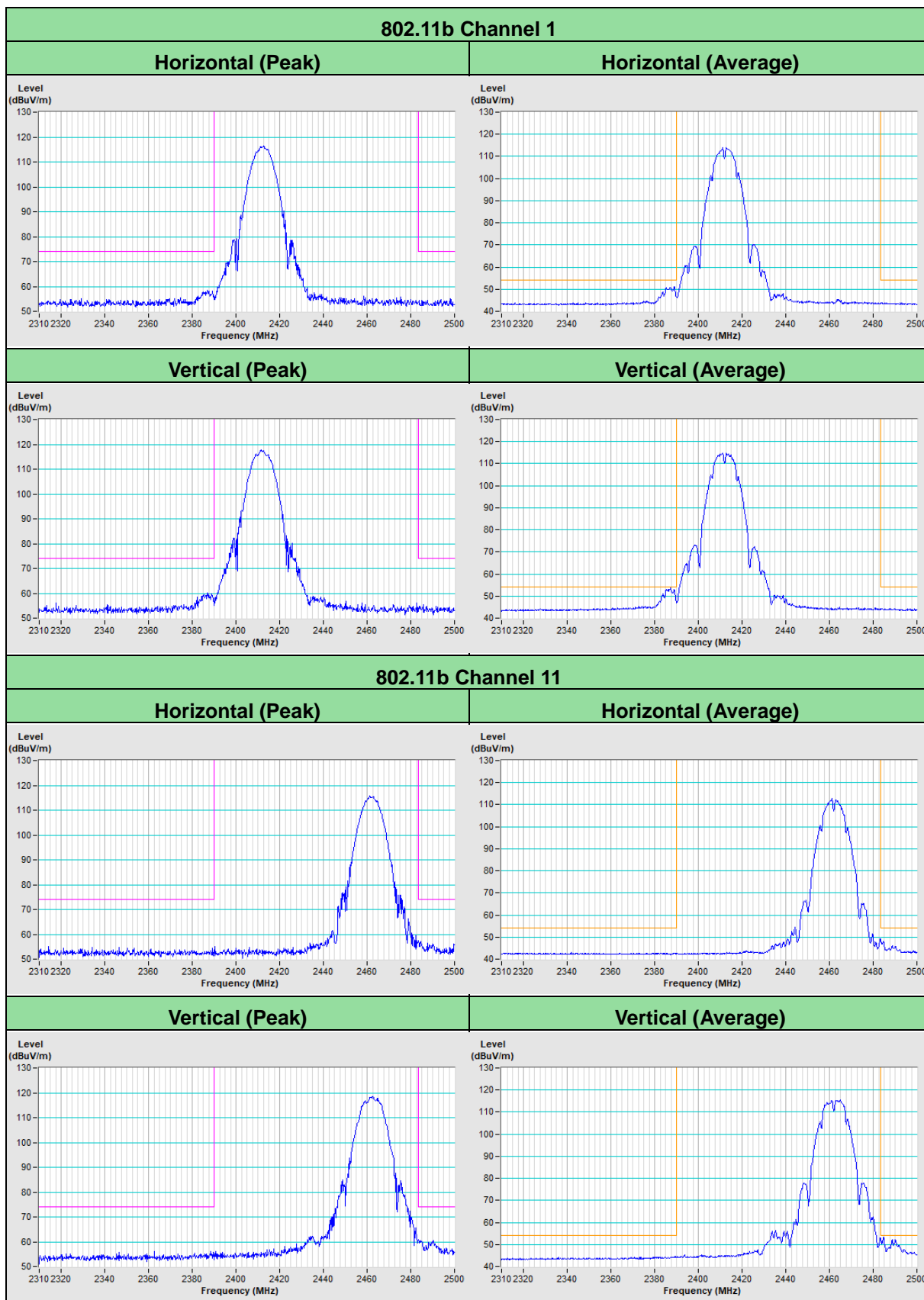
#### CH 9 Band edge



## 5 Pictures of Test Arrangements

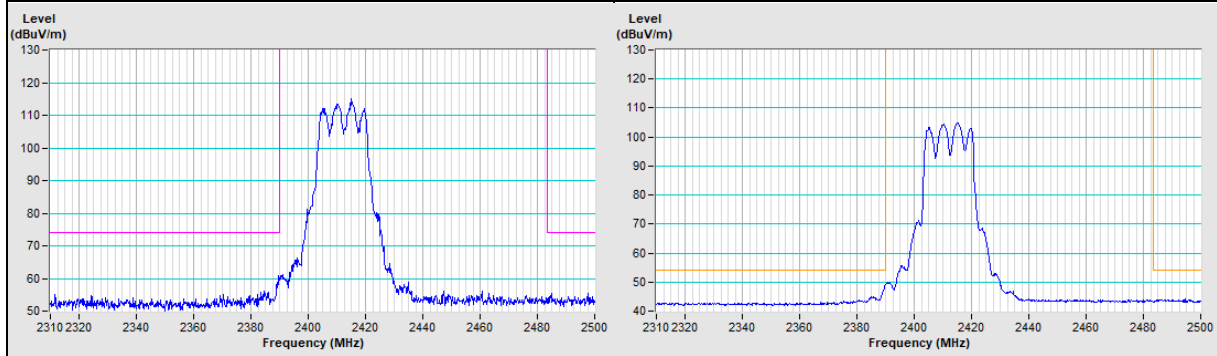
Please refer to the attached file (Test Setup Photo).

### Annex A - Band-Edge Measurement

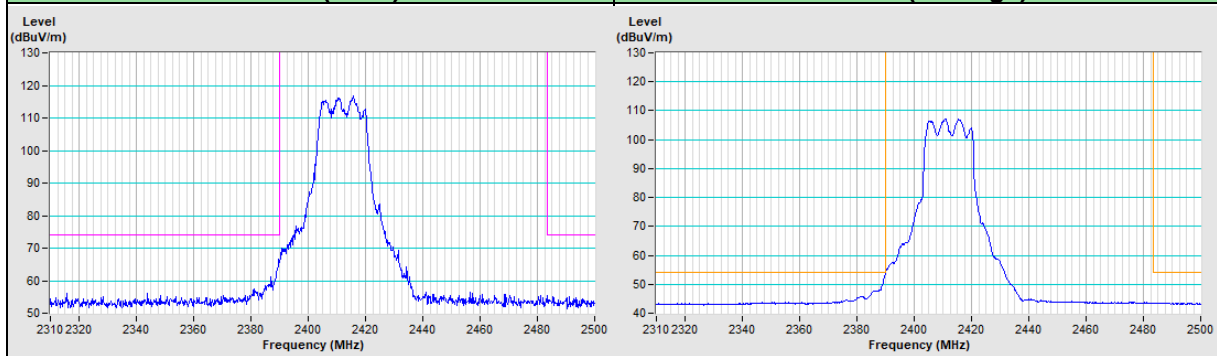


### 802.11g Channel 1

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

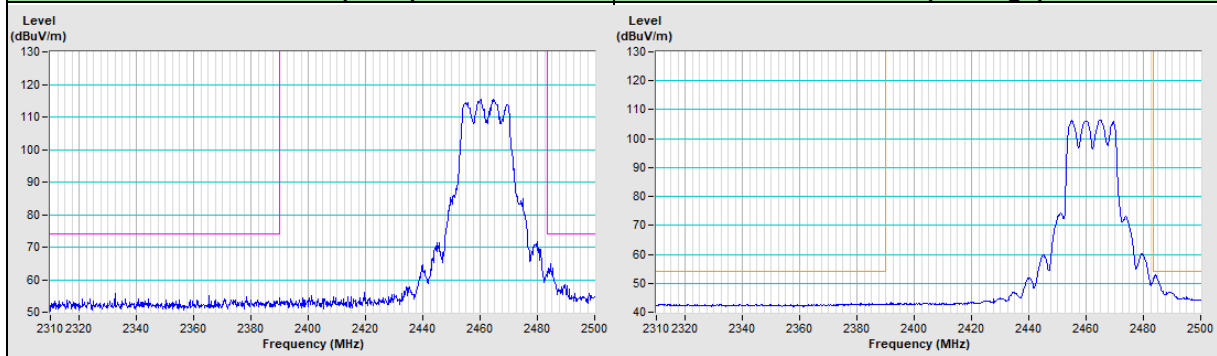


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

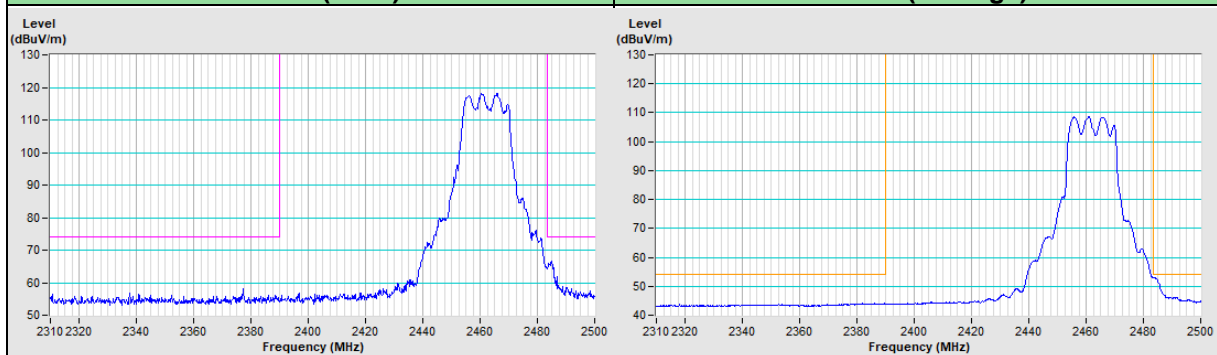


### 802.11g Channel 11

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

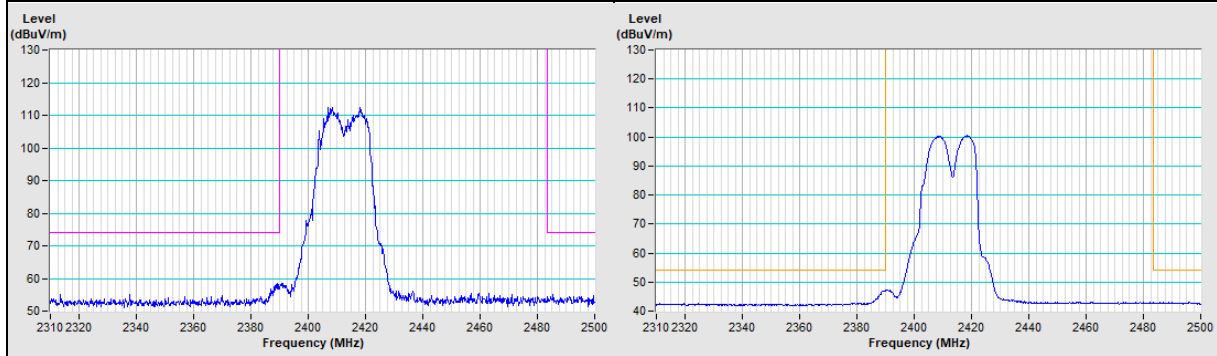


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

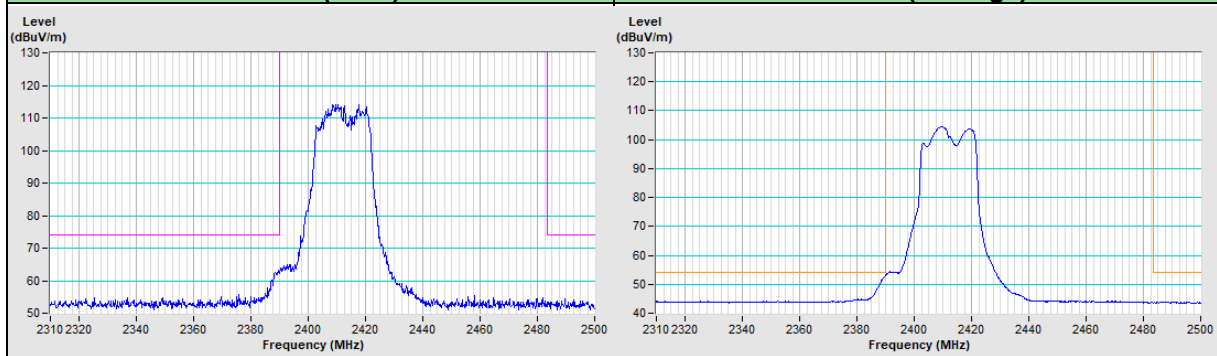


### 802.11ax (HE20) Channel 1

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

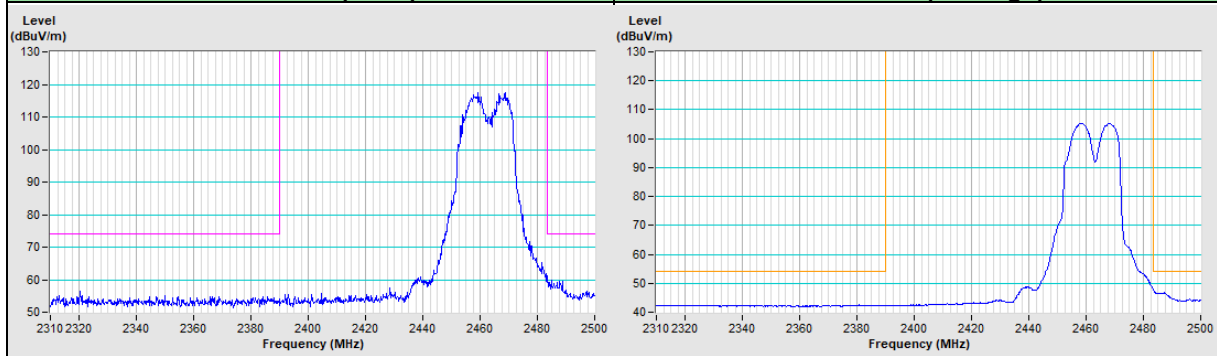


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

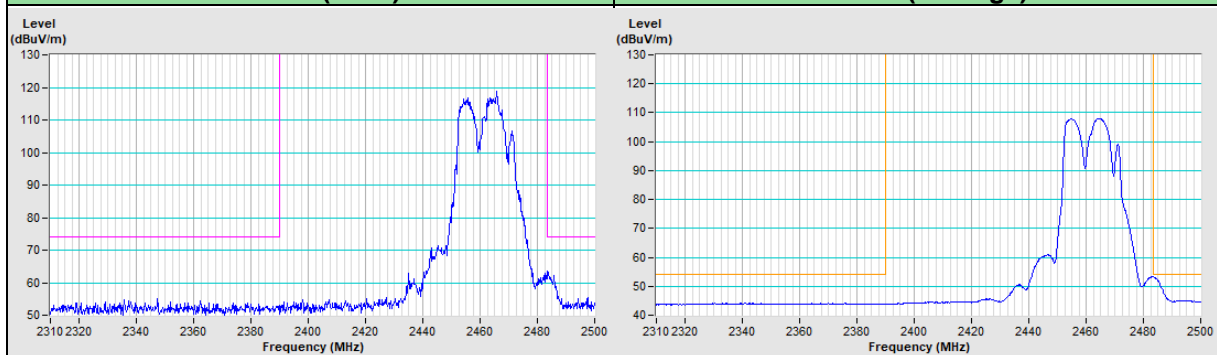


### 802.11ax (HE20) Channel 11

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

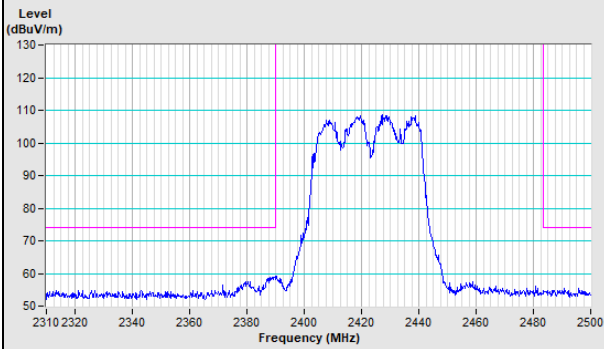


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

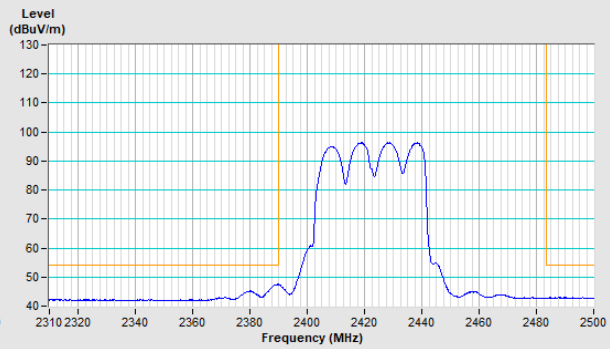


### 802.11ax (HE40) Channel 3

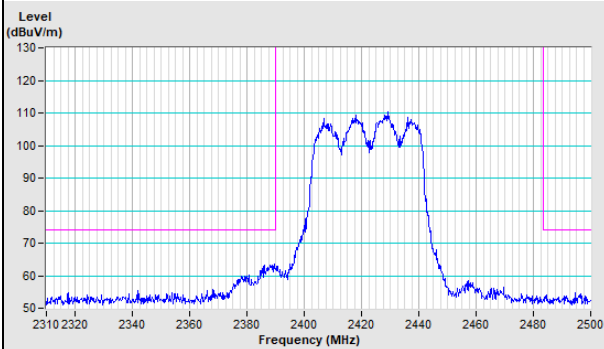
#### Horizontal (Peak)



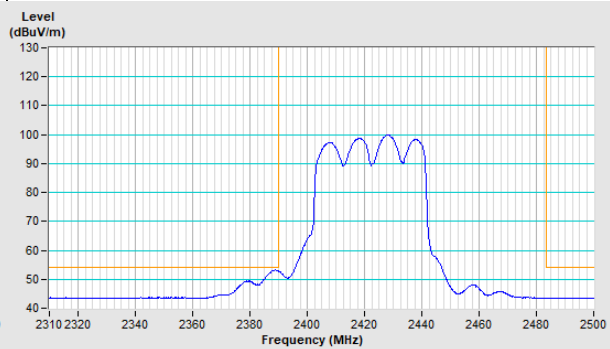
#### Horizontal (Average)



#### Vertical (Peak)

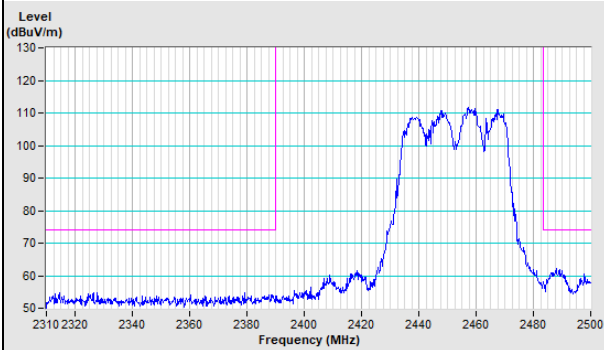


#### Vertical (Average)

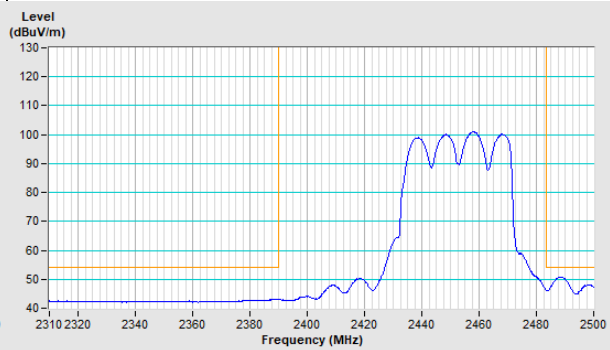


### 802.11ax (HE40) Channel 9

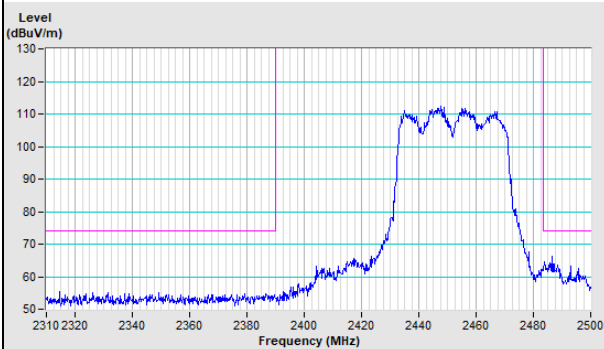
#### Horizontal (Peak)



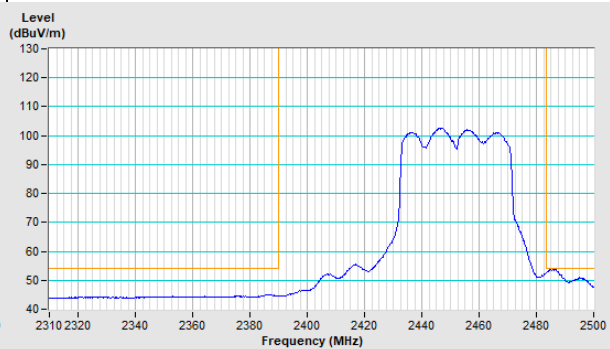
#### Horizontal (Average)



#### 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.

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

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