

## FCC Test Report

**Report No.:** RF200115C20

**FCC ID:** A8J-EWS357APV3

**Test Model:** EWS357AP v3

**Series Model:** ECW620 v2, ECW220 v2 (refer to item 3.1 for more details)

**Received Date:** Jan. 15, 2020

**Test Date:** Feb. 6 to Mar. 24, 2020

**Issued Date:** Apr. 1, 2020

**Applicant:** EnGenius Technologies

**Address:** 1580 Scenic Avenue, Costa Mesa, CA92626

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /  
Designation Number:** 788550 / TW0003



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### Release Control Record

Issue No.	Description	Date Issued
RF200115C20	Original release	Apr. 1, 2020

## 1 Certificate of Conformity

**Product:** 802.11AX Indoor Ceiling Mount Access Point

**Brand:** EnGenius

**Test Model:** EWS357AP v3

**Series Model:** ECW620 v2, ECW220 v2 (refer to item 3.1 for more details)

**Sample Status:** Engineering sample

**Applicant:** EnGenius Technologies

**Test Date:** Feb. 6 to Mar. 24, 2020

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

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

**Prepared by :** Annie Chang, **Date:** Apr. 1, 2020  
Annie Chang / Senior Specialist

**Approved by :** Rex Lai, **Date:** Apr. 1, 2020  
Rex Lai / Associate 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 -6.80dB at 0.46936MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.5dB at 50.78MHz.
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 not a standard connector.

### Note:

- For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.86 dB
	200MHz ~ 1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	802.11AX Indoor Ceiling Mount Access Point
Brand	EnGenius
Test Model	EWS357AP v3
Series Model	ECW620 v2, ECW220 v2
Model Difference	Refer to note for more details
Sample Status	Engineering sample
Power Supply Rating	12Vdc from Adapter 54Vdc from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n (HT20/40): up to MCS15 802.11n (VHT20/40): up to MCS15 802.11ax: up to MCS11
Operating Frequency	2412~2462MHz
Number of Channel	<u>2GHz traffic radio:</u> 802.11b, 802.11g, 802.11n (HT20), 802.11n (VHT20) , 802.11ax (HE20): 11 802.11n (HT40), 802.11n (VHT40), 802.11ax (HE40): 7 <u>Scanning radio:</u> 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	<u>2G traffic radio: CDD Mode:</u> 276.098mW <u>2G traffic radio: Beamforming Mode:</u> 99.532mW <u>Scanning radio: CDD Mode:</u> 84.333mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Cable Supplied	NA

Note:

1. The following models are provided to this EUT. The model EWS357AP v3 was chosen for final test.

Brand	Test Model	Difference
EnGenius	EWS357AP v3	Marketing Differentiation
	ECW620 v2	
	ECW220 v2	

2. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	CDD Mode	Beamforming Mode	TX Function	Radio
802.11b	Support	Not Support	2TX	2G traffic radio
802.11g	Support	Not Support	2TX	
802.11n (HT20)	Support	Not Support	2TX	
802.11n (HT40)	Support	Not Support	2TX	
802.11n (VHT20)	Support	Support	2TX	
802.11n (VHT40)	Support	Support	2TX	
802.11ax (HE20)	Support	Support	2TX	
802.11ax (HE40)	Support	Support	2TX	
802.11b	Support	Not Support	1TX	Scanning radio
802.11g	Support	Not Support	1TX	
802.11n (HT20)	Support	Not Support	1TX	
802.11n (HT40)	Support	Not Support	1TX	

\* The bandwidth and modulation are similar for HT20/HT40 on 802.11n mode and VHT20/VHT40 on 802.11n mode and HE20/HE40 on 802.11ax mode. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)

\* For 802.11n/ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

3. The EUT consumes power from the following adapter and POE.

Adapter (support units only)	
Brand	JG
Model	ZZU1588-150120-2A
Input Power	100-240V~1.5A Max 50-60Hz
Output Power	12V / 1.5A
Power Line	1.5m cable without core attached on adapter

POE (support units only)	
Brand	EnGenius
Model	EPA5006GP
Input Power	100-240VAC~0.8A, 50-60Hz
Output Power	54V / 0.6A PIN 4,5:54V PIN 7,8:RETURN



4. The following antennas were provided to the EUT.

Antenna Type	PIFA					
Antenna Connector	IPEX					
Antenna No.	Gain (dBi)					
	2400MHz	2450MHz	2500MHz	5150MHz	5500MHz	5850MHz
2G1	3.35	3.46	3.41	4.22	4.85	4.75
2G2	3.13	3.40	3.31	4.22	4.52	3.77

Antenna Type	PCB	
Antenna Connector	IPEX	
Antenna No.	Gain (dBi)	
	2.4GHz	5GHz
Scanning	3.40	6.78
BT	5.58	-

5. 2G traffic radio, 5G traffic radio, Scanning radio (5G) and BT technologies can transmit at same time. But 5G traffic radio and Scanning radio (5G) cannot transmit in the same band at same time. 2G traffic radio and Scanning radio (2.4G) cannot transmit at same time.

6. Spurious emission of the simultaneous operation (2G traffic radio, 5G traffic radio, Scanning radio (5G) and BT technologies) has been evaluated and no non-compliance was found.

### 3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20), 802.11n (VHT20), 802.11ax (HE20):

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

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

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

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description	
	RE $\geq$ 1G	RE<1G	PLC	APCM	EUT Model	Power
A	√	√	√	√	EWS357AP v3	Power from adapter
B	-	√	√	-		Power from PoE

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement  
 RE<1G: Radiated Emission below 1GHz  
 PLC: Power Line Conducted Emission  
 APCM: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.
3. "-": Means no effect.

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
CDD Mode							
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	2G traffic radio
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	
	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0	
	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0	
	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	Scanning radio
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5		
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	

#### Radiated Emission Test (Below 1GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
CDD Mode							
A, B	802.11b	1 to 11	6	DSSS	DBPSK	1.0	2G traffic radio
A, B	802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5	Scanning radio

**Power Line Conducted Emission Test:**

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
CDD Mode							
A, B	802.11b	1 to 11	6	DSSS	DBPSK	1.0	2G traffic radio
A, B	802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5	Scanning radio

**Antenna Port Conducted Measurement:**

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
CDD Mode							
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	2G traffic radio
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	
	802.11n (HT20)*	1 to 11	1, 6, 11	OFDM	BPSK	6.5	
	802.11n (HT40)*	3 to 9	3, 6, 9	OFDM	BPSK	13.5	
	802.11ac (VHT20)*	1 to 11	1, 6, 11	OFDM	BPSK	6.5	
	802.11ac (VHT40)*	3 to 9	3, 6, 9	OFDM	BPSK	13.5	
	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0	Scanning radio
	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0	
	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	
*802.11n (HT20), 802.11n (HT40), 802.11ac (VHT20), 802.11ac (VHT40) are for Conducted Power Measurement only.							
Beamforming Mode(Conducted Power Measurement only)							
A	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0	2G traffic radio
	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0	

**Test Condition:**

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	23 deg. C, 67% RH	120Vac, 60Hz	Adair Peng
RE<1G	23 deg. C, 67% RH	120Vac, 60Hz	Titan Hsu, Adair Peng
PLC	23 deg. C, 68% RH	120Vac, 60Hz	Titan Hsu
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Jisyong Wang

### 3.3 Duty Cycle of Test Signal

Duty cycle of test signal is > 98%, duty factor is not required.

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

#### Test Mode A

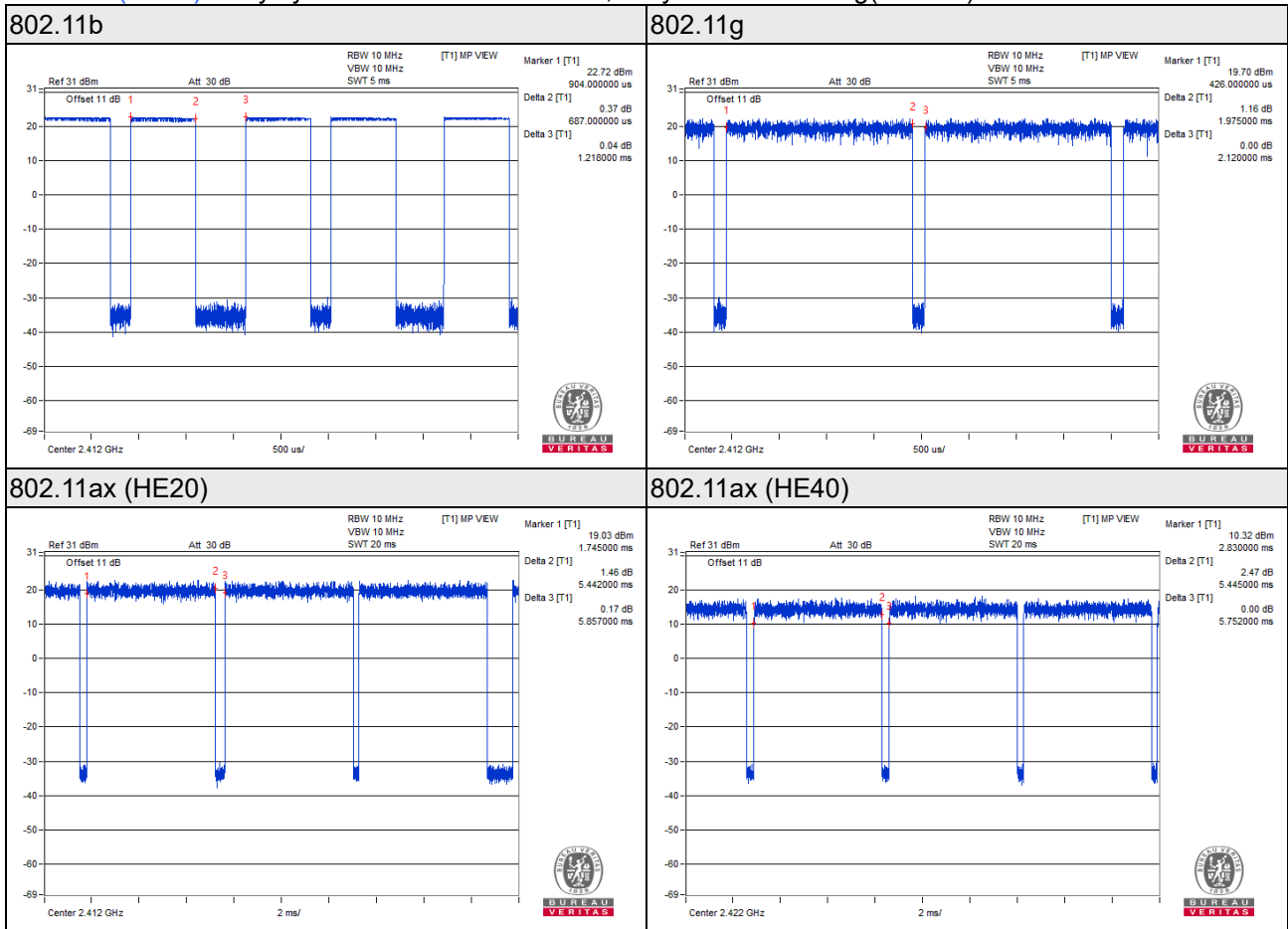
#### 2G traffic radio

802.11b: Duty cycle =  $0.687/1.218 = 0.564$ , Duty factor =  $10 * \log(1/0.564) = 2.49$

802.11g: Duty cycle =  $1.975/2.12 = 0.932$ , Duty factor =  $10 * \log(1/0.932) = 0.31$

802.11ax (HE20): Duty cycle =  $5.442/5.857 = 0.929$ , Duty factor =  $10 * \log(1/0.929) = 0.32$

802.11ax (HE40): Duty cycle =  $5.445/5.752 = 0.947$ , Duty factor =  $10 * \log(1/0.947) = 0.24$



### Scanning radio

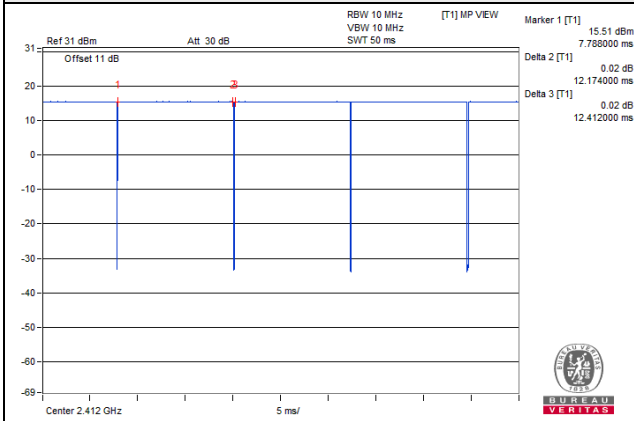
802.11b: Duty cycle =  $12.174/12.412 = 0.981$

802.11g: Duty cycle =  $2.023/2.192 = 0.923$ , Duty factor =  $10 * \log(1/0.923) = 0.35$

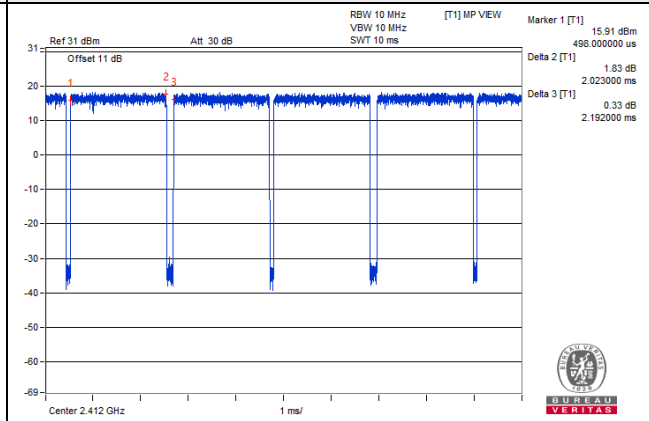
802.11n (HT20): Duty cycle =  $1.886/2.036 = 0.926$ , Duty factor =  $10 * \log(1/0.926) = 0.33$

802.11n (HT40): Duty cycle =  $0.928/1.088 = 0.853$ , Duty factor =  $10 * \log(1/0.853) = 0.69$

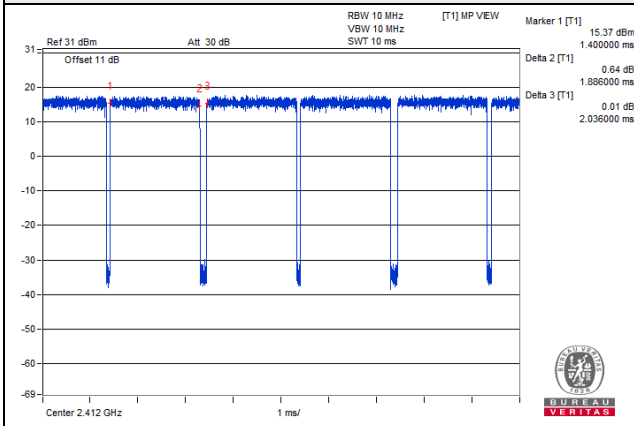
802.11b



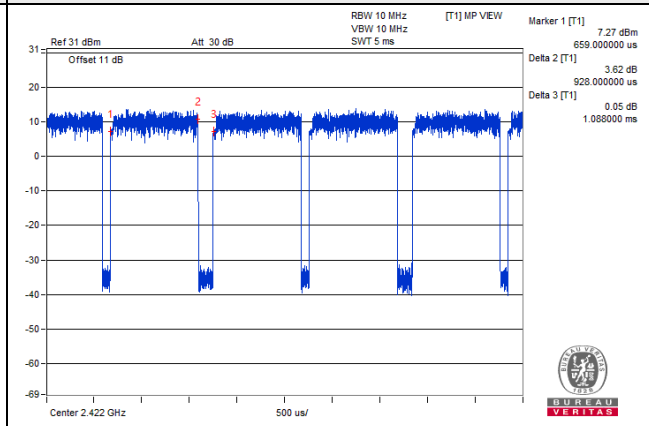
802.11g



802.11n (HT20)



802.11n (HT40)



### 3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-
B.	Adapter	JG	ZZU1588-150120-2A	NA	NA	Provided by client
C.	POE	EnGenius	EPA5006GP	NA	NA	Provided by client

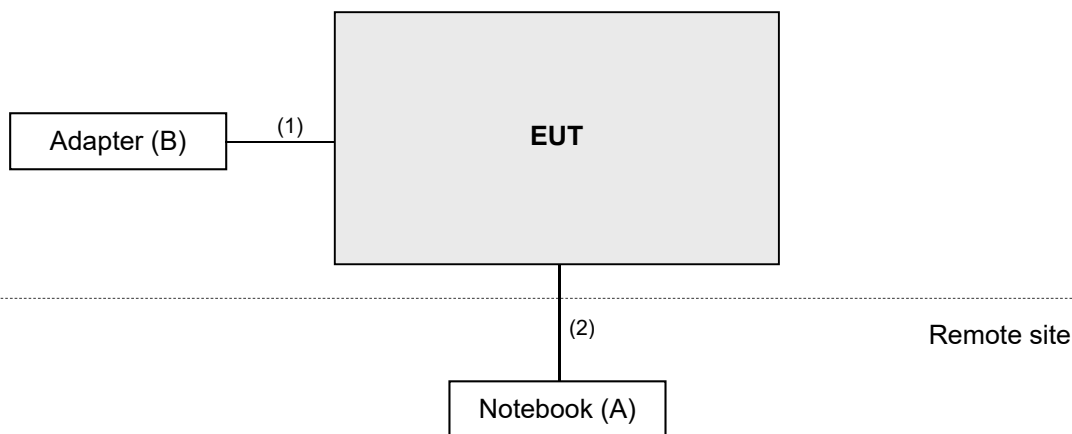
Note:

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

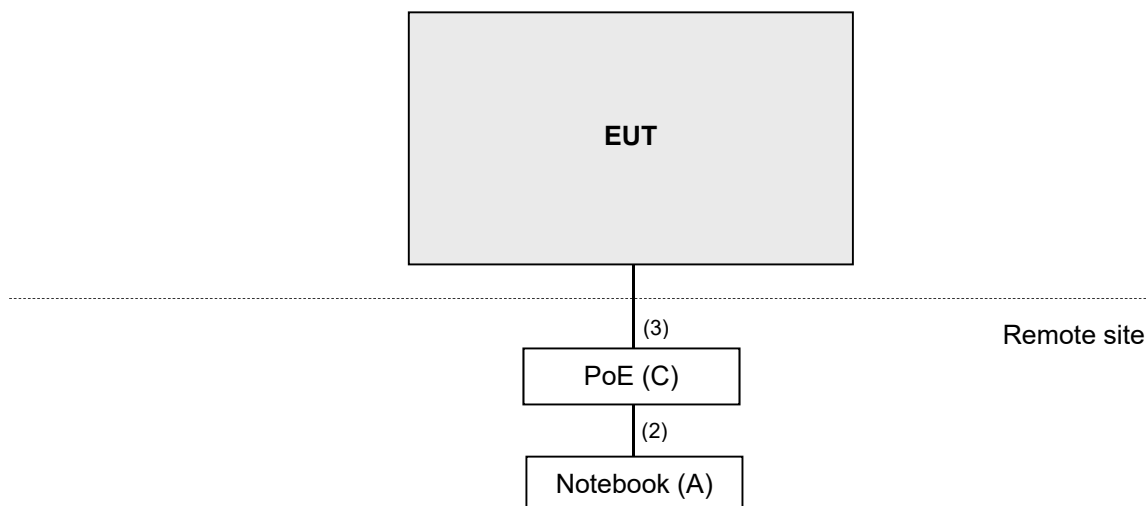
ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Power cable	1	1.5	-	0	Provided by client
2.	LAN	1	7.0	N	0	RJ45, Cat5e
3.	LAN	1	1.5	N	0	RJ45, Cat5e

#### 3.4.1 Configuration of System under Test

Mode A



Mode B



### 3.5 General Description of Applied Standards and References

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

**Test standard:**

**FCC Part 15, Subpart C (15.247)**

ANSI C63.10-2013

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

**References Test Guidance:**

**KDB 558074 D01 15.247 Meas Guidance v05r02**

**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

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 30, 2019	May 29, 2020
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2019	Nov. 10, 2020
HORN Antenna SCHWARZBECK	9120D	209	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 24, 2019	Nov. 23, 2020
Loop Antenna TESEQ	HLA 6121	45745	Jul. 01, 2019	Jun. 30, 2020
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 20, 2019	Aug. 19, 2020
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Mar. 27, 2019	Mar. 26, 2020
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH3-01	Aug. 20, 2019	Aug. 19, 2020
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 20, 2019	Aug. 19, 2020
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM- SM-8000	Cable-CH3-03 (309224+170907)	Aug. 20, 2019	Aug. 19, 2020
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 05, 2019	Sep. 04, 2020
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY5519 0004/MY55190007/MY 55210005	Jul. 15, 2019	Jul. 14, 2020

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The test was performed in HwaYa Chamber 3.

### 4.1.3 Test Procedures

#### For Radiated emission below 30MHz

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

#### Note:

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

#### For Radiated emission above 30MHz

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

#### Note:

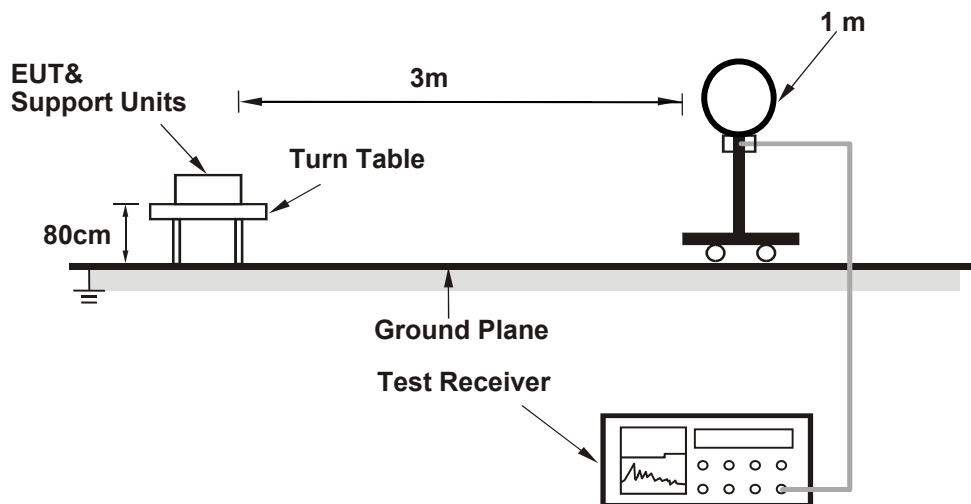
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.  
(2G traffic radio: 802.11b: RBW = 1MHz, VBW = 1kHz; 802.11g: RBW = 1MHz, VBW = 1kHz; 802.11ax (HE20): RBW = 1MHz, VBW = 1kHz; 802.11ax (HE40): RBW = 1MHz, VBW = 1kHz; Scanning radio: 802.11b: RBW = 1MHz, VBW = 10Hz; 802.11g: RBW = 1MHz, VBW = 1kHz; 802.11n (HT20): RBW = 1MHz, VBW = 1kHz; 802.11n (HT40): RBW = 1MHz, VBW = 1kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

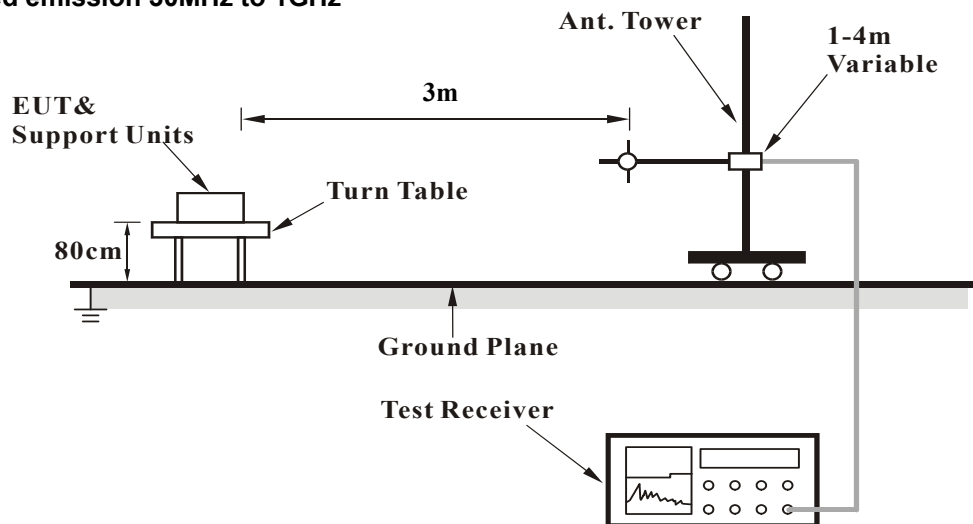
No deviation.

#### 4.1.5 Test Setup

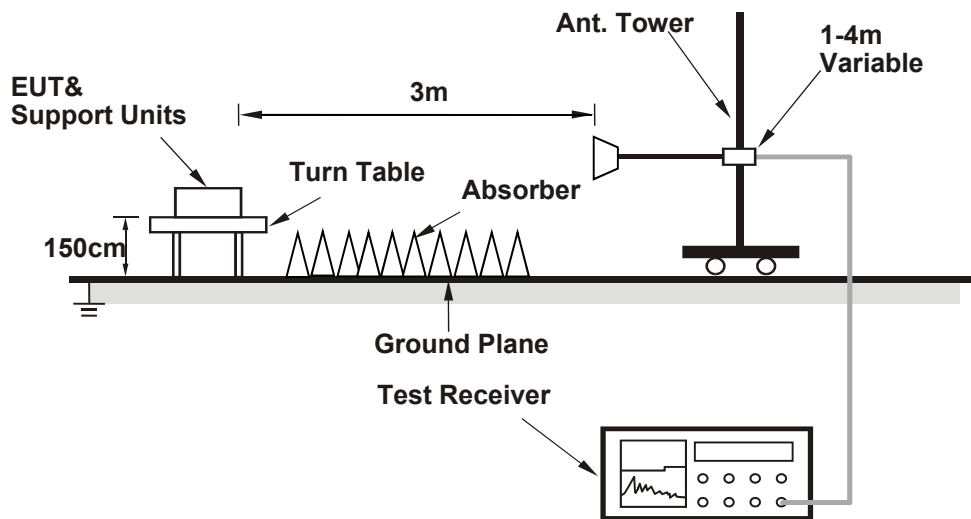
##### For Radiated emission below 30MHz



##### 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

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

#### 4.1.7 Test Results

Above 1GHz worst-Case data:

#### Test Mode A

2G traffic radio: CDD Mode

802.11b

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

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2387.00	61.7 PK	74.0	-12.3	1.55 H	222	29.4	32.3
2	2387.00	52.3 AV	54.0	-1.7	1.55 H	222	20.0	32.3
3	*2412.00	111.4 PK			1.49 H	217	79.1	32.3
4	*2412.00	109.1 AV			1.49 H	217	76.8	32.3
5	4824.00	49.7 PK	74.0	-24.3	1.02 H	310	46.3	3.4
6	4824.00	43.2 AV	54.0	-10.8	1.02 H	310	39.8	3.4

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2387.00	59.7 PK	74.0	-14.3	1.31 V	345	27.4	32.3
2	2387.00	50.9 AV	54.0	-3.1	1.31 V	345	18.6	32.3
3	*2412.00	109.9 PK			1.26 V	338	77.6	32.3
4	*2412.00	107.3 AV			1.26 V	338	75.0	32.3
5	4824.00	52.8 PK	74.0	-21.2	1.72 V	31	49.4	3.4
6	4824.00	49.0 AV	54.0	-5.0	1.72 V	31	45.6	3.4

#### REMARKS:

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

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.5 PK			1.24 H	59	80.2	32.3
2	*2437.00	110.3 AV			1.24 H	59	78.0	32.3
3	4874.00	53.1 PK	74.0	-20.9	1.06 H	313	49.4	3.7
4	4874.00	48.6 AV	54.0	-5.4	1.06 H	313	44.9	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	111.9 PK			1.53 V	38	79.6	32.3
2	*2437.00	109.8 AV			1.53 V	38	77.5	32.3
3	4874.00	55.9 PK	74.0	-18.1	1.59 V	22	52.2	3.7
4	4874.00	52.5 AV	54.0	-1.5	1.59 V	22	48.8	3.7

**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.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.3 PK			1.40 H	213	77.9	32.4
2	*2462.00	107.9 AV			1.40 H	213	75.5	32.4
3	2487.00	62.0 PK	74.0	-12.0	1.39 H	214	29.6	32.4
4	2487.00	52.4 AV	54.0	-1.6	1.39 H	214	20.0	32.4
5	4924.00	51.9 PK	74.0	-22.1	1.07 H	311	48.1	3.8
6	4924.00	47.0 AV	54.0	-7.0	1.07 H	311	43.2	3.8

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.4 PK			1.16 V	340	78.0	32.4
2	*2462.00	108.2 AV			1.16 V	340	75.8	32.4
3	2487.00	61.9 PK	74.0	-12.1	1.50 V	338	29.5	32.4
4	2487.00	52.1 AV	54.0	-1.9	1.50 V	338	19.7	32.4
5	4924.00	55.0 PK	74.0	-19.0	1.62 V	34	51.2	3.8
6	4924.00	51.6 AV	54.0	-2.4	1.62 V	34	47.8	3.8

**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.

802.11g

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.7 PK	74.0	-11.3	1.44 H	112	30.4	32.3
2	2390.00	50.1 AV	54.0	-3.9	1.44 H	112	17.8	32.3
3	*2412.00	110.1 PK			1.94 H	219	77.8	32.3
4	*2412.00	100.0 AV			1.94 H	219	67.7	32.3
5	4824.00	47.4 PK	74.0	-26.6	1.85 H	336	44.0	3.4
6	4824.00	33.3 AV	54.0	-20.7	1.85 H	336	29.9	3.4

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.8 PK	74.0	-8.2	1.34 V	332	33.5	32.3
2	2390.00	52.7 AV	54.0	-1.3	1.34 V	332	20.4	32.3
3	*2412.00	109.5 PK			1.28 V	336	77.2	32.3
4	*2412.00	98.8 AV			1.28 V	336	66.5	32.3
5	4824.00	50.4 PK	74.0	-23.6	1.48 V	25	47.0	3.4
6	4824.00	35.9 AV	54.0	-18.1	1.48 V	25	32.5	3.4

**REMARKS:**

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



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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.8 PK	74.0	-8.2	1.30 H	220	33.5	32.3
2	2390.00	53.0 AV	54.0	-1.0	1.30 H	220	20.7	32.3
3	*2437.00	114.1 PK			1.49 H	214	81.8	32.3
4	*2437.00	103.8 AV			1.49 H	214	71.5	32.3
5	2483.50	64.5 PK	74.0	-9.5	1.51 H	205	32.1	32.4
6	2483.50	50.1 AV	54.0	-3.9	1.51 H	205	17.7	32.4
7	4874.00	53.8 PK	74.0	-20.2	1.75 H	320	50.1	3.7
8	4874.00	39.7 AV	54.0	-14.3	1.75 H	320	36.0	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.0 PK	74.0	-7.0	1.31 V	334	34.7	32.3
2	2390.00	52.3 AV	54.0	-1.7	1.31 V	334	20.0	32.3
3	*2437.00	113.2 PK			1.47 V	337	80.9	32.3
4	*2437.00	103.0 AV			1.47 V	337	70.7	32.3
5	2483.50	66.3 PK	74.0	-7.7	1.28 V	347	33.9	32.4
6	2483.50	51.9 AV	54.0	-2.1	1.28 V	347	19.5	32.4
7	4874.00	57.2 PK	74.0	-16.8	1.95 V	33	53.5	3.7
8	4874.00	42.4 AV	54.0	-11.6	1.95 V	33	38.7	3.7

**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.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.0 PK			1.41 H	211	77.6	32.4
2	*2462.00	99.4 AV			1.41 H	211	67.0	32.4
3	2483.50	66.4 PK	74.0	-7.6	1.37 H	207	34.0	32.4
4	2483.50	52.7 AV	54.0	-1.3	1.37 H	207	20.3	32.4
5	4924.00	50.7 PK	74.0	-23.3	1.69 H	312	46.9	3.8
6	4924.00	36.0 AV	54.0	-18.0	1.69 H	312	32.2	3.8

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.0 PK			1.11 V	345	76.6	32.4
2	*2462.00	98.7 AV			1.11 V	345	66.3	32.4
3	2483.50	65.5 PK	74.0	-8.5	1.53 V	343	33.1	32.4
4	2483.50	52.2 AV	54.0	-1.8	1.53 V	343	19.8	32.4
5	4924.00	53.6 PK	74.0	-20.4	1.51 V	23	49.8	3.8
6	4924.00	39.1 AV	54.0	-14.9	1.51 V	23	35.3	3.8

**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.

802.11ax (HE20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.8 PK	74.0	-9.2	1.35 H	51	32.5	32.3
2	2390.00	52.7 AV	54.0	-1.3	1.35 H	51	20.4	32.3
3	*2412.00	112.5 PK			1.50 H	214	80.2	32.3
4	*2412.00	98.7 AV			1.50 H	214	66.4	32.3
5	4824.00	46.0 PK	74.0	-28.0	1.70 H	333	42.6	3.4
6	4824.00	32.9 AV	54.0	-21.1	1.70 H	333	29.5	3.4

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.3 PK	74.0	-9.7	1.38 V	331	32.0	32.3
2	2390.00	51.9 AV	54.0	-2.1	1.38 V	331	19.6	32.3
3	*2412.00	112.0 PK			1.28 V	335	79.7	32.3
4	*2412.00	97.7 AV			1.28 V	335	65.4	32.3
5	4824.00	49.0 PK	74.0	-25.0	1.44 V	345	45.6	3.4
6	4824.00	38.4 AV	54.0	-15.6	1.44 V	345	35.0	3.4

REMARKS:

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

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.2 PK	74.0	-6.8	1.53 H	220	34.9	32.3
2	2390.00	52.3 AV	54.0	-1.7	1.53 H	220	20.0	32.3
3	*2437.00	116.1 PK			1.45 H	212	83.8	32.3
4	*2437.00	102.3 AV			1.45 H	212	70.0	32.3
5	2483.50	66.7 PK	74.0	-7.3	1.23 H	206	34.3	32.4
6	2483.50	51.3 AV	54.0	-2.7	1.23 H	206	18.9	32.4
7	4874.00	53.2 PK	74.0	-20.8	1.29 H	312	49.5	3.7
8	4874.00	37.4 AV	54.0	-16.6	1.29 H	312	33.7	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.6 PK	74.0	-7.4	1.52 V	333	34.3	32.3
2	2390.00	51.5 AV	54.0	-2.5	1.52 V	333	19.2	32.3
3	*2437.00	114.5 PK			1.48 V	337	82.2	32.3
4	*2437.00	101.2 AV			1.48 V	337	68.9	32.3
5	2483.50	66.5 PK	74.0	-7.5	1.39 V	340	34.1	32.4
6	2483.50	50.4 AV	54.0	-3.6	1.39 V	340	18.0	32.4
7	4874.00	57.0 PK	74.0	-17.0	1.44 V	34	53.3	3.7
8	4874.00	40.3 AV	54.0	-13.7	1.44 V	34	36.6	3.7

**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.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.6 PK			1.41 H	210	78.2	32.4
2	*2462.00	97.4 AV			1.41 H	210	65.0	32.4
3	2483.50	66.9 PK	74.0	-7.1	1.41 H	212	34.5	32.4
4	2483.50	52.7 AV	54.0	-1.3	1.41 H	212	20.3	32.4
5	4924.00	48.1 PK	74.0	-25.9	1.23 H	306	44.3	3.8
6	4924.00	34.6 AV	54.0	-19.4	1.23 H	306	30.8	3.8

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.8 PK			1.47 V	33	77.4	32.4
2	*2462.00	95.9 AV			1.47 V	33	63.5	32.4
3	2483.50	64.2 PK	74.0	-9.8	1.26 V	353	31.8	32.4
4	2483.50	51.8 AV	54.0	-2.2	1.26 V	353	19.4	32.4
5	4924.00	51.7 PK	74.0	-22.3	1.55 V	20	47.9	3.8
6	4924.00	36.1 AV	54.0	-17.9	1.55 V	20	32.3	3.8

**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.

802.11ax (HE40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.3 PK	74.0	-8.7	1.22 H	50	33.0	32.3
2	2390.00	52.3 AV	54.0	-1.7	1.22 H	50	20.0	32.3
3	*2422.00	105.6 PK			1.22 H	57	73.3	32.3
4	*2422.00	93.3 AV			1.22 H	57	61.0	32.3
5	4844.00	46.3 PK	74.0	-27.7	1.63 H	323	42.8	3.5
6	4844.00	32.8 AV	54.0	-21.2	1.63 H	323	29.3	3.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.5 PK	74.0	-7.5	1.10 V	335	34.2	32.3
2	2390.00	53.0 AV	54.0	-1.0	1.10 V	335	20.7	32.3
3	*2422.00	105.3 PK			1.27 V	339	73.0	32.3
4	*2422.00	92.5 AV			1.27 V	339	60.2	32.3
5	4844.00	49.5 PK	74.0	-24.5	1.88 V	26	46.0	3.5
6	4844.00	35.8 AV	54.0	-18.2	1.88 V	26	32.3	3.5

REMARKS:

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

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.8 PK	74.0	-8.2	1.33 H	215	33.5	32.3
2	2390.00	52.3 AV	54.0	-1.7	1.33 H	215	20.0	32.3
3	*2437.00	108.5 PK			1.47 H	211	76.2	32.3
4	*2437.00	96.1 AV			1.47 H	211	63.8	32.3
5	2483.50	63.6 PK	74.0	-10.4	1.40 H	213	31.2	32.4
6	2483.50	49.9 AV	54.0	-4.1	1.40 H	213	17.5	32.4
7	4874.00	48.2 PK	74.0	-25.8	1.78 H	329	44.5	3.7
8	4874.00	33.7 AV	54.0	-20.3	1.78 H	329	30.0	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.6 PK	74.0	-8.4	1.28 V	349	33.3	32.3
2	2390.00	51.4 AV	54.0	-2.6	1.28 V	349	19.1	32.3
3	*2437.00	108.5 PK			1.20 V	336	76.2	32.3
4	*2437.00	95.3 AV			1.20 V	336	63.0	32.3
5	2483.50	63.4 PK	74.0	-10.6	1.31 V	350	31.0	32.4
6	2483.50	49.7 AV	54.0	-4.3	1.31 V	350	17.3	32.4
7	4874.00	51.3 PK	74.0	-22.7	1.91 V	35	47.6	3.7
8	4874.00	36.9 AV	54.0	-17.1	1.91 V	35	33.2	3.7

**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.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	106.7 PK			1.46 H	215	74.3	32.4
2	*2452.00	93.4 AV			1.46 H	215	61.0	32.4
3	2483.50	64.7 PK	74.0	-9.3	1.42 H	214	32.3	32.4
4	2483.50	52.4 AV	54.0	-1.6	1.42 H	214	20.0	32.4
5	4904.00	47.4 PK	74.0	-26.6	1.57 H	321	43.7	3.7
6	4904.00	33.6 AV	54.0	-20.4	1.57 H	321	29.9	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	105.2 PK			1.21 V	337	72.8	32.4
2	*2452.00	92.3 AV			1.21 V	337	59.9	32.4
3	2483.50	65.4 PK	74.0	-8.6	1.28 V	351	33.0	32.4
4	2483.50	52.0 AV	54.0	-2.0	1.28 V	351	19.6	32.4
5	4904.00	50.5 PK	74.0	-23.5	1.44 V	30	46.8	3.7
6	4904.00	35.7 AV	54.0	-18.3	1.44 V	30	32.0	3.7

**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.



**Test Mode A**

**Scanning radio: CDD Mode**

802.11b

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.3 PK	74.0	-14.7	1.05 H	357	27.0	32.3
2	2390.00	48.1 AV	54.0	-5.9	1.05 H	357	15.8	32.3
3	*2412.00	103.2 PK			1.00 H	1	70.9	32.3
4	*2412.00	99.6 AV			1.00 H	1	67.3	32.3
5	4824.00	52.9 PK	74.0	-21.1	2.98 H	347	49.5	3.4
6	4824.00	48.9 AV	54.0	-5.1	2.98 H	347	45.5	3.4

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.1 PK	74.0	-14.9	2.55 V	19	26.8	32.3
2	2390.00	46.7 AV	54.0	-7.3	2.55 V	19	14.4	32.3
3	*2412.00	94.2 PK			2.65 V	13	61.9	32.3
4	*2412.00	90.8 AV			2.65 V	13	58.5	32.3
5	4824.00	56.0 PK	74.0	-18.0	1.78 V	16	52.6	3.4
6	4824.00	52.7 AV	54.0	-1.3	1.78 V	16	49.3	3.4

**REMARKS:**

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

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.9 PK			1.06 H	5	72.6	32.3
2	*2437.00	101.3 AV			1.06 H	5	69.0	32.3
3	4874.00	53.1 PK	74.0	-20.9	3.21 H	331	49.4	3.7
4	4874.00	48.8 AV	54.0	-5.2	3.21 H	331	45.1	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	95.5 PK			2.41 V	21	63.2	32.3
2	*2437.00	91.8 AV			2.41 V	21	59.5	32.3
3	4874.00	55.5 PK	74.0	-18.5	1.98 V	19	51.8	3.7
4	4874.00	52.3 AV	54.0	-1.7	1.98 V	19	48.6	3.7

**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.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.7 PK			1.34 H	7	72.3	32.4
2	*2462.00	101.0 AV			1.34 H	7	68.6	32.4
3	2483.50	59.6 PK	74.0	-14.4	1.29 H	1	27.2	32.4
4	2483.50	47.5 AV	54.0	-6.5	1.29 H	1	15.1	32.4
5	4924.00	50.5 PK	74.0	-23.5	1.87 H	318	46.7	3.8
6	4924.00	44.5 AV	54.0	-9.5	1.87 H	318	40.7	3.8

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	98.2 PK			1.43 V	324	65.8	32.4
2	*2462.00	94.7 AV			1.43 V	324	62.3	32.4
3	2483.50	60.0 PK	74.0	-14.0	1.51 V	330	27.6	32.4
4	2483.50	47.0 AV	54.0	-7.0	1.51 V	330	14.6	32.4
5	4924.00	56.3 PK	74.0	-17.7	2.56 V	323	52.5	3.8
6	4924.00	52.9 AV	54.0	-1.1	2.56 V	323	49.1	3.8

**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.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.3 PK	74.0	-6.7	1.00 H	0	35.0	32.3
2	2390.00	52.3 AV	54.0	-1.7	1.00 H	0	20.0	32.3
3	*2412.00	108.1 PK			1.00 H	2	75.8	32.3
4	*2412.00	97.3 AV			1.00 H	2	65.0	32.3
5	4824.00	52.9 PK	74.0	-21.1	1.01 H	331	49.5	3.4
6	4824.00	38.7 AV	54.0	-15.3	1.01 H	331	35.3	3.4

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.3 PK	74.0	-14.7	1.65 V	280	27.0	32.3
2	2390.00	47.0 AV	54.0	-7.0	1.65 V	280	14.7	32.3
3	*2412.00	94.7 PK			1.63 V	267	62.4	32.3
4	*2412.00	85.2 AV			1.63 V	267	52.9	32.3
5	4824.00	61.4 PK	74.0	-12.6	1.66 V	18	58.0	3.4
6	4824.00	47.2 AV	54.0	-6.8	1.66 V	18	43.8	3.4

REMARKS:

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

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.9 PK	74.0	-11.1	1.05 H	358	30.6	32.3
2	2390.00	51.3 AV	54.0	-2.7	1.05 H	358	19.0	32.3
3	*2437.00	113.8 PK			1.02 H	1	81.5	32.3
4	*2437.00	103.5 AV			1.02 H	1	71.2	32.3
5	2483.50	65.6 PK	74.0	-8.4	1.02 H	8	33.2	32.4
6	2483.50	53.0 AV	54.0	-1.0	1.02 H	8	20.6	32.4
7	4874.00	52.1 PK	74.0	-21.9	1.08 H	336	48.4	3.7
8	4874.00	38.0 AV	54.0	-16.0	1.08 H	336	34.3	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.3 PK	74.0	-15.7	1.53 V	299	26.0	32.3
2	2390.00	46.4 AV	54.0	-7.6	1.53 V	299	14.1	32.3
3	*2437.00	100.3 PK			1.60 V	281	68.0	32.3
4	*2437.00	91.3 AV			1.60 V	281	59.0	32.3
5	2483.50	58.7 PK	74.0	-15.3	1.63 V	286	26.3	32.4
6	2483.50	47.7 AV	54.0	-6.3	1.63 V	286	15.3	32.4
7	4874.00	58.4 PK	74.0	-15.6	1.72 V	19	54.7	3.7
8	4874.00	46.2 AV	54.0	-7.8	1.72 V	19	42.5	3.7

**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.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.8 PK			1.14 H	356	75.4	32.4
2	*2462.00	97.7 AV			1.14 H	356	65.3	32.4
3	2483.50	68.4 PK	74.0	-5.6	1.15 H	1	36.0	32.4
4	2483.50	52.3 AV	54.0	-1.7	1.15 H	1	19.9	32.4
5	4924.00	52.3 PK	74.0	-21.7	1.01 H	311	48.5	3.8
6	4924.00	37.8 AV	54.0	-16.2	1.01 H	311	34.0	3.8

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	94.6 PK			1.61 V	301	62.2	32.4
2	*2462.00	85.8 AV			1.61 V	301	53.4	32.4
3	2483.50	60.6 PK	74.0	-13.4	1.57 V	283	28.2	32.4
4	2483.50	47.1 AV	54.0	-6.9	1.57 V	283	14.7	32.4
5	4924.00	60.9 PK	74.0	-13.1	1.69 V	13	57.1	3.8
6	4924.00	46.4 AV	54.0	-7.6	1.69 V	13	42.6	3.8

**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.

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.3 PK	74.0	-8.7	1.03 H	357	33.0	32.3
2	2390.00	52.3 AV	54.0	-1.7	1.03 H	357	20.0	32.3
3	*2412.00	107.1 PK			1.05 H	1	74.8	32.3
4	*2412.00	96.3 AV			1.05 H	1	64.0	32.3
5	4824.00	52.7 PK	74.0	-21.3	1.04 H	319	49.3	3.4
6	4824.00	38.2 AV	54.0	-15.8	1.04 H	319	34.8	3.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.1 PK	74.0	-15.9	1.45 V	302	25.8	32.3
2	2390.00	47.0 AV	54.0	-7.0	1.45 V	302	14.7	32.3
3	*2412.00	93.7 PK			1.59 V	293	61.4	32.3
4	*2412.00	84.3 AV			1.59 V	293	52.0	32.3
5	4824.00	60.6 PK	74.0	-13.4	1.61 V	15	57.2	3.4
6	4824.00	46.8 AV	54.0	-7.2	1.61 V	15	43.4	3.4

REMARKS:

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

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.8 PK	74.0	-11.2	1.00 H	354	30.5	32.3
2	2390.00	51.3 AV	54.0	-2.7	1.00 H	354	19.0	32.3
3	*2437.00	113.6 PK			1.17 H	359	81.3	32.3
4	*2437.00	103.5 AV			1.17 H	359	71.2	32.3
5	2483.50	64.9 PK	74.0	-9.1	1.01 H	6	32.5	32.4
6	2483.50	52.7 AV	54.0	-1.3	1.01 H	6	20.3	32.4
7	4874.00	51.4 PK	74.0	-22.6	1.09 H	337	47.7	3.7
8	4874.00	37.9 AV	54.0	-16.1	1.09 H	337	34.2	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.8 PK	74.0	-16.2	1.49 V	303	25.5	32.3
2	2390.00	46.7 AV	54.0	-7.3	1.49 V	303	14.4	32.3
3	*2437.00	100.0 PK			1.56 V	301	67.7	32.3
4	*2437.00	90.2 AV			1.56 V	301	57.9	32.3
5	2483.50	58.5 PK	74.0	-15.5	1.55 V	293	26.1	32.4
6	2483.50	47.5 AV	54.0	-6.5	1.55 V	293	15.1	32.4
7	4874.00	60.1 PK	74.0	-13.9	1.66 V	16	56.4	3.7
8	4874.00	46.5 AV	54.0	-7.5	1.66 V	16	42.8	3.7

**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.



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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.0 PK			1.16 H	4	74.6	32.4
2	*2462.00	96.8 AV			1.16 H	4	64.4	32.4
3	2483.50	67.1 PK	74.0	-6.9	1.03 H	8	34.7	32.4
4	2483.50	52.4 AV	54.0	-1.6	1.03 H	8	20.0	32.4
5	4924.00	51.7 PK	74.0	-22.3	1.03 H	314	47.9	3.8
6	4924.00	37.1 AV	54.0	-16.9	1.03 H	314	33.3	3.8

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	94.0 PK			1.59 V	289	61.6	32.4
2	*2462.00	83.9 AV			1.59 V	289	51.5	32.4
3	2483.50	59.1 PK	74.0	-14.9	1.65 V	299	26.7	32.4
4	2483.50	47.2 AV	54.0	-6.8	1.65 V	299	14.8	32.4
5	4924.00	60.3 PK	74.0	-13.7	1.72 V	20	56.5	3.8
6	4924.00	45.8 AV	54.0	-8.2	1.72 V	20	42.0	3.8

**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.

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.4 PK	74.0	-9.6	1.04 H	356	32.1	32.3
2	2390.00	52.7 AV	54.0	-1.3	1.04 H	356	20.4	32.3
3	*2422.00	103.8 PK			1.25 H	1	71.5	32.3
4	*2422.00	93.7 AV			1.25 H	1	61.4	32.3
5	4844.00	46.5 PK	74.0	-27.5	1.07 H	316	43.0	3.5
6	4844.00	34.5 AV	54.0	-19.5	1.07 H	316	31.0	3.5

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.4 PK	74.0	-15.6	1.63 V	293	26.1	32.3
2	2390.00	47.2 AV	54.0	-6.8	1.63 V	293	14.9	32.3
3	*2422.00	90.9 PK			1.57 V	309	58.6	32.3
4	*2422.00	80.8 AV			1.57 V	309	48.5	32.3
5	4844.00	55.1 PK	74.0	-18.9	1.59 V	12	51.6	3.5
6	4844.00	43.1 AV	54.0	-10.9	1.59 V	12	39.6	3.5

REMARKS:

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

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.3 PK	74.0	-9.7	1.05 H	355	32.0	32.3
2	2390.00	52.2 AV	54.0	-1.8	1.05 H	355	19.9	32.3
3	*2437.00	108.6 PK			1.02 H	358	76.3	32.3
4	*2437.00	98.6 AV			1.02 H	358	66.3	32.3
5	2483.50	66.4 PK	74.0	-7.6	1.03 H	6	34.0	32.4
6	2483.50	52.5 AV	54.0	-1.5	1.03 H	6	20.1	32.4
7	4874.00	53.5 PK	74.0	-20.5	1.05 H	338	49.8	3.7
8	4874.00	39.9 AV	54.0	-14.1	1.05 H	338	36.2	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.8 PK	74.0	-16.2	1.58 V	293	25.5	32.3
2	2390.00	46.8 AV	54.0	-7.2	1.58 V	293	14.5	32.3
3	*2437.00	95.7 PK			1.66 V	313	63.4	32.3
4	*2437.00	85.8 AV			1.66 V	313	53.5	32.3
5	2483.50	58.4 PK	74.0	-15.6	1.61 V	311	26.0	32.4
6	2483.50	47.5 AV	54.0	-6.5	1.61 V	311	15.1	32.4
7	4874.00	62.0 PK	74.0	-12.0	1.69 V	15	58.3	3.7
8	4874.00	48.5 AV	54.0	-5.5	1.69 V	15	44.8	3.7

**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.

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

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	103.6 PK			1.05 H	0	71.2	32.4
2	*2452.00	93.4 AV			1.05 H	0	61.0	32.4
3	2483.50	65.9 PK	74.0	-8.1	1.06 H	6	33.5	32.4
4	2483.50	52.9 AV	54.0	-1.1	1.06 H	6	20.5	32.4
5	4904.00	47.0 PK	74.0	-27.0	1.11 H	313	43.3	3.7
6	4904.00	34.0 AV	54.0	-20.0	1.11 H	313	30.3	3.7

**ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	90.9 PK			1.57 V	319	58.5	32.4
2	*2452.00	80.6 AV			1.57 V	319	48.2	32.4
3	2483.50	58.6 PK	74.0	-15.4	1.63 V	311	26.2	32.4
4	2483.50	47.6 AV	54.0	-6.4	1.63 V	311	15.2	32.4
5	4904.00	55.7 PK	74.0	-18.3	1.70 V	12	52.0	3.7
6	4904.00	42.5 AV	54.0	-11.5	1.70 V	12	38.8	3.7

**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.

Below 1GHz worst-case data:

**Test Mode A**

**2G traffic radio: CDD Mode**

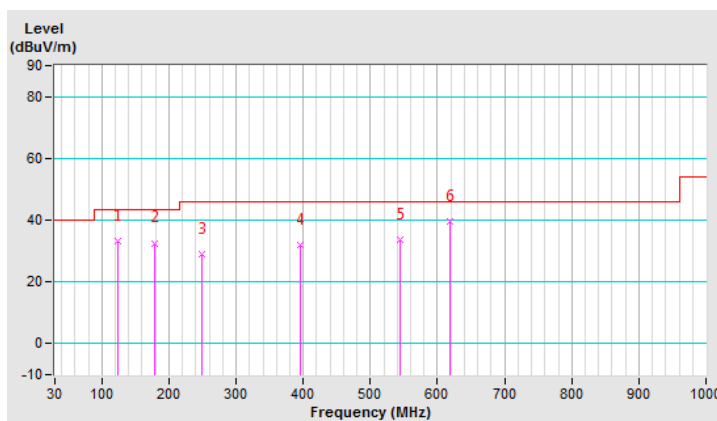
802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	124.19	33.3 QP	43.5	-10.2	1.49 H	56	43.9	-10.6
2	179.01	32.6 QP	43.5	-10.9	1.99 H	251	42.4	-9.8
3	249.30	28.9 QP	46.0	-17.1	1.00 H	82	38.4	-9.5
4	395.51	31.8 QP	46.0	-14.2	1.99 H	40	36.4	-4.6
5	544.52	33.6 QP	46.0	-12.4	1.49 H	16	34.2	-0.6
6	619.03	39.5 QP	46.0	-6.5	1.49 H	16	38.2	1.3

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.

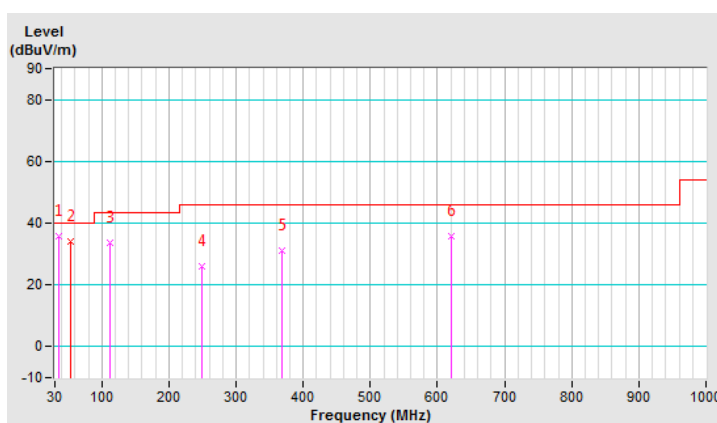


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	35.62	35.9 QP	40.0	-4.1	1.00 V	179	46.0	-10.1
2	53.83	33.9 QP	40.0	-6.1	1.49 V	3	42.8	-8.9
3	111.54	33.6 QP	43.5	-9.9	1.00 V	56	45.4	-11.8
4	249.30	26.1 QP	46.0	-19.9	1.49 V	107	35.6	-9.5
5	367.39	31.2 QP	46.0	-14.8	1.49 V	163	36.6	-5.4
6	620.43	35.6 QP	46.0	-10.4	1.00 V	137	34.3	1.3

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.



**Test Mode A**

**Scanning radio: CDD Mode**

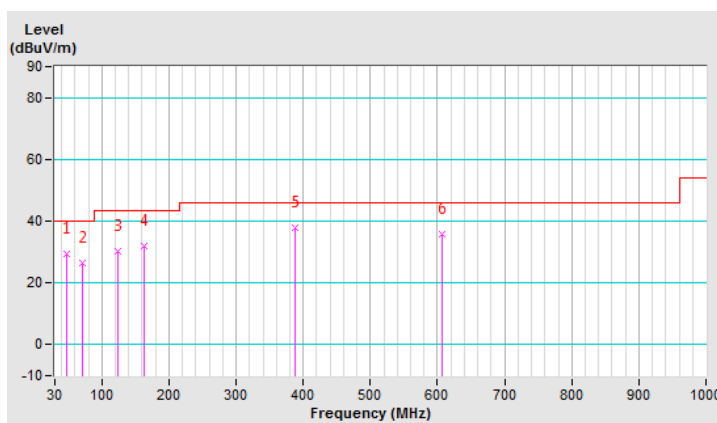
802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	48.28	29.4 QP	40.0	-10.6	1.51 H	237	38.1	-8.7
2	70.77	26.6 QP	40.0	-13.4	1.51 H	232	37.5	-10.9
3	124.19	30.3 QP	43.5	-13.2	1.51 H	68	40.9	-10.6
4	162.14	32.0 QP	43.5	-11.5	1.51 H	88	40.6	-8.6
5	388.48	37.9 QP	46.0	-8.1	2.00 H	62	42.7	-4.8
6	606.38	35.8 QP	46.0	-10.2	1.51 H	37	34.7	1.1

**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 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.

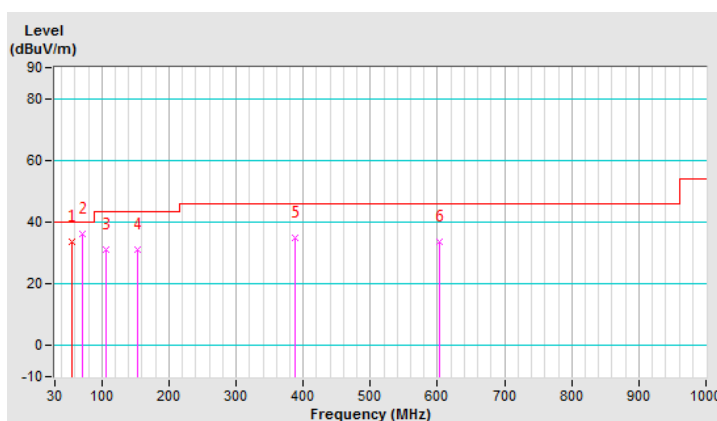


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	54.96	33.7 QP	40.0	-6.3	1.00 V	354	42.6	-8.9
2	70.77	36.0 QP	40.0	-4.0	1.00 V	280	46.9	-10.9
3	105.91	31.3 QP	43.5	-12.2	1.00 V	97	43.6	-12.3
4	153.71	31.0 QP	43.5	-12.5	1.00 V	289	39.6	-8.6
5	387.07	34.9 QP	46.0	-11.1	2.00 V	290	39.8	-4.9
6	603.57	33.8 QP	46.0	-12.2	1.00 V	227	32.7	1.1

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 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.





**Test Mode B**

**2G traffic radio: CDD Mode**

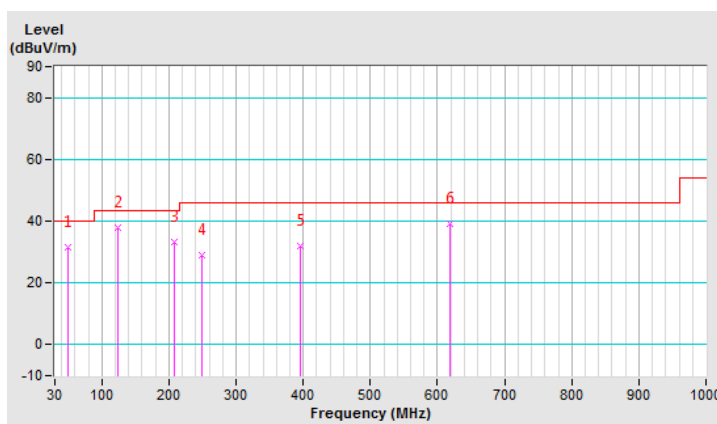
802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.68	31.4 QP	40.0	-8.6	2.00 H	37	40.2	-8.8
2	124.19	37.7 QP	43.5	-5.8	1.49 H	249	48.3	-10.6
3	207.13	33.3 QP	43.5	-10.2	1.00 H	91	44.9	-11.6
4	249.30	28.8 QP	46.0	-17.2	1.00 H	70	38.3	-9.5
5	395.51	32.0 QP	46.0	-14.0	1.00 H	44	36.6	-4.6
6	619.03	39.3 QP	46.0	-6.7	1.49 H	358	38.0	1.3

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.

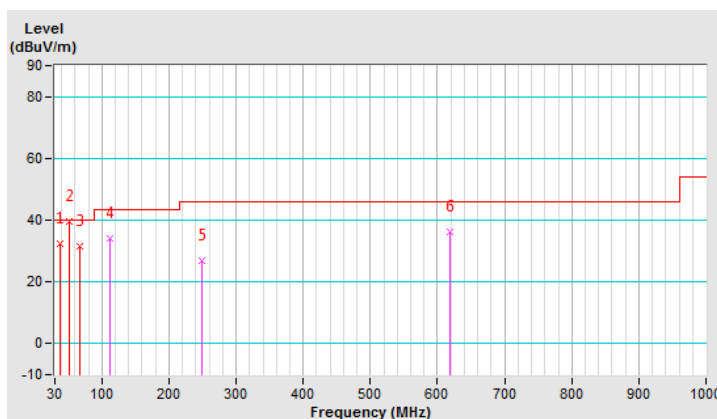


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	38.12	32.5 QP	40.0	-7.5	1.00 V	87	42.2	-9.7
2	<b>50.78</b>	<b>39.5 QP</b>	<b>40.0</b>	<b>-0.5</b>	<b>1.00 V</b>	<b>4</b>	<b>48.2</b>	<b>-8.7</b>
3	66.21	31.4 QP	40.0	-8.6	1.00 V	322	41.4	-10.0
4	111.54	33.9 QP	43.5	-9.6	1.01 V	119	45.7	-11.8
5	249.30	26.8 QP	46.0	-19.2	1.51 V	190	36.3	-9.5
6	619.03	36.2 QP	46.0	-9.8	1.01 V	201	34.9	1.3

**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.



**Test Mode B**

**Scanning radio: CDD Mode**

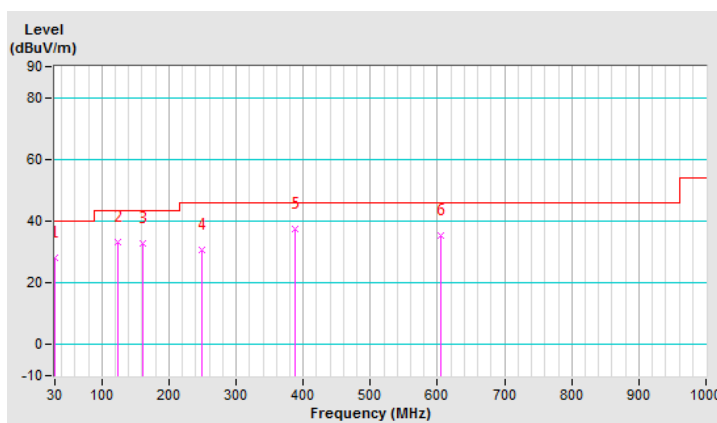
802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	28.2 QP	40.0	-11.8	1.01 H	96	38.6	-10.4
2	124.19	33.3 QP	43.5	-10.2	1.50 H	240	43.9	-10.6
3	160.74	32.9 QP	43.5	-10.6	1.50 H	94	41.5	-8.6
4	249.30	30.7 QP	46.0	-15.3	1.01 H	250	40.2	-9.5
5	388.48	37.3 QP	46.0	-8.7	1.01 H	31	42.1	-4.8
6	604.97	35.5 QP	46.0	-10.5	1.01 H	15	34.4	1.1

**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 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.

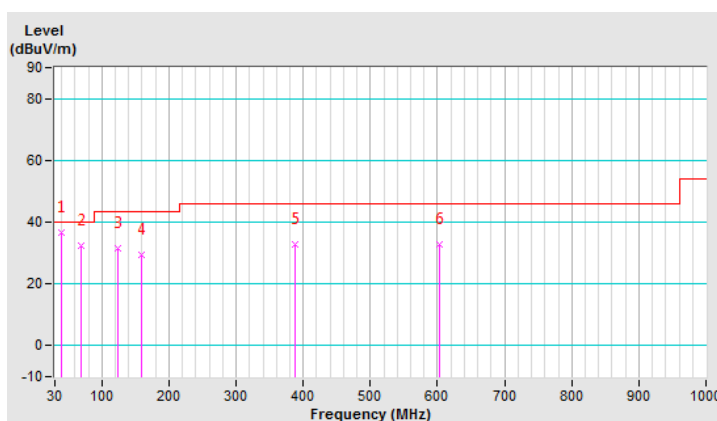


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.84	36.4 QP	40.0	-3.6	1.49 V	12	45.9	-9.5
2	69.36	32.3 QP	40.0	-7.7	1.49 V	343	43.1	-10.8
3	124.19	31.7 QP	43.5	-11.8	1.00 V	181	42.3	-10.6
4	159.33	29.3 QP	43.5	-14.2	1.00 V	304	37.8	-8.5
5	388.48	32.9 QP	46.0	-13.1	1.49 V	202	37.7	-4.8
6	602.16	32.7 QP	46.0	-13.3	1.00 V	220	31.6	1.1

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 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

Test Date: Feb. 7, 2020

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 11, 2019	Dec. 10, 2020
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2019	Sep. 04, 2020
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 22, 2019	Aug. 21, 2020
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

- Note:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The test was performed in HwaYa Shielded Room 1.  
 3. The VCCI Site Registration No. is C-12040.

### 4.2.3 Test Procedures

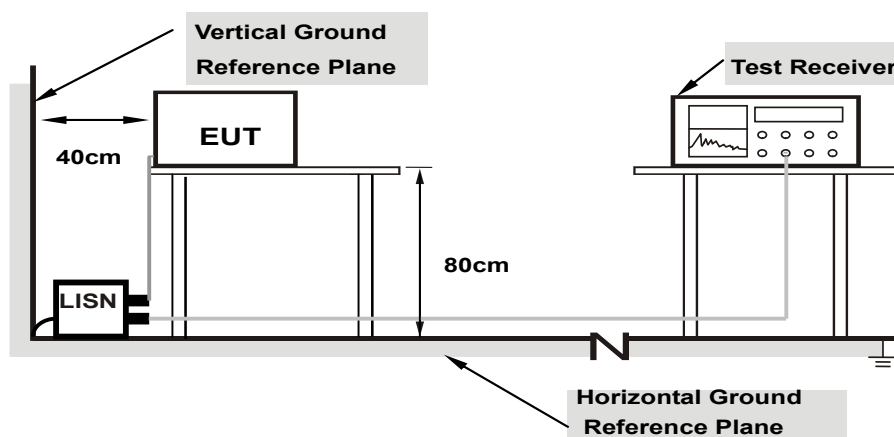
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

### 4.2.4 Deviation from Test Standard

No deviation.

### 4.2.5 Test Setup



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

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

### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

#### 4.2.7 Test Results

Worst-case data:

**Test Mode A**

**2G traffic radio: CDD Mode**

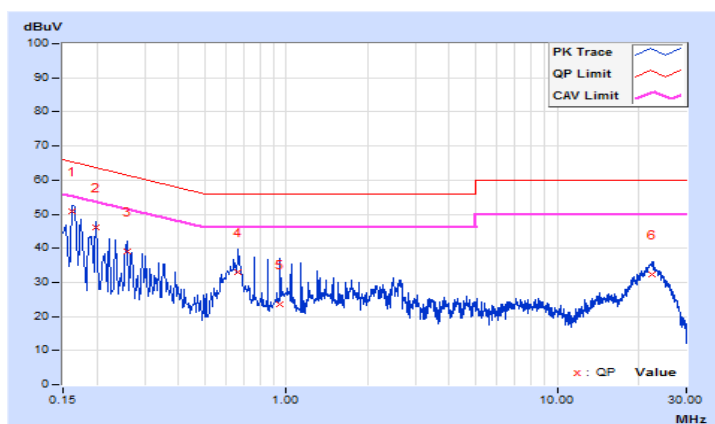
802.11b

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16200	9.72	41.28	27.67	51.00	37.39	65.36	55.36	-14.36	-17.97
2	0.19800	9.78	36.23	22.35	46.01	32.13	63.69	53.69	-17.68	-21.56
3	0.25800	9.81	29.24	15.28	39.05	25.09	61.50	51.50	-22.45	-26.41
4	0.66600	9.95	22.89	16.16	32.84	26.11	56.00	46.00	-23.16	-19.89
5	0.95000	10.01	13.53	8.10	23.54	18.11	56.00	46.00	-32.46	-27.89
6	22.37400	10.43	21.84	16.13	32.27	26.56	60.00	50.00	-27.73	-23.44

Remarks:

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

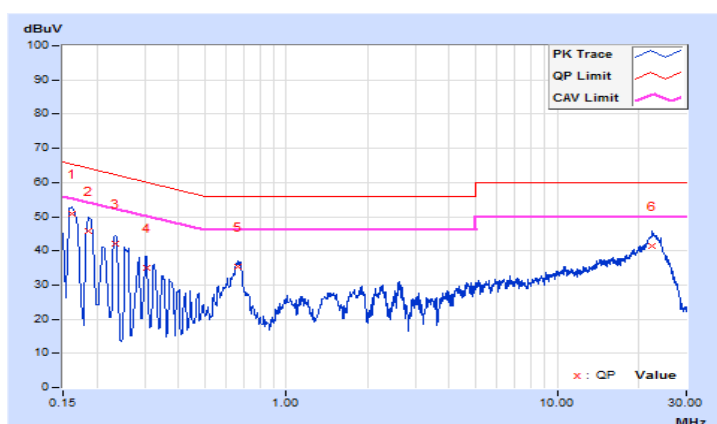


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16105	9.71	41.27	26.29	50.98	36.00	65.41	55.41	-14.43	-19.41
2	0.18600	9.77	35.95	16.10	45.72	25.87	64.21	54.21	-18.49	-28.34
3	0.23289	9.81	32.24	15.01	42.05	24.82	62.35	52.35	-20.30	-27.53
4	0.30389	9.83	25.17	14.78	35.00	24.61	60.14	50.14	-25.14	-25.53
5	0.66200	9.90	25.38	18.61	35.28	28.51	56.00	46.00	-20.72	-17.49
6	22.41800	10.50	31.03	25.18	41.53	35.68	60.00	50.00	-18.47	-14.32

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.





**Test Mode A**

**Scanning radio: CDD Mode**

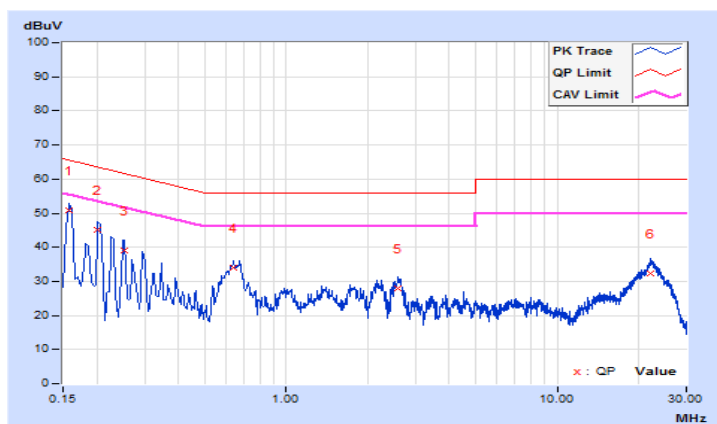
802.11n (HT20)

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	9.71	41.14	24.96	50.85	34.67	65.57	55.57	-14.72	-20.90
2	0.20200	9.78	35.40	19.37	45.18	29.15	63.53	53.53	-18.35	-24.38
3	0.25400	9.81	29.36	13.95	39.17	23.76	61.63	51.63	-22.46	-27.87
4	0.63800	9.95	24.11	17.18	34.06	27.13	56.00	46.00	-21.94	-18.87
5	2.59400	10.12	17.90	9.81	28.02	19.93	56.00	46.00	-27.98	-26.07
6	22.17000	10.42	21.74	16.05	32.16	26.47	60.00	50.00	-27.84	-23.53

Remarks:

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

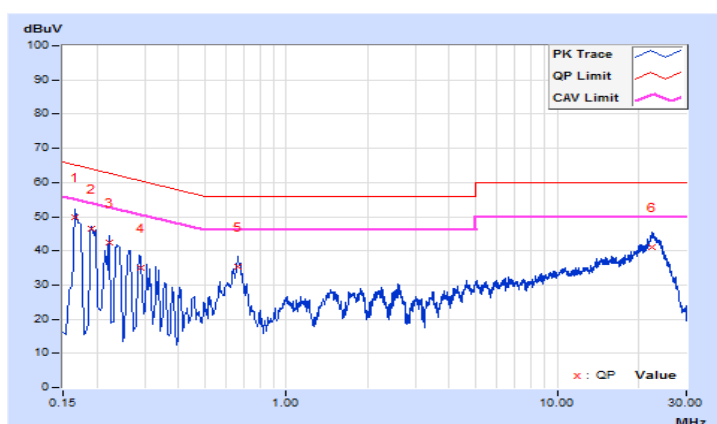


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16600	9.72	40.23	24.90	49.95	34.62	65.16	55.16	-15.21	-20.54
2	0.19000	9.78	36.71	19.25	46.49	29.03	64.04	54.04	-17.55	-25.01
3	0.22200	9.81	32.77	14.60	42.58	24.41	62.74	52.74	-20.16	-28.33
4	0.29000	9.83	25.33	9.94	35.16	19.77	60.52	50.52	-25.36	-30.75
5	0.66200	9.90	25.57	18.89	35.47	28.79	56.00	46.00	-20.53	-17.21
6	22.34600	10.50	30.68	25.04	41.18	35.54	60.00	50.00	-18.82	-14.46

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.



**Test Mode B**

**2G traffic radio: CDD Mode**

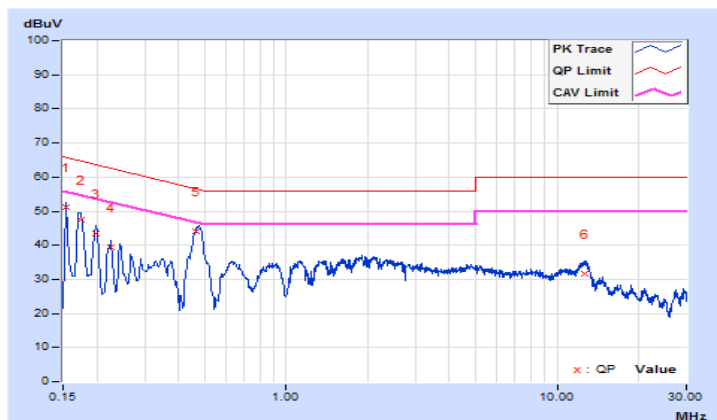
802.11b

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.15400	9.71	41.47	26.70	51.18	36.41	65.78
2	0.17384	9.74	37.67	22.64	47.41	32.38	64.77	54.77	-17.36	-22.39
3	0.19800	9.78	33.75	18.33	43.53	28.11	63.69	53.69	-20.16	-25.58
4	0.22600	9.80	29.47	14.94	39.27	24.74	62.60	52.60	-23.33	-27.86
5	0.46690	9.91	34.29	29.71	44.20	39.62	56.57	46.57	-12.37	-6.95
6	12.56600	10.35	21.31	16.59	31.66	26.94	60.00	50.00	-28.34	-23.06

Remarks:

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

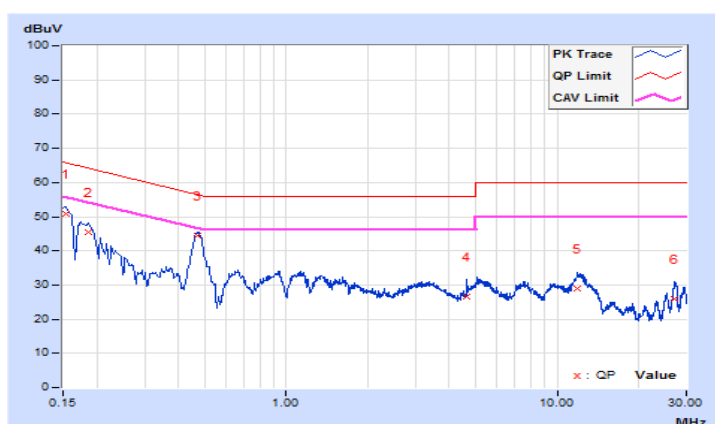


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.69	41.28	26.33	50.97	36.02	65.78	55.78	-14.81	-19.76
2	0.18568	9.77	35.75	19.74	45.52	29.51	64.23	54.23	-18.71	-24.72
<b>3</b>	<b>0.46936</b>	<b>9.87</b>	<b>34.41</b>	<b>29.86</b>	<b>44.28</b>	<b>39.73</b>	<b>56.53</b>	<b>46.53</b>	<b>-12.25</b>	<b>-6.80</b>
4	4.64200	10.14	16.50	9.63	26.64	19.77	56.00	46.00	-29.36	-26.23
5	11.93800	10.30	18.63	13.44	28.93	23.74	60.00	50.00	-31.07	-26.26
6	27.22600	10.54	15.39	10.81	25.93	21.35	60.00	50.00	-34.07	-28.65

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.



**Test Mode B**

**Scanning radio: CDD Mode**

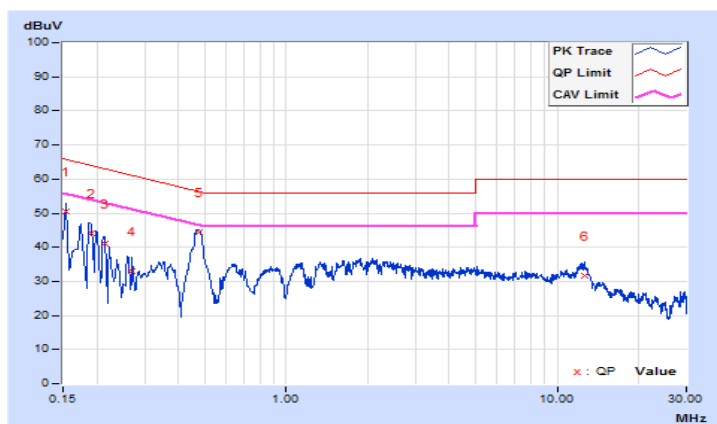
802.11n (HT20)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.71	40.72	26.21	50.43	35.92	65.78	55.78	-15.35	-19.86
2	0.19000	9.76	34.27	19.06	44.03	28.82	64.04	54.04	-20.01	-25.22
3	0.21294	9.79	31.14	17.15	40.93	26.94	63.09	53.09	-22.16	-26.15
4	0.27000	9.82	23.20	12.25	33.02	22.07	61.12	51.12	-28.10	-29.05
5	0.47400	9.91	34.63	29.40	44.54	39.31	56.44	46.44	-11.90	-7.13
6	12.56600	10.35	21.21	16.53	31.56	26.88	60.00	50.00	-28.44	-23.12

Remarks:

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

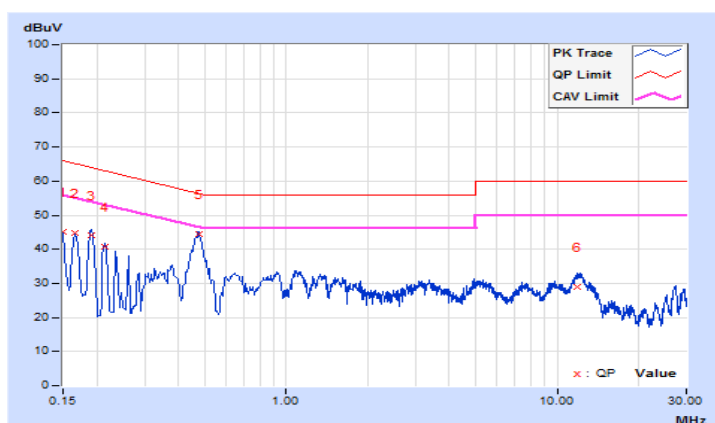


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.68	35.47	25.20	45.15	34.88	66.00	56.00	-20.85	-21.12
2	0.16579	9.72	35.04	21.70	44.76	31.42	65.17	55.17	-20.41	-23.75
3	0.19000	9.78	34.26	18.50	44.04	28.28	64.04	54.04	-20.00	-25.76
4	0.21350	9.80	30.86	15.88	40.66	25.68	63.07	53.07	-22.41	-27.39
5	0.47400	9.87	34.44	29.24	44.31	39.11	56.44	46.44	-12.13	-7.33
6	11.90600	10.30	18.58	13.48	28.88	23.78	60.00	50.00	-31.12	-26.22

Remarks:

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

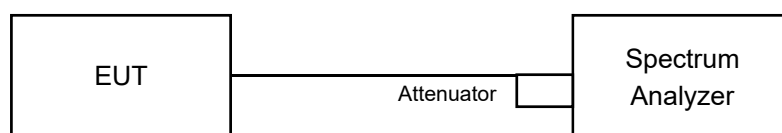


### 4.3 6dB Bandwidth Measurement

#### 4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

- Set resolution bandwidth (RBW) = 100kHz.
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

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

#### 4.3.7 Test Result

##### Test Mode A

##### 2G traffic radio: CDD Mode

##### 802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.02	8.06	0.5	Pass
6	2437	8.08	7.14	0.5	Pass
11	2462	7.61	8.07	0.5	Pass

##### 802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.80	16.10	0.5	Pass
6	2437	15.70	16.32	0.5	Pass
11	2462	15.71	16.33	0.5	Pass

##### 802.11ax (HE20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	18.52	18.44	0.5	Pass
6	2437	18.71	17.85	0.5	Pass
11	2462	18.52	17.92	0.5	Pass

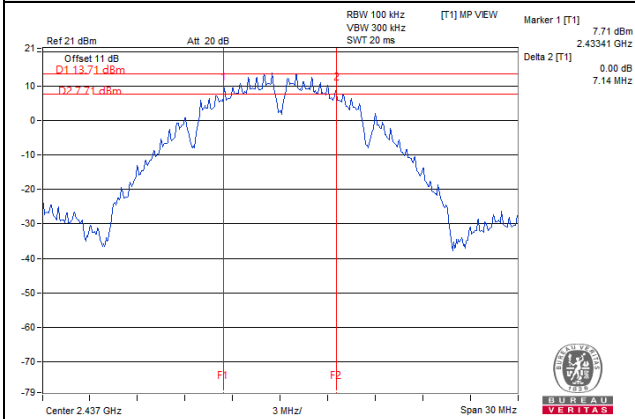
##### 802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	37.94	38.03	0.5	Pass
6	2437	37.64	37.72	0.5	Pass
9	2452	37.92	37.95	0.5	Pass

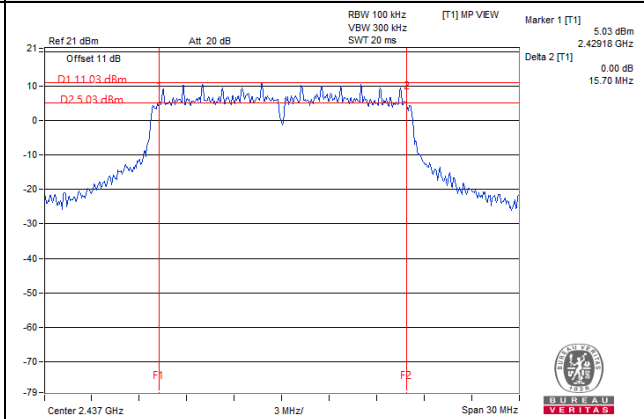


### Spectrum Plot of Worst Value

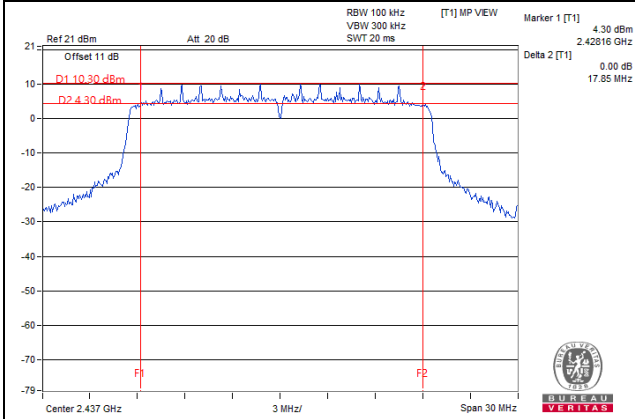
#### 802.11b



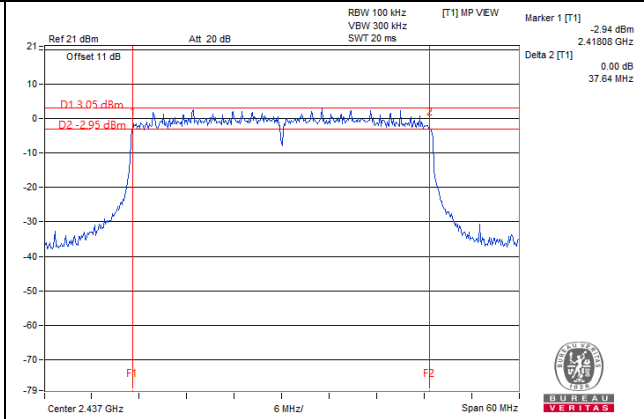
#### 802.11g



#### 802.11ax (HE20)



#### 802.11ax (HE40)



**Test Mode A**

**Scanning radio: CDD Mode**

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	7.10	0.5	Pass
6	2437	7.11	0.5	Pass
11	2462	7.11	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.34	0.5	Pass
6	2437	16.35	0.5	Pass
11	2462	16.35	0.5	Pass

802.11n (HT20)

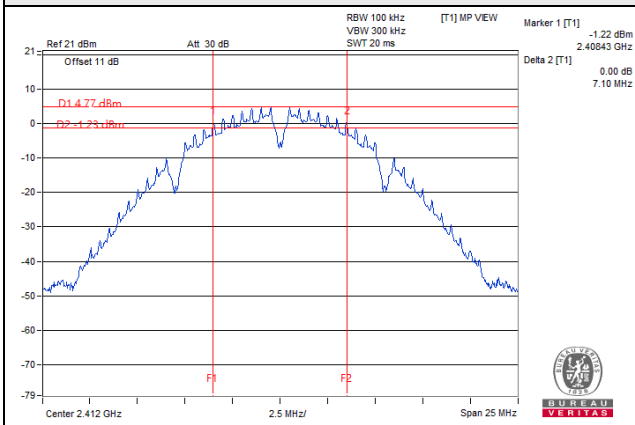
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.59	0.5	Pass
6	2437	16.95	0.5	Pass
11	2462	17.59	0.5	Pass

802.11n (HT40)

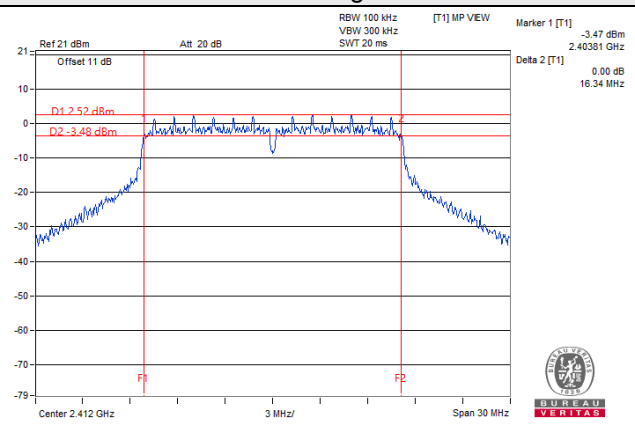
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.17	0.5	Pass
6	2437	35.87	0.5	Pass
9	2452	35.67	0.5	Pass

### Spectrum Plot of Worst Value

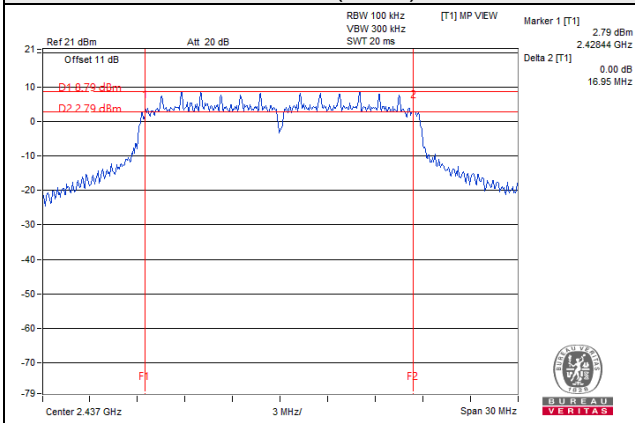
#### 802.11b



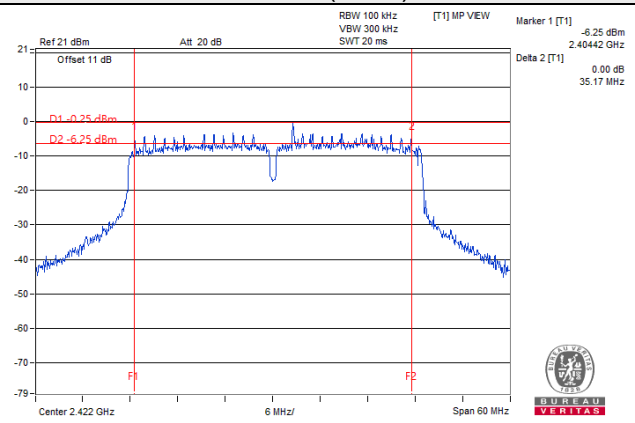
#### 802.11g



#### 802.11n (HT20)



#### 802.11n (HT40)



## 4.4 Conducted Output Power Measurement

### 4.4.1 Limits of Conducted Output Power Measurement

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

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

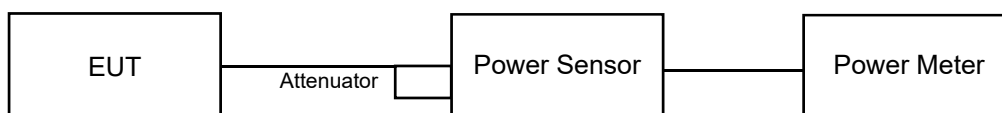
Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

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

##### Test Mode A

##### 2G traffic radio: 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	19.27	19.65	176.785	22.47	30	Pass
6	2437	21.02	21.75	<b>276.098</b>	24.41	30	Pass
11	2462	19.75	20.32	202.053	23.05	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	16.92	17.60	106.748	20.28	30	Pass
6	2437	21.02	21.51	268.053	24.28	30	Pass
11	2462	18.46	18.66	143.597	21.57	30	Pass

##### 802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	16.02	16.35	83.146	19.20	30	Pass
6	2437	19.55	20.37	199.050	22.99	30	Pass
11	2462	16.18	16.45	85.652	19.33	30	Pass

##### 802.11n (HT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	12.92	13.44	41.668	16.20	30	Pass
6	2437	15.98	16.79	87.381	19.41	30	Pass
9	2452	14.13	14.49	54.001	17.32	30	Pass

### 802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	16.05	16.33	83.226	19.20	30	Pass
6	2437	19.52	20.39	198.932	22.99	30	Pass
11	2462	16.21	16.47	86.144	19.35	30	Pass

### 802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	12.96	13.46	41.952	16.23	30	Pass
6	2437	16.01	16.76	87.326	19.41	30	Pass
9	2452	14.15	14.50	54.186	17.34	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	16.09	16.39	84.195	19.25	30	Pass
6	2437	19.57	20.43	200.981	23.03	30	Pass
11	2462	16.22	16.48	86.342	19.36	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	13.01	13.48	42.283	16.26	30	Pass
6	2437	16.04	16.87	88.820	19.49	30	Pass
9	2452	14.19	14.56	54.818	17.39	30	Pass

### Test Mode A

### 2G traffic radio: Beamforming Mode

#### 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	13.01	13.34	41.576	16.19	29.56	Pass
6	2437	16.54	17.36	<b>99.532</b>	19.98	29.56	Pass
11	2462	13.17	13.44	42.829	16.32	29.56	Pass

\*Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.44\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to  $30-(6.44-6) = 29.56\text{dBm}$

#### 802.11ax (HE 40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	9.91	10.43	20.836	13.19	29.56	Pass
6	2437	12.97	13.78	43.693	16.40	29.56	Pass
9	2452	11.12	11.48	27.002	14.31	29.56	Pass

\*Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.44\text{dBi} > 6\text{dBi}$ , so the power limit shall be reduced to  $30-(6.44-6) = 29.56\text{dBm}$

**Test Mode A**

**Scanning radio: CDD Mode**

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	20.045	13.02	30	Pass
6	2437	16.788	12.25	30	Pass
11	2462	14.289	11.55	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	27.733	14.43	30	Pass
6	2437	80.724	19.07	30	Pass
11	2462	16.255	12.11	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	22.803	13.58	30	Pass
6	2437	<b>84.333</b>	19.26	30	Pass
11	2462	13.964	11.45	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	11.194	10.49	30	Pass
6	2437	32.961	15.18	30	Pass
9	2452	7.709	8.87	30	Pass

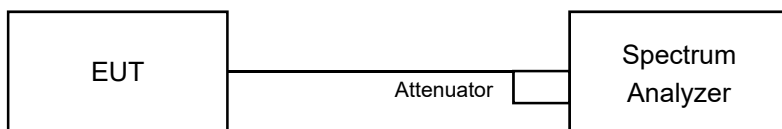


## 4.5 Power Spectral Density Measurement

### 4.5.1 Limits of Power Spectral Density Measurement

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

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedure

For Average Power (Duty cycle  $\geq 98\%$ )

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

For Average Power (Duty cycle  $< 98\%$ )

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

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Condition

Same as item 4.3.6.

#### 4.5.7 Test Results

##### Test Mode A

##### 2G traffic radio: CDD Mode

##### 802.11b

TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-12.40	3.01	2.49	-6.90	7.56	Pass
	6	2437	-14.20	3.01	2.49	-8.70	7.56	Pass
	11	2462	-14.49	3.01	2.49	-8.99	7.56	Pass
1	1	2412	-15.73	3.01	2.49	-10.23	7.56	Pass
	6	2437	-13.68	3.01	2.49	-8.18	7.56	Pass
	11	2462	-14.48	3.01	2.49	-8.98	7.56	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.44\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $8-(6.44-6) = 7.56\text{dBm}$ .
3. Refer to section 3.3 for duty cycle spectrum plot.

##### 802.11g

TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-15.30	3.01	0.31	-11.98	7.56	Pass
	6	2437	-12.27	3.01	0.31	-8.95	7.56	Pass
	11	2462	-14.54	3.01	0.31	-11.22	7.56	Pass
1	1	2412	-15.34	3.01	0.31	-12.02	7.56	Pass
	6	2437	-11.98	3.01	0.31	-8.66	7.56	Pass
	11	2462	-14.37	3.01	0.31	-11.05	7.56	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.44\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $8-(6.44-6) = 7.56\text{dBm}$ .
3. Refer to section 3.3 for duty cycle spectrum plot.

### 802.11ax (HE20)

TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-19.49	3.01	0.32	-16.16	7.56	Pass
	6	2437	-16.98	3.01	0.32	-13.65	7.56	Pass
	11	2462	-20.36	3.01	0.32	-17.03	7.56	Pass
1	1	2412	-20.40	3.01	0.32	-17.07	7.56	Pass
	6	2437	-16.70	3.01	0.32	-13.37	7.56	Pass
	11	2462	-19.49	3.01	0.32	-16.16	7.56	Pass

Note:

- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
- Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.44\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $8-(6.44-6) = 7.56\text{dBm}$ .
- Refer to section 3.3 for duty cycle spectrum plot.

### 802.11ax (HE40)

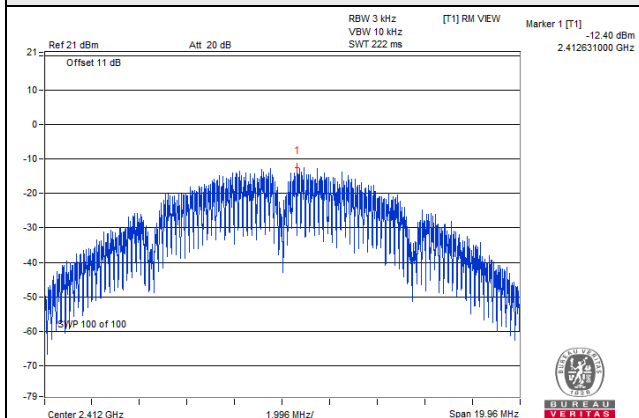
TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-24.81	3.01	0.24	-21.56	7.56	Pass
	6	2437	-22.23	3.01	0.24	-18.98	7.56	Pass
	9	2452	-24.31	3.01	0.24	-21.06	7.56	Pass
1	3	2422	-25.39	3.01	0.24	-22.14	7.56	Pass
	6	2437	-22.03	3.01	0.24	-18.78	7.56	Pass
	9	2452	-24.48	3.01	0.24	-21.23	7.56	Pass

Note:

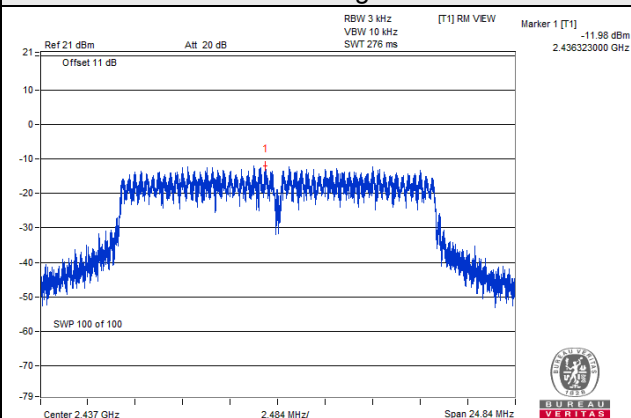
- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
- Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/2] = 6.44\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $8-(6.44-6) = 7.56\text{dBm}$ .
- Refer to section 3.3 for duty cycle spectrum plot.

### Spectrum Plot of Worst Value

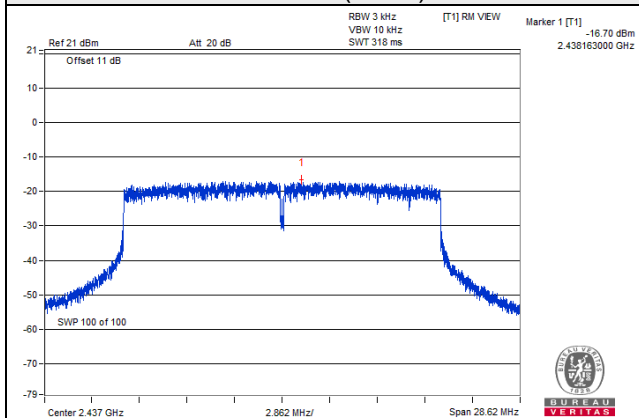
#### 802.11b



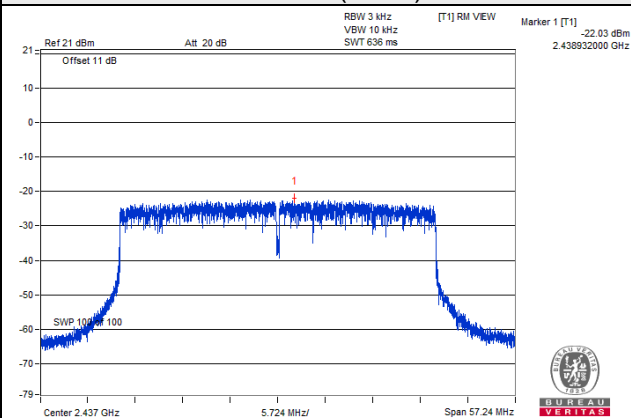
#### 802.11g



#### 802.11ax (HE20)



#### 802.11ax (HE40)



**Test Mode A**

**Scanning radio: CDD Mode**

802.11b

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-19.64	8.00	Pass
6	2437	-20.49	8.00	Pass
11	2462	-20.97	8.00	Pass

802.11g

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-22.30	0.35	-21.95	8.00	Pass
6	2437	-16.39	0.35	-16.04	8.00	Pass
11	2462	-23.65	0.35	-23.30	8.00	Pass

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

802.11n (HT20)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	2412	-20.91	0.33	-20.58	8.00	Pass
6	2437	-16.86	0.33	-16.53	8.00	Pass
11	2462	-25.03	0.33	-24.70	8.00	Pass

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

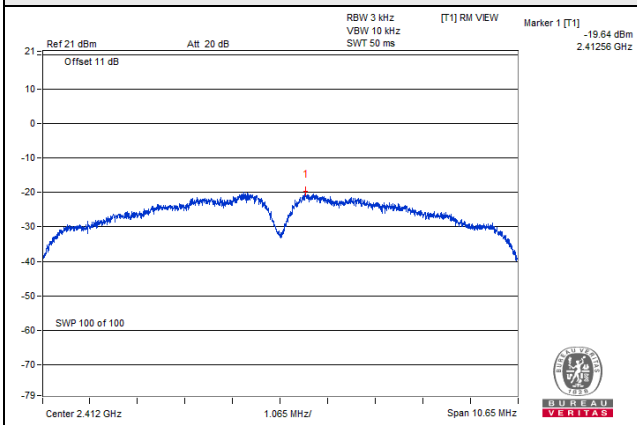
802.11n (HT40)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
3	2422	-26.90	0.69	-26.21	8.00	Pass
6	2437	-22.76	0.69	-22.07	8.00	Pass
9	2452	-29.05	0.69	-28.36	8.00	Pass

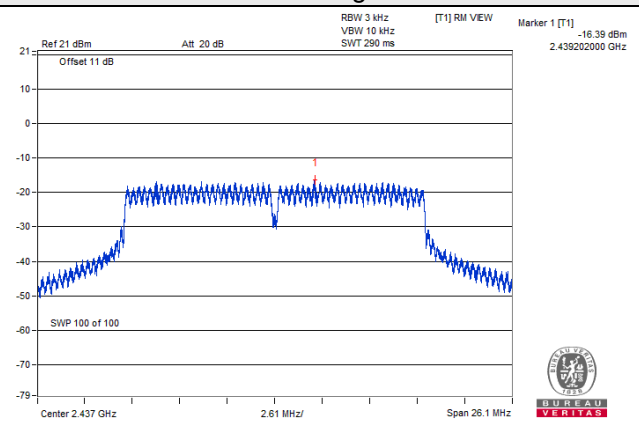
Note: Refer to section 3.3 for duty cycle spectrum plot.

### Spectrum Plot of Worst Value

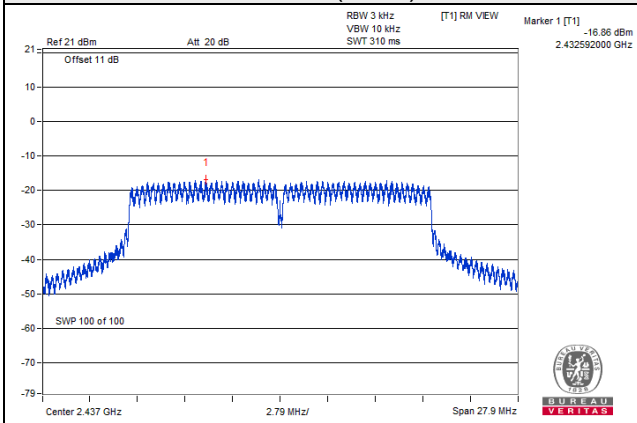
#### 802.11b



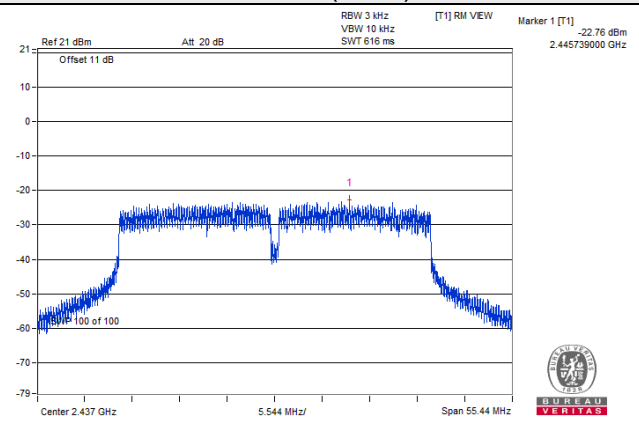
#### 802.11g



#### 802.11n (HT20)



#### 802.11n (HT40)

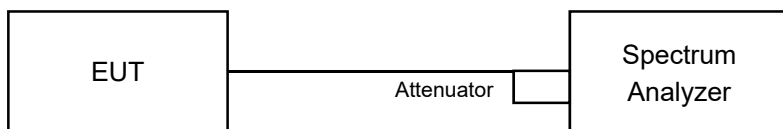


## 4.6 Conducted Out of Band Emission Measurement

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

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

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

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.

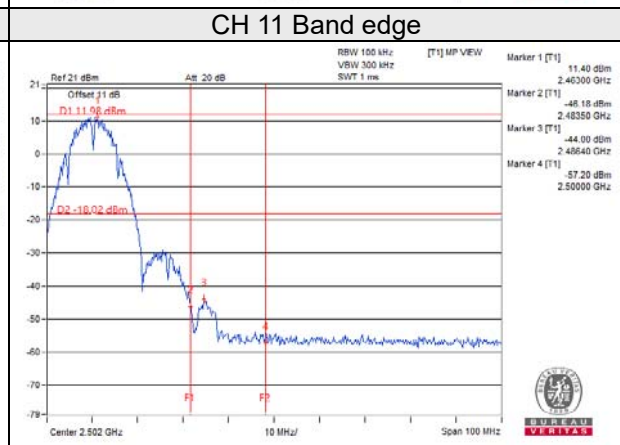
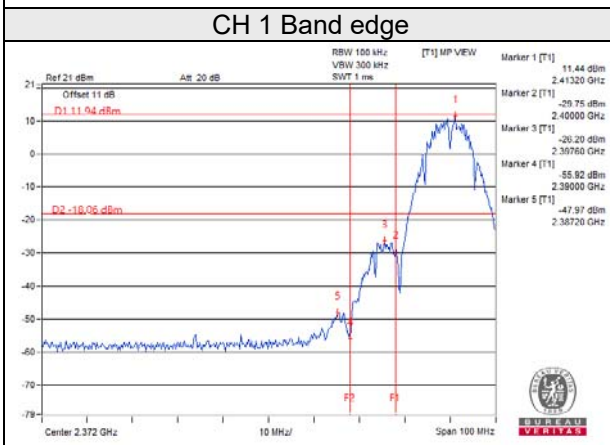
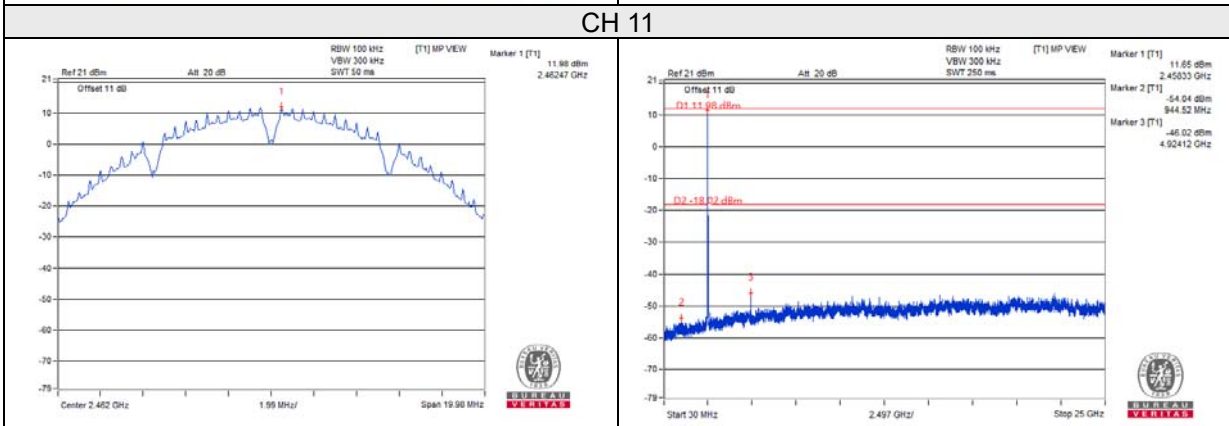
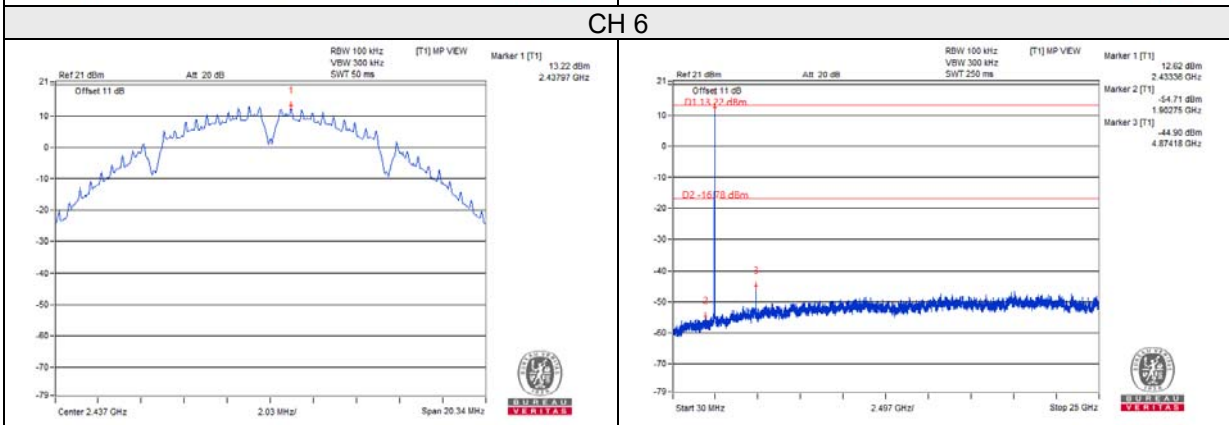
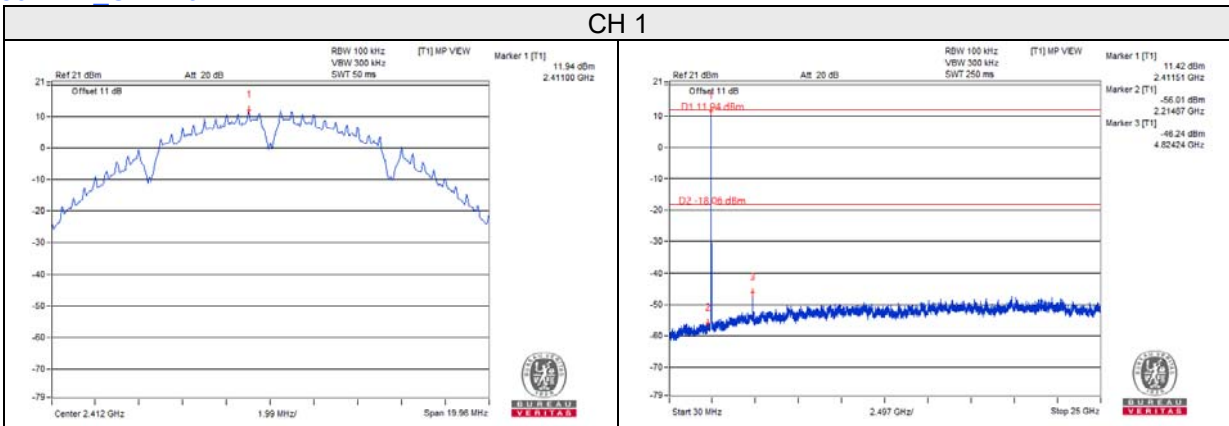
#### **4.6.7 Test Results**

The conducted emission test is performed on each TX port of operating mode without summing or adding  $10\log(N)$  since the limit is relative emission limit.

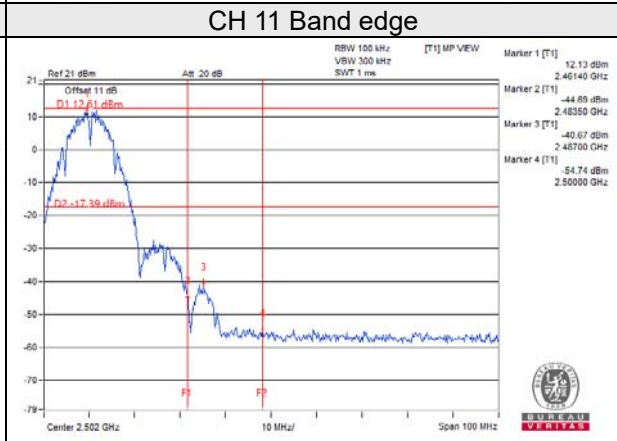
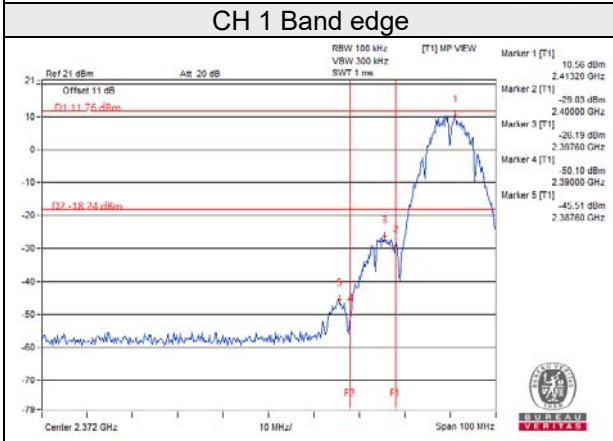
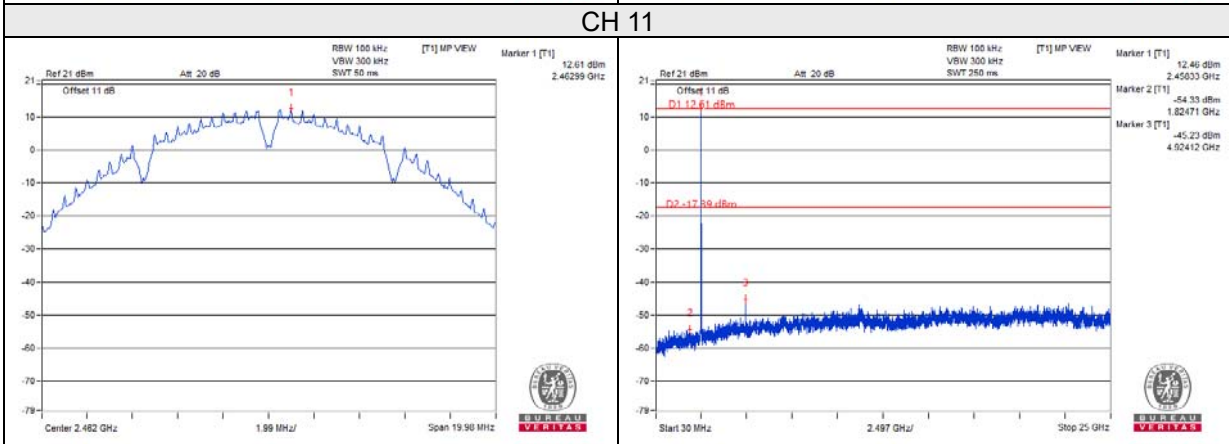
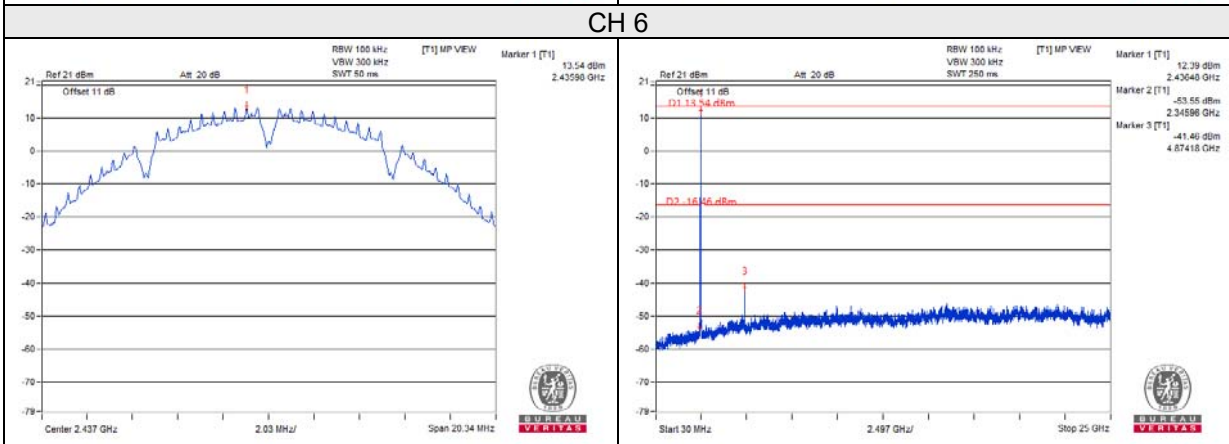
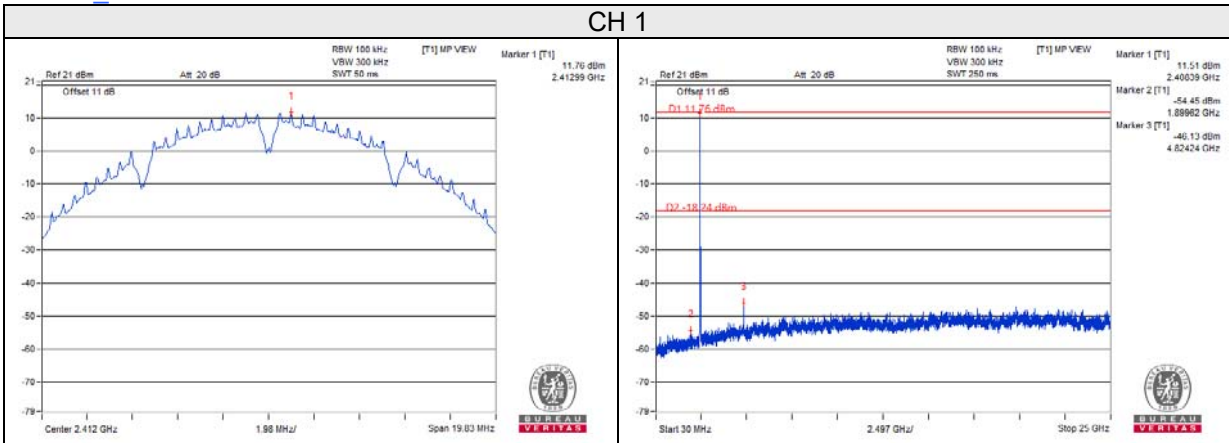
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.



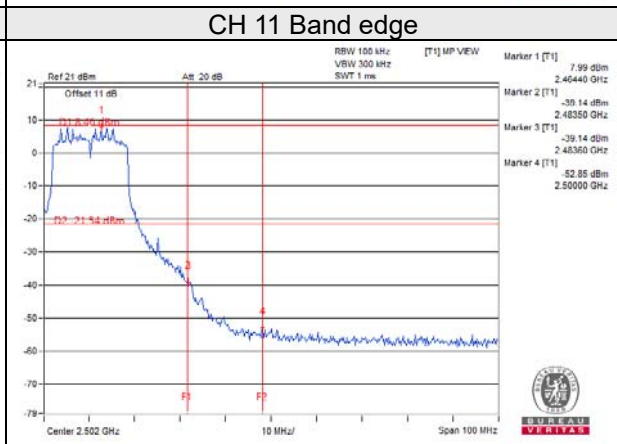
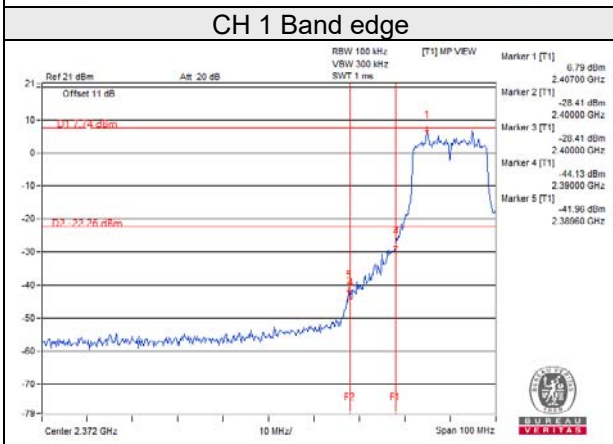
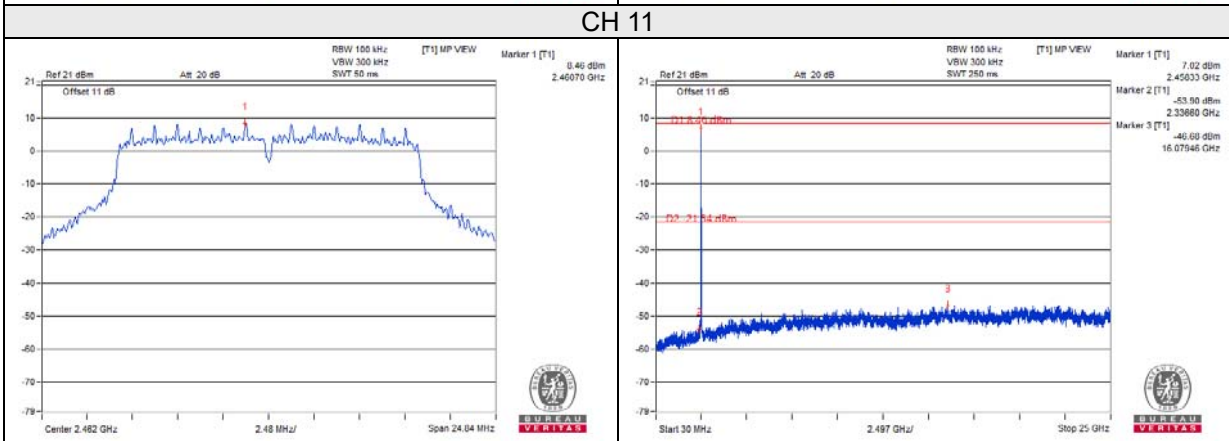
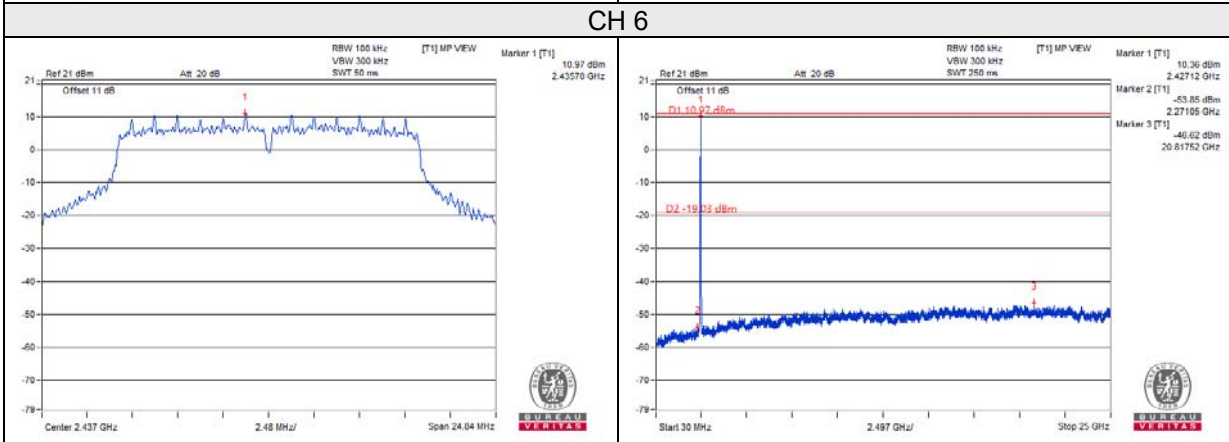
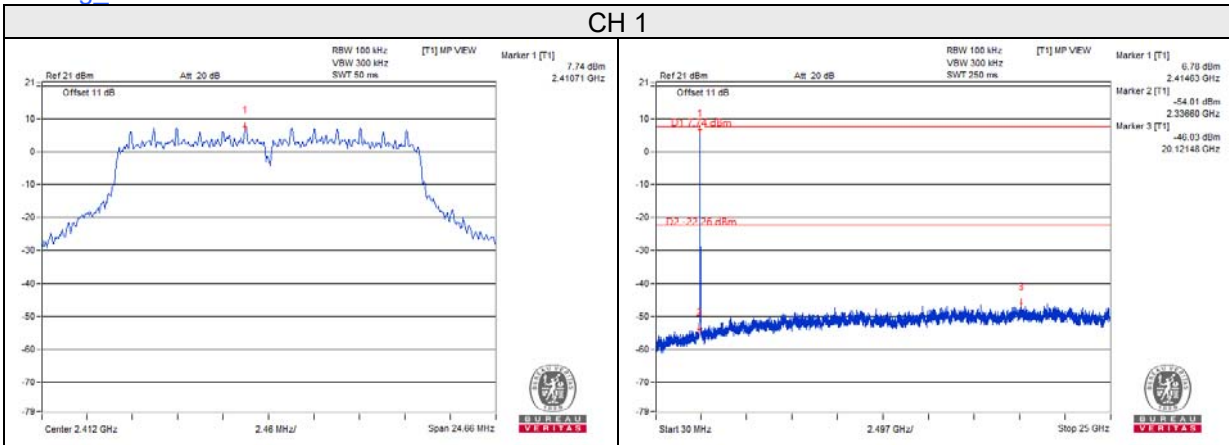
**Test Mode A**  
**2G traffic radio: CDD Mode**  
**802.11b Chain 0**



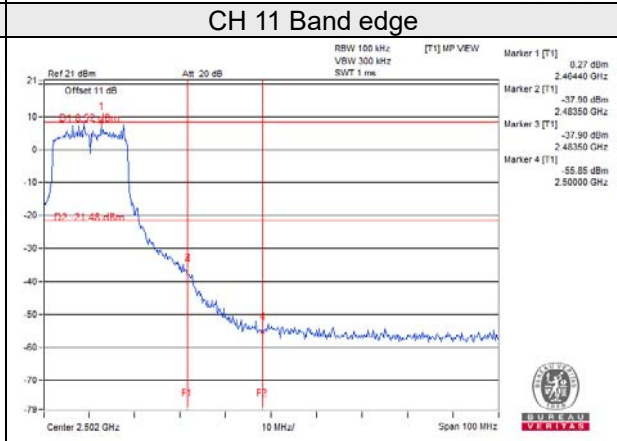
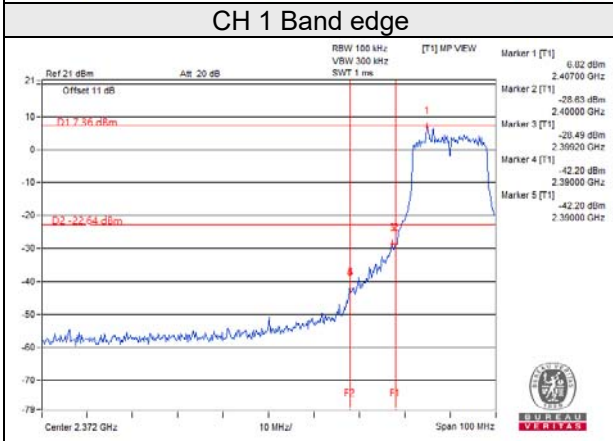
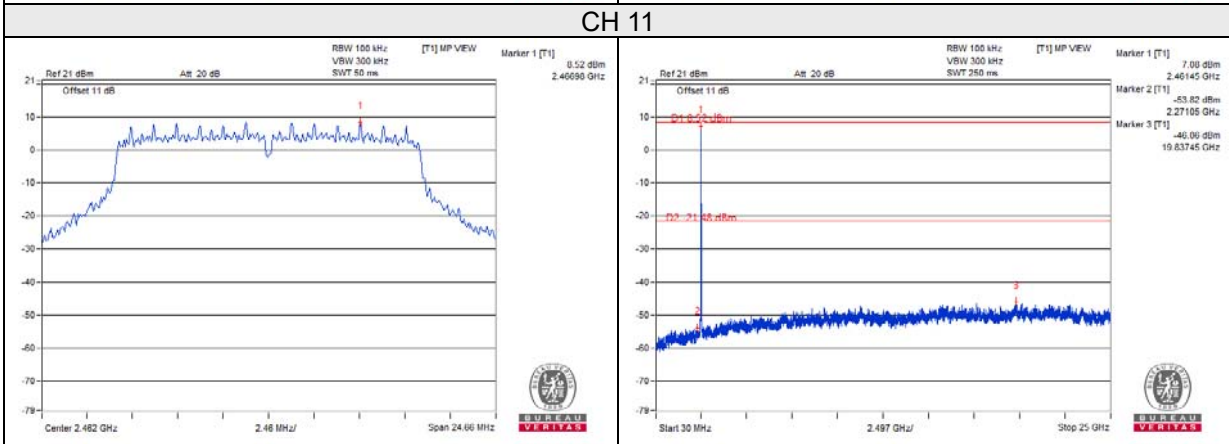
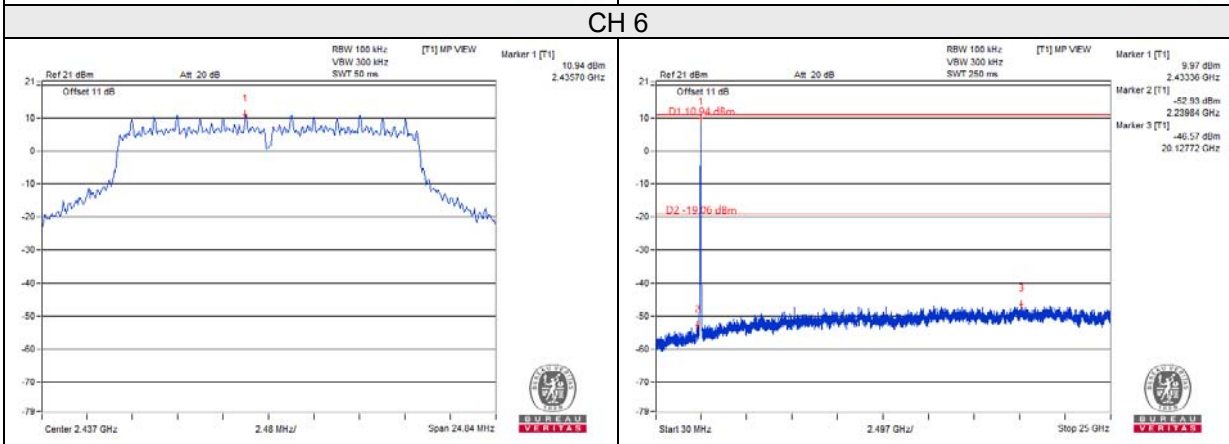
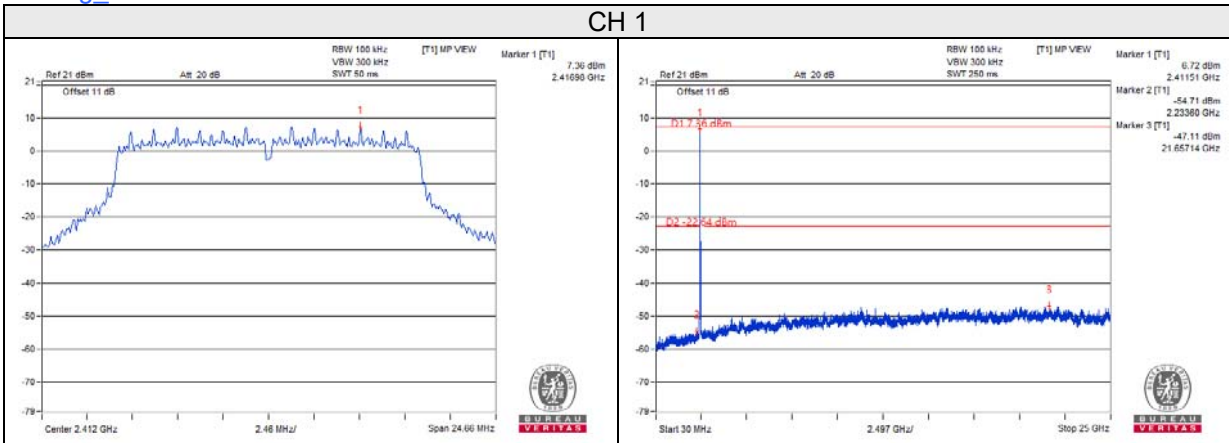
802.11b\_Chain 1



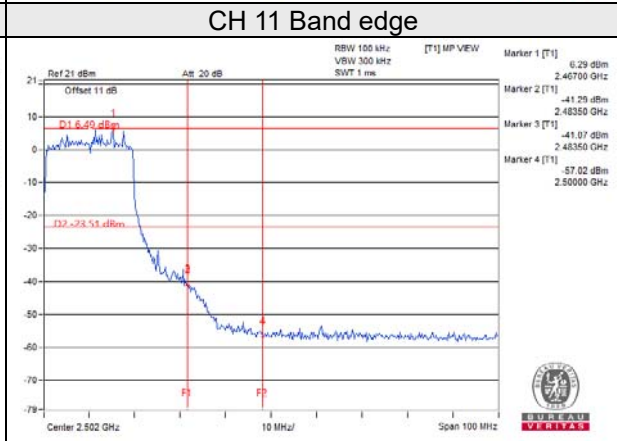
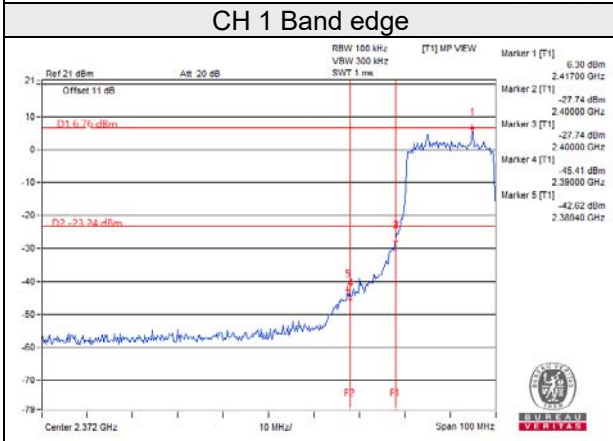
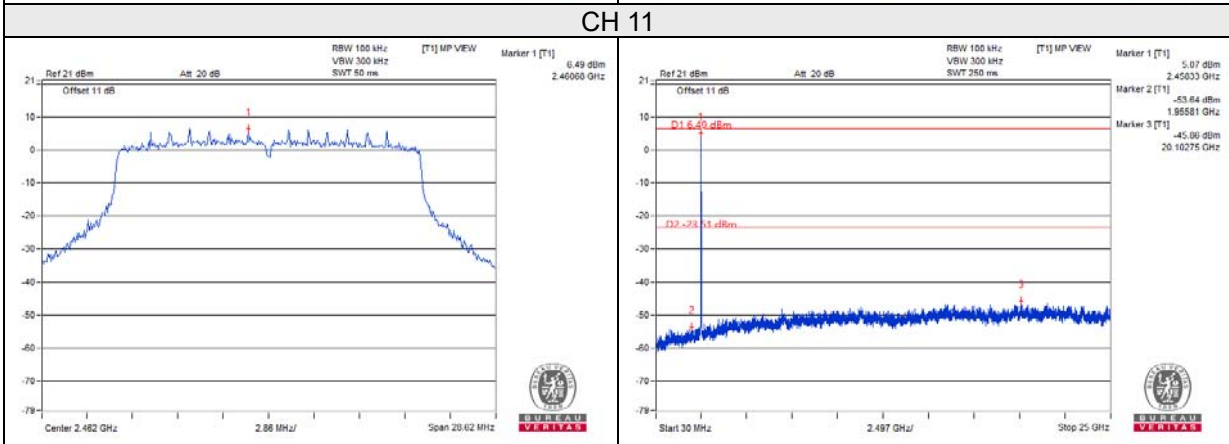
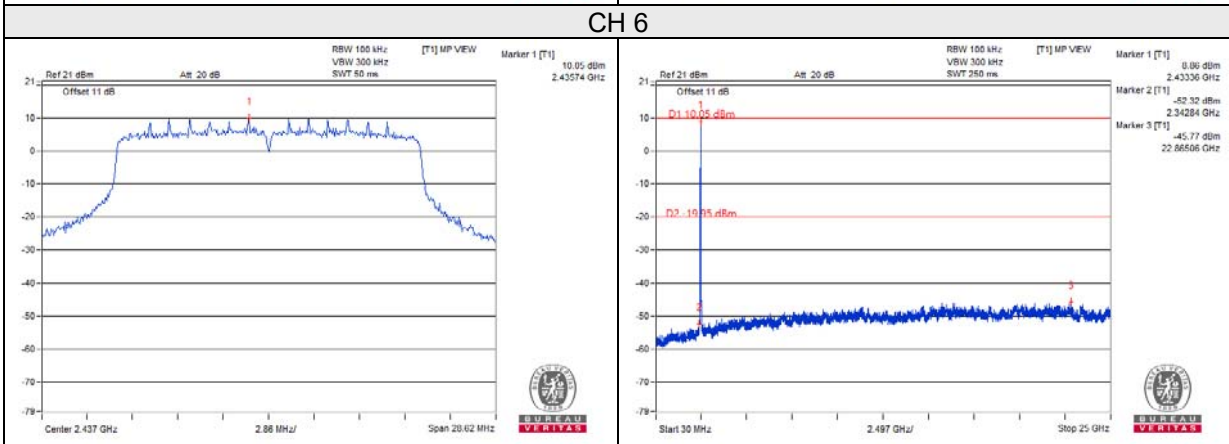
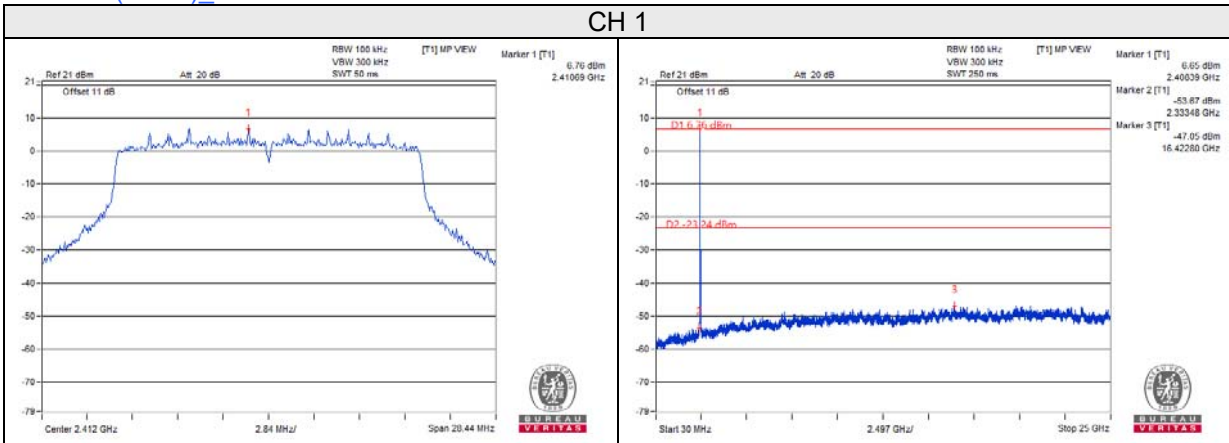
802.11g\_Chain 0



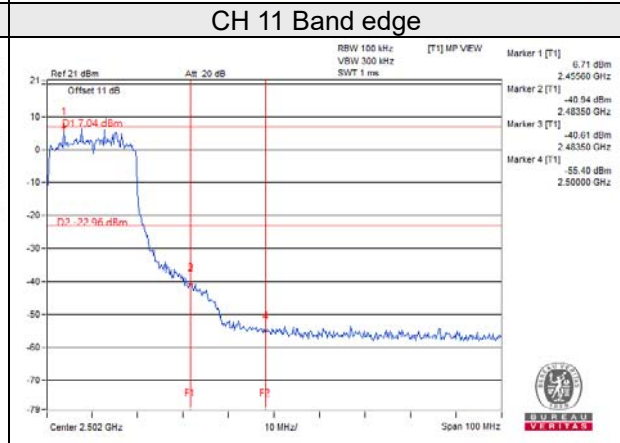
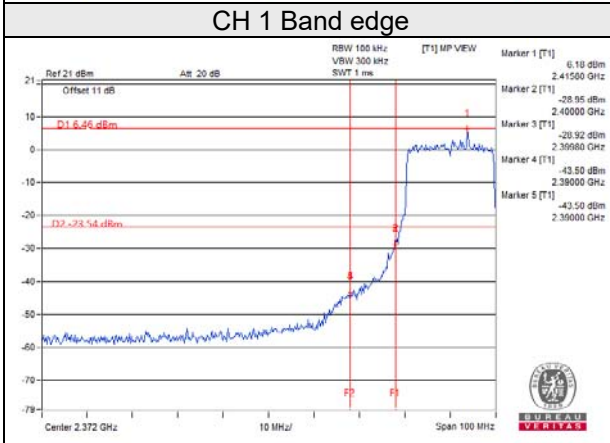
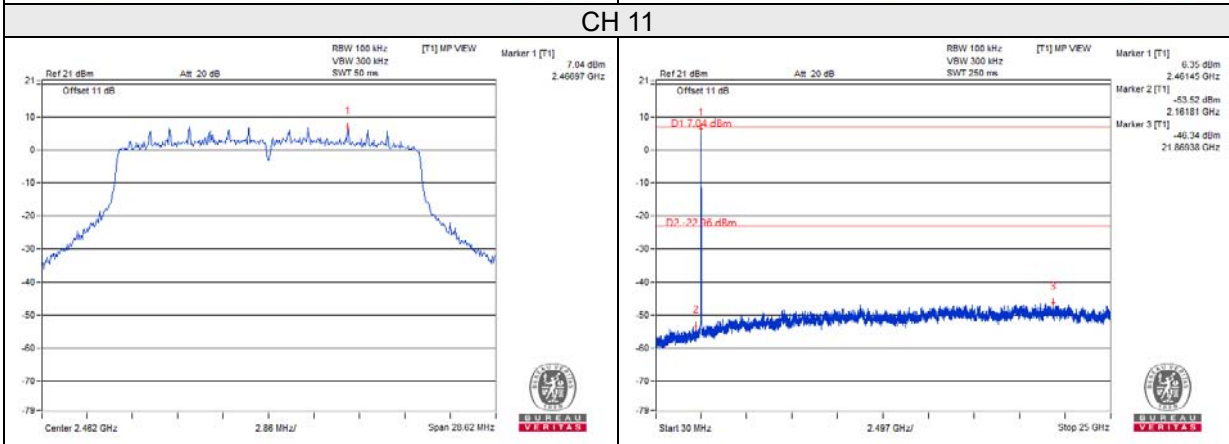
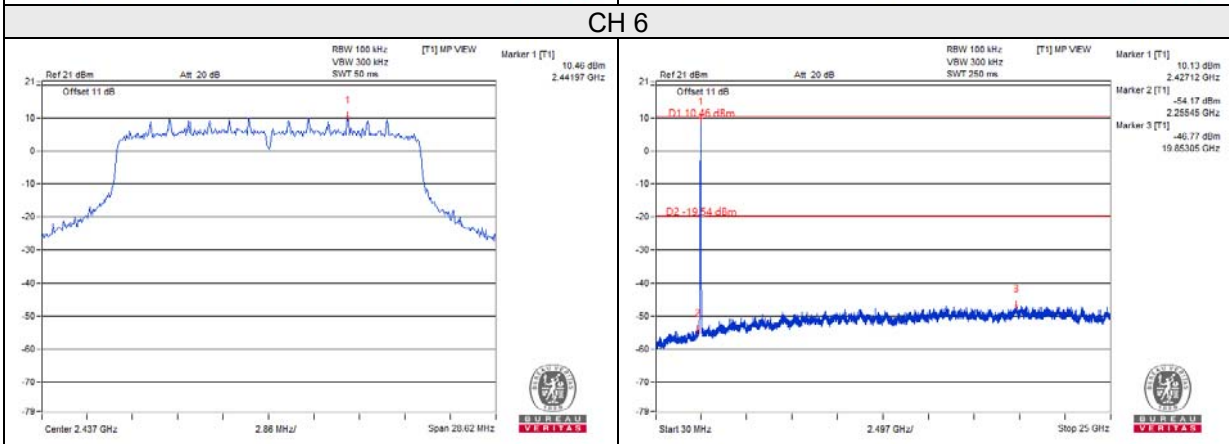
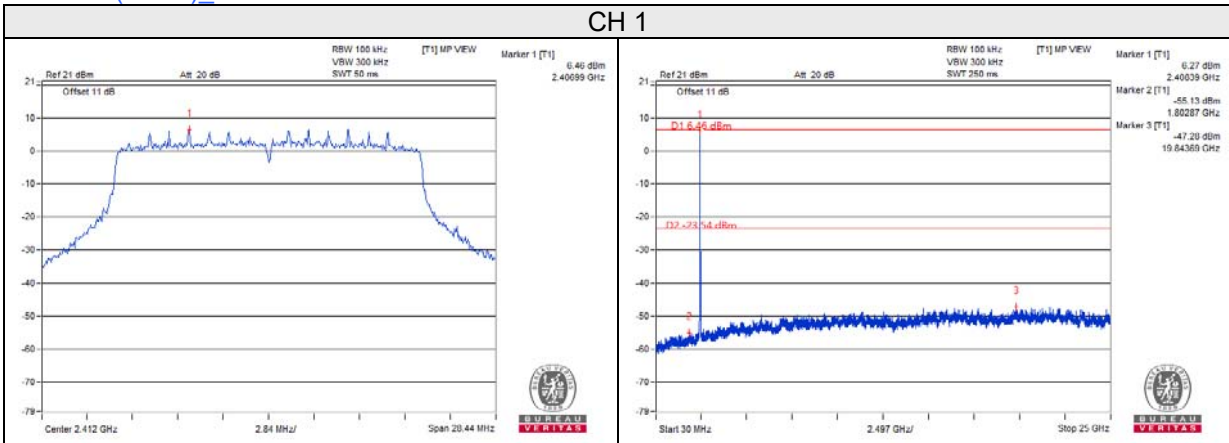
802.11g\_Chain 1



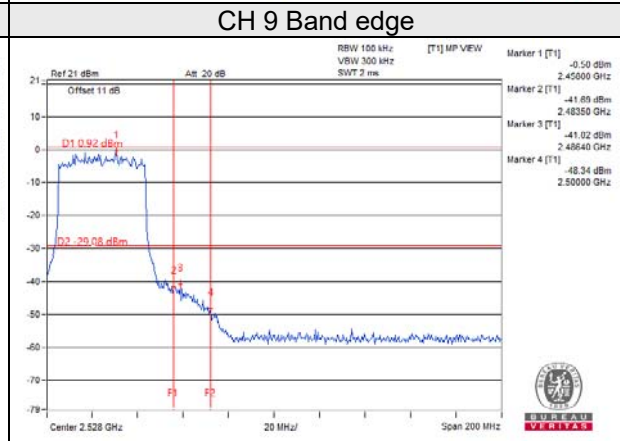
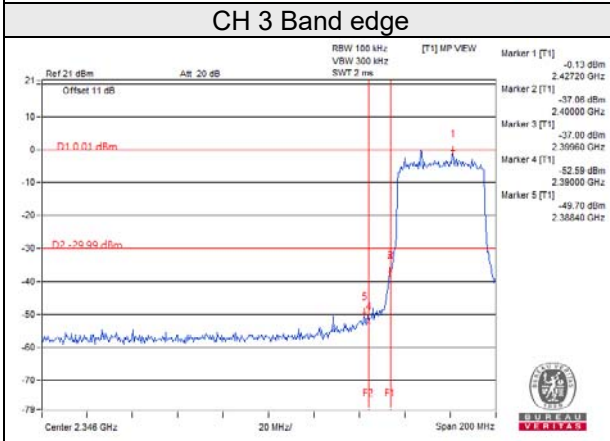
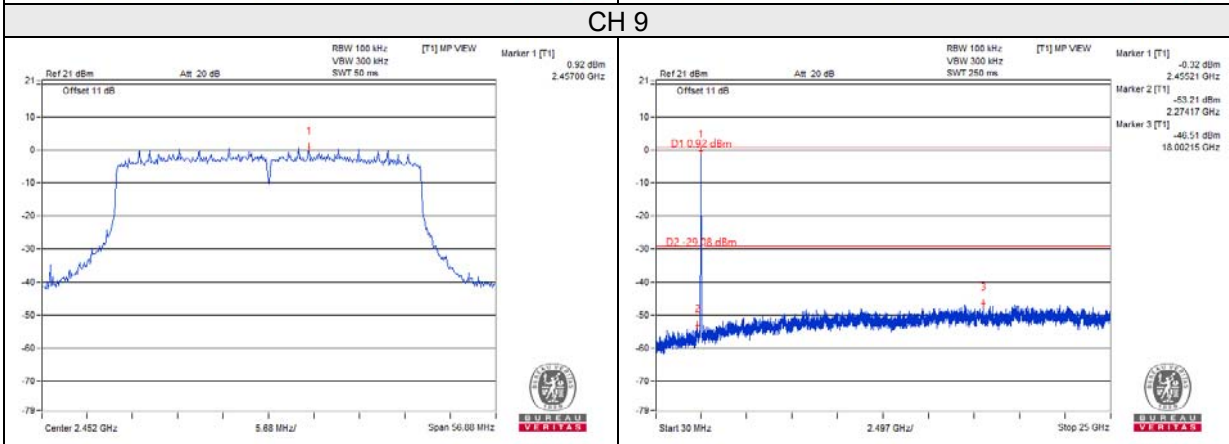
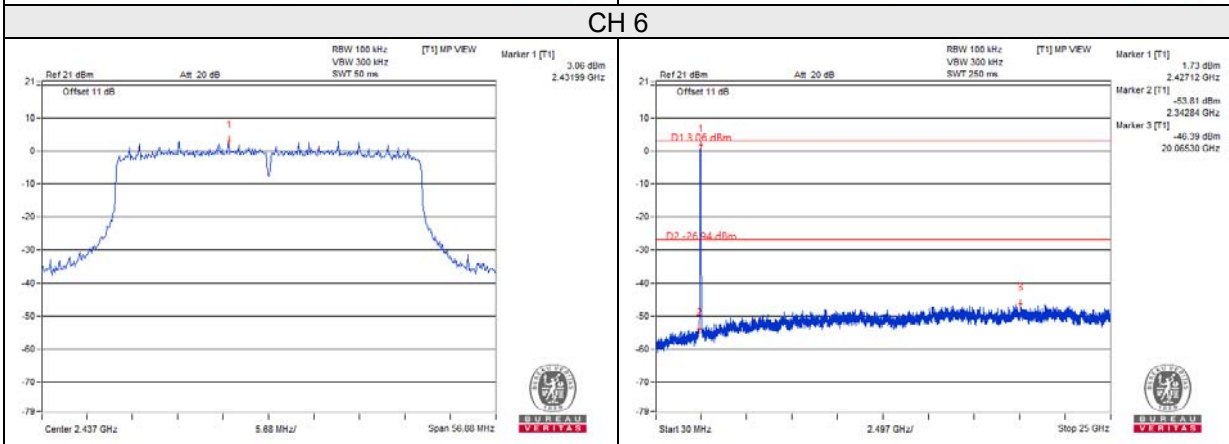
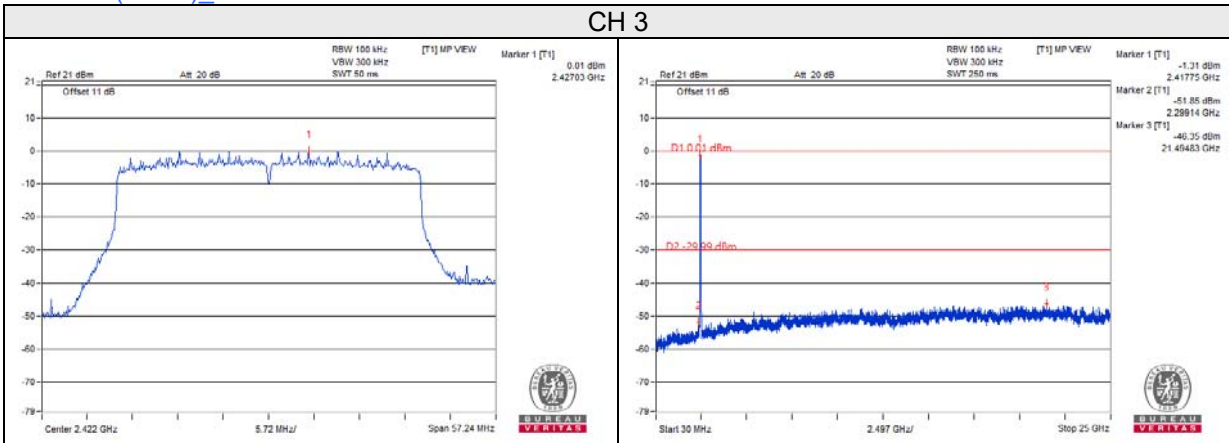
802.11ax (HE20)\_Chain 0



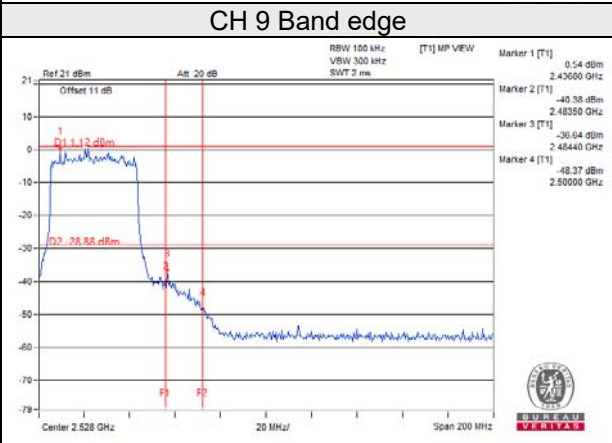
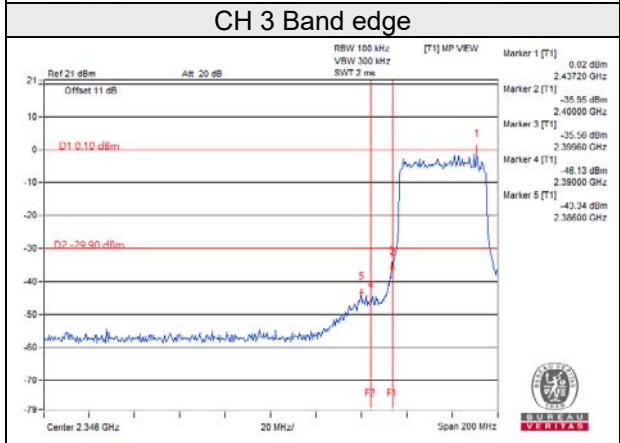
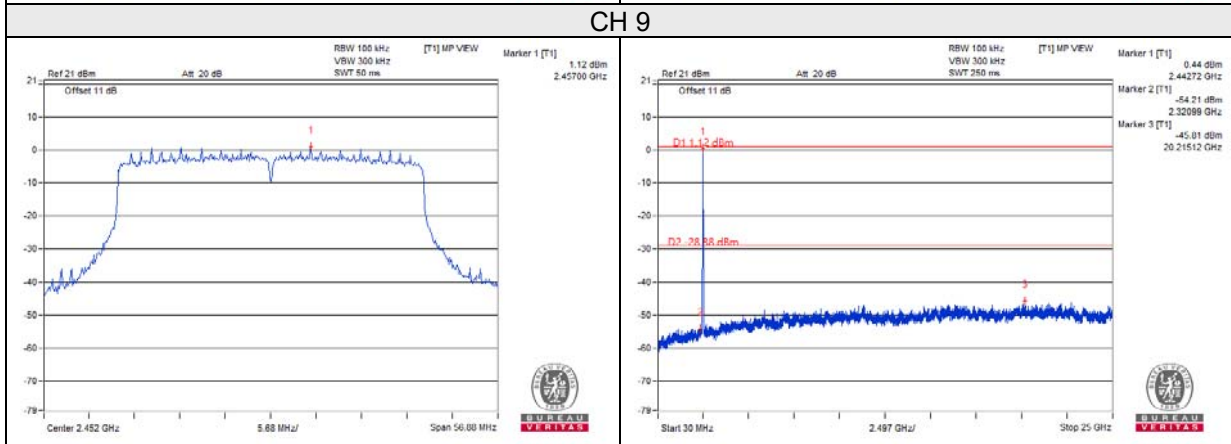
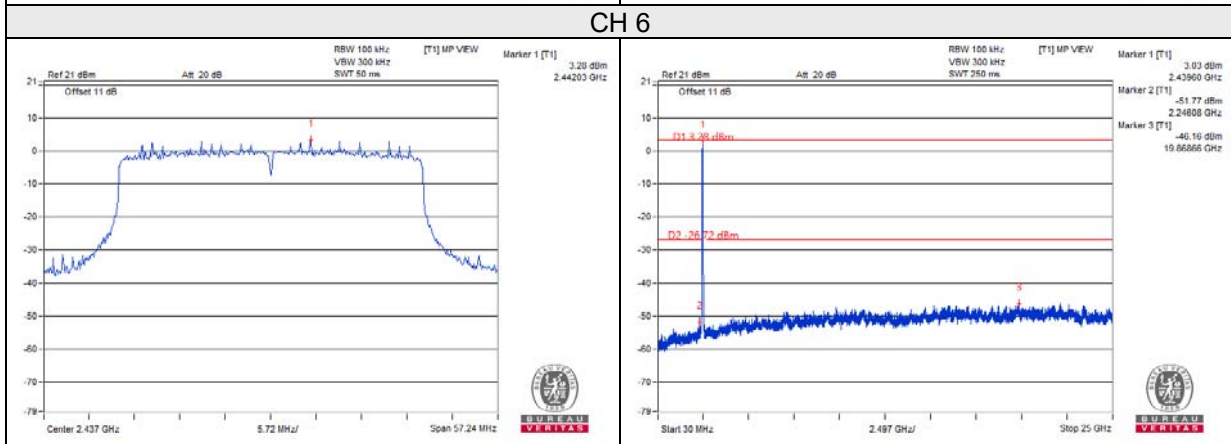
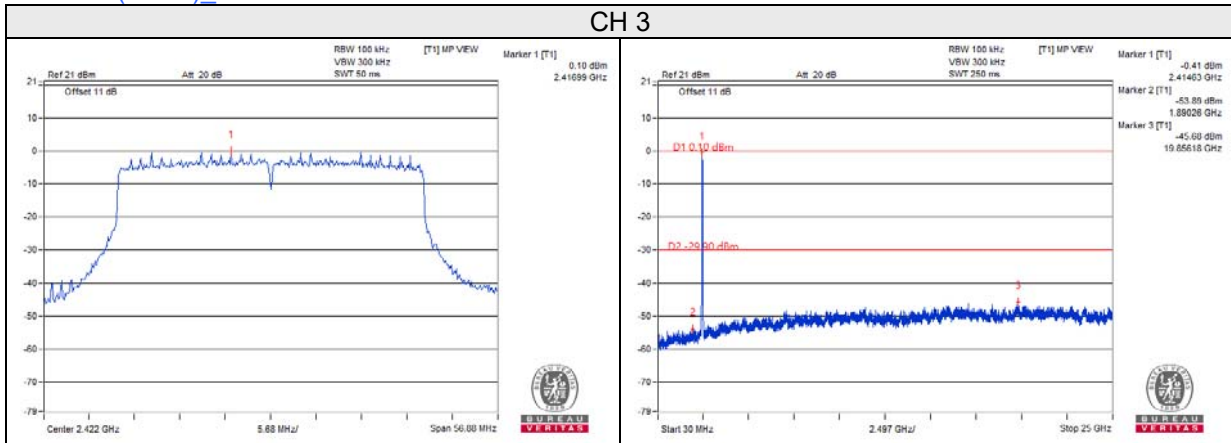
802.11ax (HE20)\_Chain 1



802.11ax (HE40)\_Chain 0

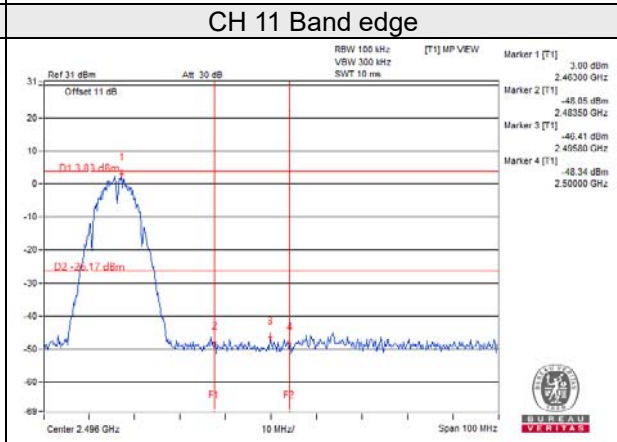
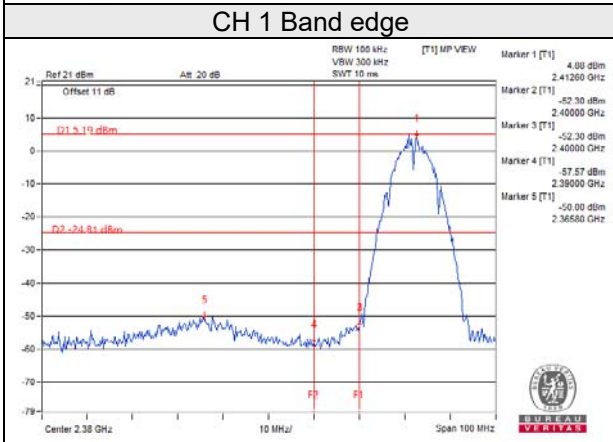
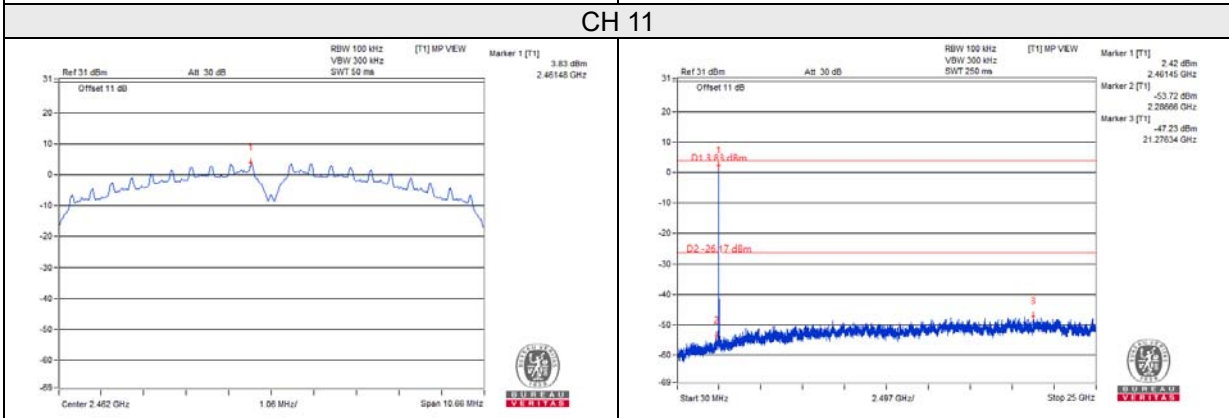
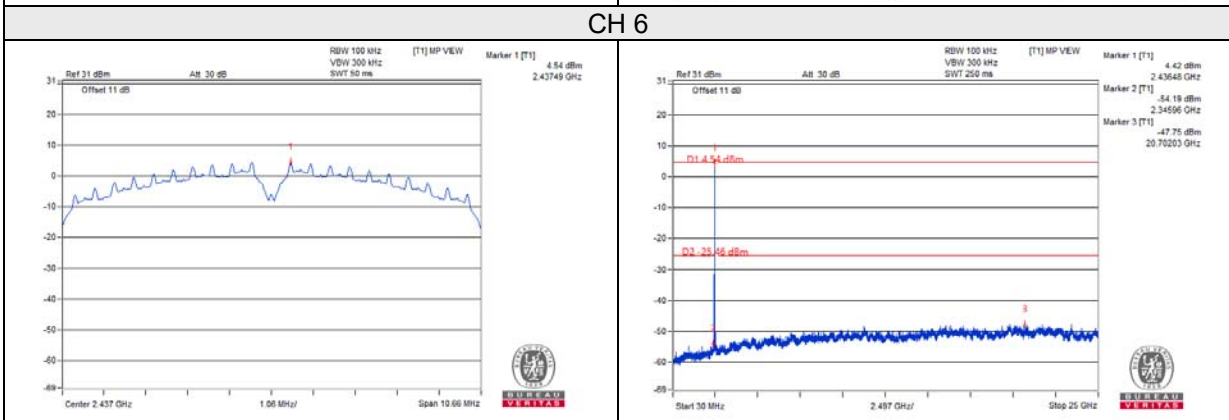
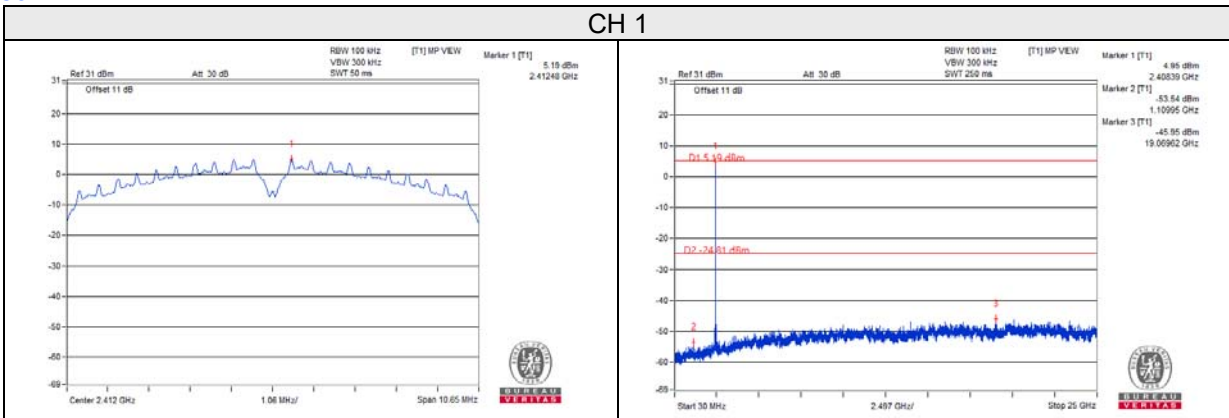


802.11ax (HE40)\_Chain 1

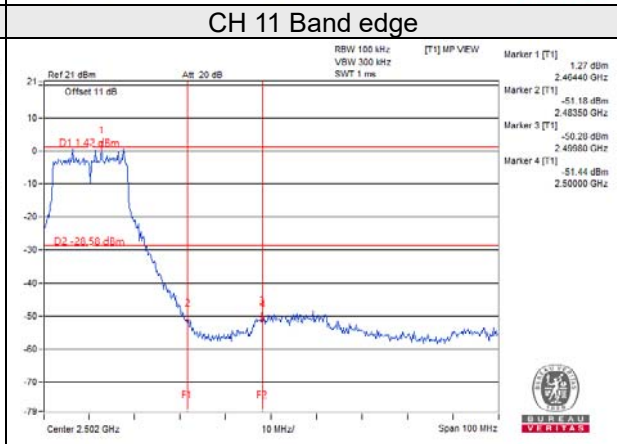
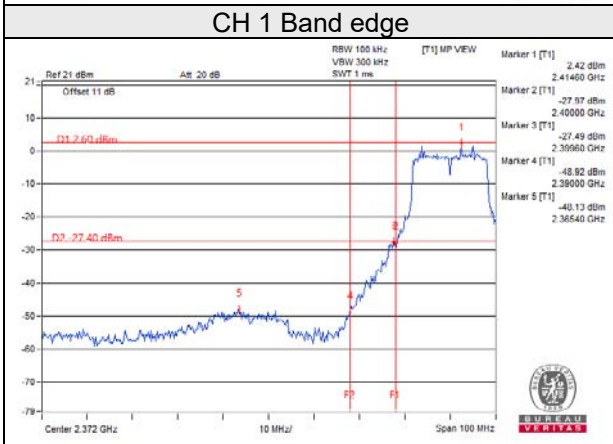
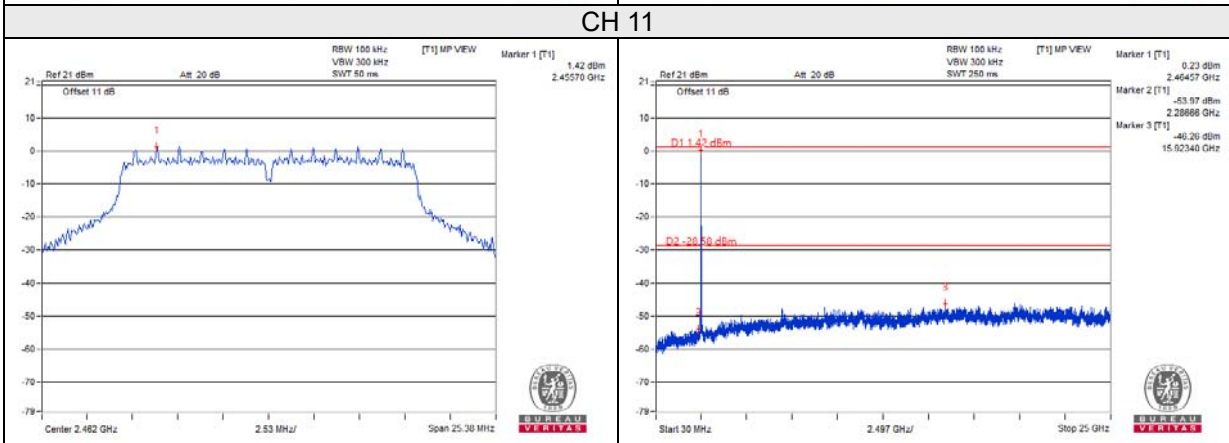
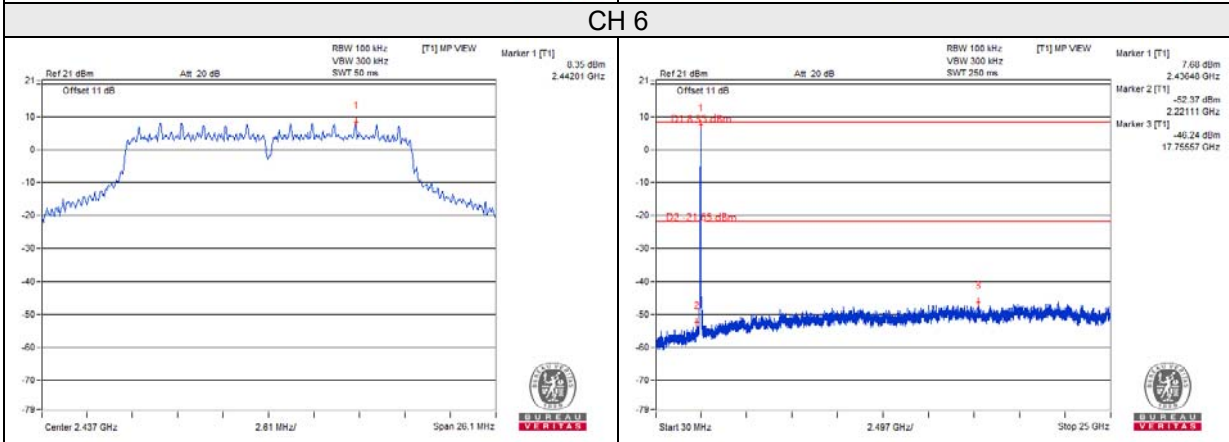
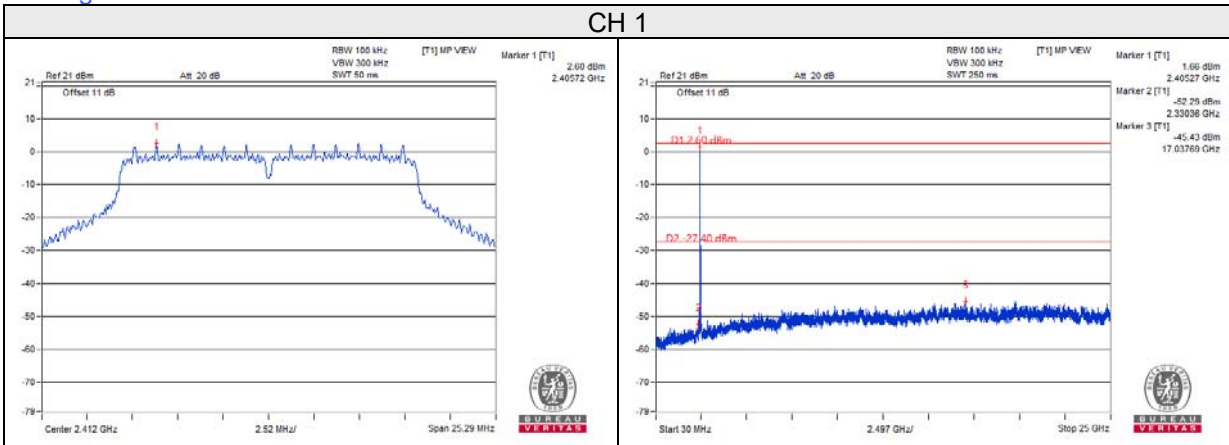




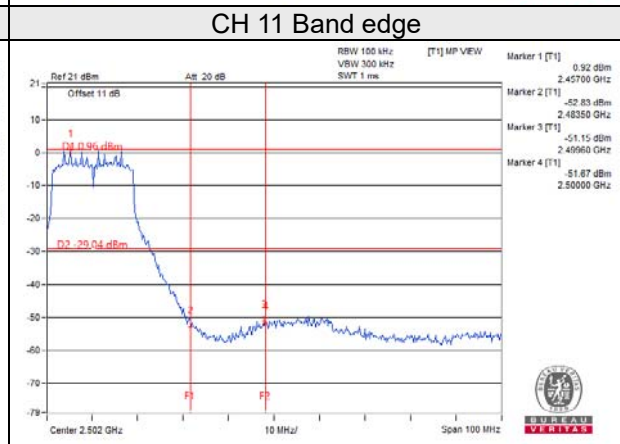
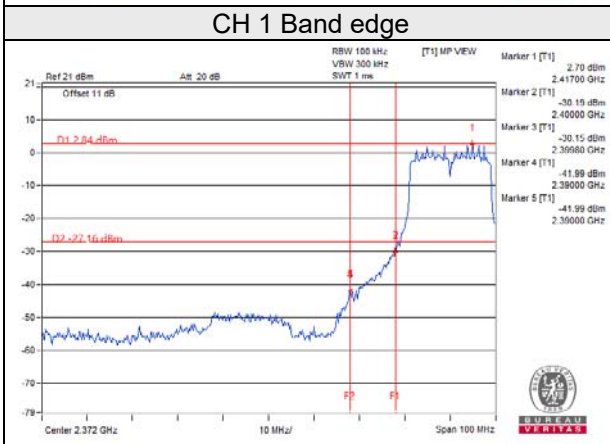
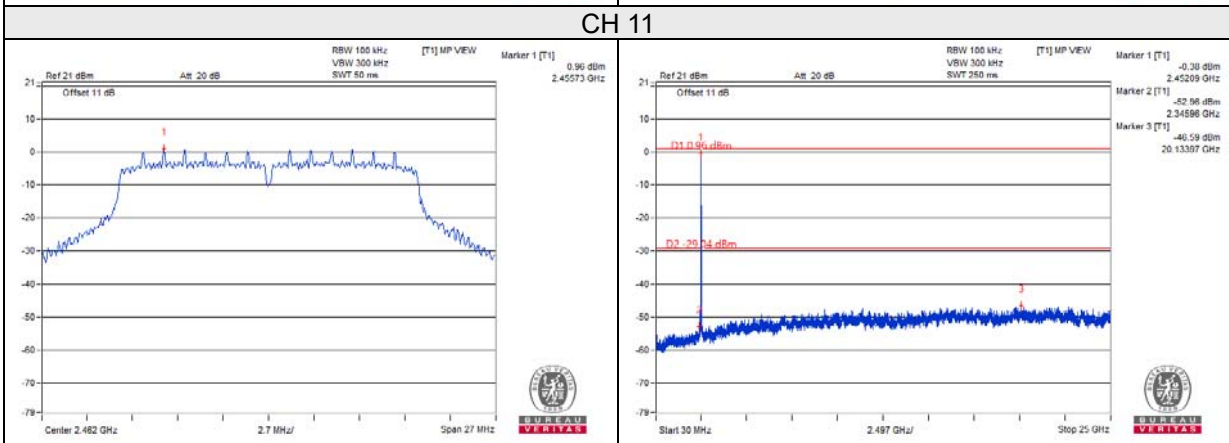
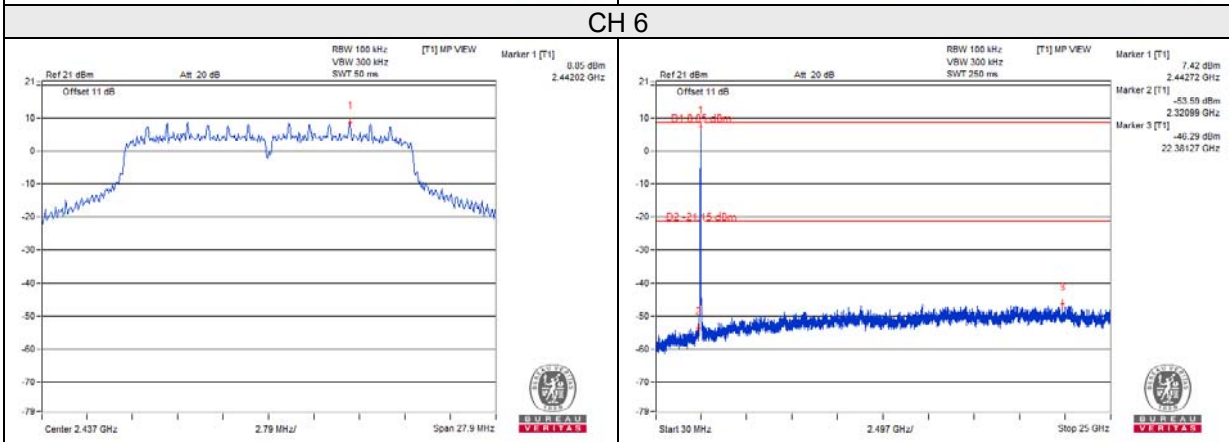
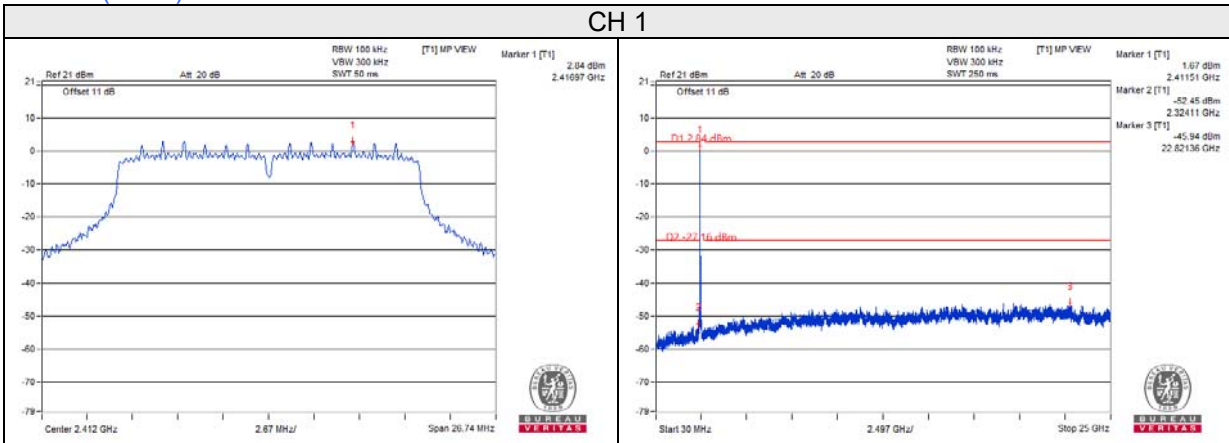
**Test Mode A**  
**Scanning radio: CDD Mode**  
**802.11b**



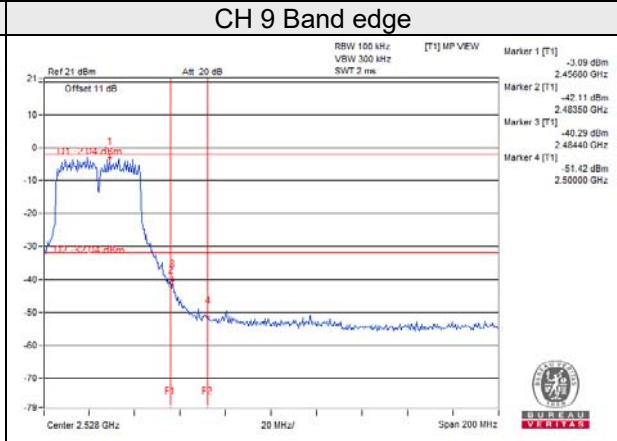
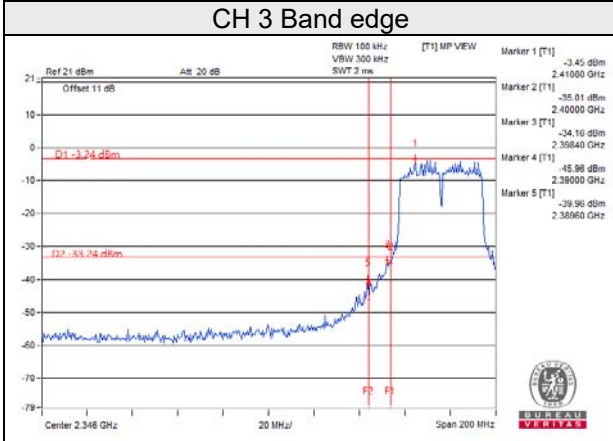
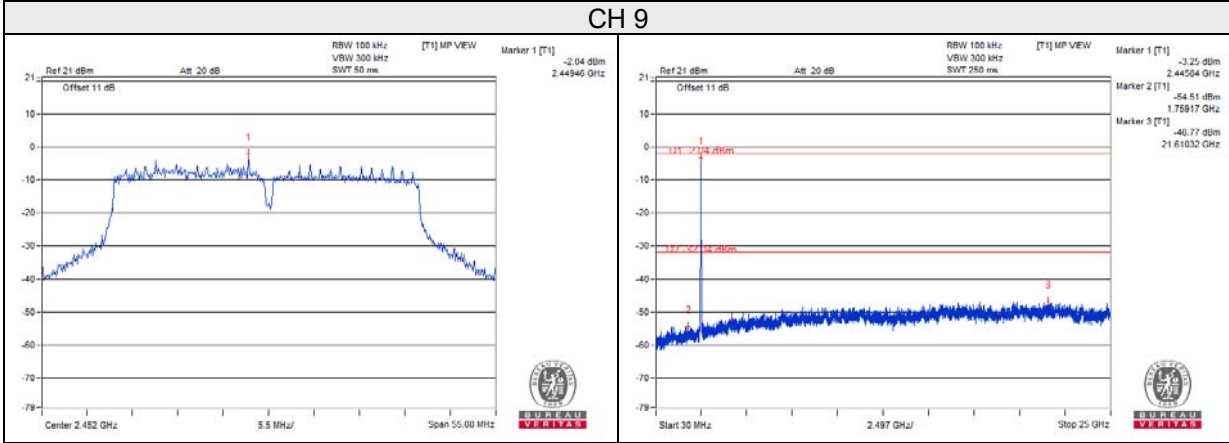
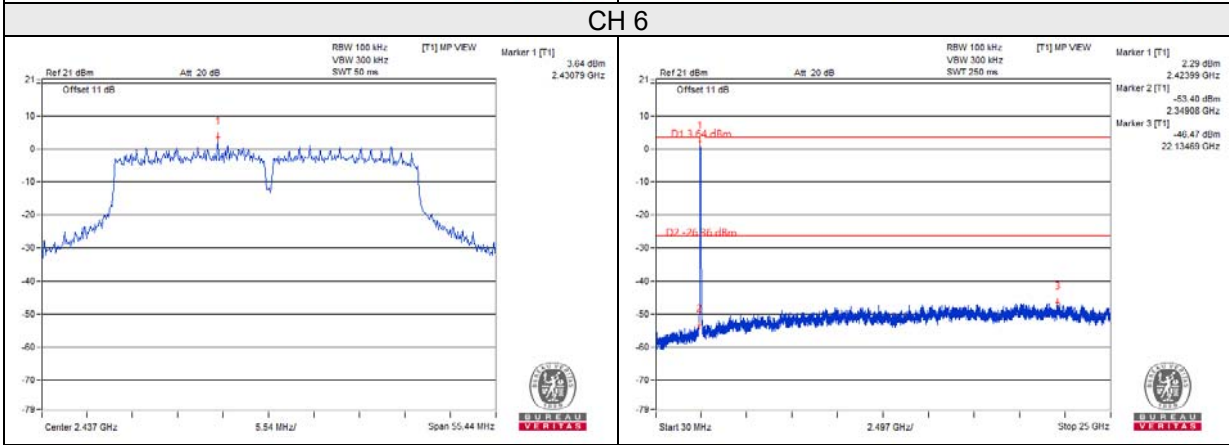
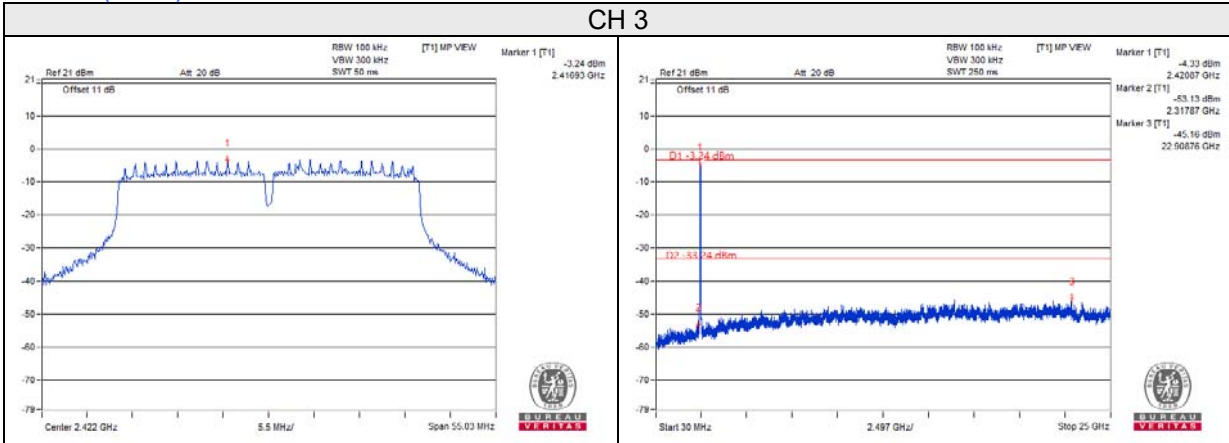
802.11g



802.11n (HT20)



802.11n (HT40)



## 5 Pictures of Test Arrangements

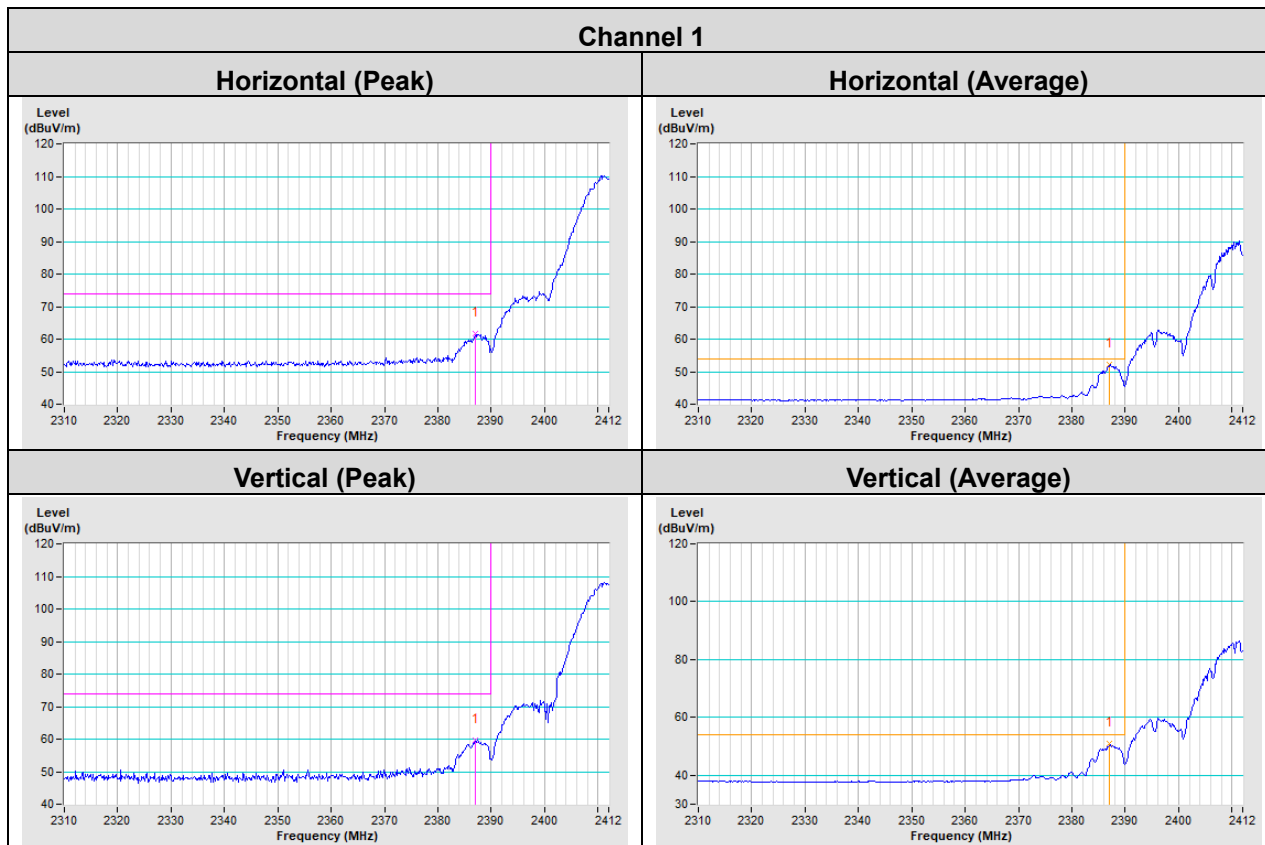
Please refer to the attached file (Test Setup Photo).

# Annex A- Band Edge Measurement

Test Mode A

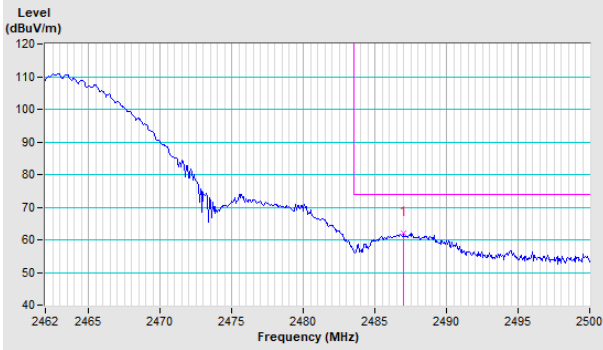
2G traffic radio: CDD Mode

802.11b

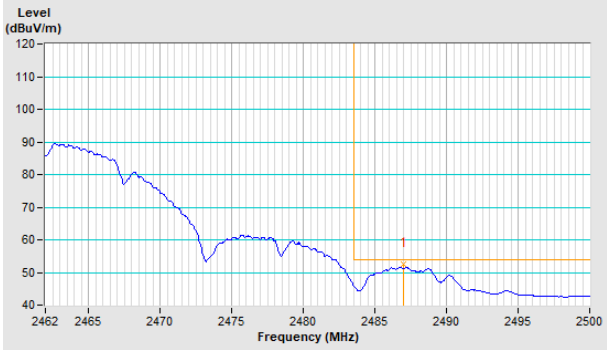


**Channel 11**

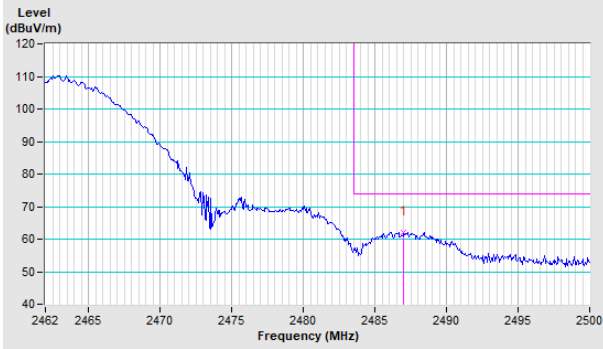
**Horizontal (Peak)**



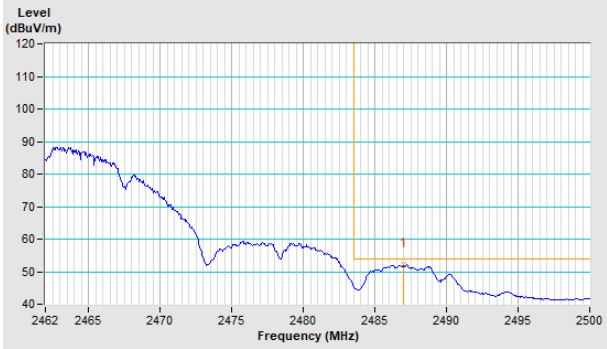
**Horizontal (Average)**



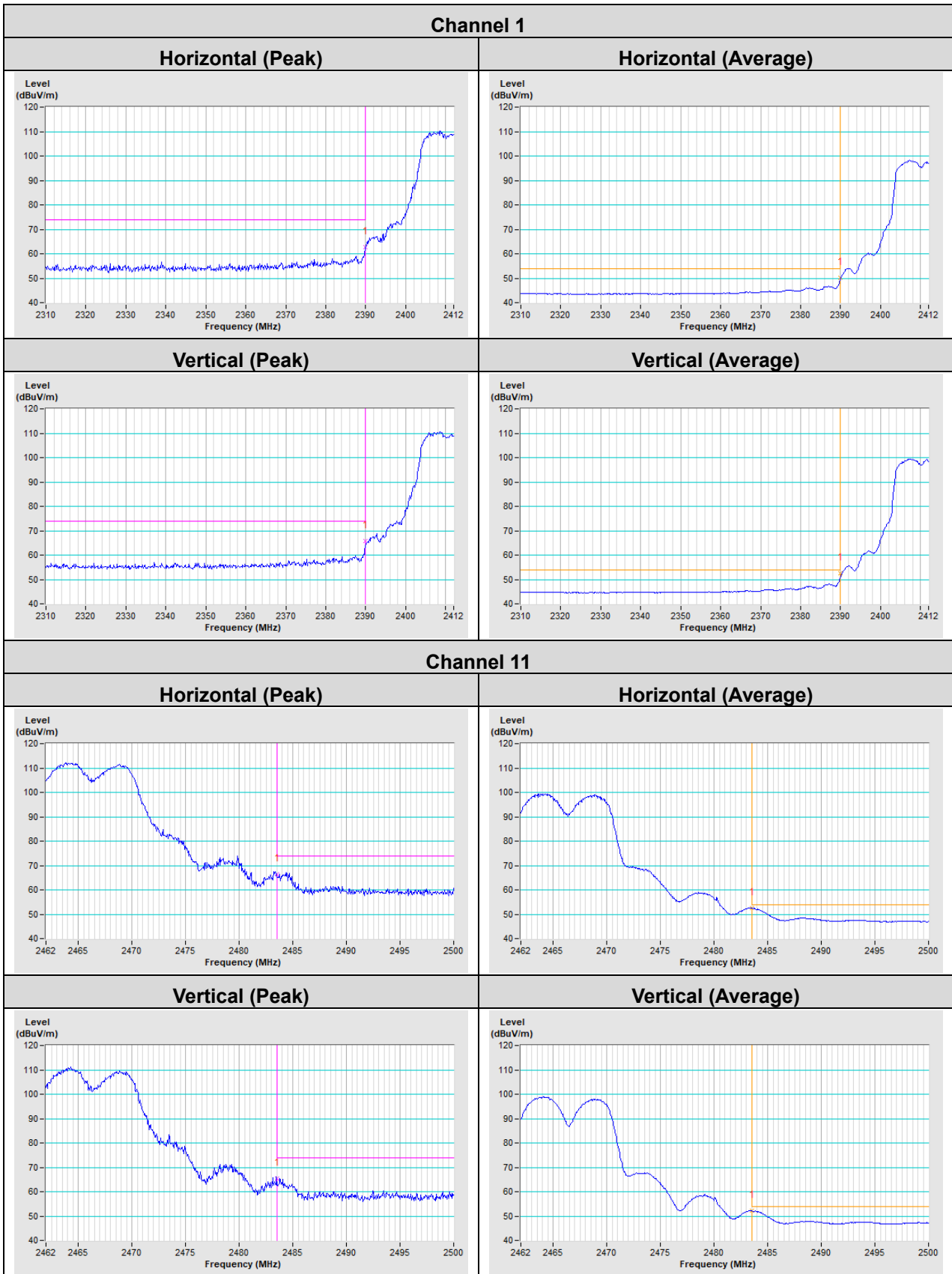
**Vertical (Peak)**



**Vertical (Average)**

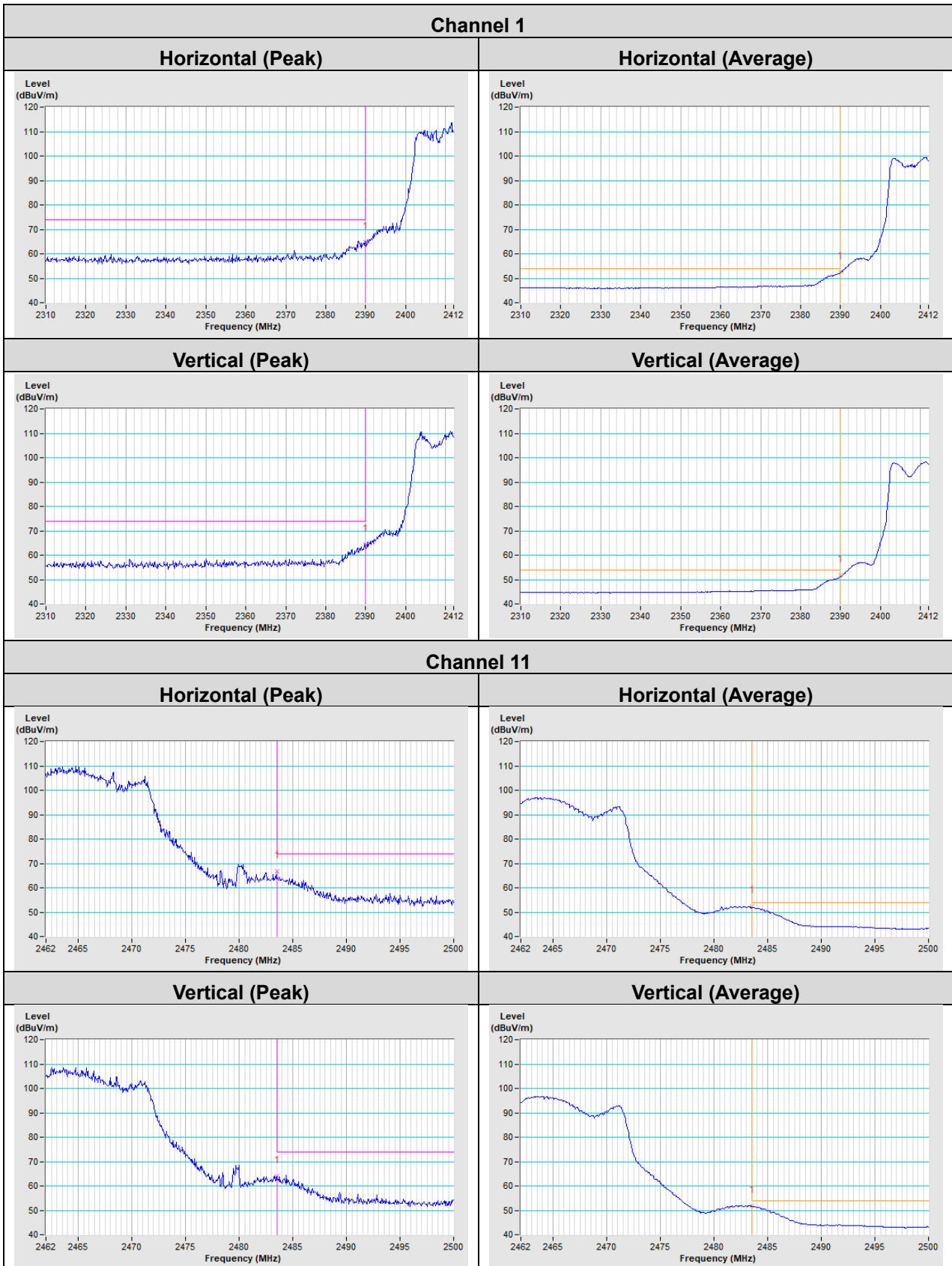


802.11g

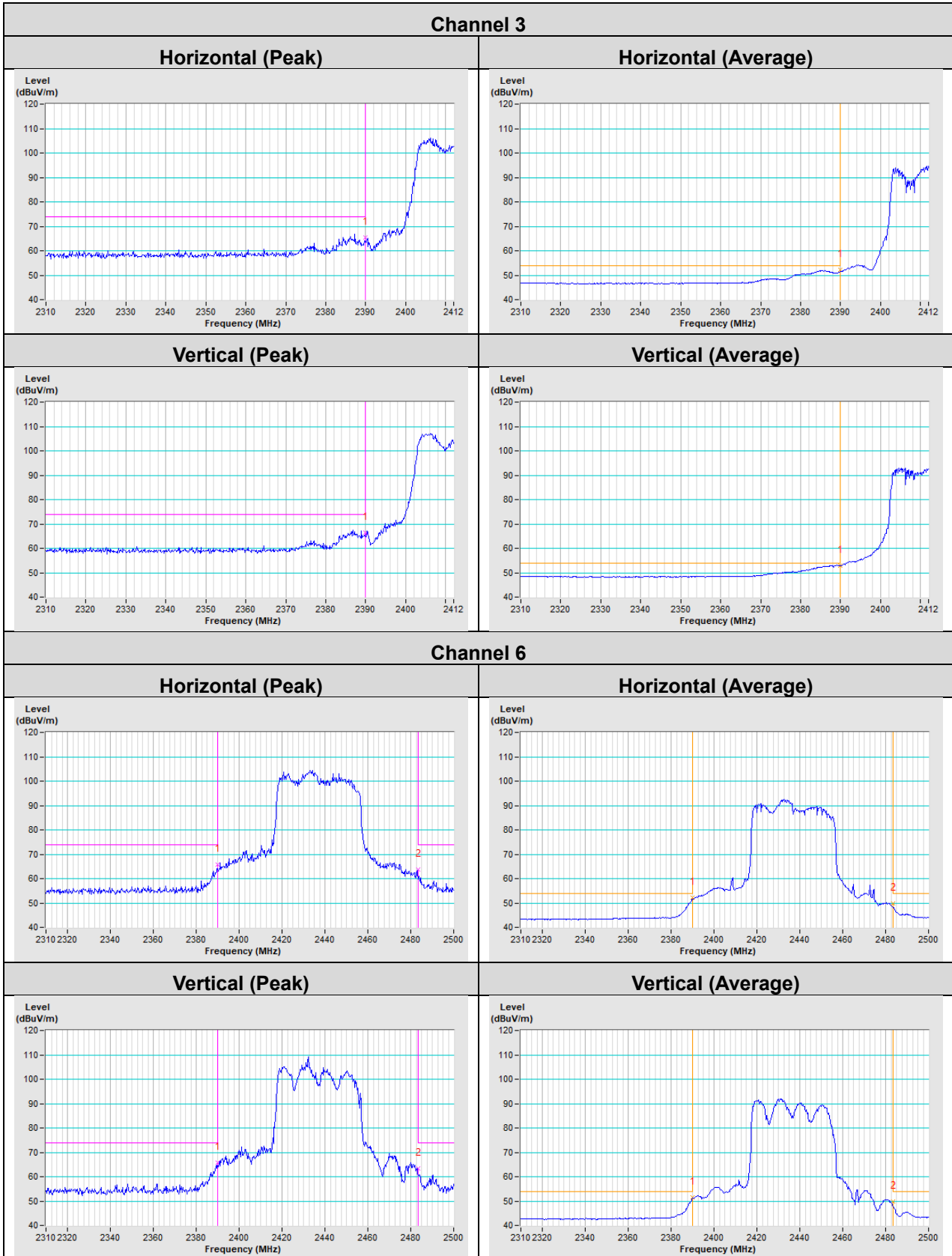




802.11ax (HE20)

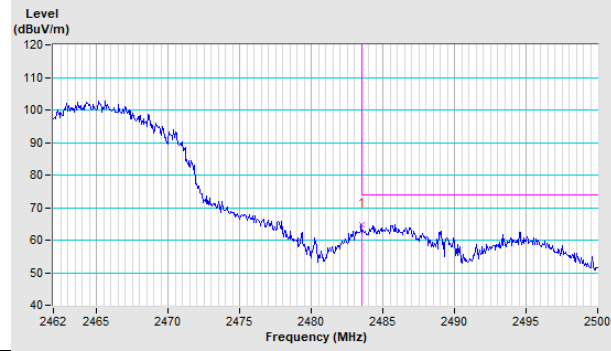


802.11ax (HE40)

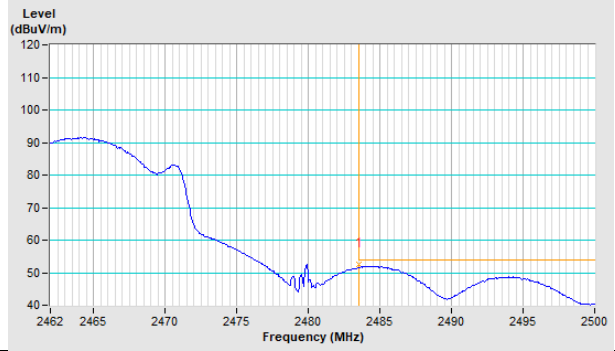


**Channel 9**

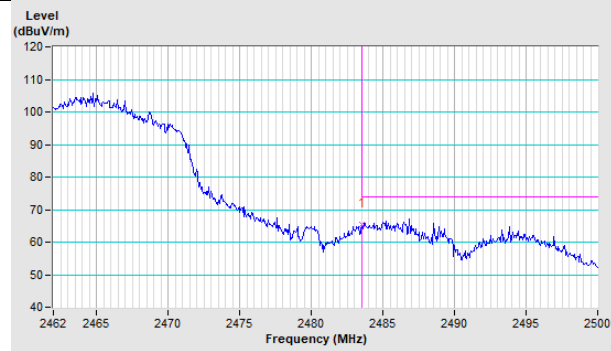
**Horizontal (Peak)**



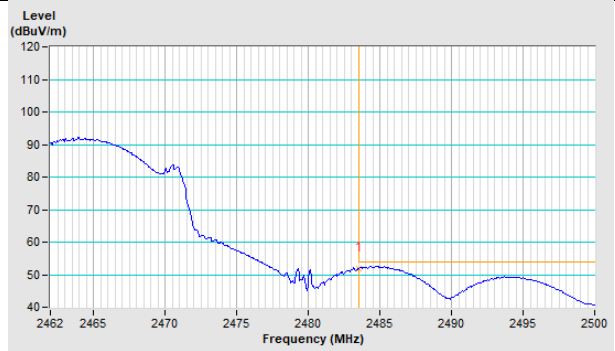
**Horizontal (Average)**



**Vertical (Peak)**



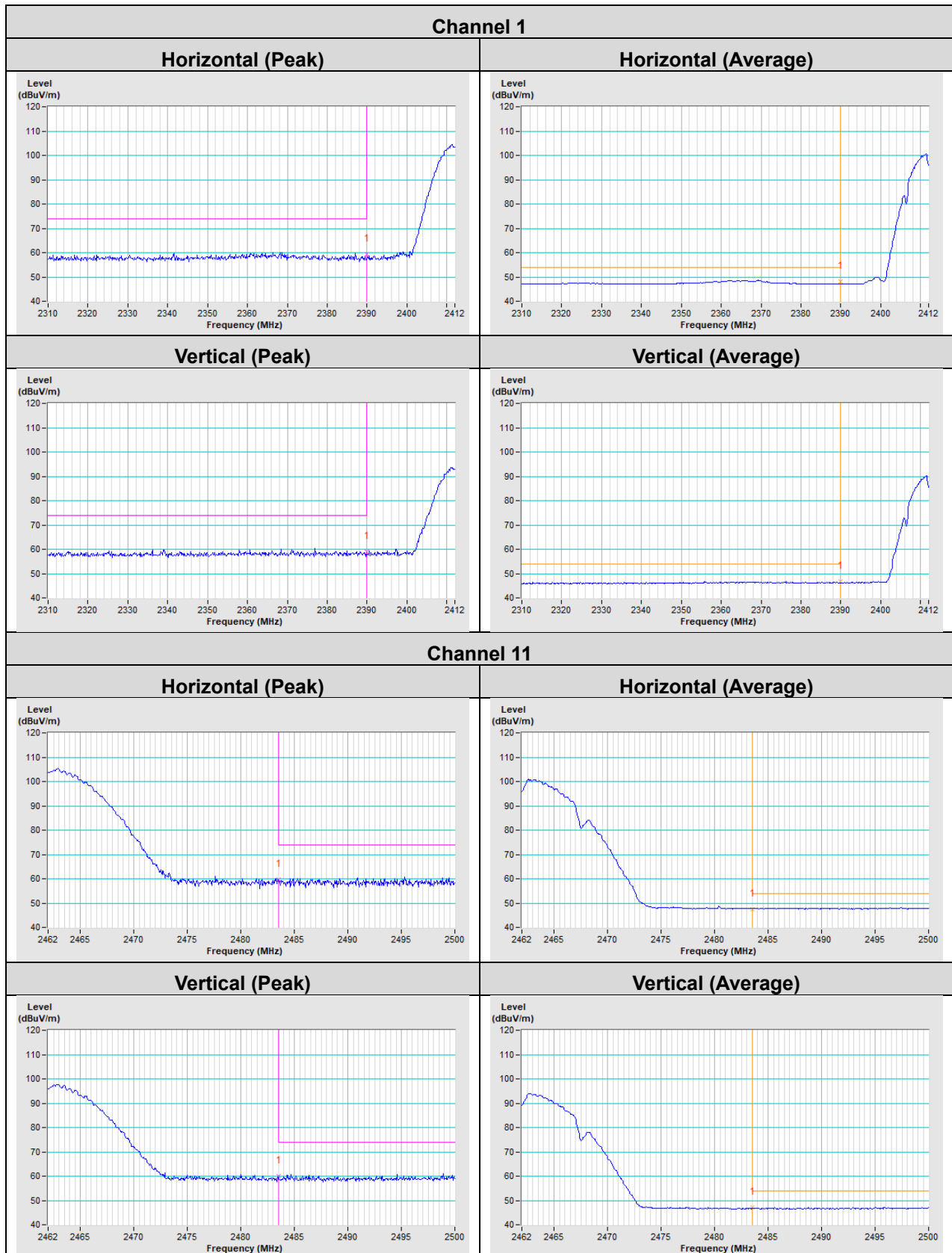
**Vertical (Average)**



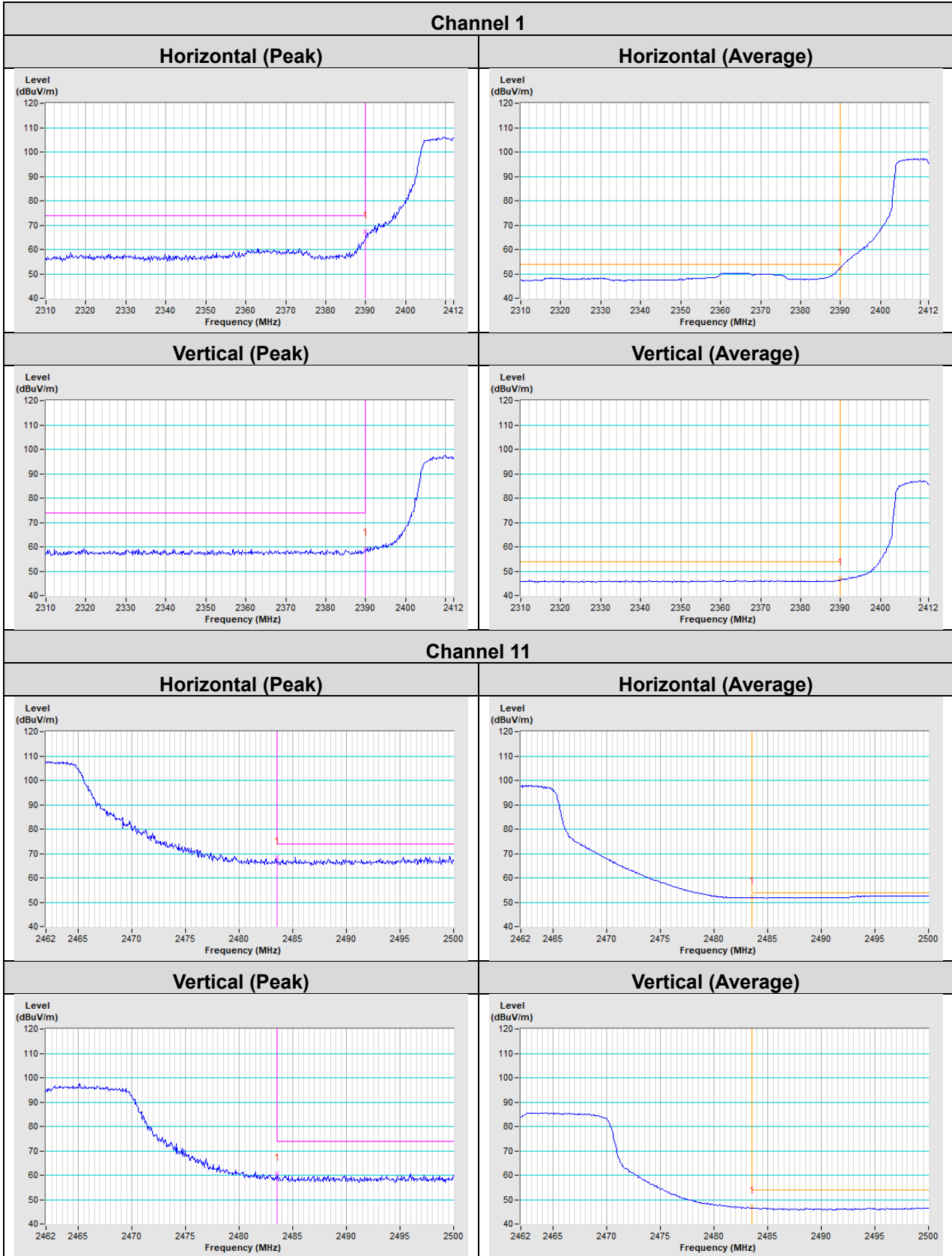
**Test Mode A**

Scanning radio: CDD Mode

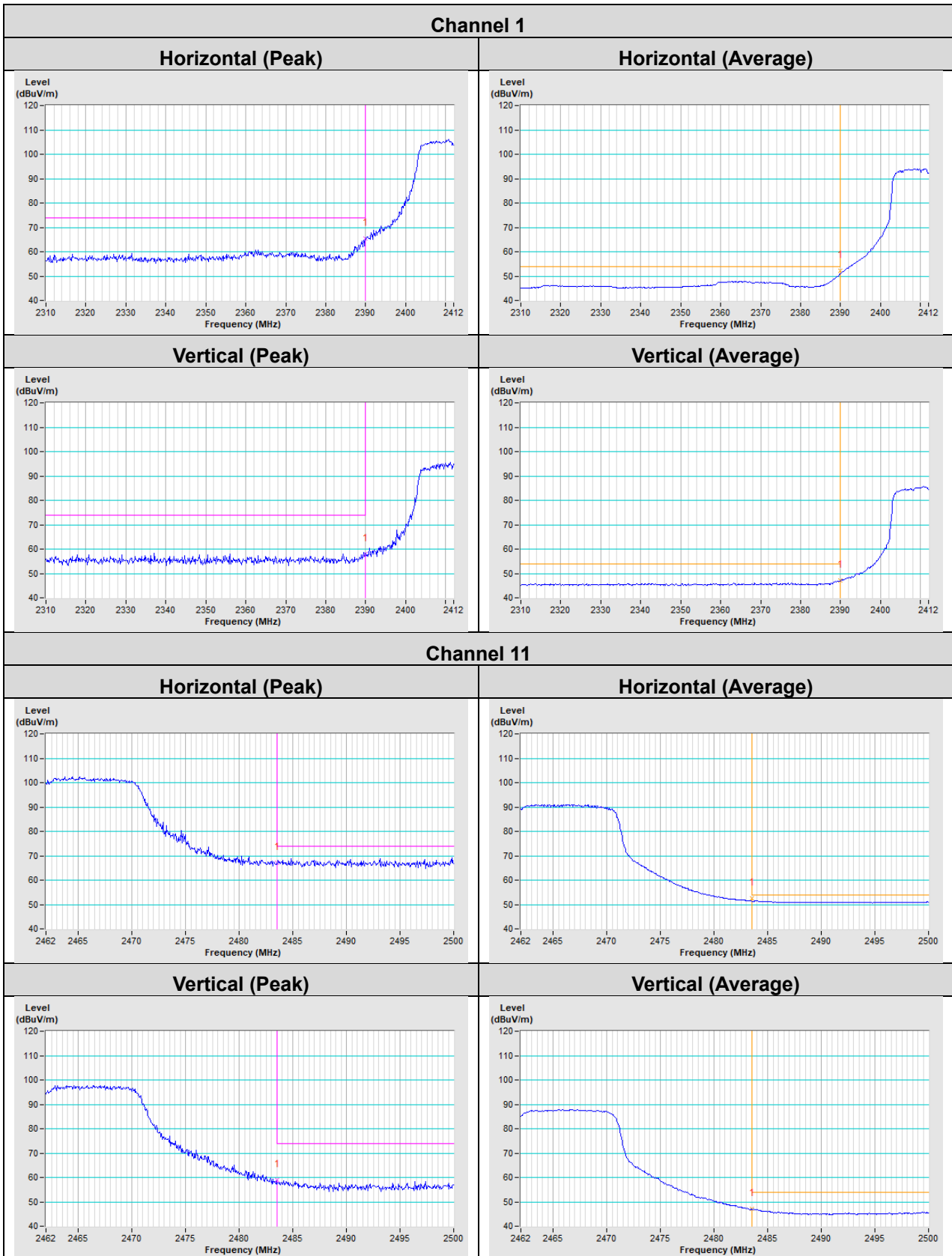
802.11b



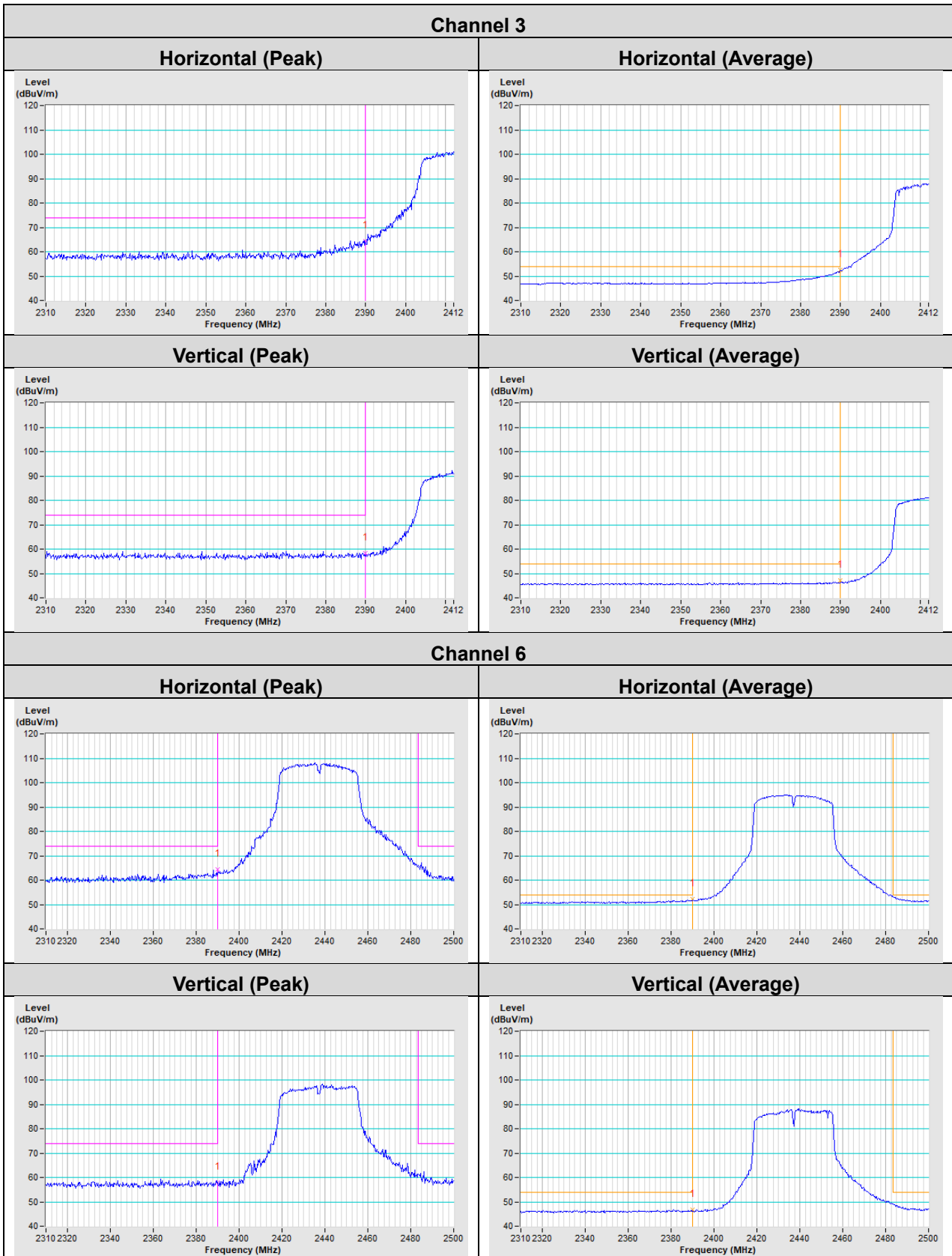
802.11g



802.11n (HT20)

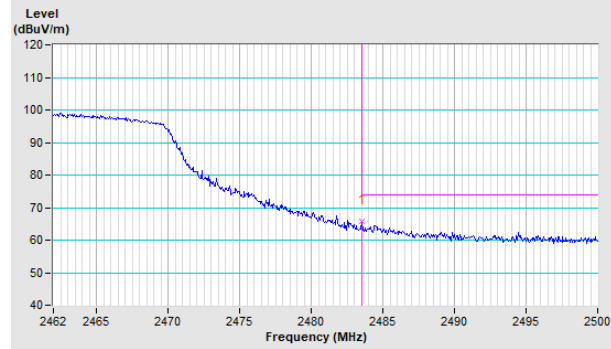


802.11n (HT40)

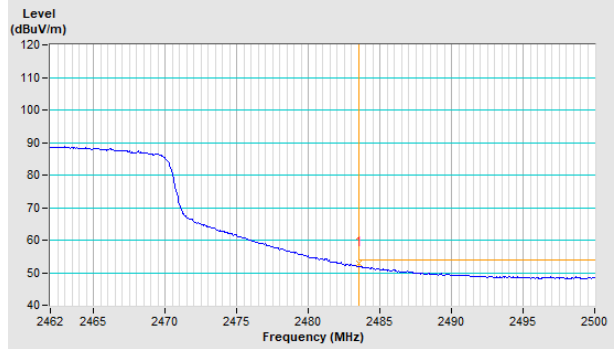


**Channel 9**

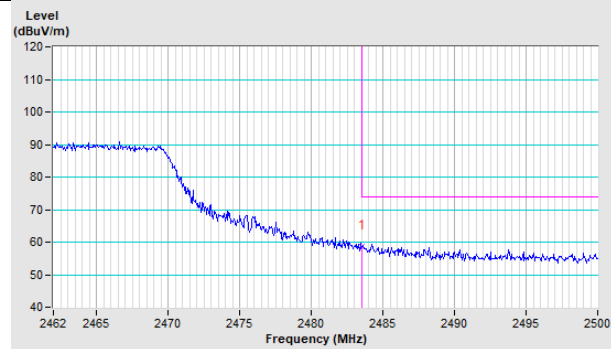
**Horizontal (Peak)**



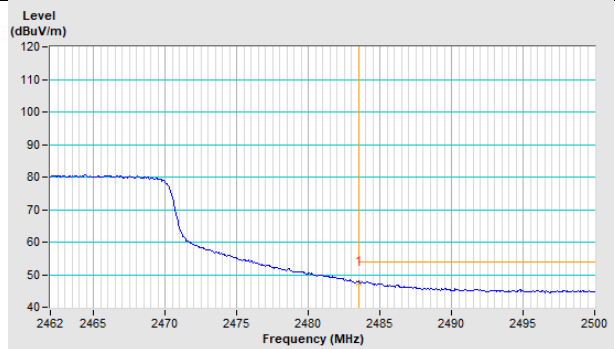
**Horizontal (Average)**



**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 and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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**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.

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