

FCC Test Report

Report No.: RFBDYS-WTW-P22090601

FCC ID: Q6G-AP332CR

Test Model: AP332CR

Received Date: May 20, 2022

Test Date: Sep. 14 ~ Sep. 20, 2022

Issued Date: Sep. 23, 2022

Applicant: WatchGuard Technologies, Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number (1):** 788550 / TW0003

Test Location (2): No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

**FCC Registration /
Designation Number (2):** 281270 / TW0032



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Release Control Record

Issue No.	Description	Date Issued
RFBDYS-WTW-P22090601	Original release	Sep. 23, 2022

1 Certificate of Conformity

Product: Wireless Access Point

Brand: WatchGuard

Test Model: AP332CR

Sample Status: Engineering sample

Applicant: WatchGuard Technologies, Inc.

Test Date: Sep. 14 ~ Sep. 20, 2022

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

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

Prepared by : Pettie Chen, **Date:** Sep. 23, 2022
Pettie Chen / Senior Specialist

Approved by : Jeremy Lin, **Date:** Sep. 23, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -4.51dB at 0.53125MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.6dB at 2483.50MHz.
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 R-SMA not a standard connector.

Note:

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~ 1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless Access Point
Brand	WatchGuard
Test Model	AP332CR
Sample Status	Engineering sample
Power Supply Rating	54Vdc (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: up to 400Mbps 802.11ax: up to 574Mbps
Operating Frequency	2412 ~ 2462MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), 802.11n (VHT20), 802.11ax (HE20): 11 802.11n (HT40), 802.11n (VHT40), 802.11ax (HE40): 7
Output Power	CDD Mode: 374.350mW Beamforming Mode: 337.798mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	POE
Cable Supplied	1.75m non-shielded ground cable without core

Note:

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

Modulation Mode	Beamforming Mode	TX Function
802.11b	Not Support	2TX
802.11g	Not Support	2TX
802.11n (HT20)	Support	2TX
802.11n (HT40)	Support	2TX
802.11n (VHT20)	Support	2TX
802.11n (VHT40)	Support	2TX
802.11ax (HE20)	Support	2TX
802.11ax (HE40)	Support	2TX

* 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, 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.

* EUT supports full-RU only

2. The EUT consumes power from the following PoE (support unit only).

Brand	EnGenius
Model	EPA5006GP
Input Power	100-240Vac, 0.8A, 50-60Hz
Output Power	54Vdc, 0.6A PIN 4,5: 54Vdc
Power Line	0.5m non-shielded AC power cable without core

3. There are 2 radios for the EUT.

Radio	Function	TX/RX Function
1	WLAN 2.4G	2TX / 2RX
2	WLAN 5G	2TX / 2RX

4. The EUT with follow antennas gain is listed as table below.

Ant. Type	Dipole			
Connector	R-SMA			
Gain (dBi)				
Frequency (MHz)	2400 ~ 2483.5MHz	5150~5350MHz	5470~5725MHz	5715~5850MHz
Ant. 1	5.17	-	-	-
Ant. 2	5.17	-	-	-
Ant. 3	-	5.12	5.17	5.17
Ant. 4	-	5.12	5.17	5.17

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

5. 2.4GHz (Radio 1) & 5GHz (Radio 2) technology can transmit at same time.

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≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement

PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

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.

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)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11ax (HE20)	1 to 11	1, 6, 11	OFDM	OFDMA	MCS0
-	802.11ax (HE40)	3 to 9	3, 6, 9	OFDM	OFDMA	MCS0

Radiated Emission Test (Below 1GHz):

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	1 to 11	6	OFDM	BPSK	6.0

Power Line Conducted Emission Test:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11g	1 to 11	6	OFDM	BPSK	6.0

Conducted Output Power 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)
-	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 (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
-	802.11ax (HE20)	1 to 11	1, 6, 11	OFDM	OFDMA	MCS0
-	802.11ax (HE40)	3 to 9	3, 6, 9	OFDM	OFDMA	MCS0

Bandwidth, Power Spectral Density and Conducted Out of Band Emission 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)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11ax (HE20)	1 to 11	1, 6, 11	OFDM	OFDMA	MCS0
-	802.11ax (HE40)	3 to 9	3, 6, 9	OFDM	OFDMA	MCS0

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	23 deg. C, 67% RH	120Vac, 60Hz	Adair Peng
RE<1G	21 deg. C, 68% RH	120Vac, 60Hz	Thomas Cheng
PLC	21.4 deg. C, 68.1% RH	120Vac, 60Hz	Thomas Cheng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Alan Wu

3.3 Duty Cycle of Test Signal

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

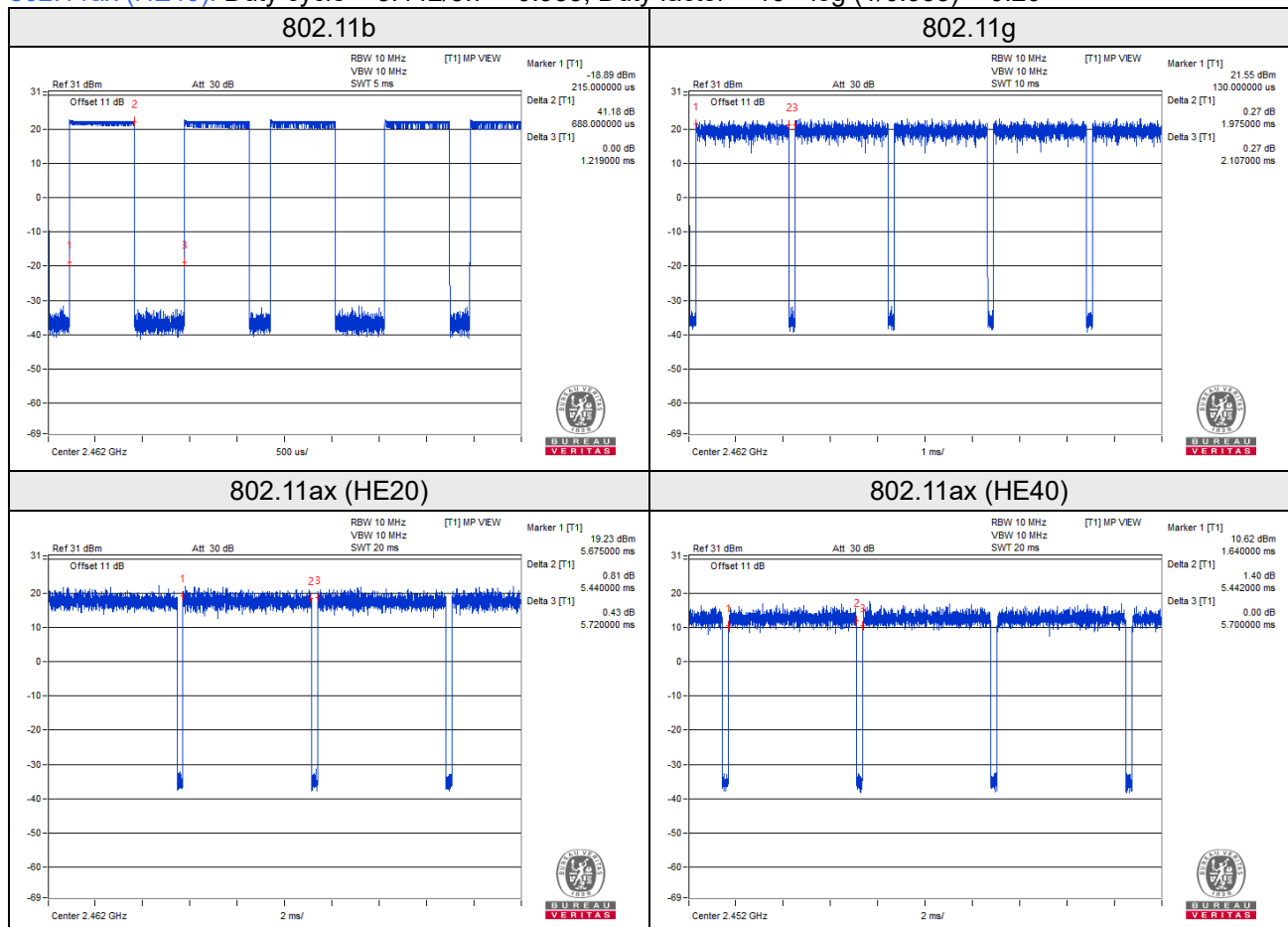
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = $0.688 / 1.219 = 0.561$, Duty factor = $10 * \log(1/0.561) = 2.48$

802.11g: Duty cycle = $1.975 / 2.107 = 0.937$, Duty factor = $10 * \log(1/0.937) = 0.28$

802.11ax (HE20): Duty cycle = $5.44 / 5.72 = 0.951$, Duty factor = $10 * \log(1/0.951) = 0.22$

802.11ax (HE40): Duty cycle = $5.442 / 5.7 = 0.955$, Duty factor = $10 * \log(1/0.955) = 0.20$



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.

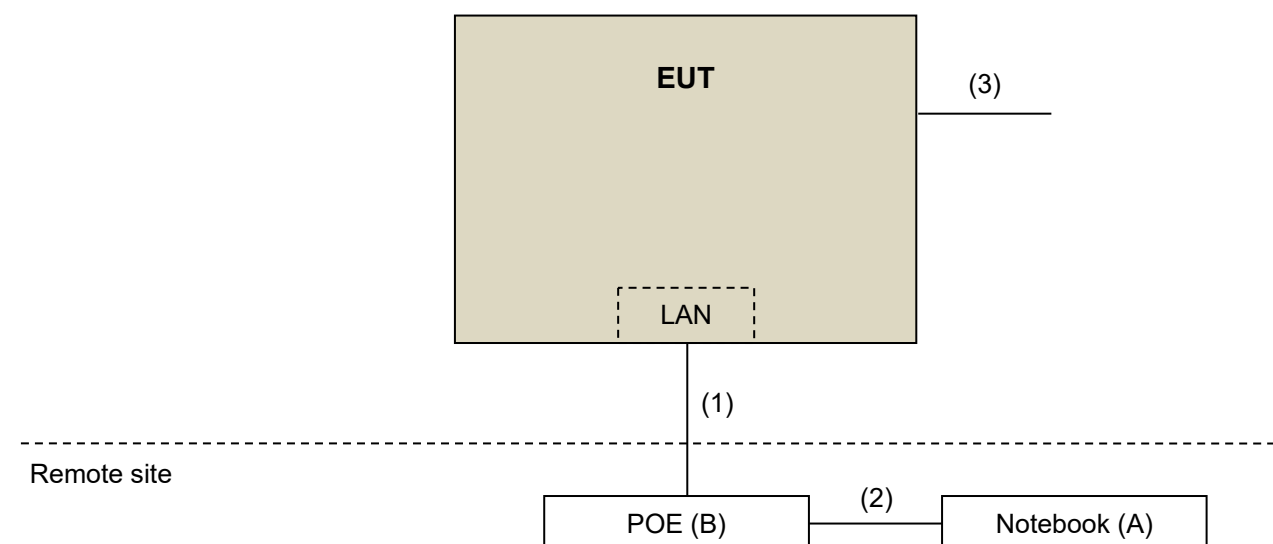
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-
B.	PoE	EnGenius	EPA5006GP	NA	NA	Provided by client

Note:

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

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1.5	N	0	RJ45, Cat5e
2.	LAN cable	1	7	N	0	RJ45, Cat5e
3.	Ground cable	1	1.75	N	0	Accessory of EUT

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

Test standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

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

Note:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Rohde & Schwarz	N9038A	MY55420137	Apr. 27, 2022	Apr. 26, 2023
Spectrum Analyzer KEYSIGHT	N9020B	MY60110440	Dec. 09, 2021	Dec. 08, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-1213	Oct. 27, 2021	Oct. 26, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	9170-995	Nov. 14, 2021	Nov. 13, 2022
Loop Antenna TESEQ	HLA 6121	45745	Jul. 27, 2022	Jul. 26, 2023
Preamplifier EMCI	EMC330N	980782	Jan. 17, 2022	Jan. 16, 2023
Preamplifier EMCI	EMC118A45SE	980808	Dec. 30, 2021	Dec. 29, 2022
Preamplifier EMCI	EMC184045SE	980788	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC104-SM-SM-(90 00+2000+1000)	201243+ 201231+ 210102	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMCCFD400-NM-N M-(9000+300+500)	201236+ 201235+ 201233	Jan. 17, 2022	Jan. 16, 2023
RF signal cable EMCI	EMC101G-KM-KM-(5 000+3000+2000)	201260+201257+2012 54	Jan. 17, 2022	Jan. 16, 2023
Software BV ADT	ADT_Radiated_V7.6. 15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Max-Full	MF-7802BS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208674	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY551900 04/MY55190007/MY5521 0005	Jul. 13, 2022	Jul. 12, 2023

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in WM Chamber 8.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

Note:

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

For Radiated emission above 30MHz

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

Note:

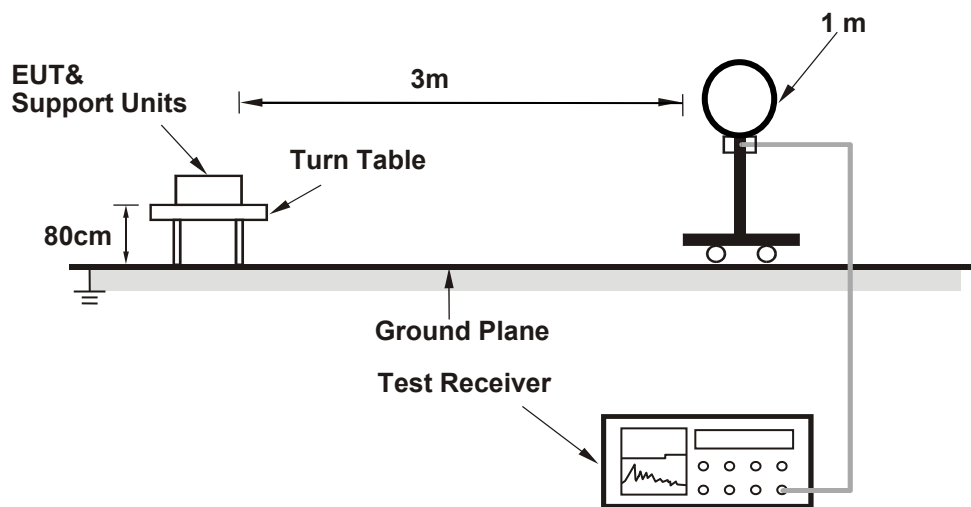
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz. (802.11b: RBW = 1MHz, VBW = 3kHz; 802.11g: RBW = 1MHz, VBW = 1kHz; 802.11ax (HE20): RBW = 1MHz, VBW = 1kHz; 802.11ax (HE40): 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

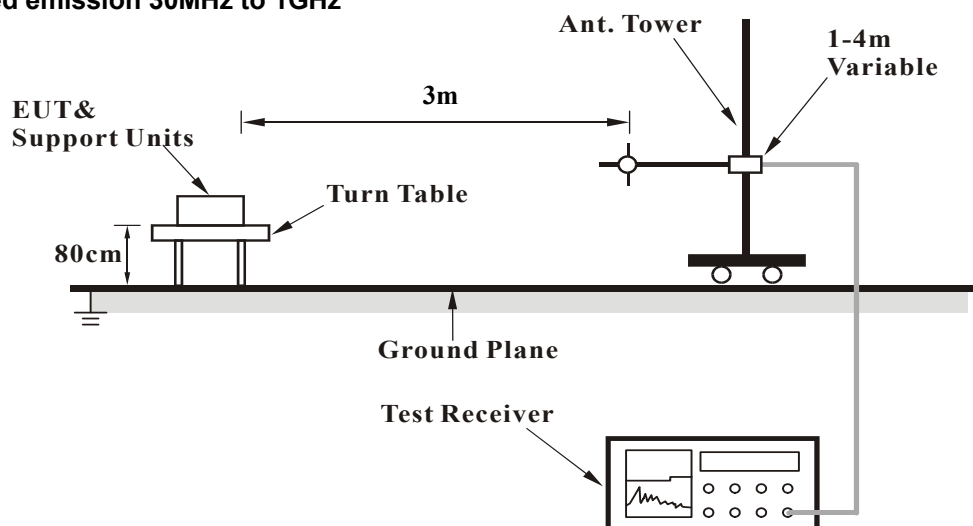
No deviation.

4.1.5 Test Setup

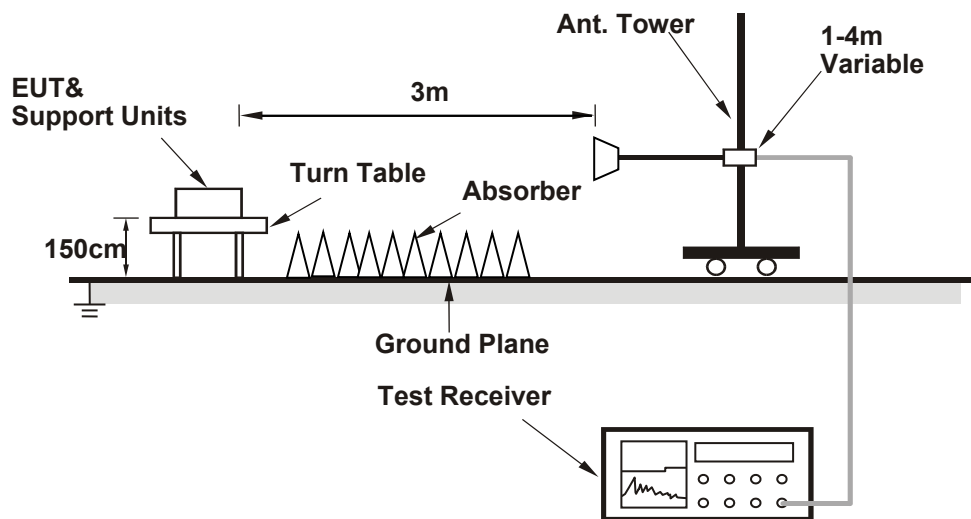
For Radiated emission below 30MHz



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

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

4.1.7 Test Results

Above 1GHz Data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.80	58.3 PK	74.0	-15.7	1.55 H	177	24.4	33.9
2	2386.80	45.9 AV	54.0	-8.1	1.55 H	177	12.0	33.9
3	*2412.00	102.7 PK			1.42 H	166	68.9	33.8
4	*2412.00	100.2 AV			1.42 H	166	66.4	33.8
5	4824.00	53.2 PK	74.0	-20.8	1.46 H	324	42.3	10.9
6	4824.00	43.9 AV	54.0	-10.1	1.46 H	324	33.0	10.9
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	2386.80	62.2 PK	74.0	-11.8	2.22 V	235	28.3	33.9
2	2386.80	52.9 AV	54.0	-1.1	2.22 V	235	19.0	33.9
3	*2412.00	116.0 PK			2.18 V	171	82.2	33.8
4	*2412.00	113.4 AV			2.18 V	171	79.6	33.8
5	4824.00	56.1 PK	74.0	-17.9	3.26 V	202	45.2	10.9
6	4824.00	51.0 AV	54.0	-3.0	3.26 V	202	40.1	10.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
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	*2437.00	105.4 PK			1.46 H	169	71.6	33.8
2	*2437.00	102.7 AV			1.46 H	169	68.9	33.8
3	4874.00	54.7 PK	74.0	-19.3	1.51 H	329	43.6	11.1
4	4874.00	45.9 AV	54.0	-8.1	1.51 H	329	34.8	11.1
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	118.6 PK			2.11 V	178	84.8	33.8
2	*2437.00	116.0 AV			2.11 V	178	82.2	33.8
3	4874.00	57.8 PK	74.0	-16.2	3.20 V	204	46.7	11.1
4	4874.00	52.9 AV	54.0	-1.1	3.20 V	204	41.8	11.1

Remarks:

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

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	102.8 PK			1.47 H	163	69.0	33.8
2	*2462.00	100.0 AV			1.47 H	163	66.2	33.8
3	2483.50	59.0 PK	74.0	-15.0	1.59 H	178	25.2	33.8
4	2483.50	47.9 AV	54.0	-6.1	1.59 H	178	14.1	33.8
5	4924.00	52.2 PK	74.0	-21.8	1.48 H	318	41.1	11.1
6	4924.00	42.9 AV	54.0	-11.1	1.48 H	318	31.8	11.1
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	116.3 PK			2.11 V	176	82.5	33.8
2	*2462.00	113.8 AV			2.11 V	176	80.0	33.8
3	2483.50	62.1 PK	74.0	-11.9	2.14 V	171	28.3	33.8
4	2483.50	53.3 AV	54.0	-0.7	2.14 V	171	19.5	33.8
5	4924.00	55.1 PK	74.0	-18.9	3.05 V	203	44.0	11.1
6	4924.00	49.8 AV	54.0	-4.2	3.05 V	203	38.7	11.1

Remarks:

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

802.11g

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	57.8 PK	74.0	-16.2	1.59 H	176	23.9	33.9
2	2390.00	45.6 AV	54.0	-8.4	1.59 H	176	11.7	33.9
3	*2412.00	101.5 PK			1.43 H	168	67.7	33.8
4	*2412.00	91.6 AV			1.43 H	168	57.8	33.8
5	4824.00	50.4 PK	74.0	-23.6	1.68 H	205	39.5	10.9
6	4824.00	37.5 AV	54.0	-16.5	1.68 H	205	26.6	10.9
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	1.59 V	25	32.6	33.9
2	2390.00	53.3 AV	54.0	-0.7	1.59 V	25	19.4	33.9
3	*2412.00	116.5 PK			1.61 V	25	82.7	33.8
4	*2412.00	106.5 AV			1.61 V	25	72.7	33.8
5	4824.00	51.9 PK	74.0	-22.1	1.78 V	51	41.0	10.9
6	4824.00	41.4 AV	54.0	-12.6	1.78 V	51	30.5	10.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
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	*2437.00	107.5 PK			1.48 H	171	73.7	33.8
2	*2437.00	62.9 AV			1.48 H	171	63.4	-0.5
3	4874.00	51.4 PK	74.0	-22.6	1.63 H	212	40.3	11.1
4	4874.00	38.3 AV	54.0	-15.7	1.63 H	212	27.2	11.1
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	122.5 PK			1.61 V	26	88.7	33.8
2	*2437.00	112.1 AV			1.61 V	26	78.3	33.8
3	4874.00	53.0 PK	74.0	-21.0	1.80 V	52	41.9	11.1
4	4874.00	42.2 AV	54.0	-11.8	1.80 V	52	31.1	11.1

Remarks:

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

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	100.2 PK			1.51 H	170	66.4	33.8
2	*2462.00	89.9 AV			1.51 H	170	56.1	33.8
3	2483.50	59.3 PK	74.0	-14.7	1.69 H	161	25.5	33.8
4	2483.50	47.2 AV	54.0	-6.8	1.69 H	161	13.4	33.8
5	4924.00	46.4 PK	74.0	-27.6	1.73 H	209	39.9	6.5
6	4924.00	33.5 AV	54.0	-20.5	1.73 H	209	27.0	6.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	114.7 PK			1.69 V	30	80.9	33.8
2	*2462.00	104.9 AV			1.69 V	30	71.1	33.8
3	2483.50	66.0 PK	74.0	-8.0	2.22 V	20	32.2	33.8
4	2483.50	53.2 AV	54.0	-0.8	2.22 V	20	19.4	33.8
5	4924.00	52.5 PK	74.0	-21.5	1.82 V	50	41.4	11.1
6	4924.00	41.7 AV	54.0	-12.3	1.82 V	50	30.6	11.1

Remarks:

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

802.11ax (HE20)

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	59.9 PK	74.0	-14.1	1.69 H	175	26.0	33.9
2	2390.00	45.7 AV	54.0	-8.3	1.69 H	175	11.8	33.9
3	*2412.00	101.8 PK			1.80 H	188	68.0	33.8
4	*2412.00	89.2 AV			1.80 H	188	55.4	33.8
5	4824.00	45.1 PK	74.0	-28.9	1.79 H	222	38.5	6.6
6	4824.00	34.2 AV	54.0	-19.8	1.79 H	222	27.6	6.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.5 PK	74.0	-8.5	1.76 V	28	31.6	33.9
2	2390.00	53.0 AV	54.0	-1.0	1.76 V	28	19.1	33.9
3	*2412.00	106.6 PK			1.78 V	31	72.8	33.8
4	*2412.00	103.8 AV			1.78 V	31	70.0	33.8
5	4824.00	50.9 PK	74.0	-23.1	1.91 V	57	40.0	10.9
6	4824.00	41.6 AV	54.0	-12.4	1.91 V	57	30.7	10.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. Margin value = Emission Level – Limit value.
4. The other emission levels were very low against the limit.
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	*2437.00	109.3 PK			1.77 H	170	75.5	33.8
2	*2437.00	96.1 AV			1.77 H	170	62.3	33.8
3	4874.00	50.5 PK	74.0	-23.5	1.62 H	208	39.4	11.1
4	4874.00	38.9 AV	54.0	-15.1	1.62 H	208	27.8	11.1
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	124.1 PK			1.60 V	29	90.3	33.8
2	*2437.00	110.9 AV			1.60 V	29	77.1	33.8
3	4874.00	51.9 PK	74.0	-22.1	1.93 V	52	40.8	11.1
4	4874.00	42.6 AV	54.0	-11.4	1.93 V	52	31.5	11.1

Remarks:

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

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	102.1 PK			1.61 H	165	68.3	33.8
2	*2462.00	88.4 AV			1.61 H	165	54.6	33.8
3	2483.50	58.3 PK	74.0	-15.7	1.58 H	177	24.5	33.8
4	2483.50	47.1 AV	54.0	-6.9	1.58 H	177	13.3	33.8
5	4924.00	49.6 PK	74.0	-24.4	1.71 H	215	38.5	11.1
6	4924.00	38.4 AV	54.0	-15.6	1.71 H	215	27.3	11.1
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	116.4 PK			1.76 V	22	82.6	33.8
2	*2462.00	103.3 AV			1.76 V	22	69.5	33.8
3	2483.50	65.0 PK	74.0	-9.0	2.13 V	23	31.2	33.8
4	2483.50	53.1 AV	54.0	-0.9	2.13 V	23	19.3	33.8
5	4924.00	51.3 PK	74.0	-22.7	1.88 V	49	40.2	11.1
6	4924.00	41.9 AV	54.0	-12.1	1.88 V	49	30.8	11.1

Remarks:

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

802.11ax (HE40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.2 PK	74.0	-15.8	1.58 H	172	24.3	33.9
2	2390.00	45.5 AV	54.0	-8.5	1.58 H	172	11.6	33.9
3	*2422.00	96.3 PK			1.47 H	162	62.5	33.8
4	*2422.00	84.0 AV			1.47 H	162	50.2	33.8
5	4844.00	50.3 PK	74.0	-23.7	1.79 H	208	39.3	11.0
6	4844.00	37.7 AV	54.0	-16.3	1.79 H	208	26.7	11.0
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	66.1 PK	74.0	-7.9	1.83 V	18	32.2	33.9
2	2390.00	53.2 AV	54.0	-0.8	1.83 V	18	19.3	33.9
3	*2422.00	112.1 PK			1.91 V	22	78.3	33.8
4	*2422.00	98.8 AV			1.91 V	22	65.0	33.8
5	4844.00	51.5 PK	74.0	-22.5	2.05 V	56	40.5	11.0
6	4844.00	39.5 AV	54.0	-14.5	2.05 V	56	28.5	11.0

Remarks:

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

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	*2437.00	98.9 PK			1.58 H	161	65.1	33.8
2	*2437.00	86.6 AV			1.58 H	161	52.8	33.8
3	2483.50	58.8 PK	74.0	-15.2	1.69 H	177	25.0	33.8
4	2483.50	47.4 AV	54.0	-6.6	1.69 H	177	13.6	33.8
5	4874.00	51.0 PK	74.0	-23.0	1.78 H	215	39.9	11.1
6	4874.00	38.6 AV	54.0	-15.4	1.78 H	215	27.5	11.1
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	113.9 PK			1.80 V	23	80.1	33.8
2	*2437.00	101.5 AV			1.80 V	23	67.7	33.8
3	2483.50	66.1 PK	74.0	-7.9	1.73 V	16	32.3	33.8
4	2483.50	53.3 AV	54.0	-0.7	1.73 V	16	19.5	33.8
5	4874.00	52.0 PK	74.0	-22.0	2.09 V	51	40.9	11.1
6	4874.00	39.9 AV	54.0	-14.1	2.09 V	51	28.8	11.1

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	94.6 PK			1.78 H	177	60.8	33.8
2	*2452.00	82.1 AV			1.78 H	177	48.3	33.8
3	2483.50	59.7 PK	74.0	-14.3	1.63 H	161	25.9	33.8
4	2483.50	47.2 AV	54.0	-6.8	1.63 H	161	13.4	33.8
5	4904.00	51.1 PK	74.0	-22.9	1.60 H	200	40.0	11.1
6	4904.00	38.0 AV	54.0	-16.0	1.60 H	200	26.9	11.1
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	110.9 PK			1.72 V	24	77.1	33.8
2	*2452.00	97.9 AV			1.72 V	24	64.1	33.8
3	2483.50	66.3 PK	74.0	-7.7	2.16 V	26	32.5	33.8
4	2483.50	53.4 AV	54.0	-0.6	2.16 V	26	19.6	33.8
5	4904.00	51.9 PK	74.0	-22.1	2.00 V	56	40.8	11.1
6	4904.00	39.8 AV	54.0	-14.2	2.00 V	56	28.7	11.1

Remarks:

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

Below 1GHz worst-case data:

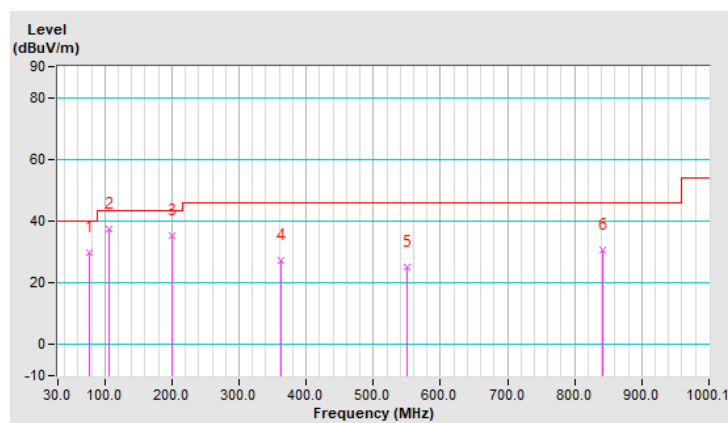
802.11g

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	77.53	30.0 QP	40.0	-10.0	2.23 H	23	47.0	-17.0
2	105.67	37.6 QP	43.5	-5.9	3.82 H	133	53.3	-15.7
3	199.77	35.5 QP	43.5	-8.0	1.76 H	261	51.5	-16.0
4	362.74	27.4 QP	46.0	-18.6	2.23 H	55	37.5	-10.1
5	549.97	25.3 QP	46.0	-20.7	2.91 H	203	30.5	-5.2
6	841.97	30.5 QP	46.0	-15.5	3.70 H	247	29.4	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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

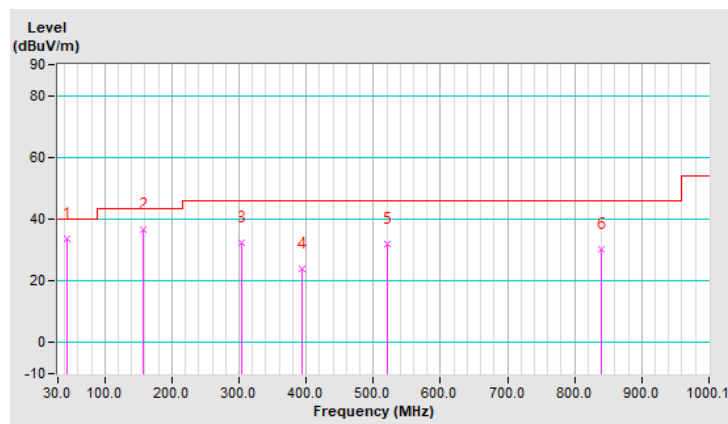


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	44.55	33.8 QP	40.0	-6.2	1.23 V	256	46.6	-12.8
2	158.05	36.6 QP	43.5	-6.9	2.37 V	187	48.9	-12.3
3	304.54	32.4 QP	46.0	-13.6	3.26 V	254	44.3	-11.9
4	392.82	24.0 QP	46.0	-22.0	1.58 V	332	33.4	-9.4
5	520.87	31.9 QP	46.0	-14.1	1.52 V	204	37.6	-5.7
6	839.06	30.4 QP	46.0	-15.6	3.32 V	147	29.3	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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 03, 2021	Dec. 02, 2022
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 15, 2022	Jan. 14, 2023
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Mar. 14, 2022	Mar. 13, 2023
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 12, 2022	Sep. 11, 2023
Software ADT	BV ADT_Conf_ 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

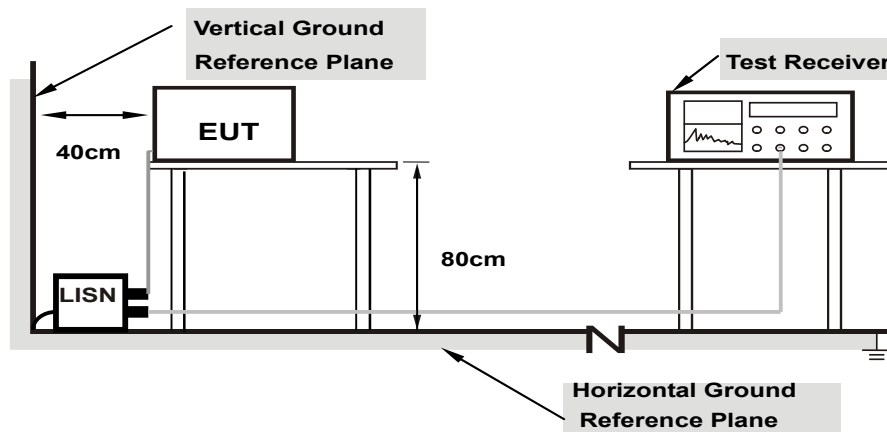
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

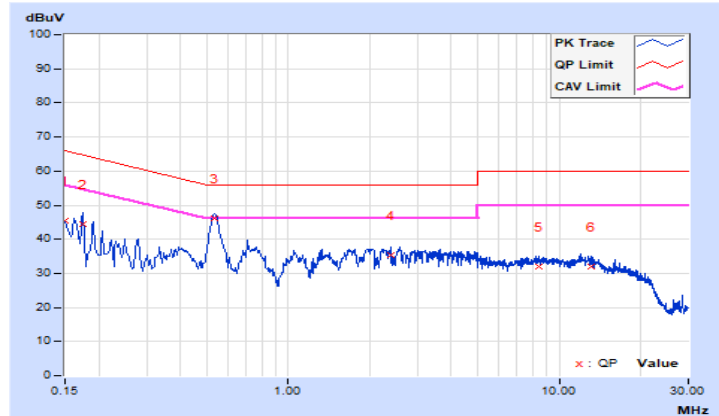
802.11g

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.62	35.78	25.36	45.40	34.98	66.00	56.00	-20.60	-21.02
2	0.17400	9.63	34.98	22.31	44.61	31.94	64.77	54.77	-20.16	-22.83
3	0.53125	9.69	36.51	31.80	46.20	41.49	56.00	46.00	-9.80	-4.51
4	2.38200	9.73	25.68	17.58	35.41	27.31	56.00	46.00	-20.59	-18.69
5	8.46600	9.78	22.09	16.23	31.87	26.01	60.00	50.00	-28.13	-23.99
6	13.05400	9.78	22.17	14.89	31.95	24.67	60.00	50.00	-28.05	-25.33

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.

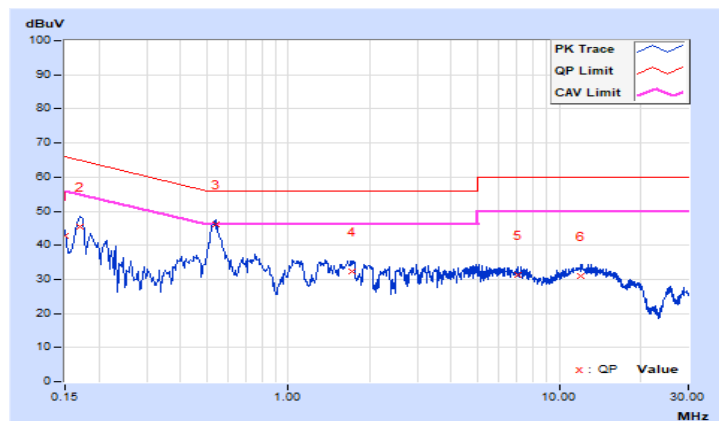


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.62	33.02	24.93	42.64	34.55	66.00	56.00	-23.36	-21.45
2	0.17000	9.62	35.68	21.51	45.30	31.13	64.96	54.96	-19.66	-23.83
3	0.53800	9.68	36.38	31.51	46.06	41.19	56.00	46.00	-9.94	-4.81
4	1.72600	9.71	22.68	17.93	32.39	27.64	56.00	46.00	-23.61	-18.36
5	7.07400	9.77	21.49	13.86	31.26	23.63	60.00	50.00	-28.74	-26.37
6	12.07400	9.81	21.16	14.90	30.97	24.71	60.00	50.00	-29.03	-25.29

Remarks:

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

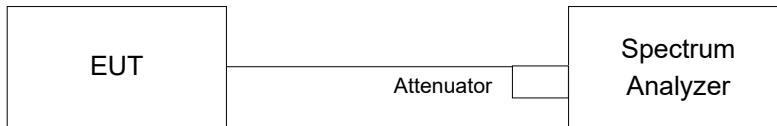


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.09	7.65	0.5	Pass
6	2437	8.55	8.57	0.5	Pass
11	2462	7.15	7.62	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.71	15.83	0.5	Pass
6	2437	15.79	15.48	0.5	Pass
11	2462	15.85	16.33	0.5	Pass

802.11ax (HE20)

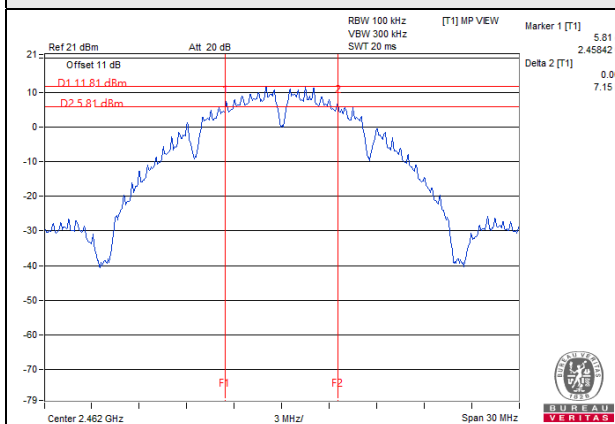
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	18.49	18.05	0.5	Pass
6	2437	18.56	17.99	0.5	Pass
11	2462	17.92	18.49	0.5	Pass

802.11ax (HE40)

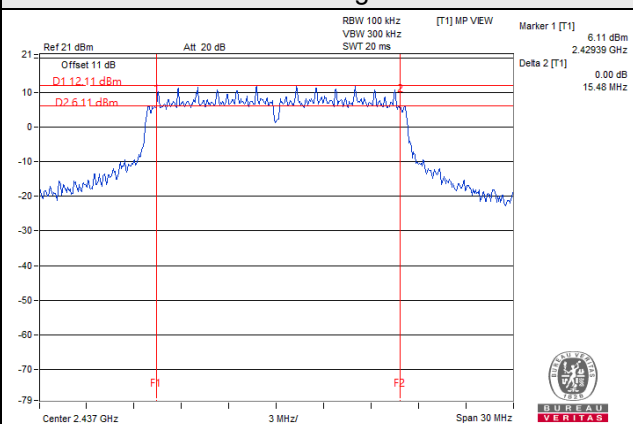
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	37.87	37.74	0.5	Pass
6	2437	37.71	37.53	0.5	Pass
9	2452	37.69	37.69	0.5	Pass

Spectrum Plot of Worst Value

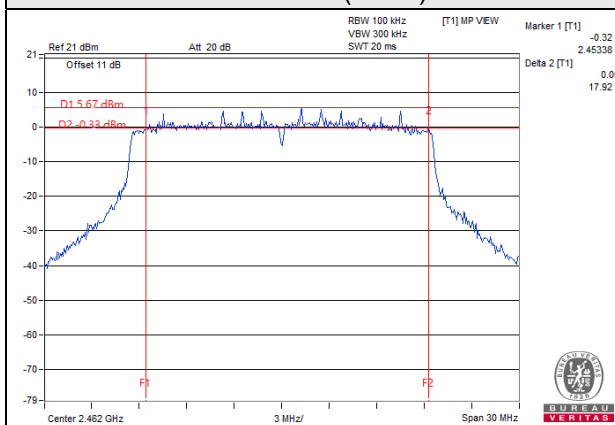
802.11b



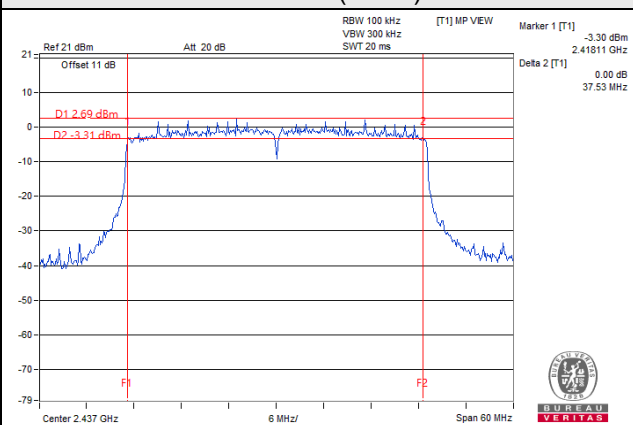
802.11g



802.11ax (HE20)



802.11ax (HE40)



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,

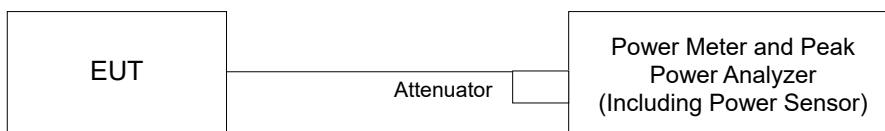
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

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

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as item 4.3.6.

4.4.7 Test Results

CDD Mode

802.11b

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.41	20.69	227.120	23.56	30.00	Pass
6	2437	22.47	22.70	362.812	25.60	30.00	Pass
11	2462	20.82	20.43	231.189	23.64	30.00	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	19.15	19.11	163.695	22.14	30.00	Pass
6	2437	22.46	22.97	374.350	25.73	30.00	Pass
11	2462	18.11	17.52	121.208	20.84	30.00	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.23	17.28	106.301	20.27	30.00	Pass
6	2437	21.88	22.00	312.659	24.95	30.00	Pass
11	2462	15.86	15.04	70.463	18.48	30.00	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	14.91	14.93	62.091	17.93	30.00	Pass
6	2437	16.02	15.97	79.531	19.01	30.00	Pass
9	2452	12.83	13.77	43.010	16.34	30.00	Pass

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.29	17.48	109.555	20.40	30.00	Pass
6	2437	22.06	22.23	327.803	25.16	30.00	Pass
11	2462	16.06	15.26	73.938	18.69	30.00	Pass

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	14.93	15.02	62.886	17.99	30.00	Pass
6	2437	16.30	16.18	84.153	19.25	30.00	Pass
9	2452	13.02	14.00	45.164	16.55	30.00	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.52	17.66	114.838	20.60	30.00	Pass
6	2437	22.17	22.38	337.798	25.29	30.00	Pass
11	2462	16.23	15.42	76.810	18.85	30.00	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	15.12	15.25	66.005	18.20	30.00	Pass
6	2437	16.41	16.33	86.706	19.38	30.00	Pass
9	2452	13.22	14.11	46.753	16.70	30.00	Pass

Beamforming Mode

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.23	17.28	106.301	20.27	27.82	Pass
6	2437	21.88	22.00	312.659	24.95	27.82	Pass
11	2462	15.86	15.04	70.463	18.48	27.82	Pass

Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBi}$.

802.11n (HT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	14.91	14.93	62.091	17.93	27.82	Pass
6	2437	16.02	15.97	79.531	19.01	27.82	Pass
9	2452	12.83	13.77	43.010	16.34	27.82	Pass

Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBi}$.

802.11n (VHT20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.29	17.48	109.555	20.40	27.82	Pass
6	2437	22.06	22.23	327.803	25.16	27.82	Pass
11	2462	16.06	15.26	73.938	18.69	27.82	Pass

Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBi}$.

802.11n (VHT40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	14.93	15.02	62.886	17.99	27.82	Pass
6	2437	16.30	16.18	84.153	19.25	27.82	Pass
9	2452	13.02	14.00	45.164	16.55	27.82	Pass

Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBi}$.

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.52	17.66	114.838	20.60	27.82	Pass
6	2437	22.17	22.38	337.798	25.29	27.82	Pass
11	2462	16.23	15.42	76.810	18.85	27.82	Pass

Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBi}$.

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	15.12	15.25	66.005	18.20	27.82	Pass
6	2437	16.41	16.33	86.706	19.38	27.82	Pass
9	2452	13.22	14.11	46.753	16.70	27.82	Pass

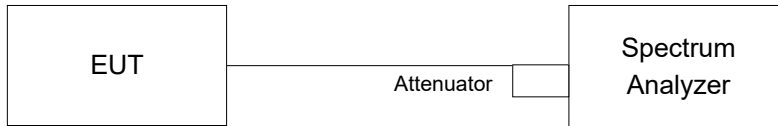
Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBi}$.

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

- 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

802.11b

TX chain	Channel	Frequency (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	-9.69	3.01	2.48	-4.2	5.82	Pass
	6	2437	-8.57	3.01	2.48	-3.08	5.82	Pass
	11	2462	-10.27	3.01	2.48	-4.78	5.82	Pass
1	1	2412	-9.03	3.01	2.48	-3.54	5.82	Pass
	6	2437	-8.36	3.01	2.48	-2.87	5.82	Pass
	11	2462	-9.53	3.01	2.48	-4.04	5.82	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 5.17dBi + 10log(2) = 8.18dBi > 6dBi, so the power density limit shall be reduced to 8 - (8.18 - 6) = 5.82dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11g

TX chain	Channel	Frequency (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	-13.25	3.01	0.28	-9.96	5.82	Pass
	6	2437	-9.76	3.01	0.28	-6.47	5.82	Pass
	11	2462	-13.73	3.01	0.28	-10.44	5.82	Pass
1	1	2412	-13.35	3.01	0.28	-10.06	5.82	Pass
	6	2437	-9.42	3.01	0.28	-6.13	5.82	Pass
	11	2462	-14.35	3.01	0.28	-11.06	5.82	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 5.17dBi + 10log(2) = 8.18dBi > 6dBi, so the power density limit shall be reduced to 8 - (8.18 - 6) = 5.82dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

TX chain	Channel	Frequency (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	-16.40	3.01	0.22	-13.17	5.82	Pass
	6	2437	-12.45	3.01	0.22	-9.22	5.82	Pass
	11	2462	-18.36	3.01	0.22	-15.13	5.82	Pass
1	1	2412	-16.31	3.01	0.22	-13.08	5.82	Pass
	6	2437	-12.03	3.01	0.22	-8.8	5.82	Pass
	11	2462	-18.58	3.01	0.22	-15.35	5.82	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add $10 \log (N_{ANT})$ dB.
2. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8 - (8.18 - 6) = 5.82\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

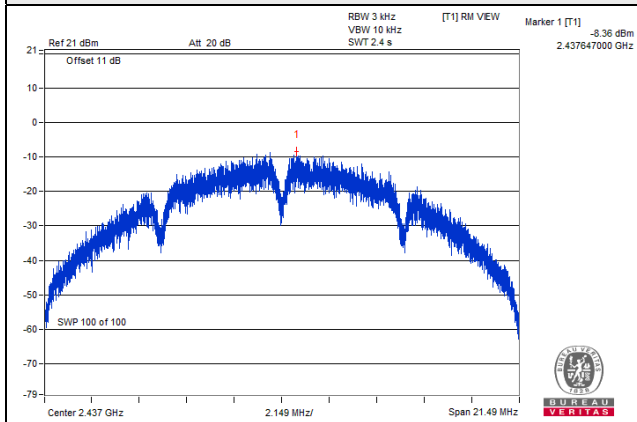
TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-21.83	3.01	0.2	-18.62	5.82	Pass
	6	2437	-20.08	3.01	0.2	-16.87	5.82	Pass
	9	2452	-22.66	3.01	0.2	-19.45	5.82	Pass
1	3	2422	-21.78	3.01	0.2	-18.57	5.82	Pass
	6	2437	-20.31	3.01	0.2	-17.10	5.82	Pass
	9	2452	-23.34	3.01	0.2	-20.13	5.82	Pass

Note:

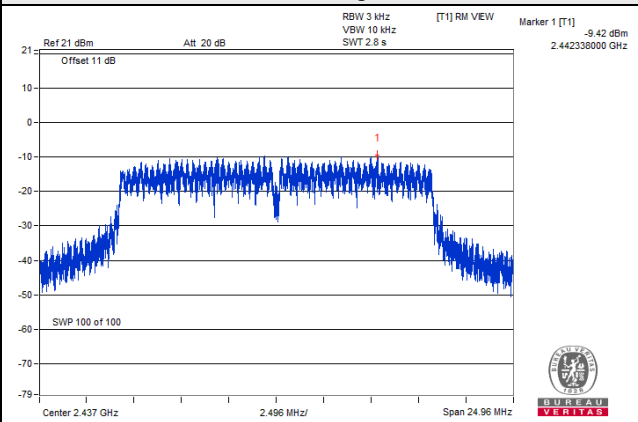
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add $10 \log (N_{ANT})$ dB.
2. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8 - (8.18 - 6) = 5.82\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

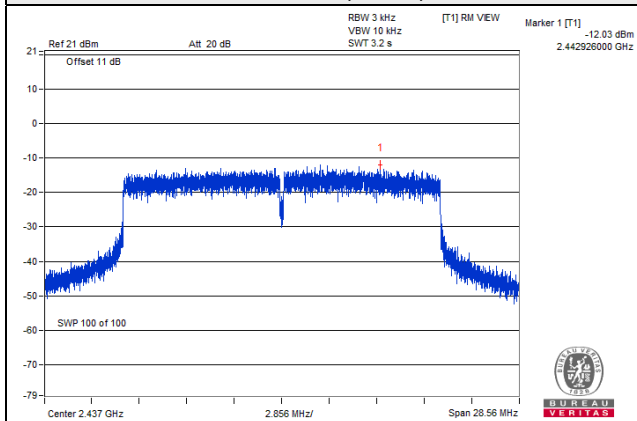
802.11b



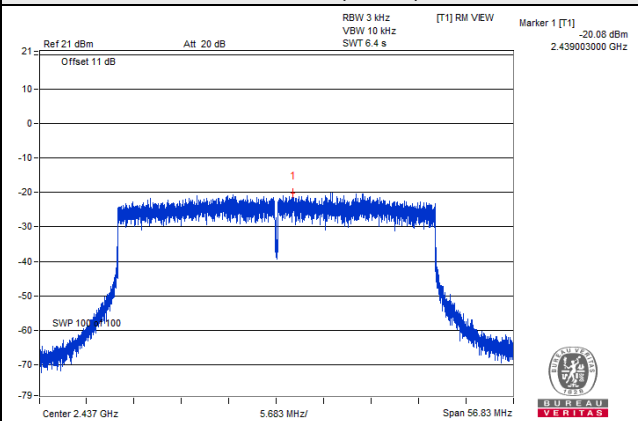
802.11g



802.11ax (HE20)



802.11ax (HE40)

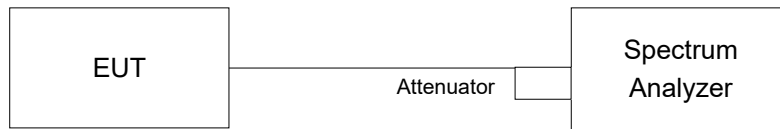


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Same as item 4.3.6

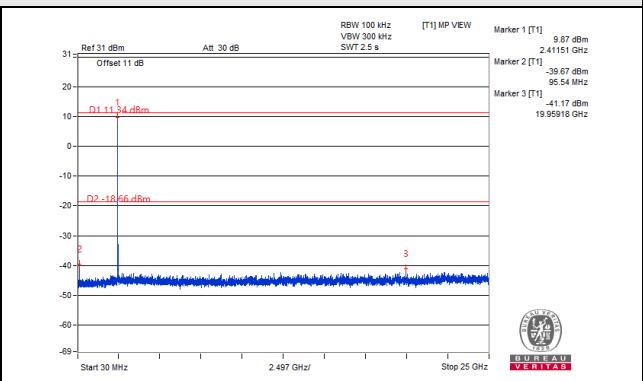
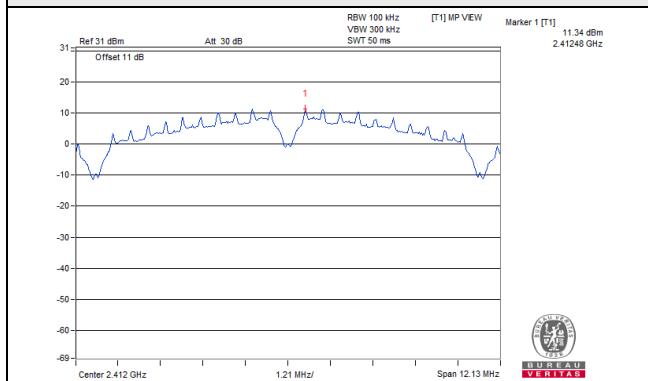
4.6.7 Test Results

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

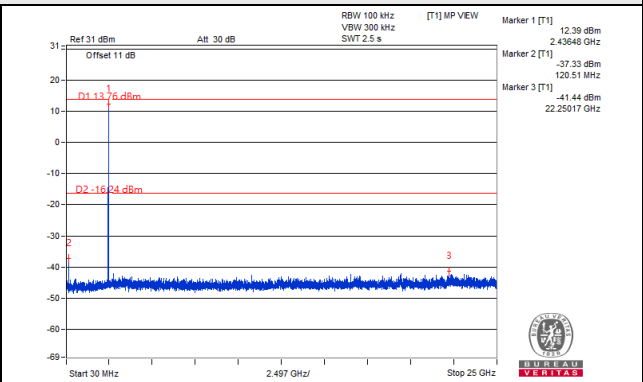
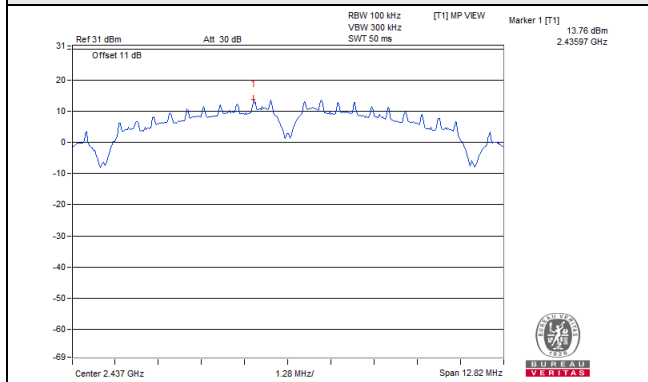
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b_Chain 0

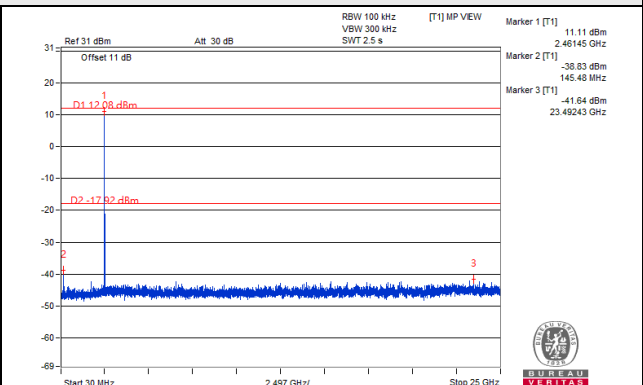
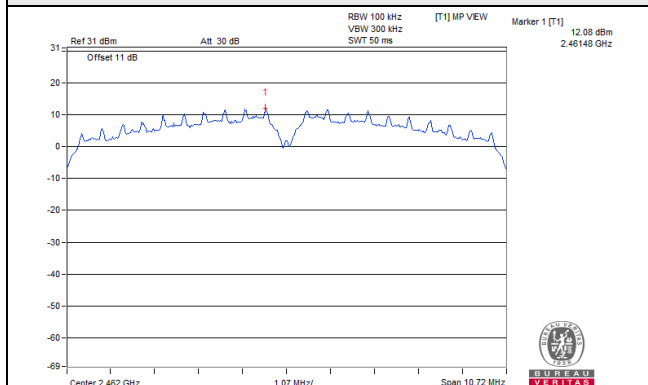
CH 1



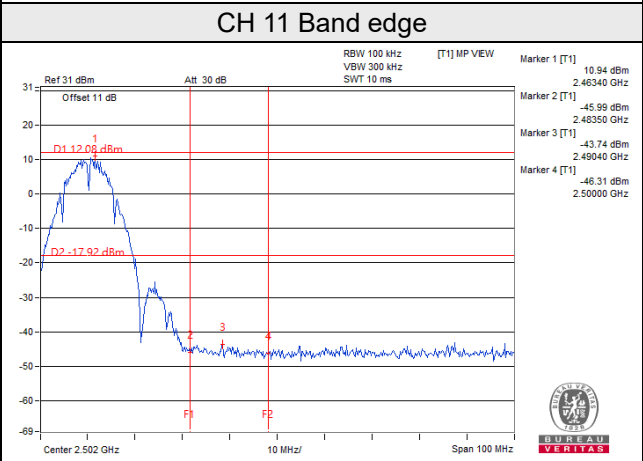
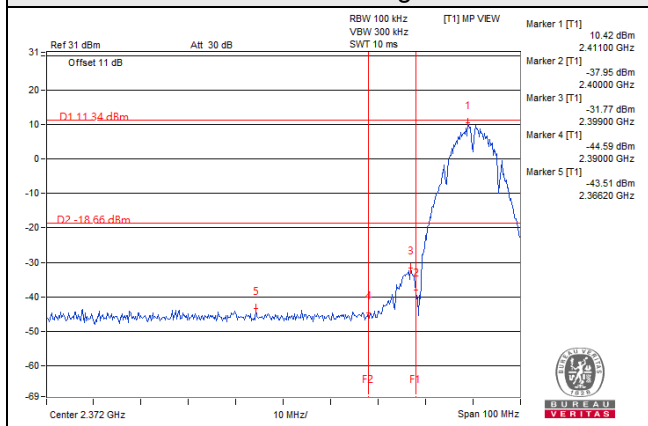
CH 6



CH 11

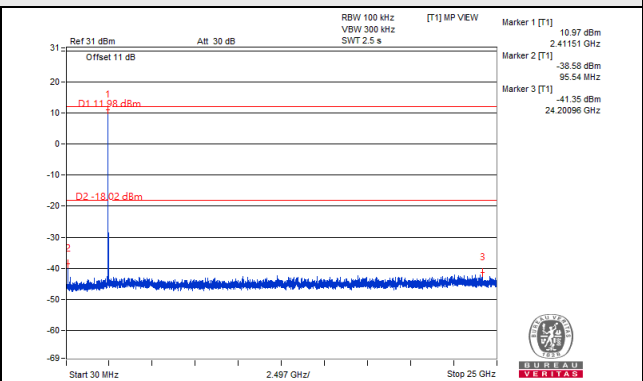
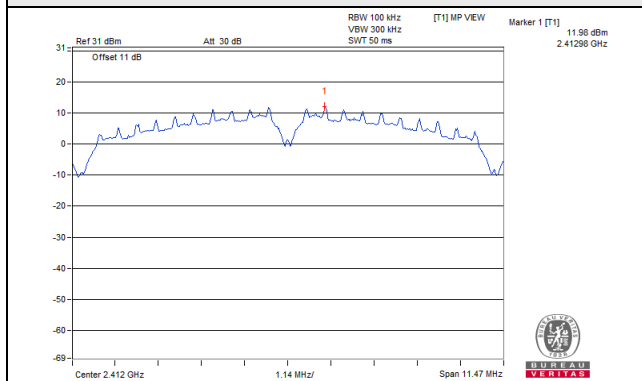


CH 1 Band edge

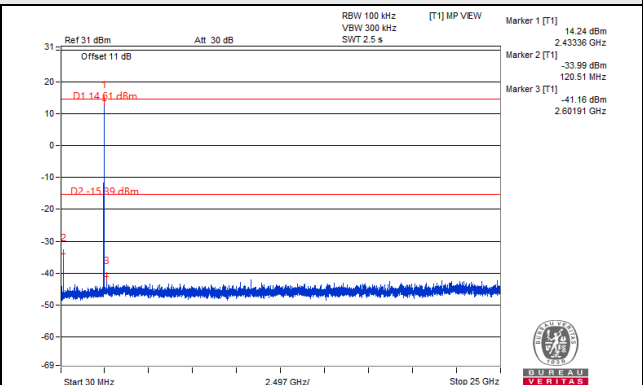
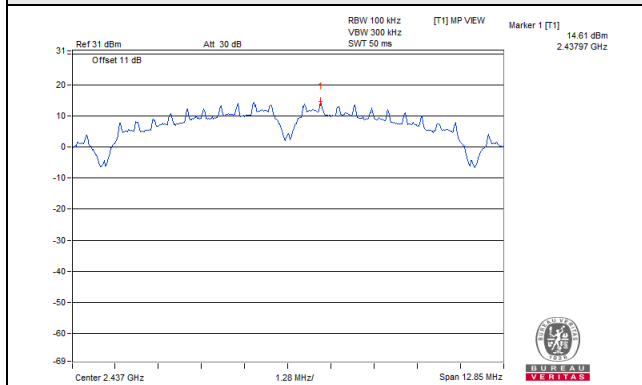


802.11b_Chain 1

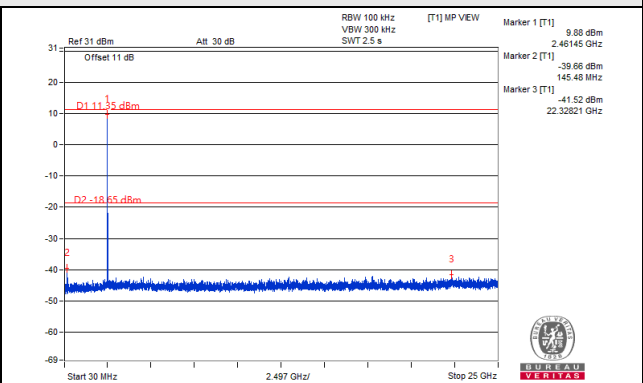
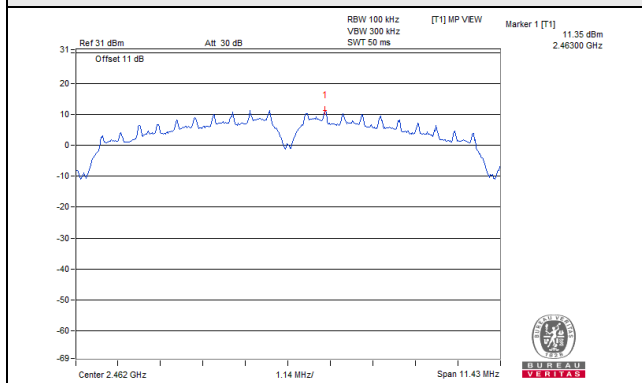
CH 1



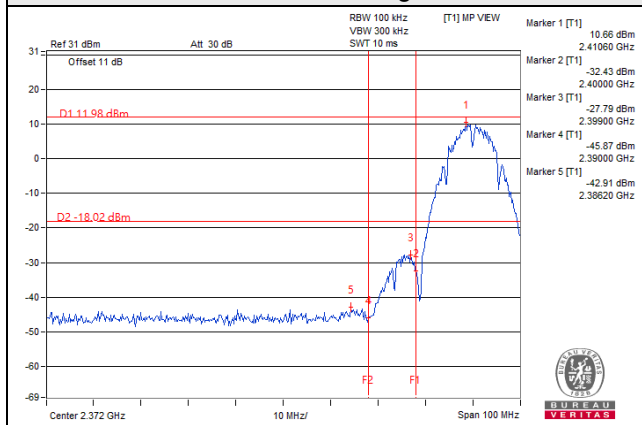
CH 6



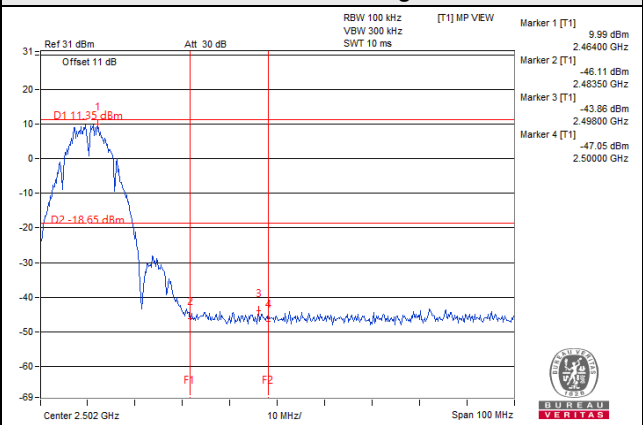
CH 11



CH 1 Band edge

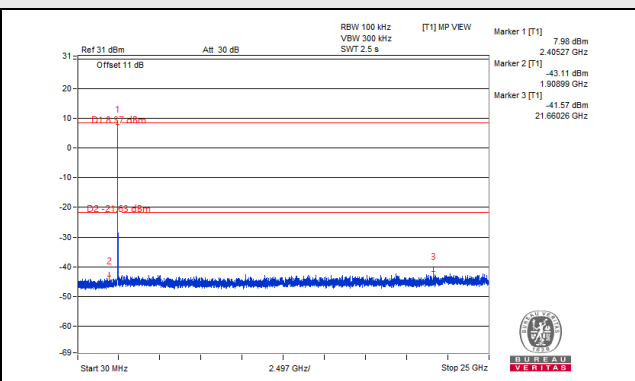
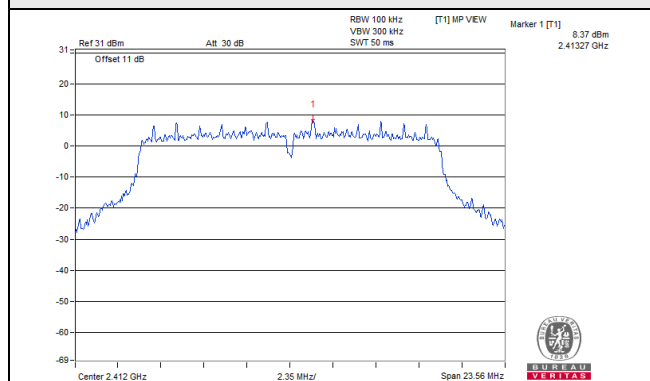


CH 11 Band edge

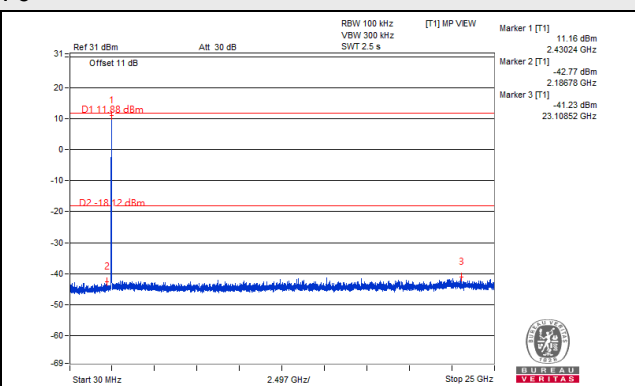
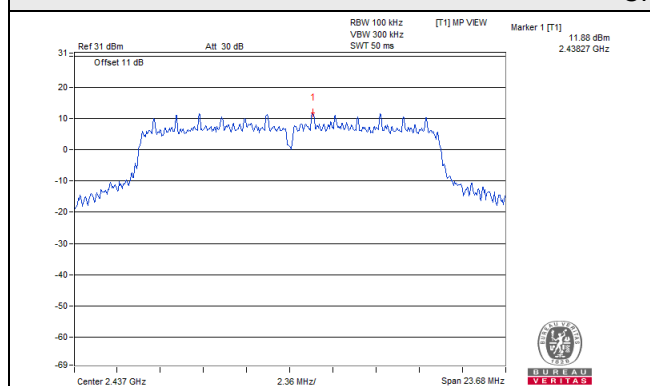


802.11g_Chain 0

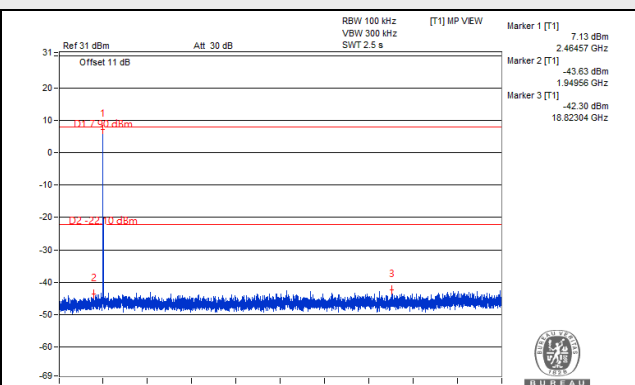
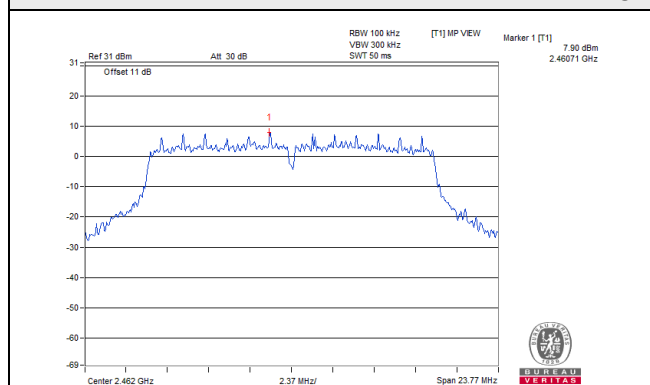
CH 1



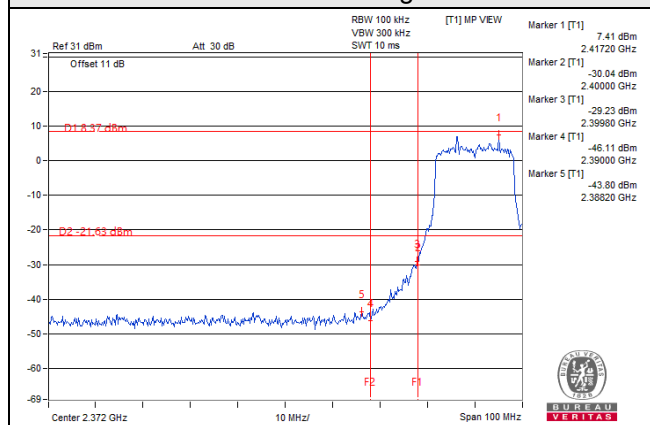
CH 6



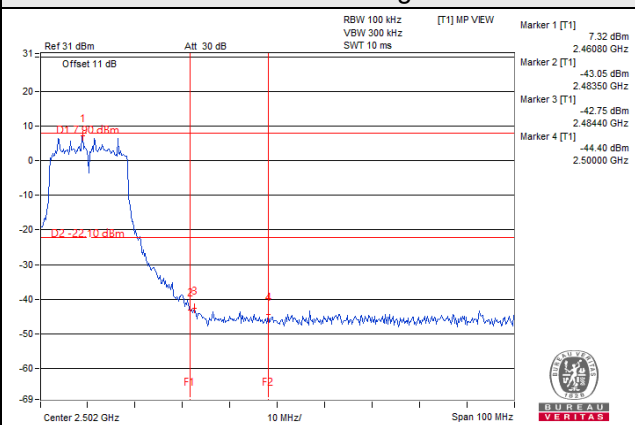
CH 11



CH 1 Band edge

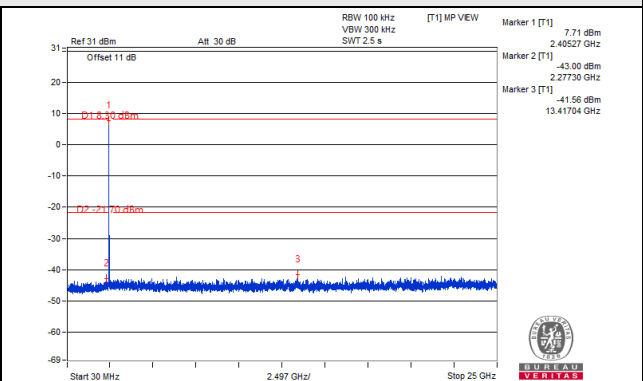
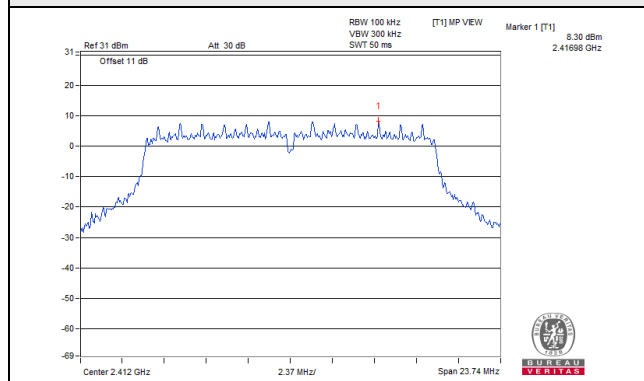


CH 11 Band edge

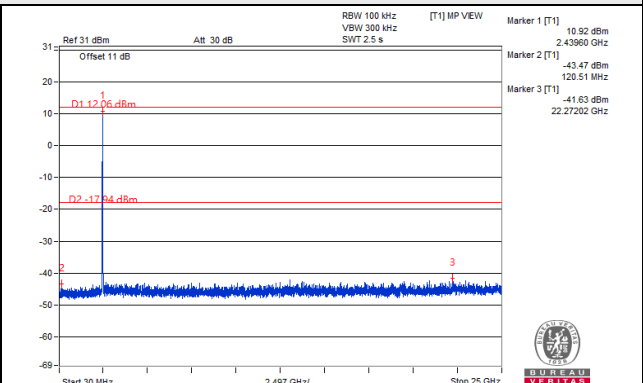
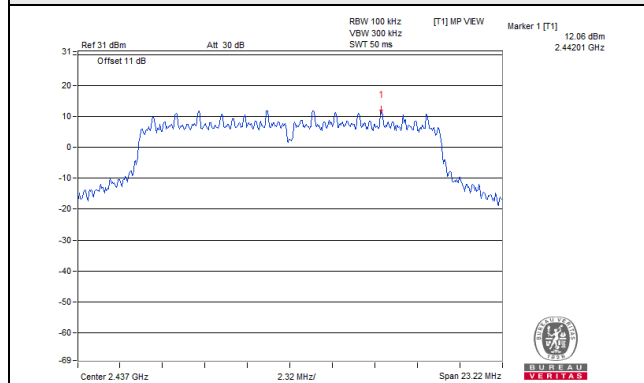


802.11g_Chain 1

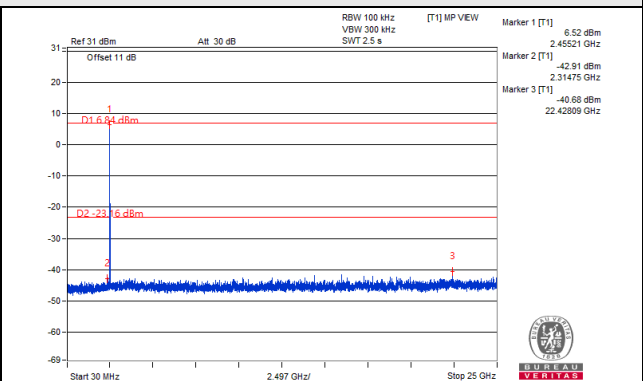
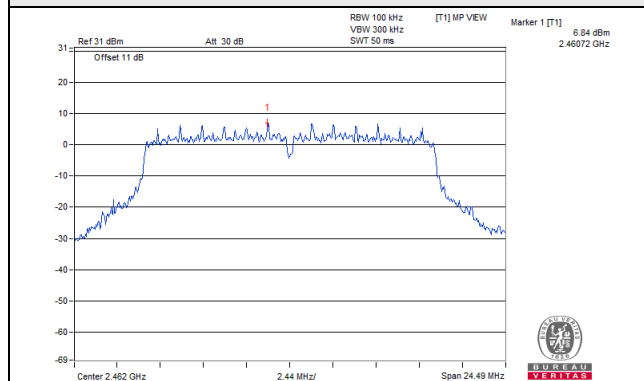
CH 1



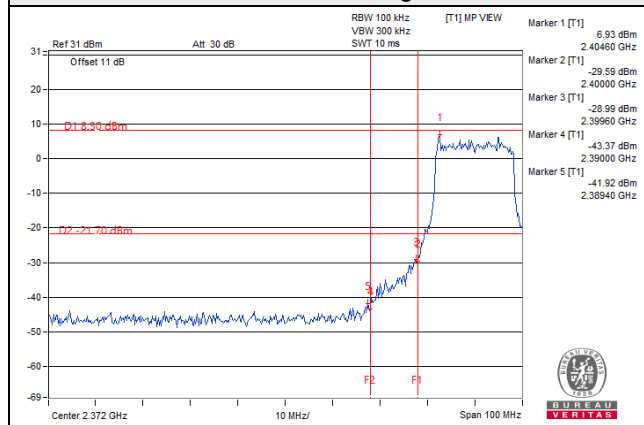
CH 6



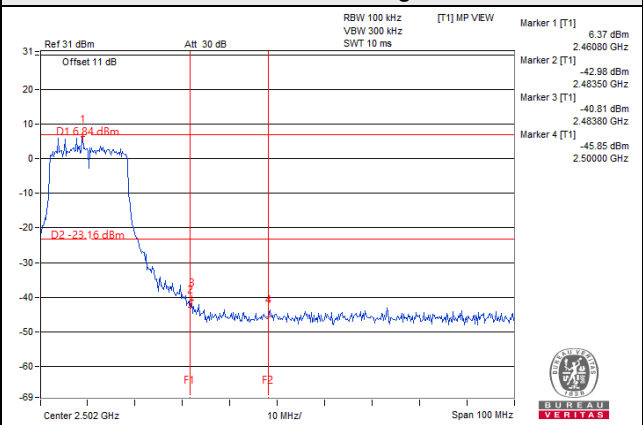
CH 11



CH 1 Band edge

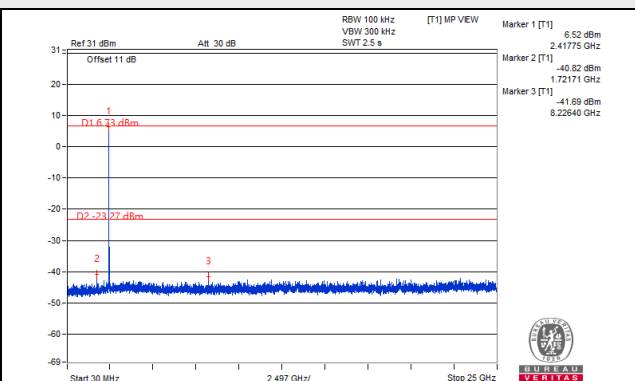
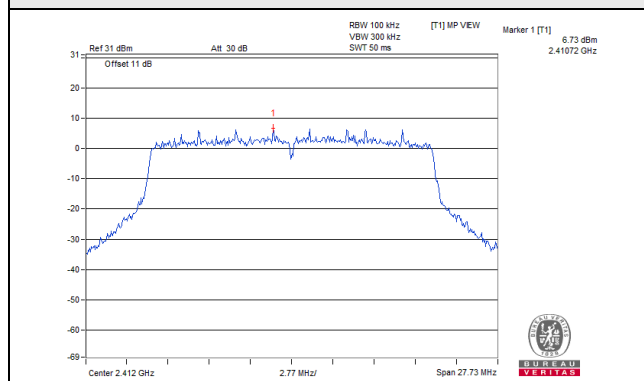


CH 11 Band edge

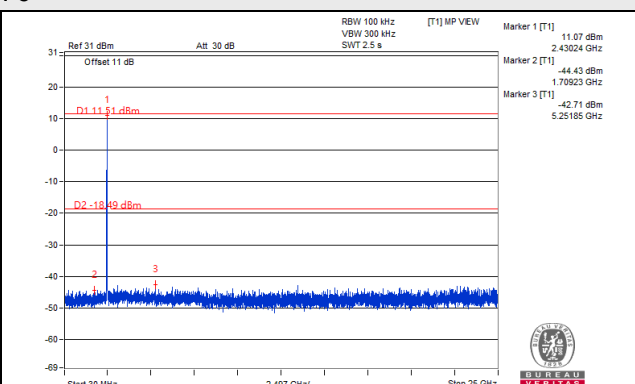
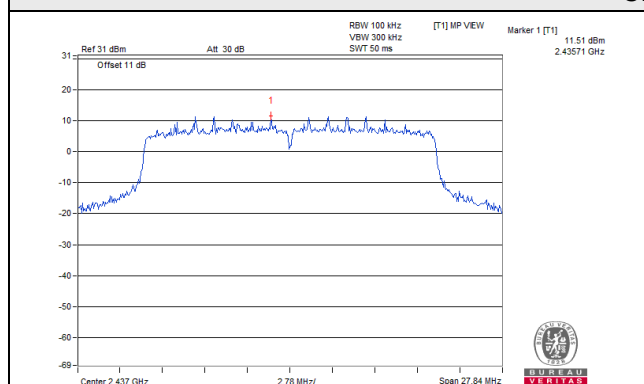


802.11ax (HE20)_Chain 0

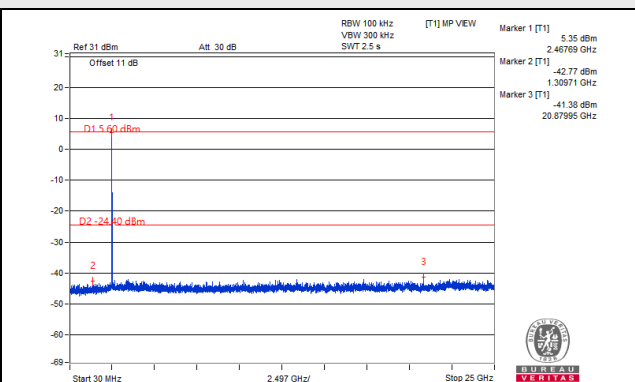
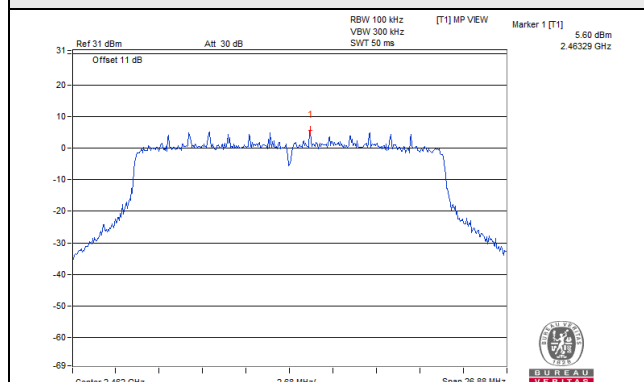
CH 1



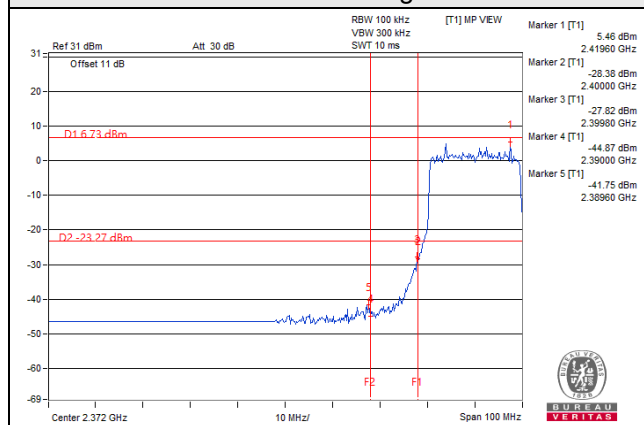
CH 6



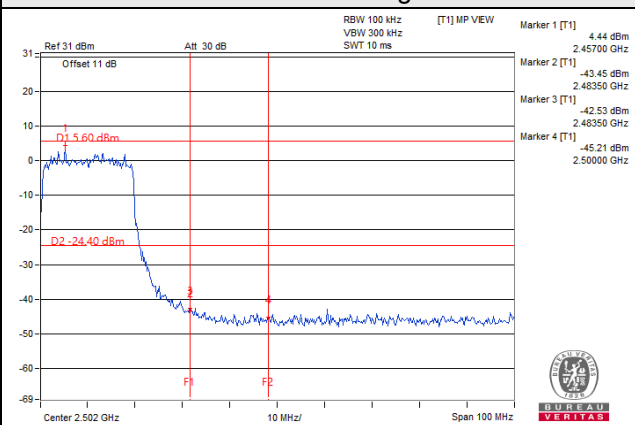
CH 11



CH 1 Band edge

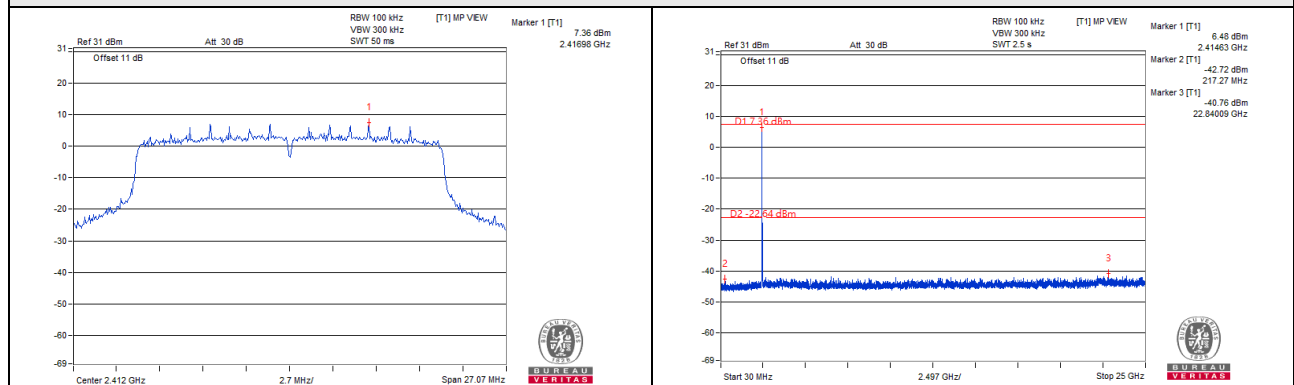


CH 11 Band edge

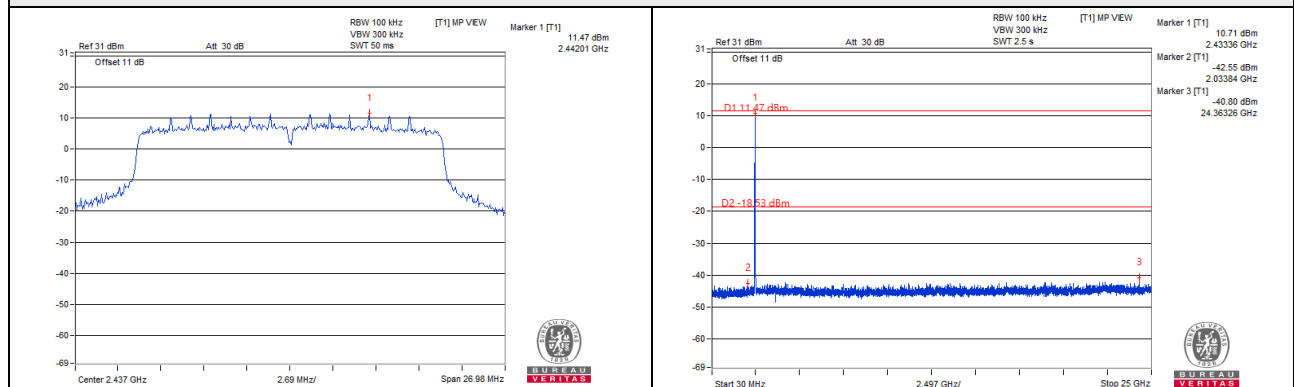


802.11ax (HE20)_Chain 1

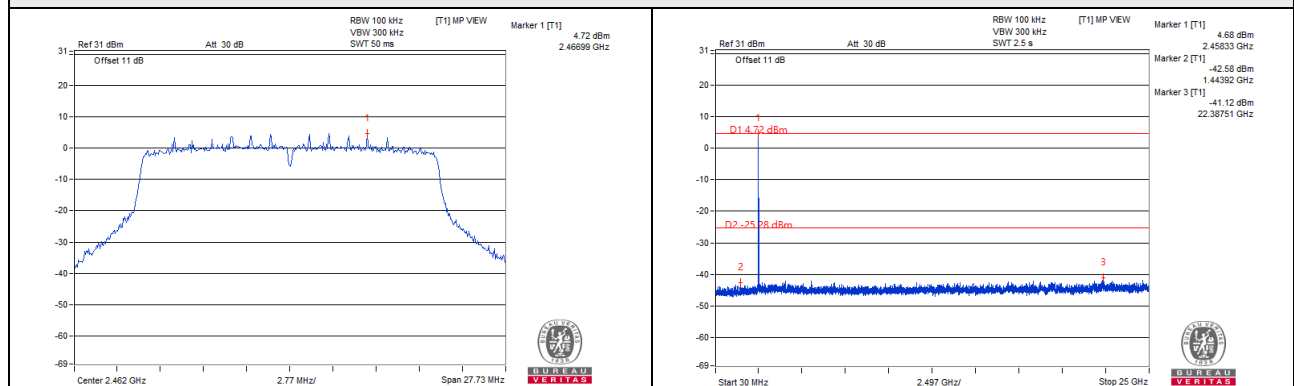
CH 1



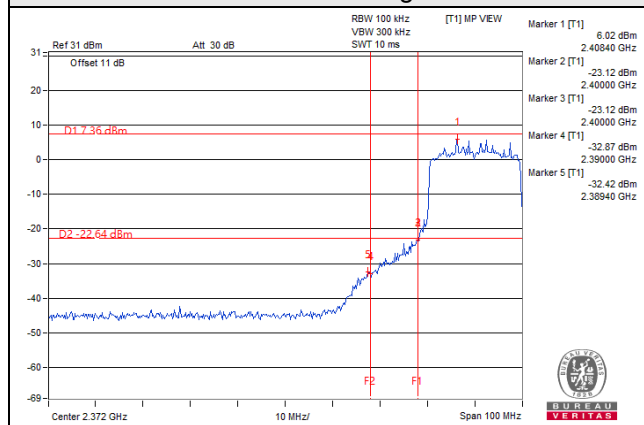
CH 6



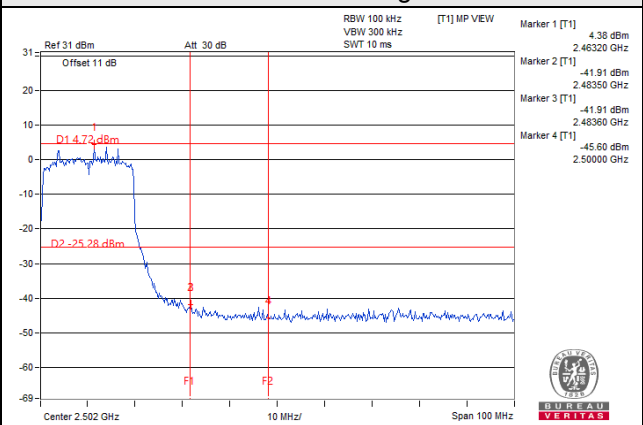
CH 11



CH 1 Band edge

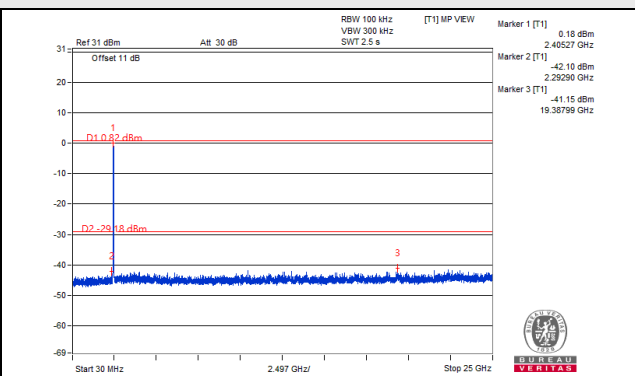
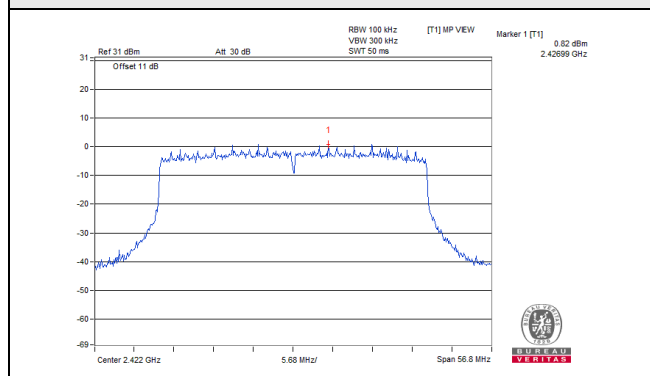


CH 11 Band edge

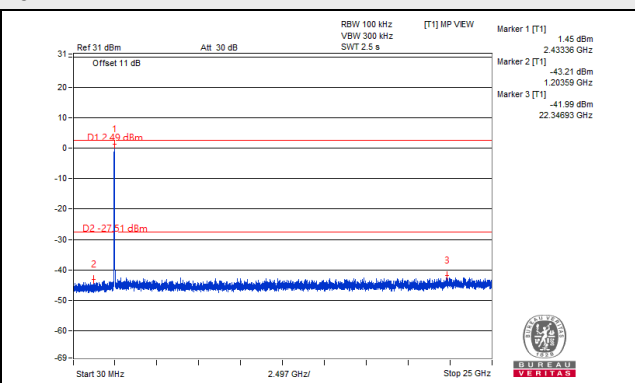
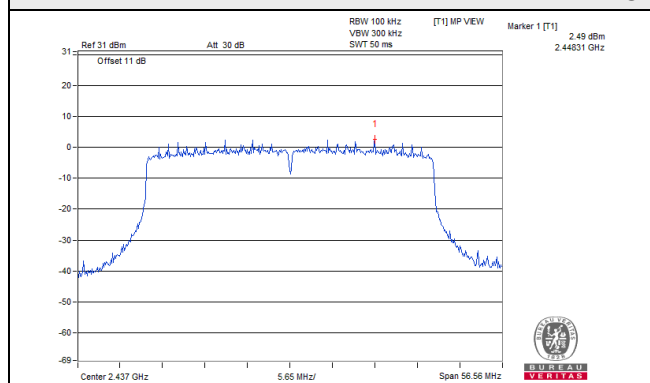


802.11ax (HE40)_Chain 0

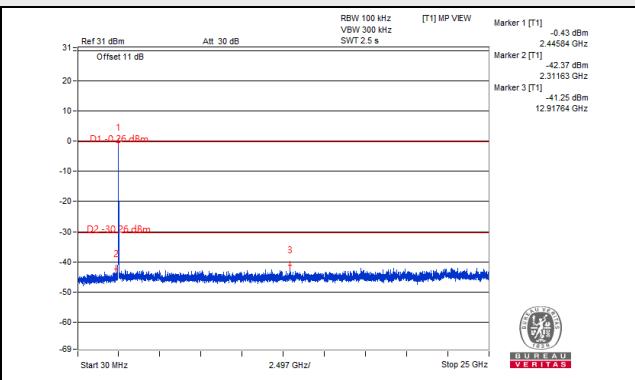
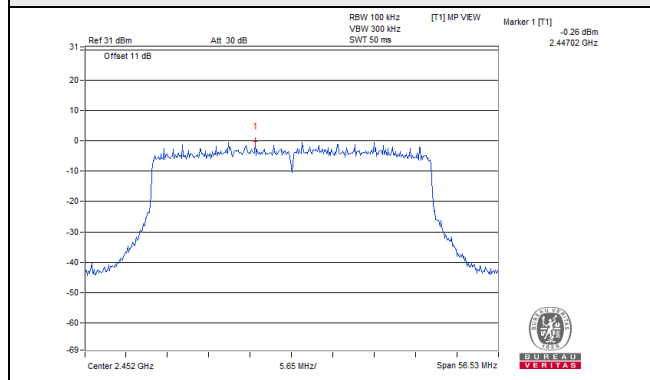
CH 3



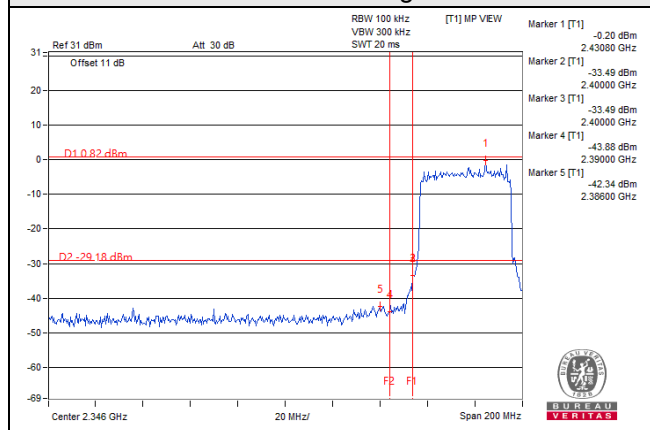
CH 6



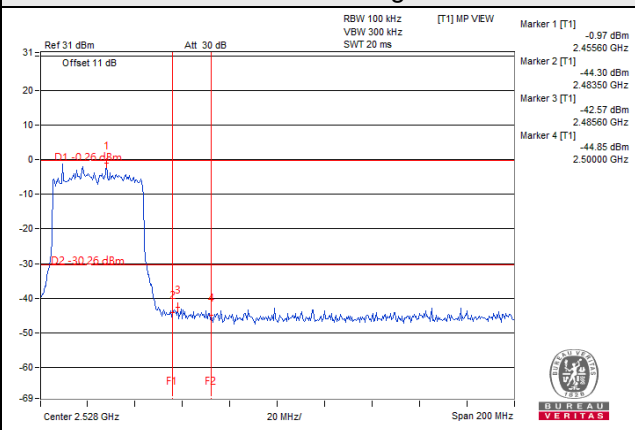
CH 9



CH 3 Band edge

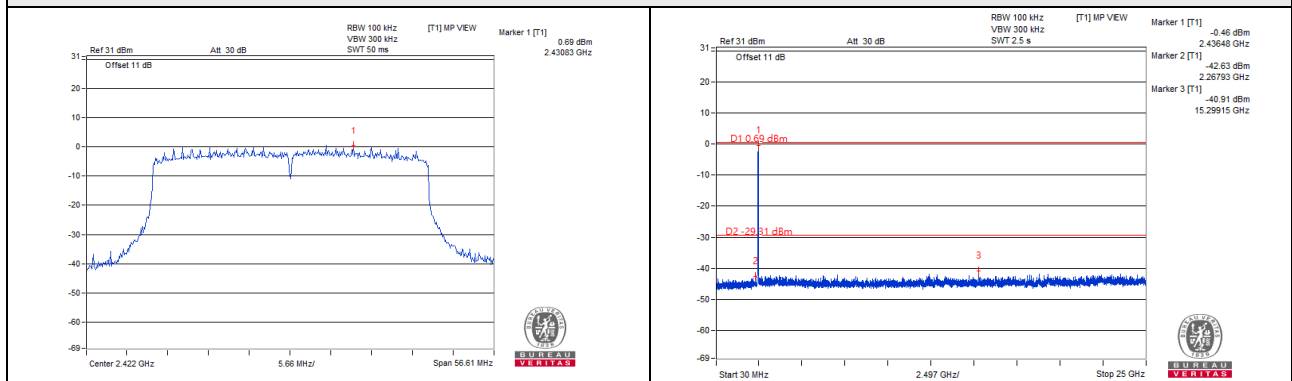


CH 9 Band edge

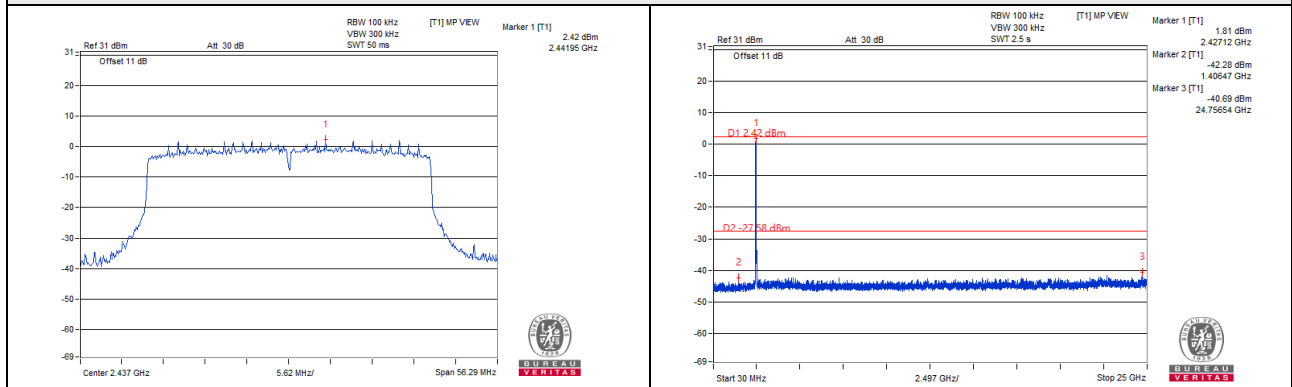


802.11ax (HE40)_Chain 1

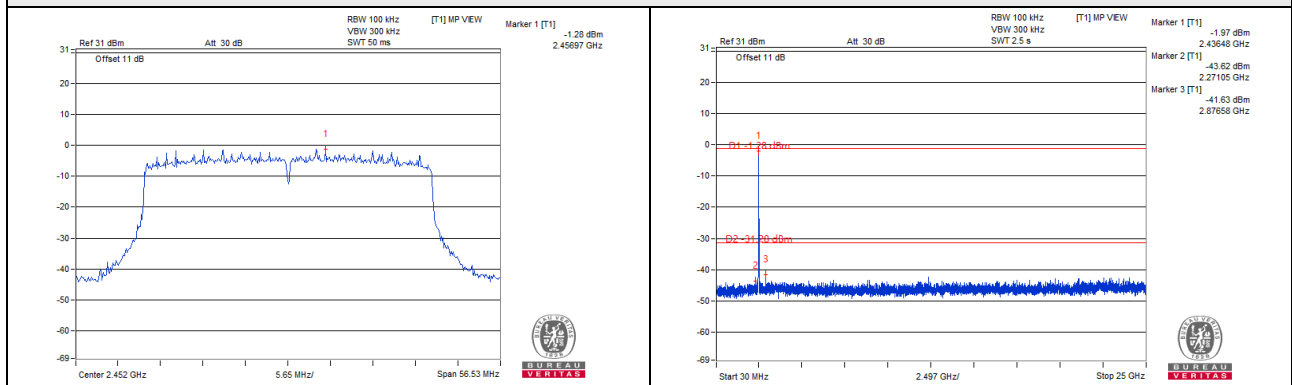
CH 3



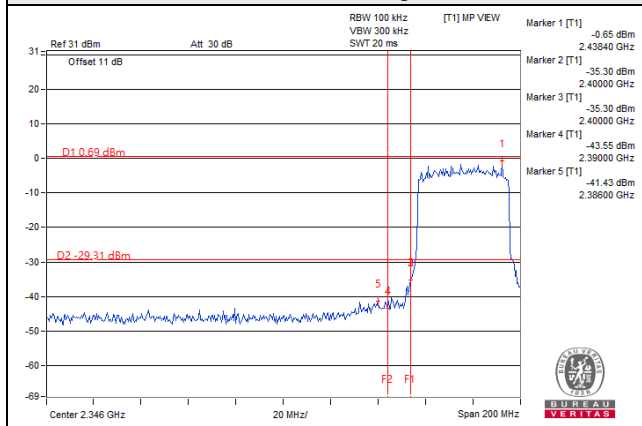
CH 6



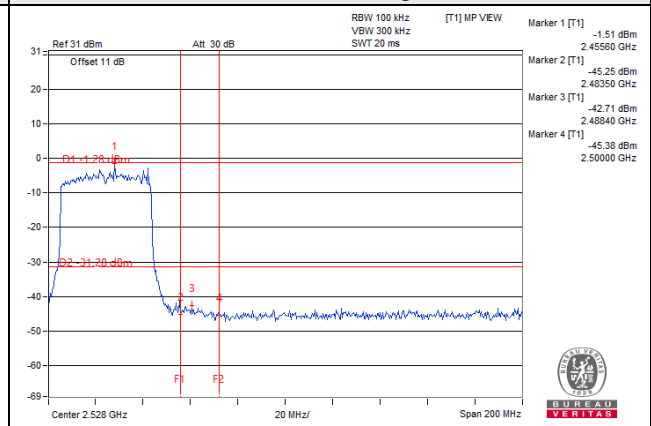
CH 9



CH 3 Band edge

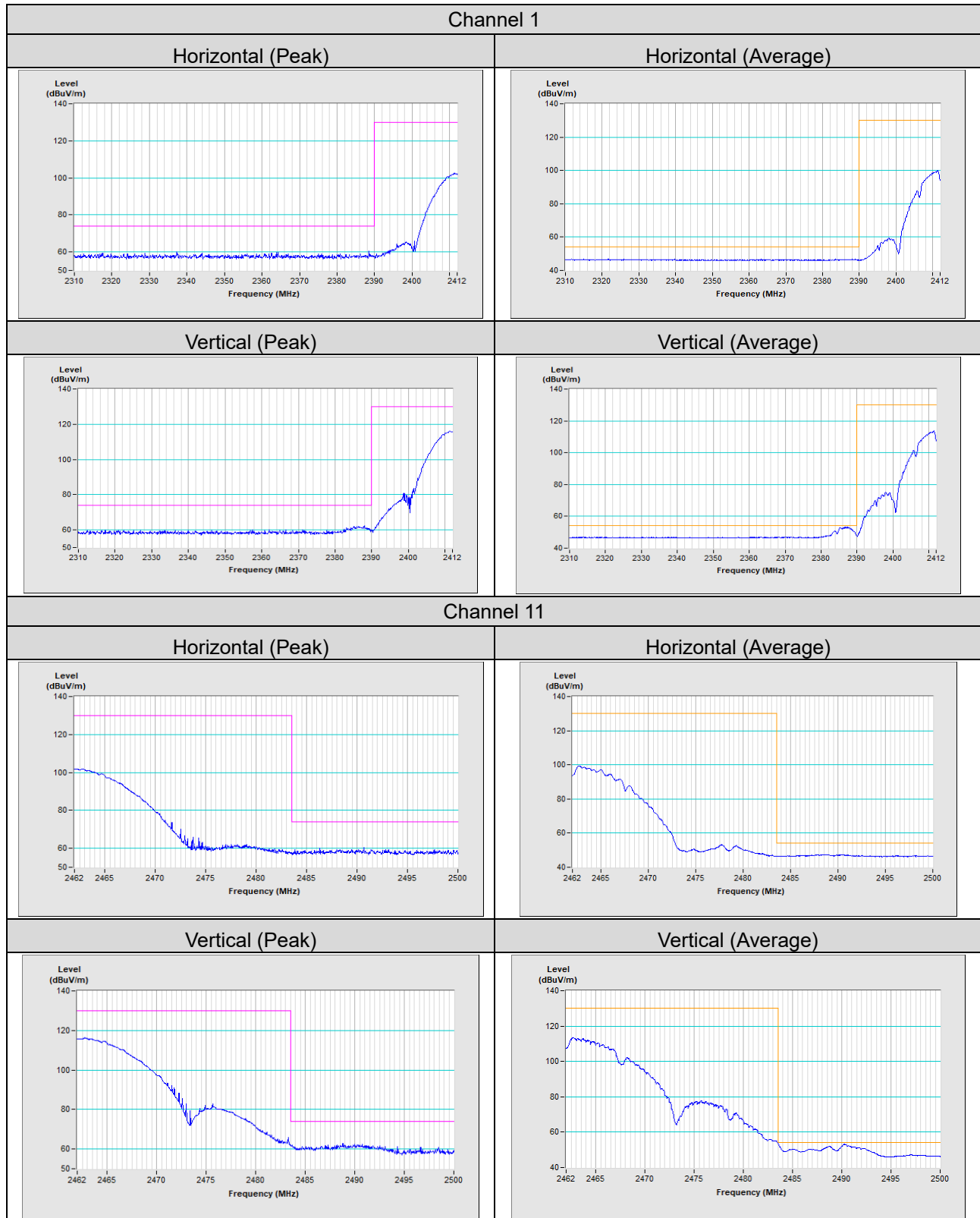


CH 9 Band edge

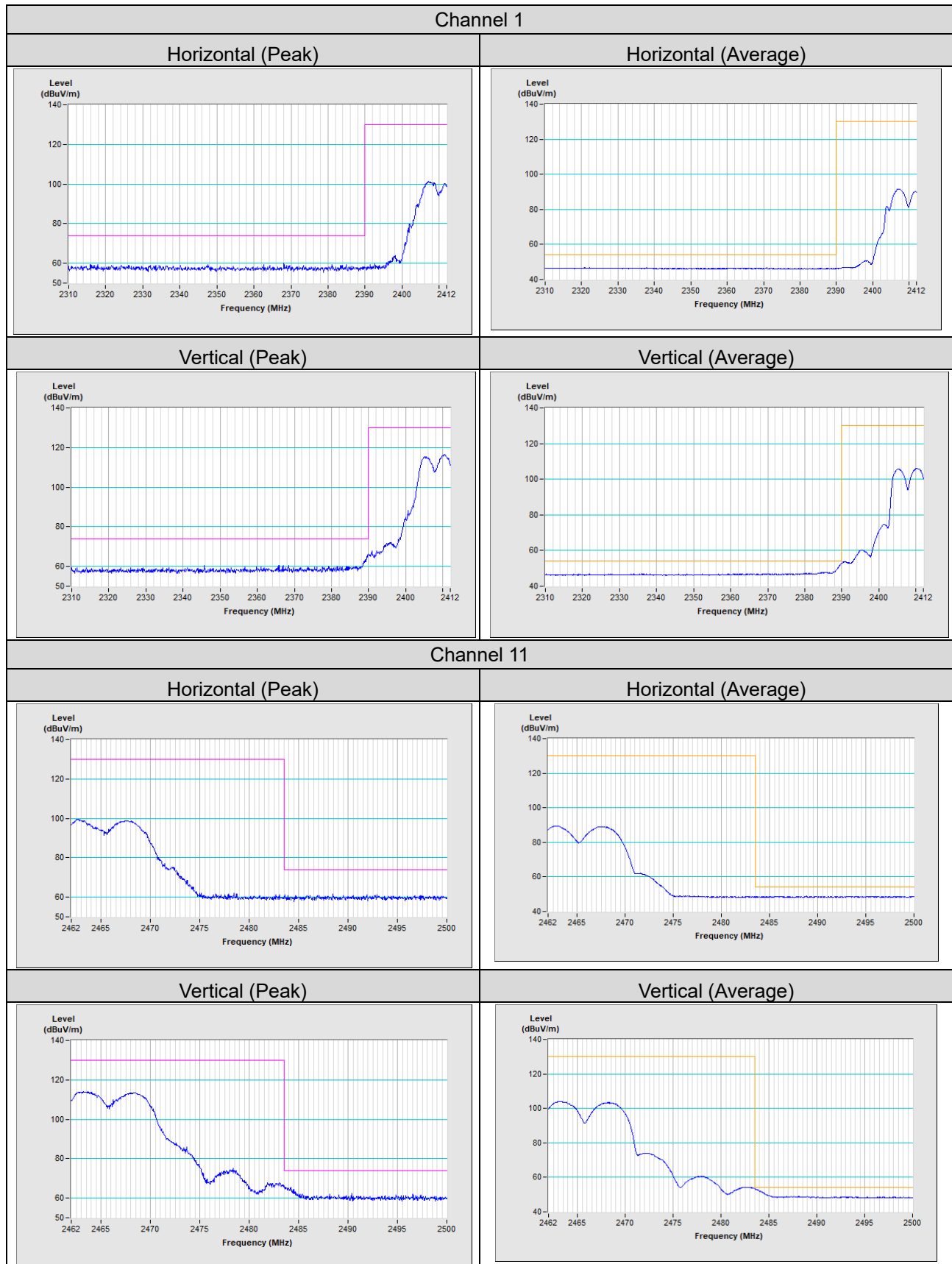


Annex A - Band Edge Measurement

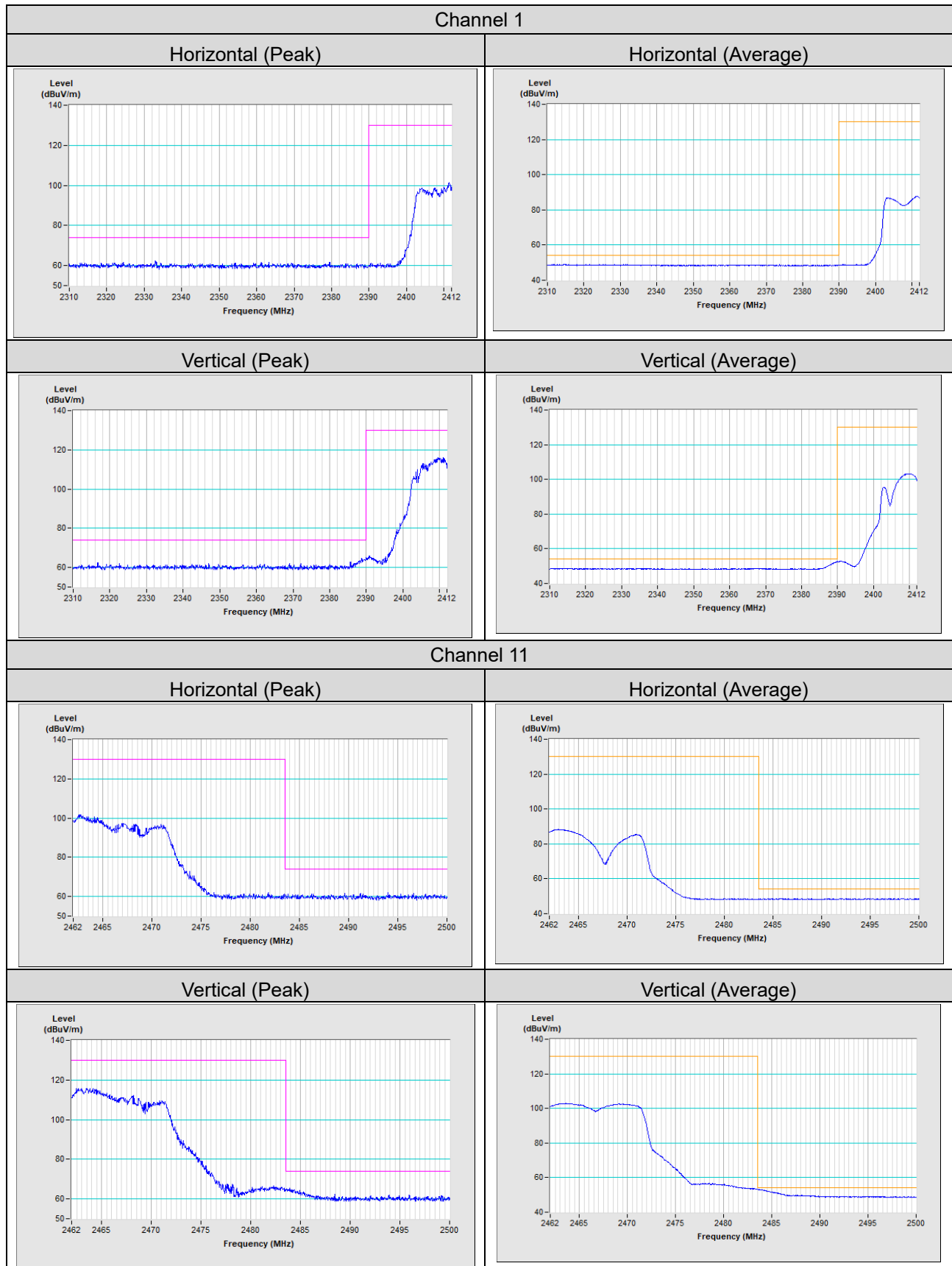
802.11b



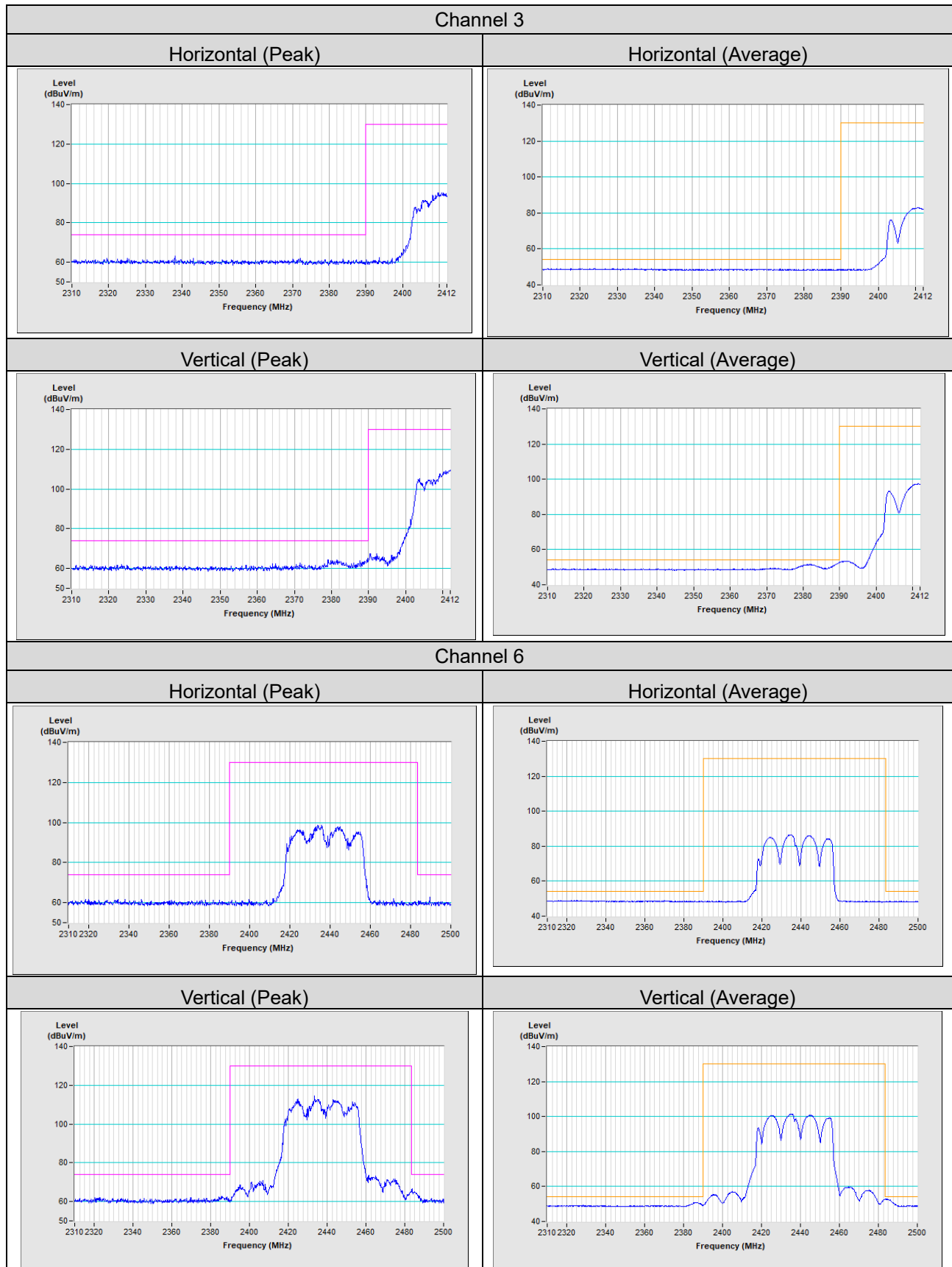
802.11g



802.11ax (HE20)

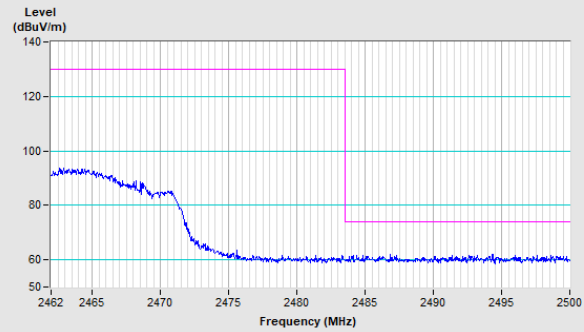


802.11ax (HE40)

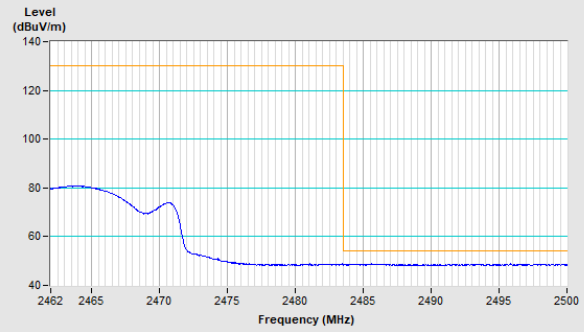


Channel 9

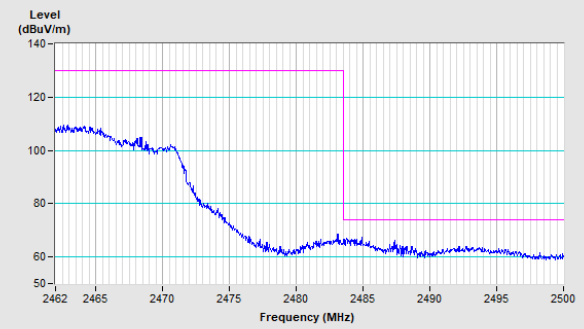
Horizontal (Peak)



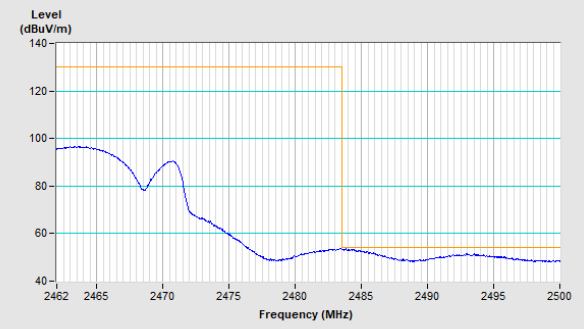
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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

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Web Site: www.bureauveritas-adt.com

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

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