FCC Test Report

Report No.:	RFBHYD-WTW-P21051101
FCC ID:	I88WSM20
Test Model:	WSM20
Received Date:	July 12, 2021
Test Date:	July 23 to Aug. 10, 2021
Issued Date:	Oct. 27, 2021
Applicant:	Zyxel Communications Corporation
Address:	No.2 Industry East RD. IX, Hsinchu Science Park, Hsinchu 30075, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RFBHYD-WTW-P21051101	Original release.	Oct. 27, 2021

1 Certificate of Conformity

Product:	AX1800 Dual-Band WiFi 6 System
Brand:	ZYXEL
Test Model:	WSM20
Sample Status:	Engineering sample
Applicant:	Zyxel Communications Corporation
Test Date:	July 23 to Aug. 10, 2021
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10: 2013

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

Prepared by : _____ , **Date:** Oct. 27, 2021

Claire Kuan / Specialist

Approved by : _____ , **Date:** Oct. 27, 2021

Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -9.94 dB at 0.45859 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.6 dB at 2483.50 MHz and 4874.00 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

Note:
1. For 2.4 GHz band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A.
2. 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	1.9 dB
Conducted emissions	-	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AX1800 Dual-Band WiFi 6 System
Brand	ZYXEL
Test Model	WSM20
RF CPU Model No.	MT7621AT
RF Chip Model No.	MT7975DN
FW Version	V1.00(ABZF.0)B2
Status of EUT	Engineering sample
Power Supply Rating	12 Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in VHT20/40 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 300 Mbps VHT: up to 400 Mbps 802.11ax: up to 573.5 Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), VHT20, 802.11ax (HE20): 11 802.11n (HT40), VHT40, 802.11ax (HE40): 7
Output Power	**CDD Mode:** **2.412 ~ 2.462 GHz:** 972.314 mW **Beamforming Mode:** **2.412 ~ 2.462 GHz:** 972.314 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory	- AC Adapter (Brand: APD, Model: WB-18Q12FU) - Ethernet Cable (Unshielded, 1.5m)

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	WLAN 5GHz
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

2. The EUT must be supplied with a power adapter and following below table:

Brand	Model No.	Spec.
APD	WB-18Q12FU	AC Input: 100-240V, 50-60Hz, 0.6A Max. DC Output: 12.0V, 1.5A 18.0W DC Cable: Unshielded, 2.0m

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

Antenna NO.	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
2	2.4G_Chain 0	WHAYU	56-001-000044Z	2.5	2.4~2.4835GHz	Dipole	i-pex(MHF)	115
	5G_Chain 0			3.4	5.15~5.85GHz			
3	2.4G_Chain 1	WHAYU	56-001-000045Z	2.4	2.4~2.4835GHz	PIFA	i-pex(MHF)	115
	5G_Chain 1			3.4	5.15~5.85GHz			

4. The EUT incorporates a MIMO function:

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

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

5. The power setting are list as below:

CDD Mode											
802.11b		**802.11g**		**VHT20**		**VHT40**		**802.11ax (HE20)**		**802.11ax (HE40)**	
Fre. (MHz)	**Power Setting**	**Fre. (MHz)**	**Power Setting**	**Fre. (MHz)**	**Power Setting**	**Fre. (MHz)**	**Power Setting**	**Fre. (MHz)**	**Power Setting**	**Fre. (MHz)**	**Power Setting**
2412	19	2412	18.5	2412	17	2422	16	2412	17	2422	16
2442	19.5	2442	22.5	2442	22.5	2442	18	2442	22.5	2442	18
2472	18	2472	18.5	2472	17	2462	15.5	2472	17	2462	15.5

Beamforming Mode							
VHT20		**VHT40**		**802.11ax (HE20)**		**802.11ax (HE40)**	
Fre. (MHz)	**Power Setting**	**Fre. (MHz)**	**Power Setting**	**Fre. (MHz)**	**Power Setting**	**Fre. (MHz)**	**Power Setting**
2412	17	2422	16	2412	17	2422	16
2442	22.5	2442	18	2442	22.5	2442	18
2472	17	2462	15.5	2472	17	2462	15.5

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

3.2 Description of Test Modes

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

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

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

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

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 **RE<1G:** Radiated Emission below 1GHz

PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

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

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE20)	1 to 11	6	OFDMA	BPSK	MCS0

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

CDD Mode					
Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE20)	1 to 11	6	OFDMA	BPSK	MCS0

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.

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

Test Condition:

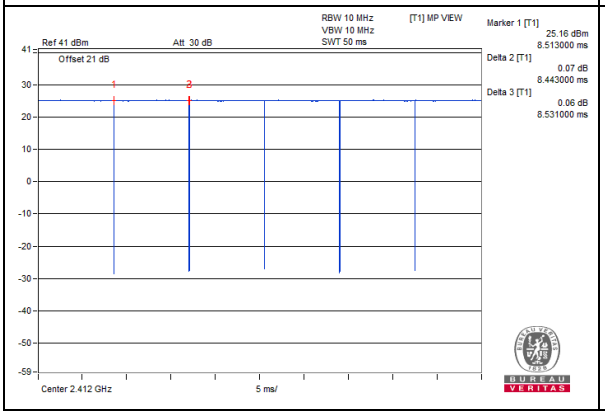
Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	20deg. C, 70%RH	120Vac, 60Hz	Ryan Du Tom Yang
RE<1G	25deg. C, 66%RH	120Vac, 60Hz	Tom Yang
PLC	25deg. C, 66%RH	120Vac, 60Hz	Tom Yang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leon Dai

3.3 Duty Cycle of Test Signal

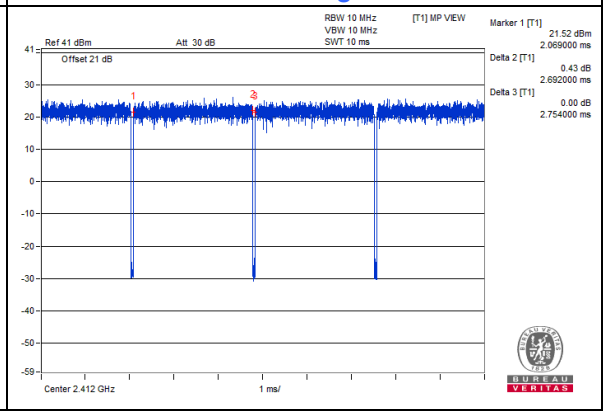
Duty cycle of test signal is > 98 %, duty factor is not required.
Duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11b: Duty cycle = 8.443 ms / 8.531 ms = 0.99
802.11g: Duty cycle = 2.692 ms / 2.754 ms = 0.977, duty factor = 10 * log (1/Duty cycle) = 0.10 dB
802.11ax (HE20): Duty cycle = 3.78 ms / 3.862 ms = 0.979, duty factor = 10 * log (1/Duty cycle) = 0.09 dB
802.11ax (HE40): Duty cycle = 3.778 ms / 3.84 ms = 0.984

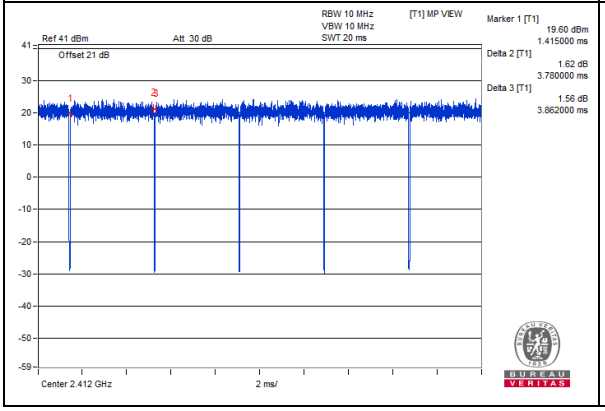
802.11b



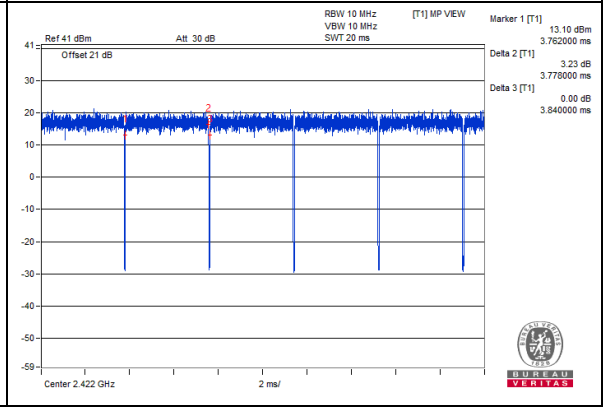
802.11g



802.11ax (HE20)



802.11ax (HE40)



3.4 Description of Support Units

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

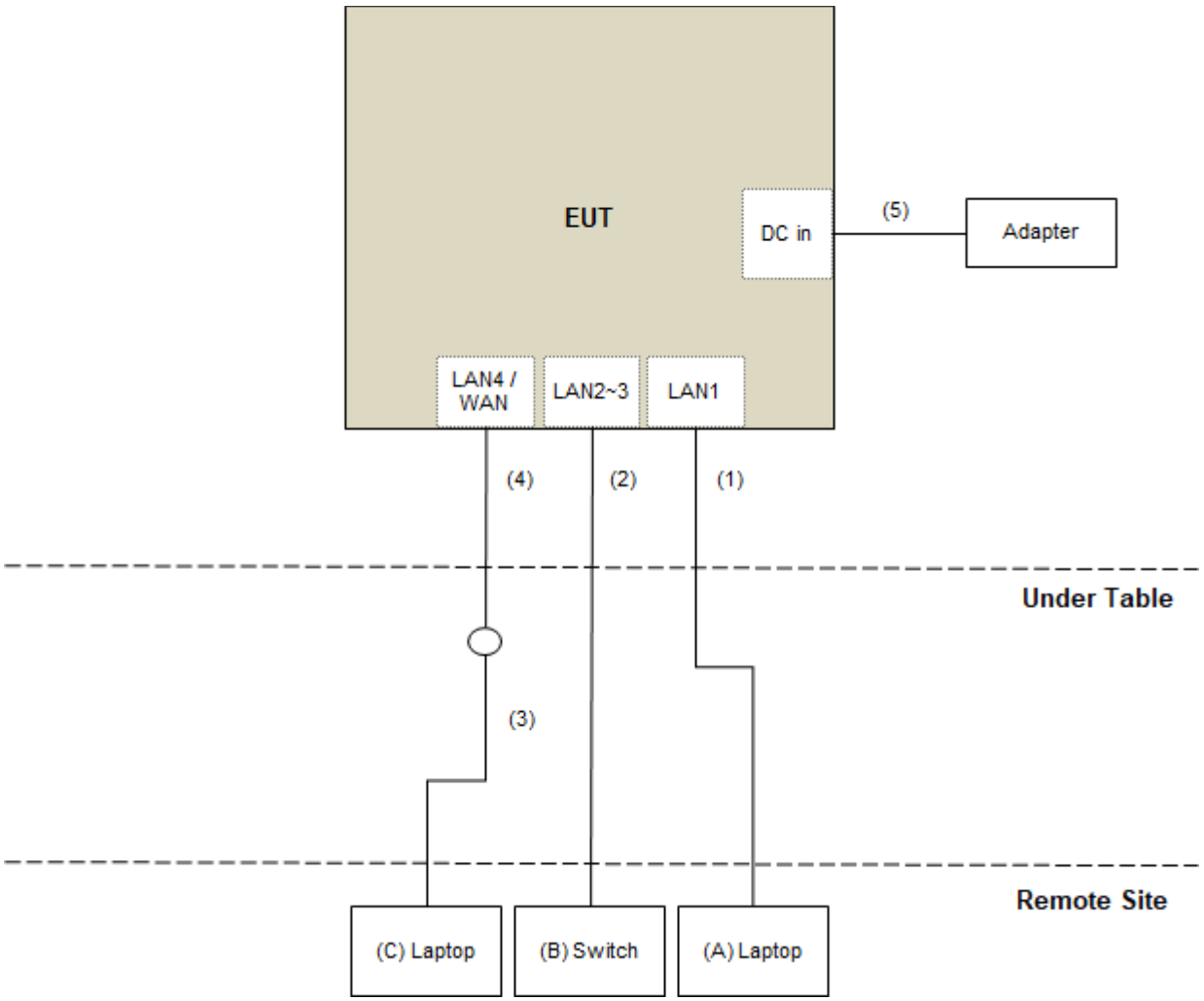
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E5430	4YV4VY1	DoC	Provided by Lab
B.	Switch	D-Link	DGS-1005D	DR8WC92000523	NA	Provided by Lab
C.	Laptop	DELL	E5430	HYV4VY1	DoC	Provided by Lab

Note:

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

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

Test Standard:

FCC Part 15, Subpart C (15.247)
ANSI C63.10-2013

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

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02
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 20dB below the highest level of the desired power:

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

Note:

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

4.1.2 Test Instruments

For Radiated emission and Bandedge test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 06, 2021	July 05, 2022
Pre-Amplifier EMCI	EMC001340	980142	May 24, 2021	May 23, 2022
Loop Antenna Electro-Metrics	EM-6879	264	Mar. 05, 2021	Mar. 04, 2022
RF Cable	5D-FB	LOOPCAB-001	Jan. 07, 2021	Jan. 06, 2022
RF Cable	5D-FB	LOOPCAB-002	Jan. 07, 2021	Jan. 06, 2022
Pre-Amplifier Mini-Circuits	ZFL-1000VH2	QA0838008	Oct. 20, 2020	Oct. 19, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 05, 2020	Nov. 04, 2021
RF Cable	8D	966-3-1	Mar. 16, 2021	Mar. 15, 2022
RF Cable	8D	966-3-2	Mar. 16, 2021	Mar. 15, 2022
RF Cable	8D	966-3-3	Mar. 16, 2021	Mar. 15, 2022
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 24, 2020	Sep. 23, 2021
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 11, 2021	Jan. 10, 2022
RF Cable	EMC104-SM-SM-1500	180504	Apr. 26, 2021	Apr. 25, 2022
RF Cable	EMC104-SM-SM-2000	180601	June 08, 2021	June 07, 2022
RF Cable	EMC104-SM-SM-6000	210201	May 13, 2021	May 12, 2022
Spectrum Analyzer Keysight	N9030A	MY54490679	July 09, 2021	July 08, 2022
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 11, 2021	Jan. 10, 2022
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 22, 2020	Nov. 21, 2021
RF Cable	EMC102-KM-KM-1200	160924	Jan. 11, 2021	Jan. 10, 2022
RF Cable	EMC-KM-KM-4000	200214	Mar. 10, 2021	Mar. 09, 2022
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: July 23 to Aug. 05, 2021

For other test items test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	101516	Mar. 08, 2021	Mar. 07, 2022
Power meter Anritsu	ML2495A	1529002	June 21, 2021	June 20, 2022
Power sensor Anritsu	MA2411B	1339443	May 31, 2021	May 30, 2022
10dB Attenuator Woken	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

NOTE: 1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: Aug. 10, 2021

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

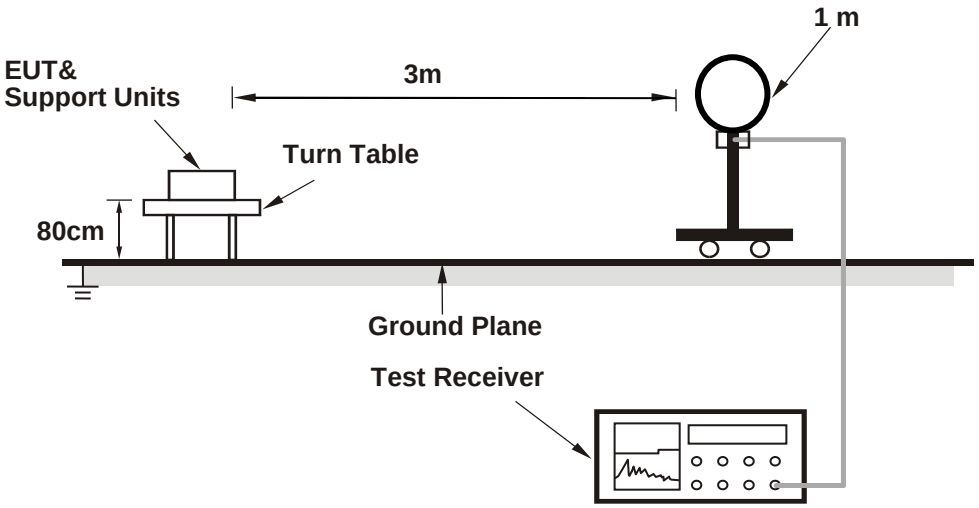
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

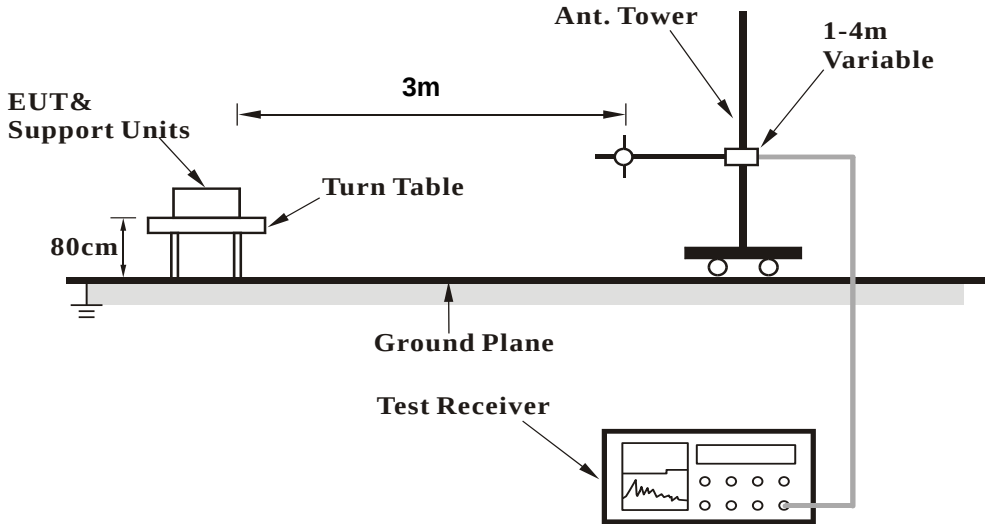
No deviation.

4.1.5 Test Setup

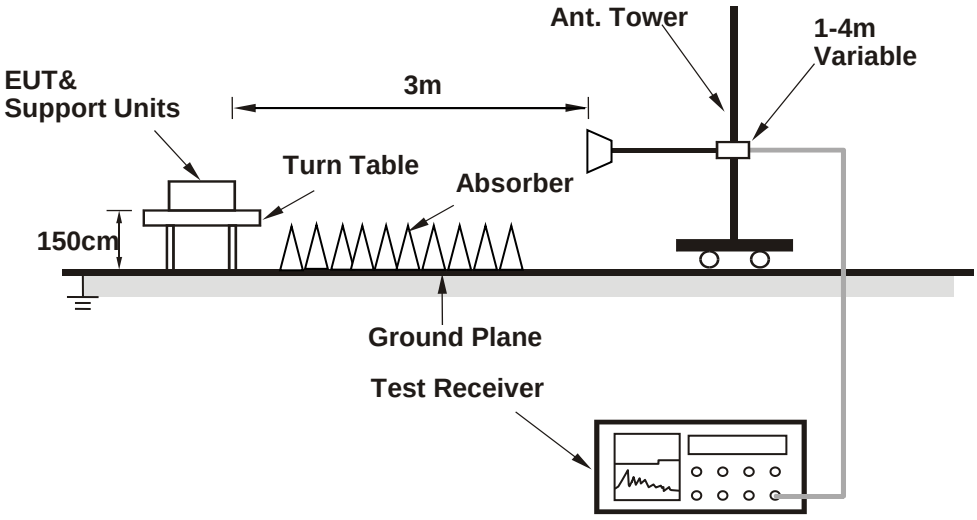
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Controlling software (package_UIv2.13_DLLv5.11_20191004-alpha-RSSI -DFS) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz Data:

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2387.28	59.6 PK	74.0	-14.4	2.05 H	119	60.8	-1.2
2	2387.28	52.5 AV	54.0	-1.5	2.05 H	119	53.7	-1.2
3	*2412.00	112.3 PK			2.05 H	119	113.5	-1.2
4	*2412.00	110.2 AV			2.05 H	119	111.4	-1.2
5	4824.00	52.7 PK	74.0	-21.3	3.62 H	206	49.0	3.7
6	4824.00	49.1 AV	54.0	-4.9	3.62 H	206	45.4	3.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2387.20	58.6 PK	74.0	-15.4	3.10 V	149	59.8	-1.2
2	2387.20	50.6 AV	54.0	-3.4	3.10 V	149	51.8	-1.2
3	*2412.00	106.7 PK			3.10 V	149	107.9	-1.2
4	*2412.00	104.5 AV			3.10 V	149	105.7	-1.2
5	4824.00	53.1 PK	74.0	-20.9	1.58 V	96	49.4	3.7
6	4824.00	50.3 AV	54.0	-3.7	1.58 V	96	46.6	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.

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.2 PK	74.0	-18.8	1.59 H	119	56.4	-1.2
2	2390.00	43.6 AV	54.0	-10.4	1.59 H	119	44.8	-1.2
3	*2437.00	112.3 PK			1.59 H	119	113.5	-1.2
4	*2437.00	110.0 AV			1.59 H	119	111.2	-1.2
5	2483.50	56.3 PK	74.0	-17.7	1.59 H	119	57.5	-1.2
6	2483.50	44.7 AV	54.0	-9.3	1.59 H	119	45.9	-1.2
7	4874.00	53.4 PK	74.0	-20.6	3.57 H	196	49.6	3.8
8	4874.00	51.9 AV	54.0	-2.1	3.57 H	196	48.1	3.8
9	7311.00	52.6 PK	74.0	-21.4	3.94 H	318	42.9	9.7
10	7311.00	44.3 AV	54.0	-9.7	3.94 H	318	34.6	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	52.9 PK	74.0	-21.1	3.05 V	148	54.1	-1.2
2	2390.00	40.8 AV	54.0	-13.2	3.05 V	148	42.0	-1.2
3	*2437.00	107.3 PK			3.05 V	148	108.5	-1.2
4	*2437.00	105.2 AV			3.05 V	148	106.4	-1.2
5	2483.50	53.6 PK	74.0	-20.4	3.05 V	148	54.8	-1.2
6	2483.50	42.4 AV	54.0	-11.6	3.05 V	148	43.6	-1.2
7	4874.00	54.6 PK	74.0	-19.4	3.01 V	278	50.8	3.8
8	**4874.00**	**53.4 AV**	**54.0**	**-0.6**	**3.01 V**	**278**	**49.6**	**3.8**
9	7311.00	49.5 PK	74.0	-24.5	1.55 V	109	39.8	9.7
10	7311.00	42.7 AV	54.0	-11.3	1.55 V	109	33.0	9.7

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.

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	111.0 PK			2.06 H	73	112.2	-1.2
2	*2462.00	108.6 AV			2.06 H	73	109.8	-1.2
3	2483.50	58.0 PK	74.0	-16.0	2.06 H	73	59.2	-1.2
4	2483.50	50.8 AV	54.0	-3.2	2.06 H	73	52.0	-1.2
5	4924.00	51.1 PK	74.0	-22.9	3.55 H	210	47.2	3.9
6	4924.00	48.6 AV	54.0	-5.4	3.55 H	210	44.7	3.9
7	7386.00	48.6 PK	74.0	-25.4	3.99 H	303	38.9	9.7
8	7386.00	42.6 AV	54.0	-11.4	3.99 H	303	32.9	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	105.7 PK			3.54 V	127	106.9	-1.2
2	*2462.00	103.3 AV			3.54 V	127	104.5	-1.2
3	2483.50	55.9 PK	74.0	-18.1	3.54 V	127	57.1	-1.2
4	2483.50	47.0 AV	54.0	-7.0	3.54 V	127	48.2	-1.2
5	4924.00	51.6 PK	74.0	-22.4	3.68 V	269	47.7	3.9
6	4924.00	49.5 AV	54.0	-4.5	3.68 V	269	45.6	3.9
7	7386.00	47.9 PK	74.0	-26.1	1.53 V	110	38.2	9.7
8	7386.00	41.0 AV	54.0	-13.0	1.53 V	110	31.3	9.7

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.

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	70.9 PK	74.0	-3.1	2.19 H	84	72.1	-1.2
2	2390.00	52.6 AV	54.0	-1.4	2.19 H	84	53.8	-1.2
3	*2412.00	110.0 PK			2.19 H	84	111.2	-1.2
4	*2412.00	101.2 AV			2.19 H	84	102.4	-1.2
5	4824.00	43.1 PK	74.0	-30.9	3.57 H	207	39.4	3.7
6	4824.00	32.5 AV	54.0	-21.5	3.57 H	207	28.8	3.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.6 PK	74.0	-11.4	3.11 V	145	63.8	-1.2
2	2390.00	47.7 AV	54.0	-6.3	3.11 V	145	48.9	-1.2
3	*2412.00	106.3 PK			3.11 V	145	107.5	-1.2
4	*2412.00	96.5 AV			3.11 V	145	97.7	-1.2
5	4824.00	44.9 PK	74.0	-29.1	3.01 V	269	41.2	3.7
6	4824.00	33.8 AV	54.0	-20.2	3.01 V	269	30.1	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.

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	70.4 PK	74.0	-3.6	1.46 H	127	71.6	-1.2
2	2390.00	51.3 AV	54.0	-2.7	1.46 H	127	52.5	-1.2
3	*2437.00	114.6 PK			1.46 H	127	115.8	-1.2
4	*2437.00	104.6 AV			1.46 H	127	105.8	-1.2
5	2483.50	72.6 PK	74.0	-1.4	1.46 H	127	73.8	-1.2
6	**2483.50**	**53.4 AV**	**54.0**	**-0.6**	**1.46 H**	**127**	**54.6**	**-1.2**
7	4874.00	49.8 PK	74.0	-24.2	3.60 H	194	46.0	3.8
8	4874.00	38.5 AV	54.0	-15.5	3.60 H	194	34.7	3.8
9	7311.00	44.1 PK	74.0	-29.9	4.00 H	292	34.4	9.7
10	7311.00	32.6 AV	54.0	-21.4	4.00 H	292	22.9	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	60.7 PK	74.0	-13.3	3.59 V	136	61.9	-1.2
2	2390.00	46.8 AV	54.0	-7.2	3.59 V	136	48.0	-1.2
3	*2437.00	108.9 PK			3.59 V	136	110.1	-1.2
4	*2437.00	99.5 AV			3.59 V	136	100.7	-1.2
5	2483.50	69.2 PK	74.0	-4.8	3.59 V	136	70.4	-1.2
6	2483.50	49.3 AV	54.0	-4.7	3.59 V	136	50.5	-1.2
7	4874.00	51.1 PK	74.0	-22.9	3.04 V	275	47.3	3.8
8	4874.00	39.2 AV	54.0	-14.8	3.04 V	275	35.4	3.8
9	7311.00	43.1 PK	74.0	-30.9	1.54 V	104	33.4	9.7
10	7311.00	31.7 AV	54.0	-22.3	1.54 V	104	22.0	9.7

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.

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	111.4 PK			2.02 H	83	112.6	-1.2
2	*2462.00	102.1 AV			2.02 H	83	103.3	-1.2
3	2485.54	68.2 PK	74.0	-5.8	2.02 H	83	69.4	-1.2
4	2485.54	51.8 AV	54.0	-2.2	2.02 H	83	53.0	-1.2
5	4924.00	42.9 PK	74.0	-31.1	3.62 H	199	39.0	3.9
6	4924.00	32.4 AV	54.0	-21.6	3.62 H	199	28.5	3.9
7	7386.00	43.0 PK	74.0	-31.0	3.97 H	279	33.3	9.7
8	7386.00	32.7 AV	54.0	-21.3	3.97 H	279	23.0	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	106.1 PK			3.93 V	148	107.3	-1.2
2	*2462.00	96.4 AV			3.93 V	148	97.6	-1.2
3	2483.70	67.6 PK	74.0	-6.4	3.93 V	148	68.8	-1.2
4	2483.70	48.2 AV	54.0	-5.8	3.93 V	148	49.4	-1.2
5	4924.00	44.8 PK	74.0	-29.2	3.05 V	275	40.9	3.9
6	4924.00	33.7 AV	54.0	-20.3	3.05 V	275	29.8	3.9
7	7386.00	43.2 PK	74.0	-30.8	1.49 V	109	33.5	9.7
8	7386.00	32.0 AV	54.0	-22.0	1.49 V	109	22.3	9.7

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.

RF Mode	TX 802.11ax (HE20)	Channel	CH 1：2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2389.60	71.8 PK	74.0	-2.2	2.09 H	87	73.0	-1.2
2	2389.60	52.8 AV	54.0	-1.2	2.09 H	87	54.0	-1.2
3	*2412.00	111.8 PK			2.09 H	87	113.0	-1.2
4	*2412.00	99.2 AV			2.09 H	87	100.4	-1.2
5	4824.00	42.6 PK	74.0	-31.4	3.63 H	215	38.9	3.7
6	4824.00	32.1 AV	54.0	-21.9	3.63 H	215	28.4	3.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2389.60	66.5 PK	74.0	-7.5	3.09 V	132	67.7	-1.2
2	2389.60	48.4 AV	54.0	-5.6	3.09 V	132	49.6	-1.2
3	2390.00	66.0 PK	74.0	-8.0	3.09 V	132	67.2	-1.2
4	2390.00	49.1 AV	54.0	-4.9	3.09 V	132	50.3	-1.2
5	*2412.00	106.6 PK			3.09 V	132	107.8	-1.2
6	*2412.00	94.6 AV			3.09 V	132	95.8	-1.2
7	4824.00	44.8 PK	74.0	-29.2	3.07 V	284	41.1	3.7
8	4824.00	33.9 AV	54.0	-20.1	3.07 V	284	30.2	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.

RF Mode	TX 802.11ax (HE20)	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	67.4 PK	74.0	-6.6	2.20 H	73	68.6	-1.2
2	2390.00	52.0 AV	54.0	-2.0	2.20 H	73	53.2	-1.2
3	*2437.00	115.7 PK			2.20 H	73	116.9	-1.2
4	*2437.00	104.7 AV			2.20 H	73	105.9	-1.2
5	2483.50	70.6 PK	74.0	-3.4	2.20 H	73	71.8	-1.2
6	2483.50	53.2 AV	54.0	-0.8	2.20 H	73	54.4	-1.2
7	4874.00	50.2 PK	74.0	-23.8	3.60 H	203	46.4	3.8
8	4874.00	39.0 AV	54.0	-15.0	3.60 H	203	35.2	3.8
9	7311.00	44.7 PK	74.0	-29.3	4.00 H	293	35.0	9.7
10	7311.00	33.0 AV	54.0	-21.0	4.00 H	293	23.3	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	61.1 PK	74.0	-12.9	3.35 V	160	62.3	-1.2
2	2390.00	46.8 AV	54.0	-7.2	3.35 V	160	48.0	-1.2
3	*2437.00	110.1 PK			3.35 V	160	111.3	-1.2
4	*2437.00	99.6 AV			3.35 V	160	100.8	-1.2
5	2483.50	67.9 PK	74.0	-6.1	3.35 V	160	69.1	-1.2
6	2483.50	49.0 AV	54.0	-5.0	3.35 V	160	50.2	-1.2
7	4874.00	50.5 PK	74.0	-23.5	3.05 V	280	46.7	3.8
8	4874.00	38.8 AV	54.0	-15.2	3.05 V	280	35.0	3.8
9	7311.00	43.2 PK	74.0	-30.8	1.59 V	103	33.5	9.7
10	7311.00	31.6 AV	54.0	-22.4	1.59 V	103	21.9	9.7

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.

RF Mode	TX 802.11ax (HE20)	Channel	CH 11：2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	110.5 PK			2.02 H	80	111.7	-1.2
2	*2462.00	99.1 AV			2.02 H	80	100.3	-1.2
3	2483.50	70.8 PK	74.0	-3.2	2.02 H	80	72.0	-1.2
4	2483.50	52.7 AV	54.0	-1.3	2.02 H	80	53.9	-1.2
5	4924.00	43.1 PK	74.0	-30.9	3.61 H	196	39.2	3.9
6	4924.00	32.8 AV	54.0	-21.2	3.61 H	196	28.9	3.9
7	7386.00	42.6 PK	74.0	-31.4	3.91 H	286	32.9	9.7
8	7386.00	32.6 AV	54.0	-21.4	3.91 H	286	22.9	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	106.3 PK			3.33 V	150	107.5	-1.2
2	*2462.00	94.2 AV			3.33 V	150	95.4	-1.2
3	2483.50	61.0 PK	74.0	-13.0	3.33 V	150	62.2	-1.2
4	2483.50	47.0 AV	54.0	-7.0	3.33 V	150	48.2	-1.2
5	4924.00	44.6 PK	74.0	-29.4	3.03 V	269	40.7	3.9
6	4924.00	33.8 AV	54.0	-20.2	3.03 V	269	29.9	3.9
7	7386.00	43.4 PK	74.0	-30.6	1.54 V	106	33.7	9.7
8	7386.00	32.2 AV	54.0	-21.8	1.54 V	106	22.5	9.7

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.

RF Mode	TX 802.11ax (HE40)	Channel	CH 3：2422 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2388.10	68.1 PK	74.0	-5.9	2.06 H	89	69.3	-1.2
2	2388.10	52.4 AV	54.0	-1.6	2.06 H	89	53.6	-1.2
3	2390.00	64.4 PK	74.0	-9.6	2.06 H	89	65.6	-1.2
4	2390.00	53.0 AV	54.0	-1.0	2.06 H	89	54.2	-1.2
5	*2422.00	108.2 PK			2.06 H	89	109.4	-1.2
6	*2422.00	95.5 AV			2.06 H	89	96.7	-1.2
7	4844.00	43.1 PK	74.0	-30.9	3.65 H	195	39.3	3.8
8	4844.00	32.8 AV	54.0	-21.2	3.65 H	195	29.0	3.8
9	7266.00	41.8 PK	74.0	-32.2	3.94 H	281	32.3	9.5
10	7266.00	32.0 AV	54.0	-22.0	3.94 H	281	22.5	9.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2387.85	64.2 PK	74.0	-9.8	3.97 V	154	65.4	-1.2
2	2387.85	47.3 AV	54.0	-6.7	3.97 V	154	48.5	-1.2
3	2388.80	63.1 PK	74.0	-10.9	3.97 V	154	64.3	-1.2
4	2388.80	48.6 AV	54.0	-5.4	3.97 V	154	49.8	-1.2
5	*2422.00	101.6 PK			3.97 V	154	102.8	-1.2
6	*2422.00	90.0 AV			3.97 V	154	91.2	-1.2
7	4844.00	44.6 PK	74.0	-29.4	3.01 V	257	40.8	3.8
8	4844.00	34.1 AV	54.0	-19.9	3.01 V	257	30.3	3.8
9	7266.00	43.4 PK	74.0	-30.6	1.49 V	107	33.9	9.5
10	7266.00	32.2 AV	54.0	-21.8	1.49 V	107	22.7	9.5

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.

RF Mode	TX 802.11ax (HE40)	Channel	CH 6：2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	67.2 PK	74.0	-6.8	2.10 H	88	68.4	-1.2
2	2390.00	52.5 AV	54.0	-1.5	2.10 H	88	53.7	-1.2
3	*2437.00	110.1 PK			2.10 H	88	111.3	-1.2
4	*2437.00	97.8 AV			2.10 H	88	99.0	-1.2
5	2483.50	70.6 PK	74.0	-3.4	2.10 H	88	71.8	-1.2
6	2483.50	51.9 AV	54.0	-2.1	2.10 H	88	53.1	-1.2
7	4874.00	42.5 PK	74.0	-31.5	3.57 H	211	38.7	3.8
8	4874.00	32.3 AV	54.0	-21.7	3.57 H	211	28.5	3.8
9	7311.00	42.5 PK	74.0	-31.5	3.97 H	300	32.8	9.7
10	7311.00	32.2 AV	54.0	-21.8	3.97 H	300	22.5	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.3 PK	74.0	-11.7	3.54 V	129	63.5	-1.2
2	2390.00	47.3 AV	54.0	-6.7	3.54 V	129	48.5	-1.2
3	*2437.00	103.9 PK			3.54 V	129	105.1	-1.2
4	*2437.00	92.7 AV			3.54 V	129	93.9	-1.2
5	2483.50	61.4 PK	74.0	-12.6	3.54 V	129	62.6	-1.2
6	2483.50	46.0 AV	54.0	-8.0	3.54 V	129	47.2	-1.2
7	4874.00	44.1 PK	74.0	-29.9	2.97 V	254	40.3	3.8
8	4874.00	33.6 AV	54.0	-20.4	2.97 V	254	29.8	3.8
9	7311.00	43.4 PK	74.0	-30.6	1.47 V	92	33.7	9.7
10	7311.00	32.0 AV	54.0	-22.0	1.47 V	92	22.3	9.7

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.

RF Mode	TX 802.11ax (HE40)	Channel	CH 9：2452 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	107.3 PK			2.02 H	88	108.5	-1.2
2	*2452.00	95.0 AV			2.02 H	88	96.2	-1.2
3	2483.70	68.0 PK	74.0	-6.0	2.02 H	88	69.2	-1.2
4	2483.70	52.8 AV	54.0	-1.2	2.02 H	88	54.0	-1.2
5	4904.00	42.7 PK	74.0	-31.3	3.61 H	186	38.8	3.9
6	4904.00	32.4 AV	54.0	-21.6	3.61 H	186	28.5	3.9
7	7356.00	42.2 PK	74.0	-31.8	3.90 H	294	32.3	9.9
8	7356.00	32.2 AV	54.0	-21.8	3.90 H	294	22.3	9.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	102.6 PK			3.58 V	124	103.8	-1.2
2	*2452.00	89.6 AV			3.58 V	124	90.8	-1.2
3	2485.10	58.5 PK	74.0	-15.5	3.58 V	124	59.7	-1.2
4	2485.10	45.6 AV	54.0	-8.4	3.58 V	124	46.8	-1.2
5	2487.00	59.2 PK	74.0	-14.8	3.58 V	124	60.4	-1.2
6	2487.00	44.8 AV	54.0	-9.2	3.58 V	124	46.0	-1.2
7	4904.00	44.2 PK	74.0	-29.8	3.00 V	274	40.3	3.9
8	4904.00	33.5 AV	54.0	-20.5	3.00 V	274	29.6	3.9
9	7356.00	43.0 PK	74.0	-31.0	1.59 V	105	33.1	9.9
10	7356.00	31.9 AV	54.0	-22.1	1.59 V	105	22.0	9.9

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.

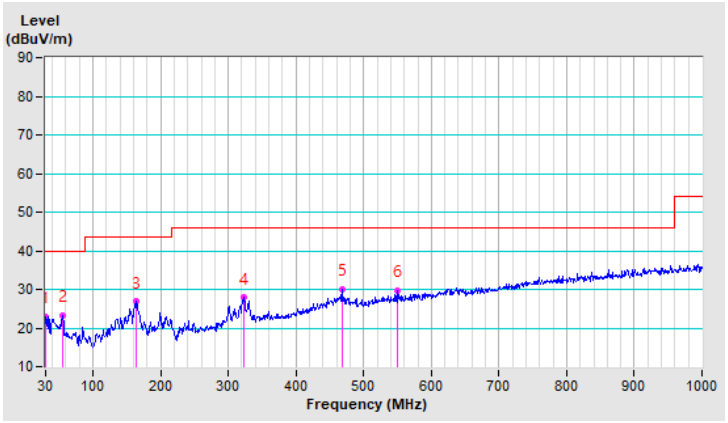
Below 1GHz Data:

RF Mode	TX 802.11ax (HE20)	Channel	CH 6：2437 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.53	22.8 QP	40.0	-17.2	1.00 H	54	32.2	-9.4
2	54.81	23.3 QP	40.0	-16.7	2.00 H	227	31.6	-8.3
3	164.73	26.8 QP	43.5	-16.7	1.50 H	253	34.7	-7.9
4	323.72	27.8 QP	46.0	-18.2	1.00 H	227	33.4	-5.6
5	468.15	30.0 QP	46.0	-16.0	2.00 H	107	31.7	-1.7
6	549.99	29.6 QP	46.0	-16.4	1.50 H	226	29.8	-0.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

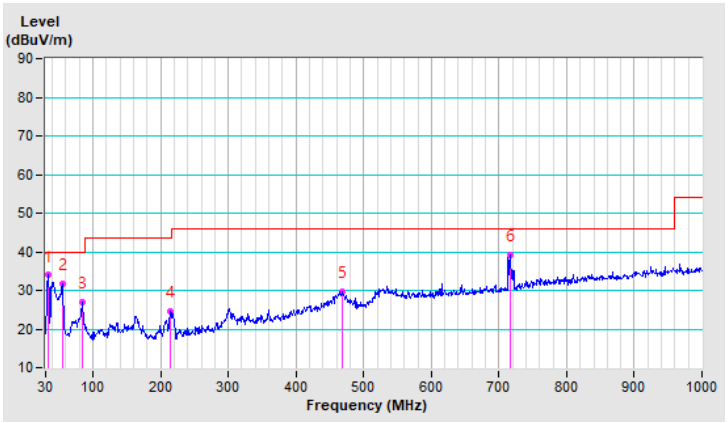


RF Mode	TX 802.11ax (HE20)	Channel	CH 6：2437 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	33.66	33.9 QP	40.0	-6.1	1.00 V	127	43.1	-9.2
2	55.05	31.8 QP	40.0	-8.2	1.00 V	324	40.1	-8.3
3	84.25	27.0 QP	40.0	-13.0	1.50 V	269	40.6	-13.6
4	214.91	24.6 QP	43.5	-18.9	1.00 V	15	35.2	-10.6
5	469.36	29.8 QP	46.0	-16.2	1.00 V	90	31.5	-1.7
6	715.91	39.3 QP	46.0	-6.7	1.00 V	247	36.0	3.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 20, 2020	Oct. 19, 2021
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 27, 2020	Oct. 26, 2021
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 26, 2021	Mar. 25, 2022
50 ohms Terminator	50	3	Oct. 26, 2020	Oct. 25, 2021
RF Cable	5D-FB	COCCAB-001	Sep. 26, 2020	Sep. 25, 2021
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 29, 2020	Aug. 28, 2021
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: July 31, 2021

4.2.3 Test Procedures

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

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

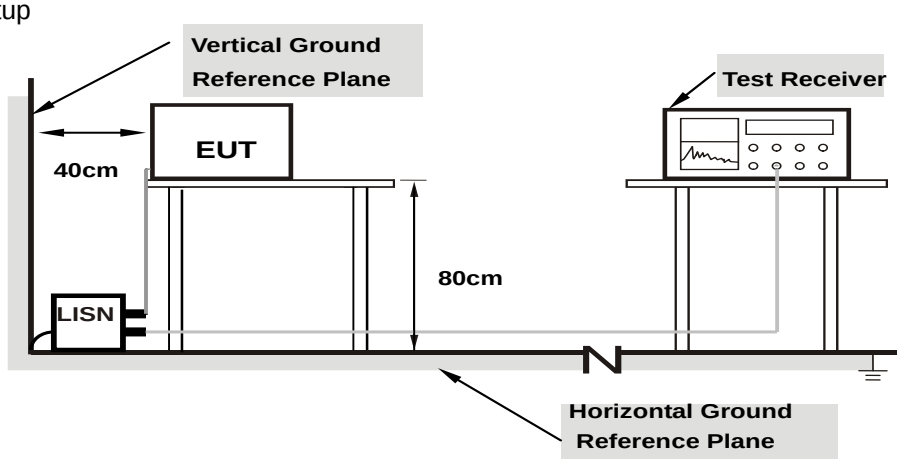
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

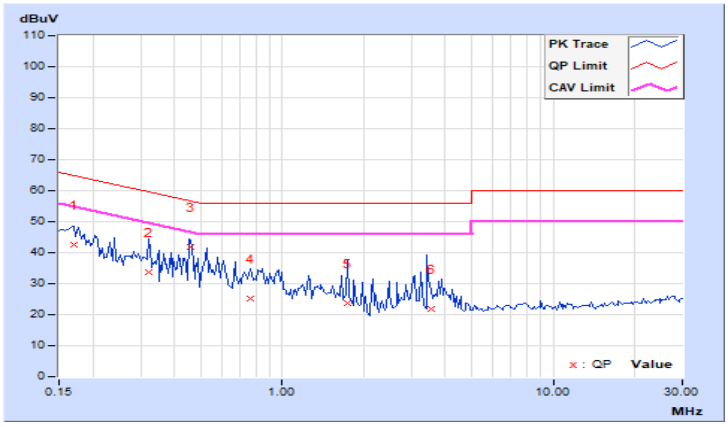
4.2.7 Test Results

RF Mode	TX 802.11ax (HE20)	Channel	CH 6：2437 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	9.98	32.53	15.56	42.51	25.54	64.98	54.98	-22.47	-29.44
2	0.32188	10.02	23.54	9.54	33.56	19.56	59.66	49.66	-26.10	-30.10
3	**0.45859**	**10.03**	**31.88**	**26.75**	**41.91**	**36.78**	**56.72**	**46.72**	**-14.81**	**-9.94**
4	0.75938	10.05	15.03	5.80	25.08	15.85	56.00	46.00	-30.92	-30.15
5	1.73438	10.11	13.68	5.55	23.79	15.66	56.00	46.00	-32.21	-30.34
6	3.54984	10.23	11.80	1.96	22.03	12.19	56.00	46.00	-33.97	-33.81

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

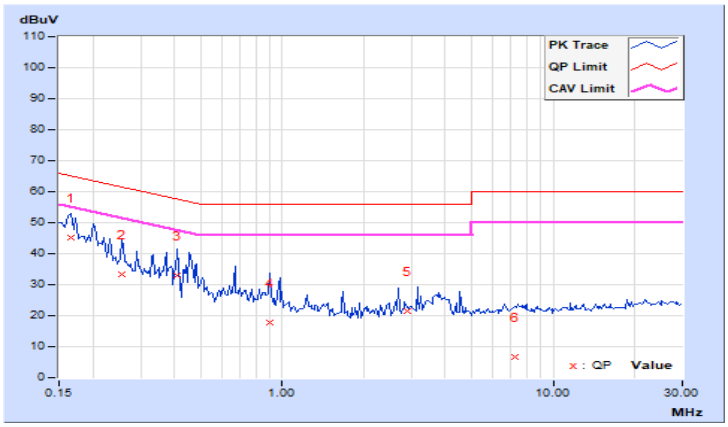


RF Mode	TX 802.11ax (HE20)	Channel	CH 6：2437 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	9.97	35.09	20.51	45.06	30.48	65.18	55.18	-20.12	-24.70
2	0.25547	10.01	23.23	9.73	33.24	19.74	61.58	51.58	-28.34	-31.84
3	0.40781	10.02	22.83	11.69	32.85	21.71	57.69	47.69	-24.84	-25.98
4	0.90000	10.05	7.86	-6.76	17.91	3.29	56.00	46.00	-38.09	-42.71
5	2.91375	10.18	11.40	-2.63	21.58	7.55	56.00	46.00	-34.42	-38.45
6	7.20313	10.43	-3.87	-8.78	6.56	1.65	60.00	50.00	-53.44	-48.35

Remarks:

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

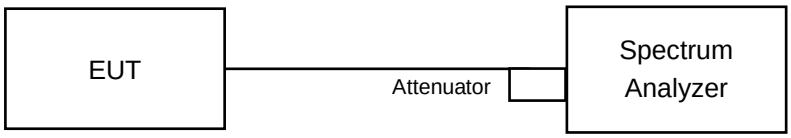


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b CDD

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)	Test Result
		Chain 0	Chain 1	Minimum	
1	2412	8.09	8.07	0.5	Pass
6	2437	9.03	8.06	0.5	Pass
11	2462	8.08	8.1	0.5	Pass

802.11g CDD

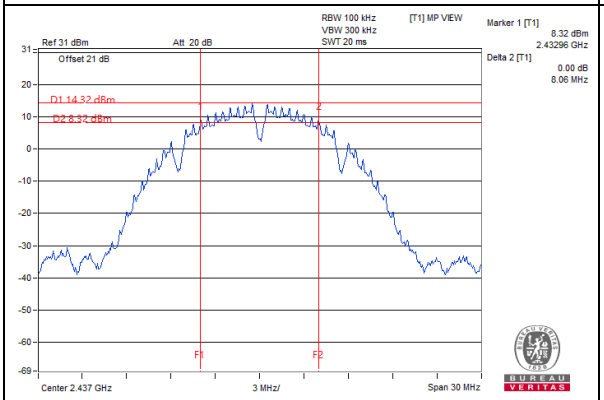
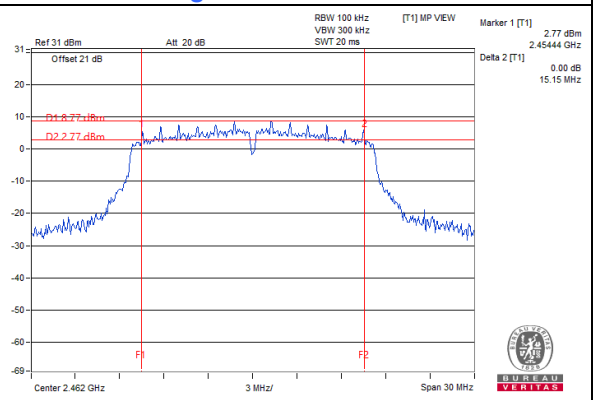
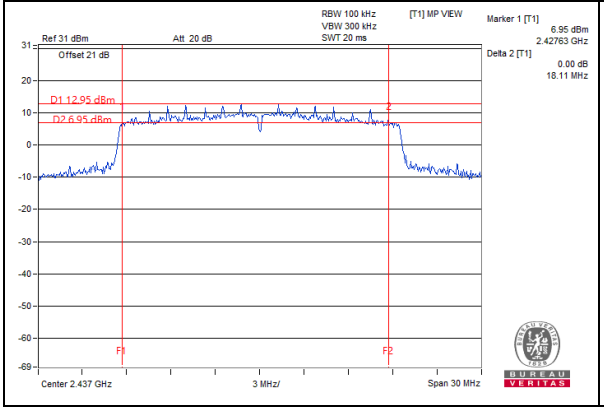
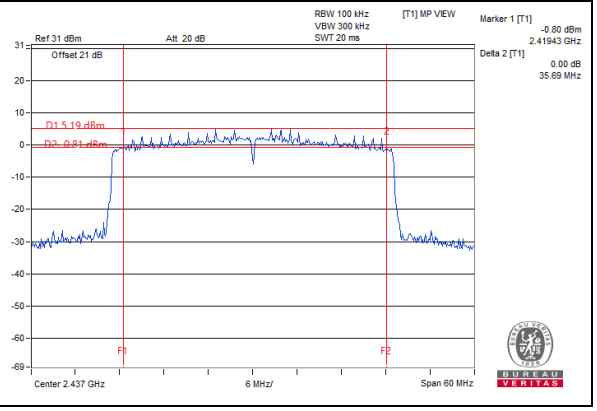
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)	Test Result
		Chain 0	Chain 1	Minimum	
1	2412	15.2	15.2	0.5	Pass
6	2437	15.16	15.2	0.5	Pass
11	2462	15.15	15.19	0.5	Pass

802.11ax (HE20) CDD

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)	Test Result
		Chain 0	Chain 1	Minimum	
1	2412	18.67	18.78	0.5	Pass
6	2437	18.11	18.4	0.5	Pass
11	2462	18.55	18.62	0.5	Pass

802.11ax (HE40) CDD

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Limit (MHz)	Test Result
		Chain 0	Chain 1	Minimum	
3	2422	36.76	36.87	0.5	Pass
6	2437	37.44	35.69	0.5	Pass
9	2452	37.13	36.67	0.5	Pass

Spectrum Plot of Worst Value	
802.11b CDD \ Chain1 : CH 6	**802.11g CDD \ Chain0 : CH 11**
	
802.11ax (HE20) CDD \ Chain0 : CH 6	**802.11ax (HE40) CDD \ Chain1 : CH 6**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

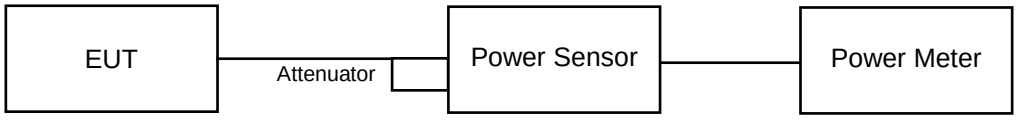
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

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

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b CDD

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	24.31	23.25	481.123	26.82	30	Pass
6	2437	24.76	24.13	558.048	27.47	30	Pass
11	2462	23.05	22.36	374.023	25.73	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.5 dBi < 6dBi, so the output power limit shall not be reduced.

802.11g CDD

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	26.13	25.86	795.682	29.01	30	Pass
6	2437	26.86	26.41	922.811	29.65	30	Pass
11	2462	25.96	25.81	775.523	28.90	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.5 dBi < 6dBi, so the output power limit shall not be reduced.

VHT20 CDD

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	25.22	25.21	664.554	28.23	30	Pass
6	2437	26.64	26.99	961.352	29.83	30	Pass
11	2462	25.30	25.53	696.117	28.43	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.5 dBi < 6dBi, so the output power limit shall not be reduced.

VHT40 CDD

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	24.25	24.47	545.971	27.37	30	Pass
6	2437	25.82	25.92	772.785	28.88	30	Pass
9	2452	23.83	24.09	497.994	26.97	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.5 dBi < 6dBi, so the output power limit shall not be reduced.

802.11ax (HE20) CDD

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	25.57	25.54	718.675	28.57	30	Pass
6	2437	26.71	27.02	972.314	29.88	30	Pass
11	2462	25.69	25.80	750.87	28.76	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.5 dBi < 6dBi, so the output power limit shall not be reduced.

802.11ax (HE40) CDD

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	24.75	24.59	586.278	27.68	30	Pass
6	2437	26.11	26.10	815.7	29.12	30	Pass
9	2452	24.01	24.17	512.984	27.10	30	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. The maximum gain is 2.5 dBi < 6dBi, so the output power limit shall not be reduced.

VHT20 BF

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	25.22	25.21	664.554	28.23	30	Pass
6	2437	26.64	26.99	961.352	29.83	30	Pass
11	2462	25.30	25.53	696.117	28.43	30	Pass

Notes:

1. Beamforming mode, Directional gain = 10 log[(10$^{Chain0/20}$ + 10$^{Chain1/20}$)^2 / 2]
2. The directional gain is 5.46 dBi < 6dBi, so the output power limit shall not be reduced.

VHT40 BF

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	24.25	24.47	545.971	27.37	30	Pass
6	2437	25.82	25.92	772.785	28.88	30	Pass
9	2452	23.83	24.09	497.994	26.97	30	Pass

Notes:

1. Beamforming mode, Directional gain = 10 log[(10$^{Chain0/20}$ + 10$^{Chain1/20}$)^2 / 2]
2. The directional gain is 5.46 dBi < 6dBi, so the output power limit shall not be reduced.

802.11ax (HE20) BF

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
1	2412	25.57	25.54	718.675	28.57	30	Pass
6	2437	26.71	27.02	972.314	29.88	30	Pass
11	2462	25.69	25.80	750.87	28.76	30	Pass

Notes:

1. Beamforming mode, Directional gain = 10 log[(10$^{Chain0/20}$ + 10$^{Chain1/20}$)^2 / 2]
2. The directional gain is 5.46 dBi < 6dBi, so the output power limit shall not be reduced.

802.11ax (HE40) BF

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Test Result
		Chain 0	Chain 1				
3	2422	24.75	24.59	586.278	27.68	30	Pass
6	2437	26.11	26.10	815.7	29.12	30	Pass
9	2452	24.01	24.17	512.984	27.10	30	Pass

Notes:

1. Beamforming mode, Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
2. The directional gain is 5.46 dBi < 6dBi, so the output power limit shall not be reduced.

FOR AVERAGE POWER

802.11b CDD

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	22.03	20.84	280.927	24.49
6	2437	22.54	21.79	330.481	25.19
11	2462	20.58	19.95	213.143	23.29

802.11g CDD

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	18.92	18.44	147.806	21.70
6	2437	23.22	22.87	403.536	26.06
11	2462	18.99	18.75	154.24	21.88

VHT20 CDD

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	17.30	16.91	102.794	20.12
6	2437	23.14	23.02	406.51	26.09
11	2462	17.21	17.43	107.937	20.33

VHT40 CDD

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	16.28	15.79	80.393	19.05
6	2437	18.48	18.45	140.454	21.48
9	2452	15.74	15.79	75.429	18.78

802.11ax (HE20) CDD

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	17.55	17.05	107.584	20.32
6	2437	23.34	23.09	419.479	26.23
11	2462	17.45	17.66	113.935	20.57

802.11ax (HE40) CDD

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	16.52	16.10	85.613	19.33
6	2437	18.66	18.59	145.728	21.64
9	2452	15.97	16.02	79.531	19.01

VHT20 BF

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	17.30	16.91	102.794	20.12
6	2437	23.14	23.02	406.51	26.09
11	2462	17.21	17.43	107.937	20.33

VHT40 BF

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	16.28	15.79	80.393	19.05
6	2437	18.48	18.45	140.454	21.48
9	2452	15.74	15.79	75.429	18.78

802.11ax (HE20) BF

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	17.55	17.05	107.584	20.32
6	2437	23.34	23.09	419.479	26.23
11	2462	17.45	17.66	113.935	20.57

802.11ax (HE40) BF

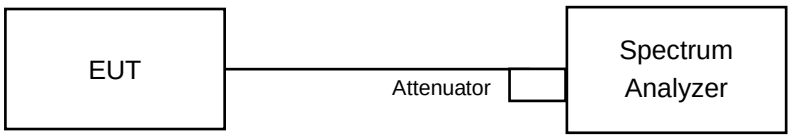
Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	16.52	16.10	85.613	19.33
6	2437	18.66	18.59	145.728	21.64
9	2452	15.97	16.02	79.531	19.01

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b CDD

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	0.75	-0.50	3.18	8.00	Pass
6	2437	-0.16	-0.15	2.86	8.00	Pass
11	2462	-1.25	-1.54	1.62	8.00	Pass

Notes:

1 Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.

2 CDD mode, Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]

3 The directional gain is 5.46 dBi <= 6dBi, so the power density limit shall not be reduced.

802.11g CDD

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	-4.62	-6.55	-2.47	8.00	Pass
6	2437	-1.26	-1.92	1.43	8.00	Pass
11	2462	-5.42	-4.65	-2.01	8.00	Pass

Notes:

1 Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.

2 CDD mode, Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]

3 The directional gain is 5.46 dBi <= 6dBi, so the power density limit shall not be reduced.

802.11ax (HE20) CDD

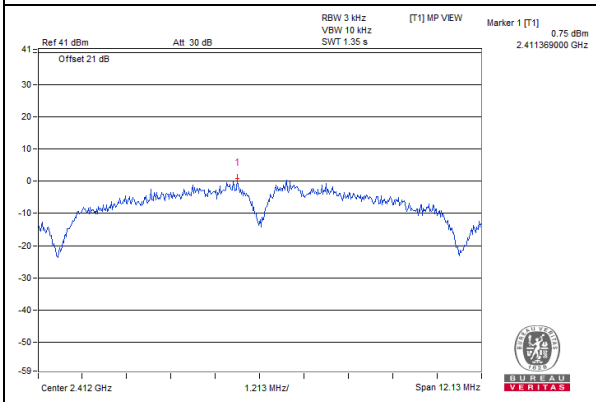
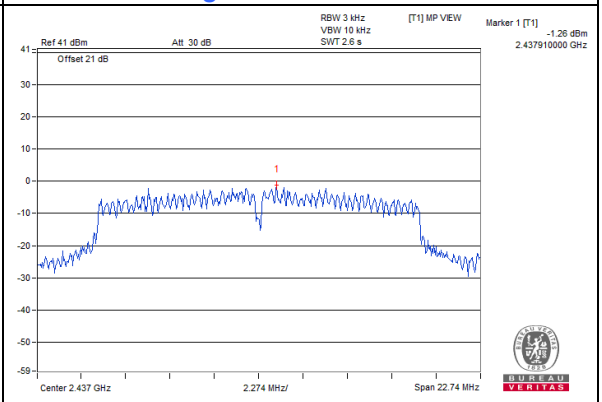
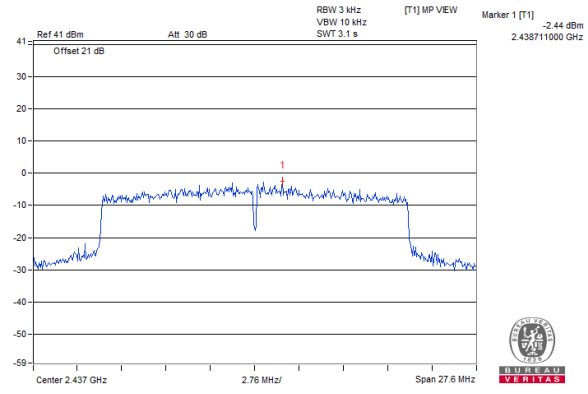
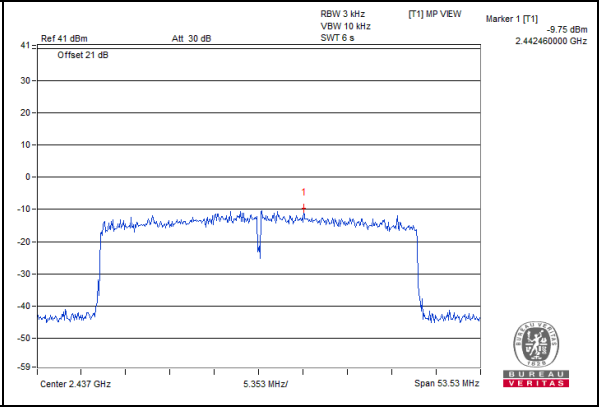
Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
1	2412	-8.96	-9.26	-6.10	8.00	Pass
6	2437	-3.06	-2.44	0.27	8.00	Pass
11	2462	-8.80	-8.29	-5.53	8.00	Pass

Notes:
1 Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2 CDD mode, Directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$)^2 / 2]
3 The directional gain is 5.46 dBi <= 6dBi, so the power density limit shall not be reduced.

802.11ax (HE40) CDD

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Test Result
		Chain 0	Chain 1			
3	2422	-10.71	-12.45	-8.48	8.00	Pass
6	2437	-9.92	-9.75	-6.82	8.00	Pass
9	2452	-12.55	-12.50	-9.51	8.00	Pass

Notes:
1 Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2 CDD mode, Directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$)^2 / 2]
3 The directional gain is 5.46 dBi <= 6dBi, so the power density limit shall not be reduced.

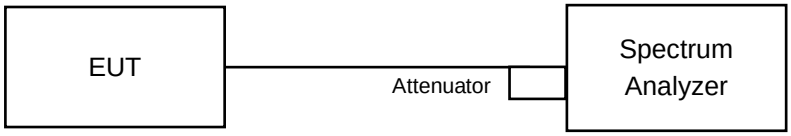
Spectrum Plot of Worst Value	
802.11b CDD \ Chain0 : CH 1	**802.11g CDD \ Chain0 : CH 6**
	
802.11ax (HE20) CDD \ Chain1 : CH 6	**802.11ax (HE40) CDD \ Chain1 : CH 6**
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 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 OOBE

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

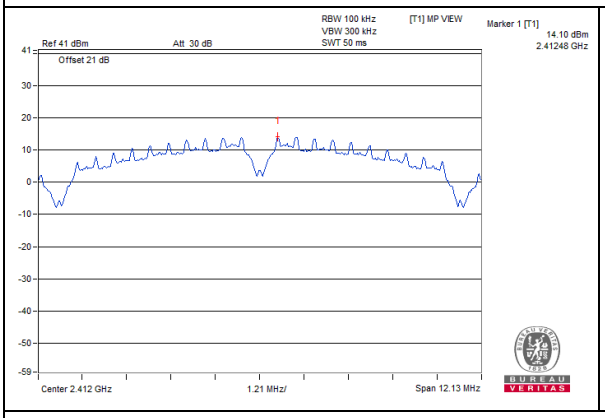
Same as Item 4.3.6

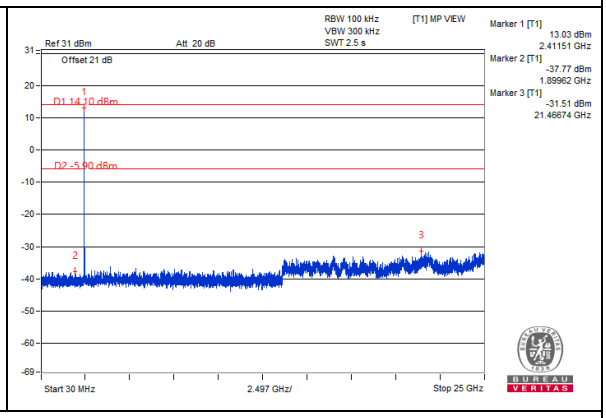
4.6.7 Test Results

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

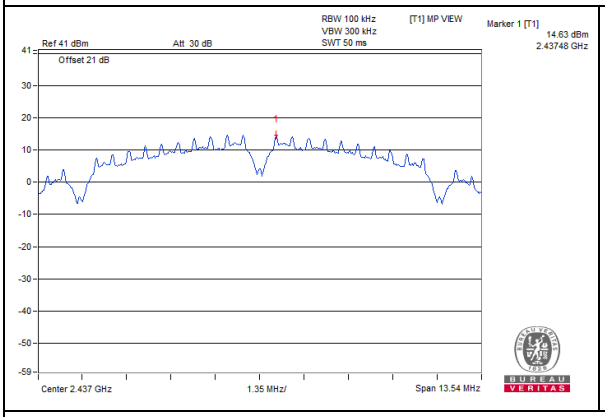
802.11b CDD

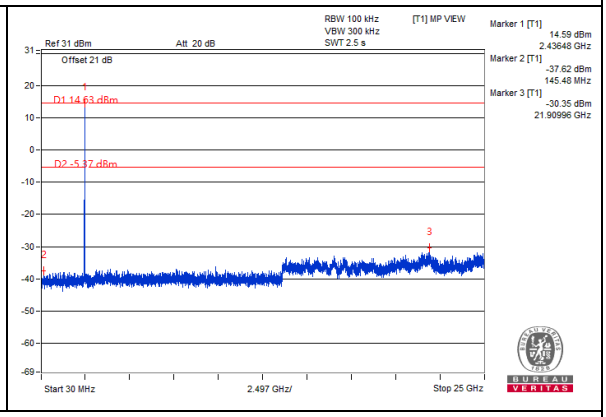
Chain0 : CH 1



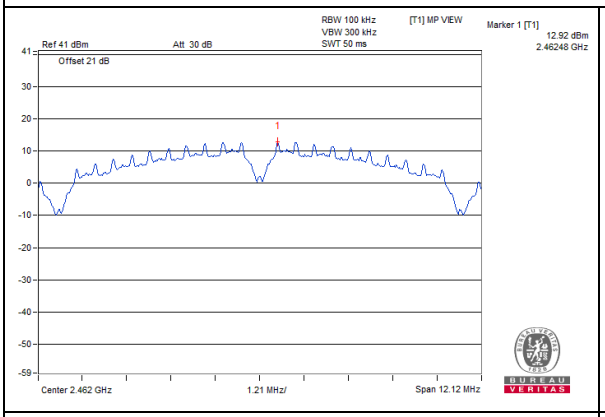


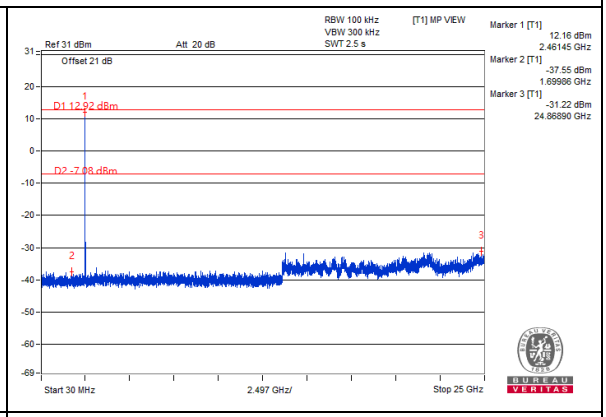
Chain0 : CH 6



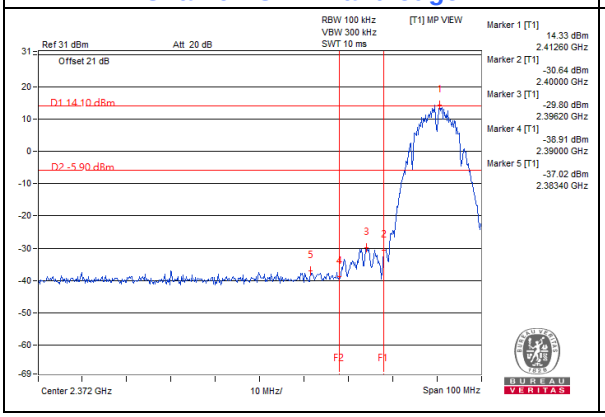


Chain0 : CH 11

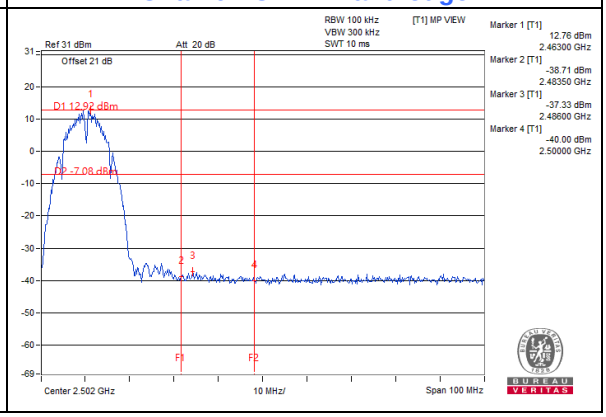




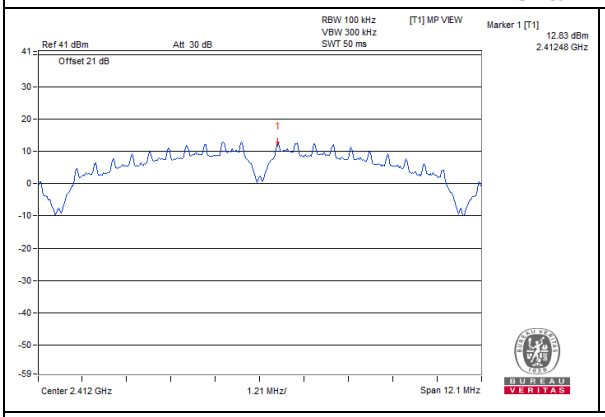
Chain0 : CH 1 Band edge

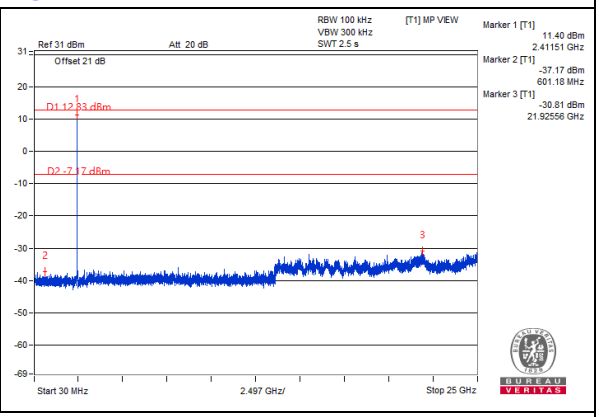


Chain0 : CH 11 Band edge

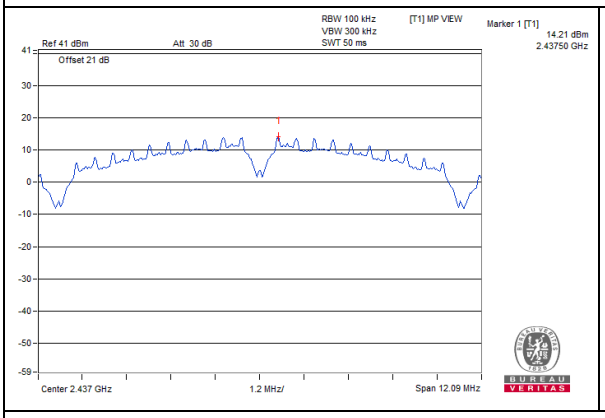


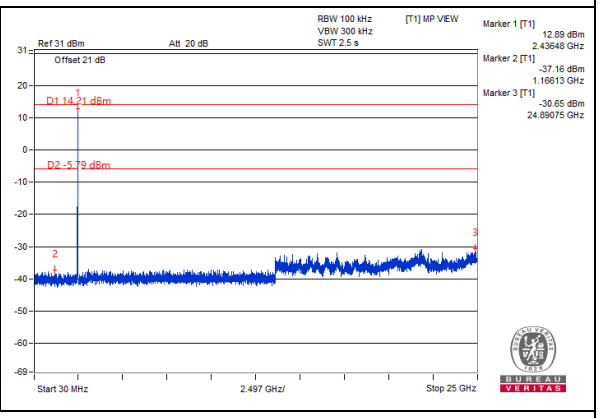
Chain1 : CH 1



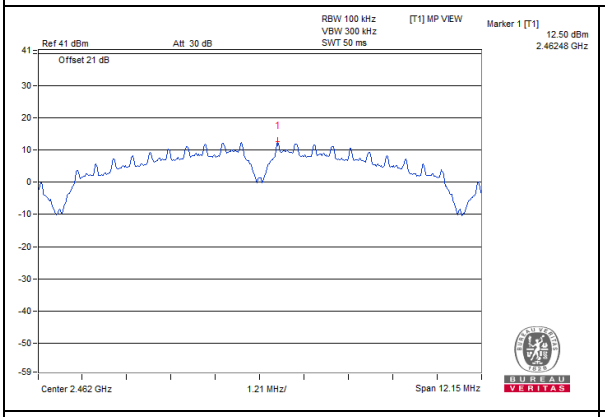


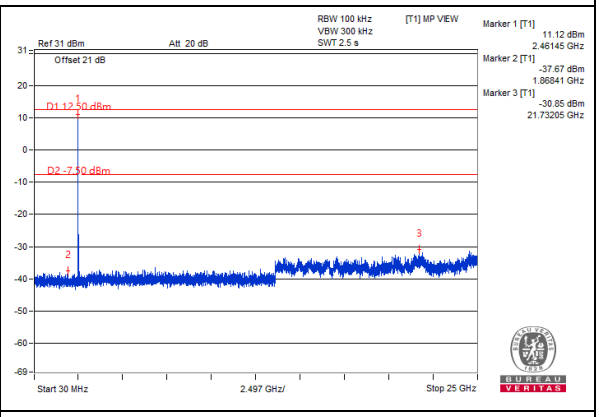
Chain1 : CH 6



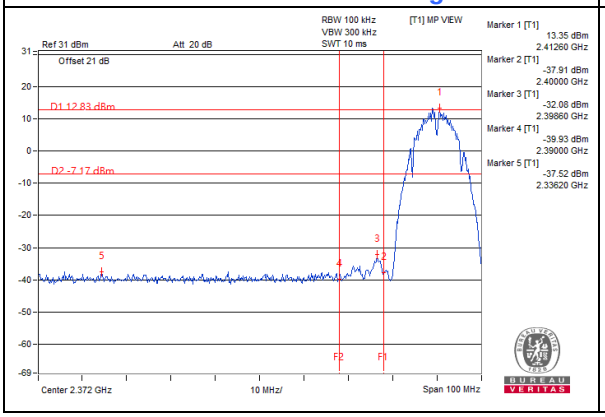


Chain1 : CH 11

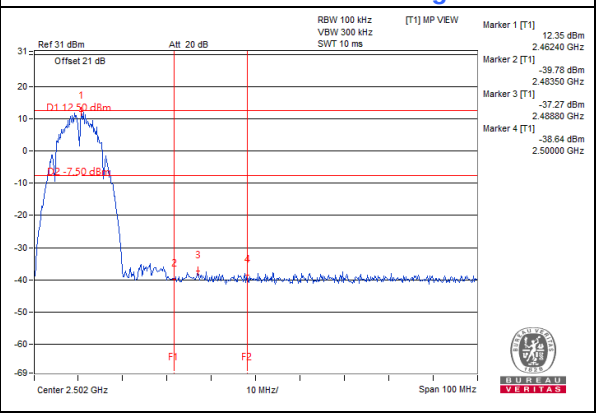




Chain1 : CH 1 Band edge

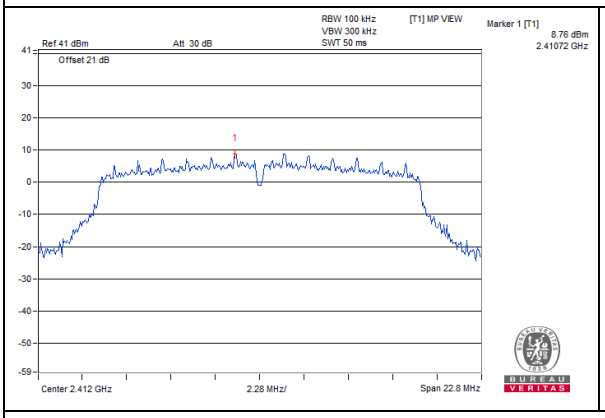


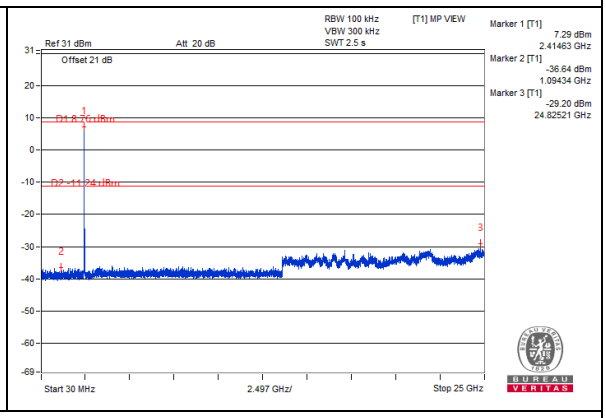
Chain1 : CH 11 Band edge



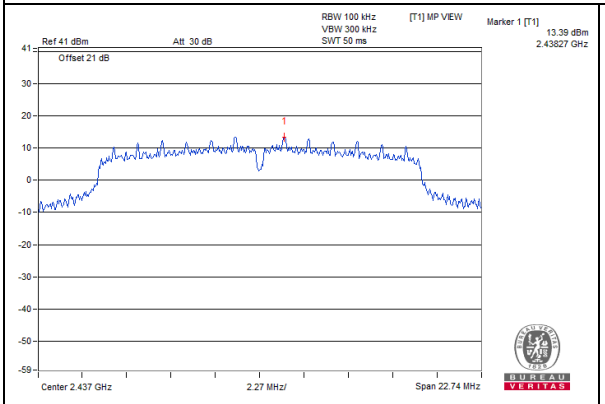
802.11g CDD

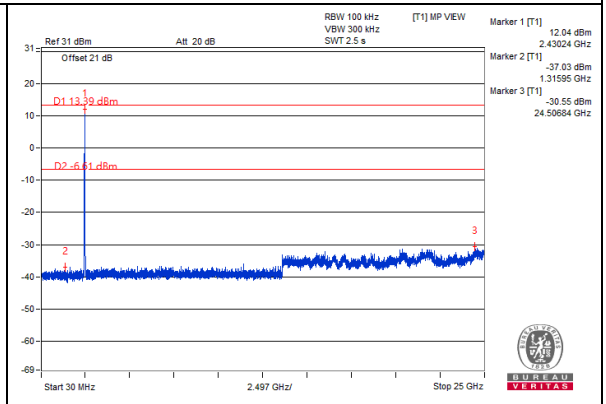
Chain0 : CH 1



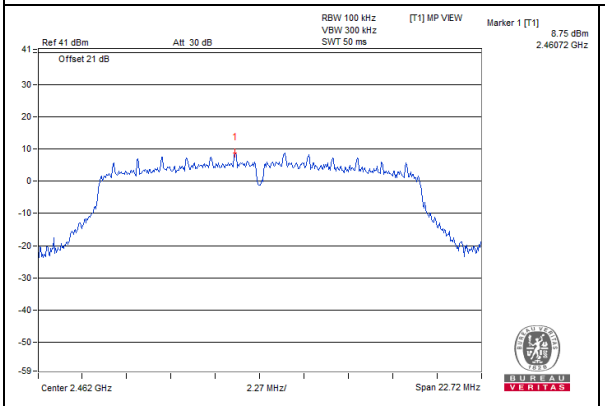


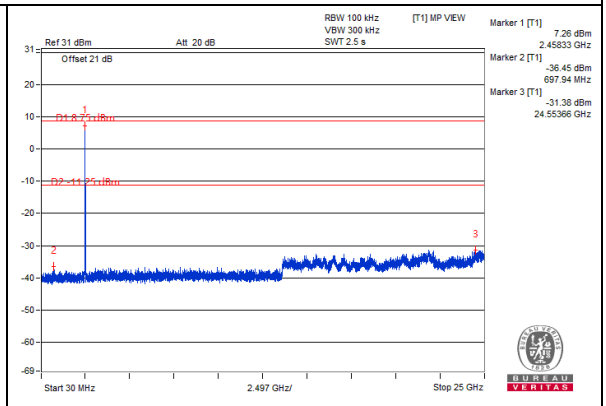
Chain0 : CH 6



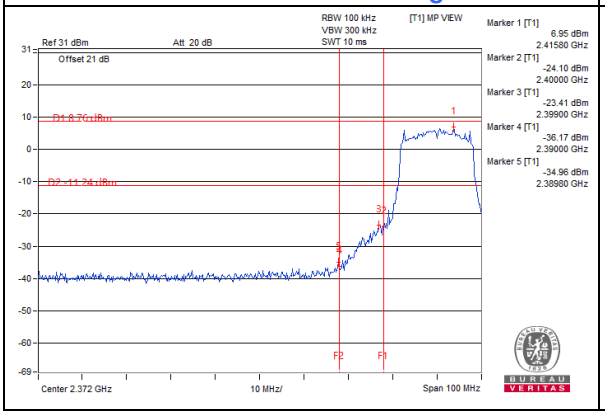


Chain0 : CH 11

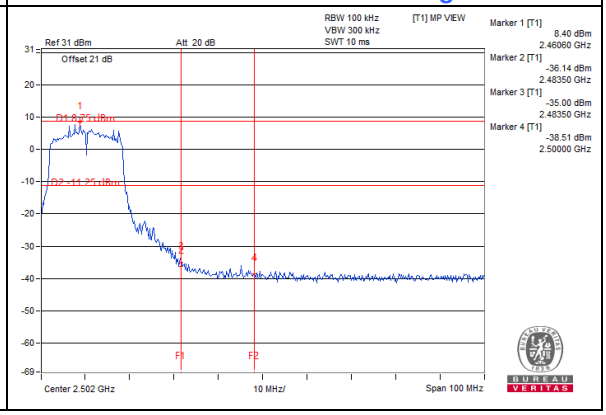




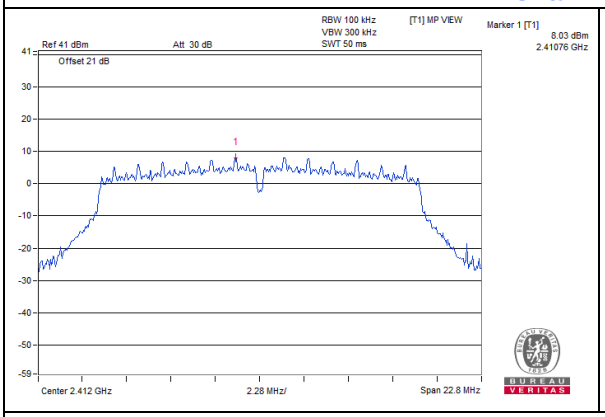
Chain0 : CH 1 Band edge

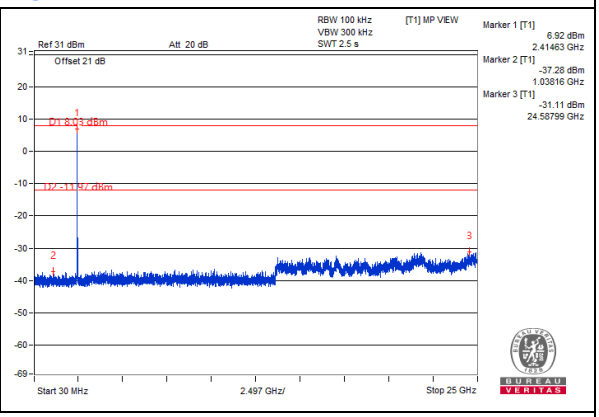


Chain0 : CH 11 Band edge

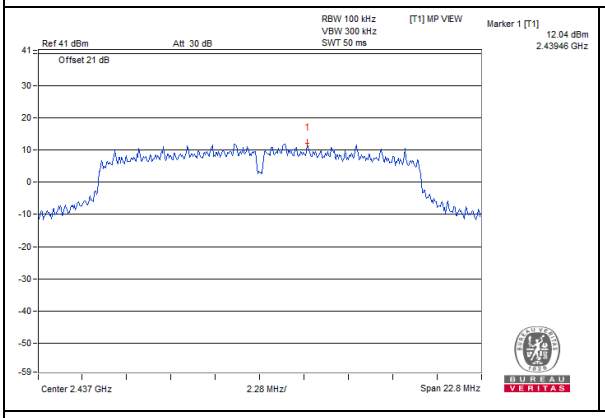


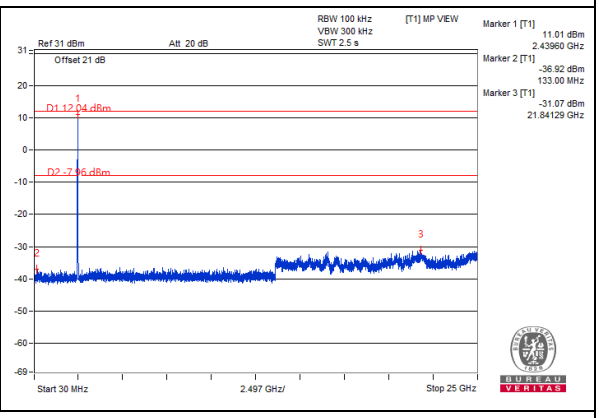
Chain1 : CH 1



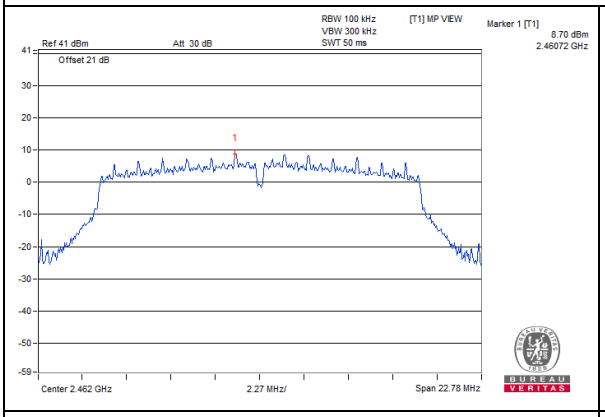


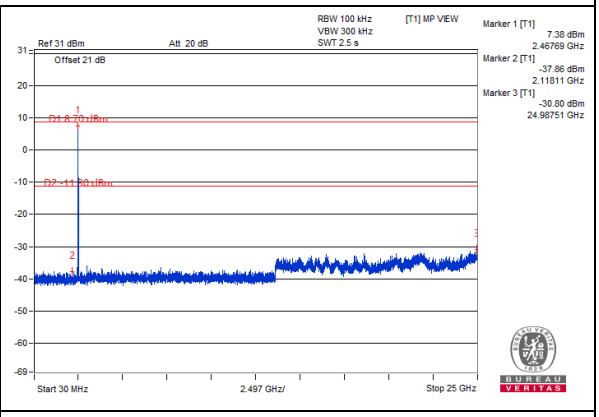
Chain1 : CH 6



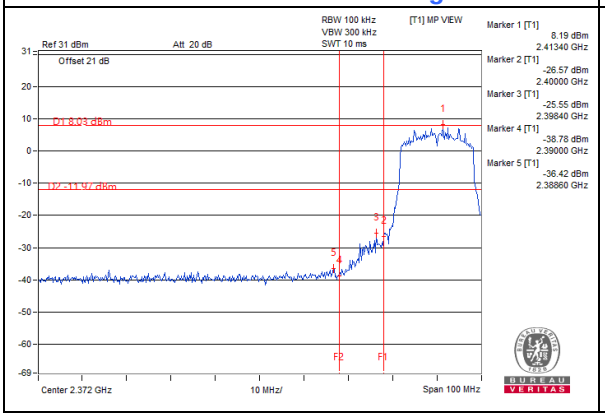


Chain1 : CH 11

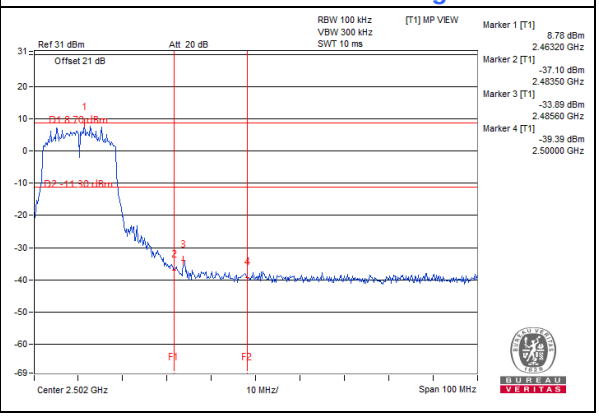




Chain1 : CH 1 Band edge

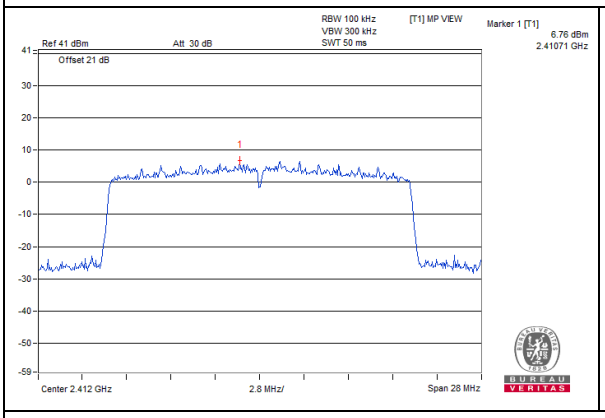


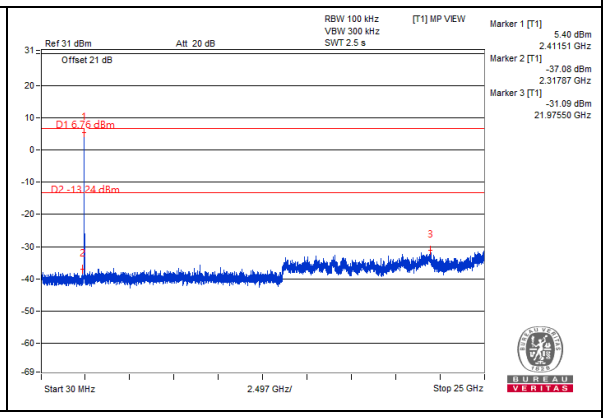
Chain1 : CH 11 Band edge



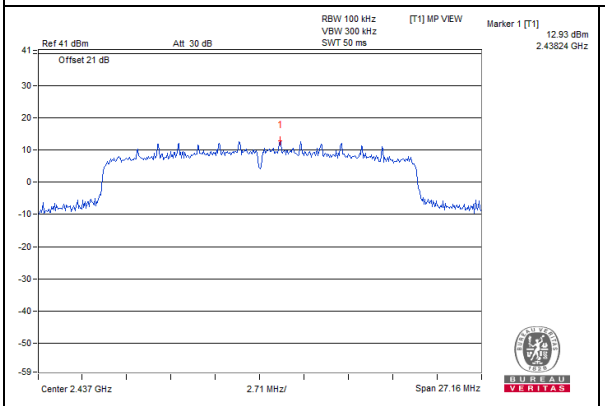
VHT20 CDD

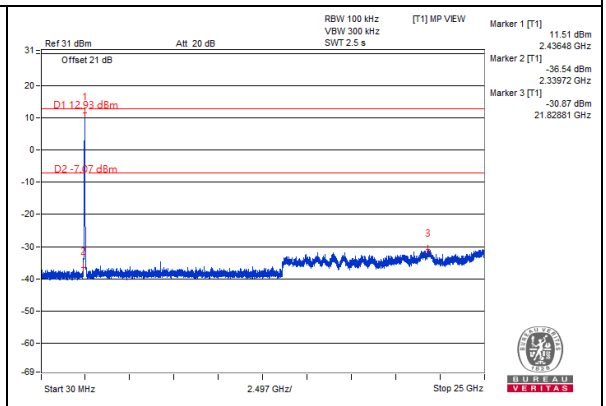
Chain0 : CH 1



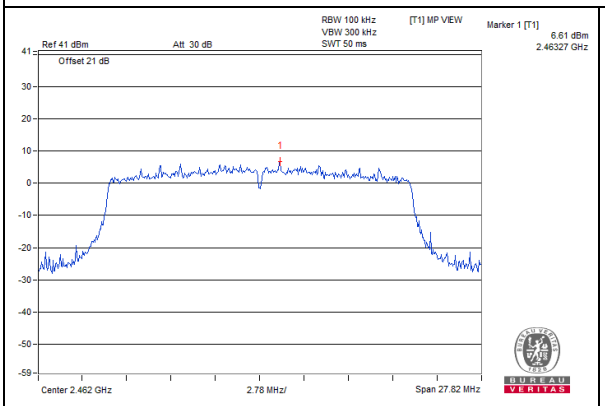


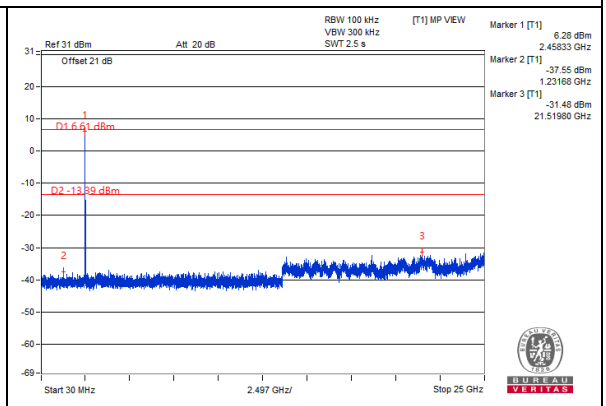
Chain0 : CH 6



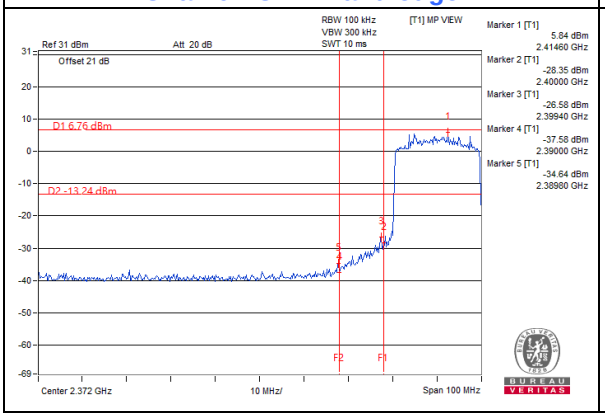


Chain0 : CH 11

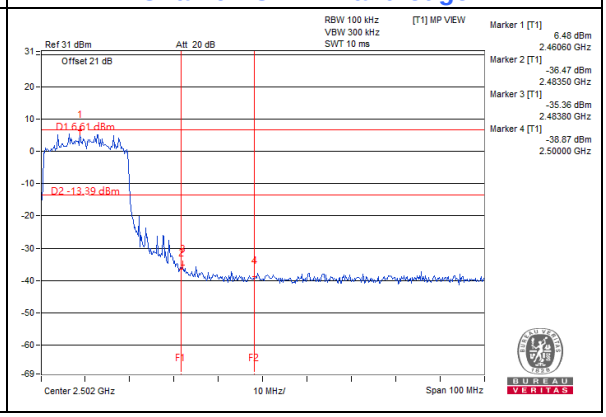




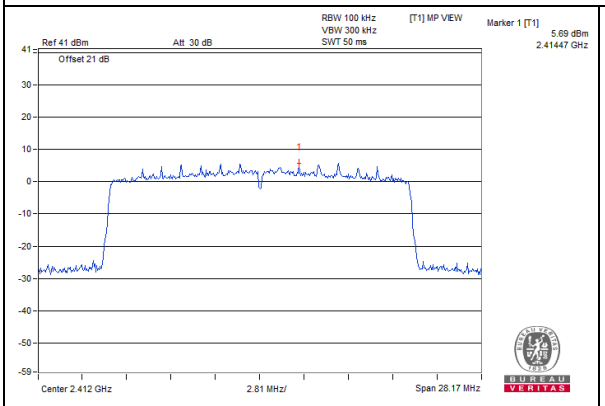
Chain0 : CH 1 Band edge

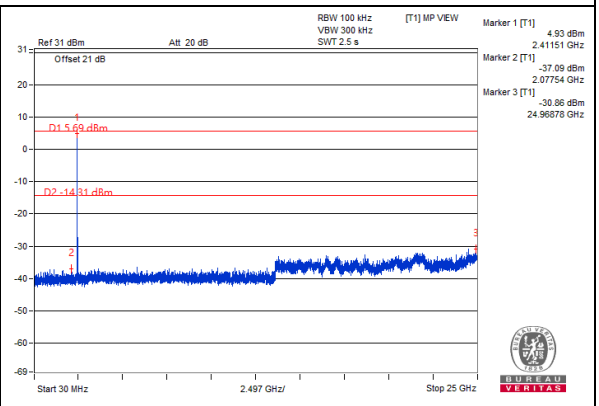


Chain0 : CH 11 Band edge

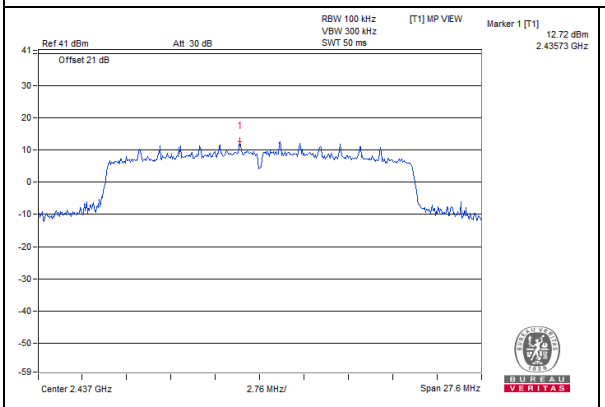


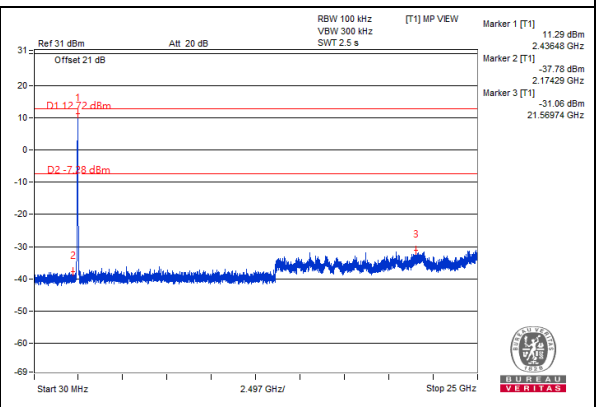
Chain1 : CH 1



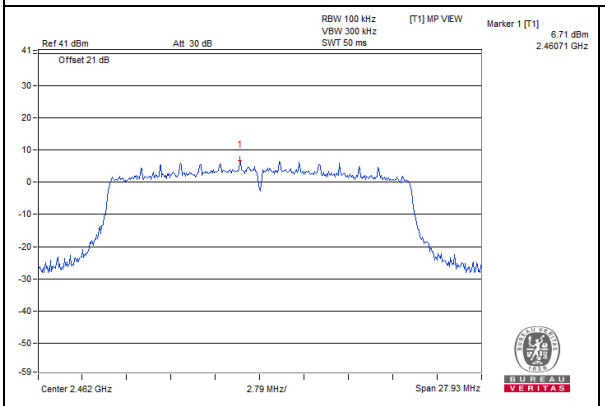


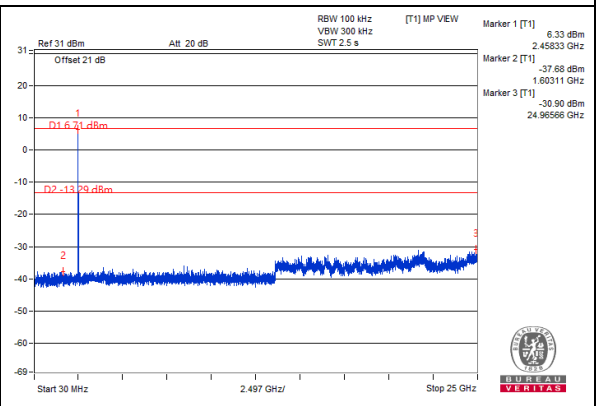
Chain1 : CH 6



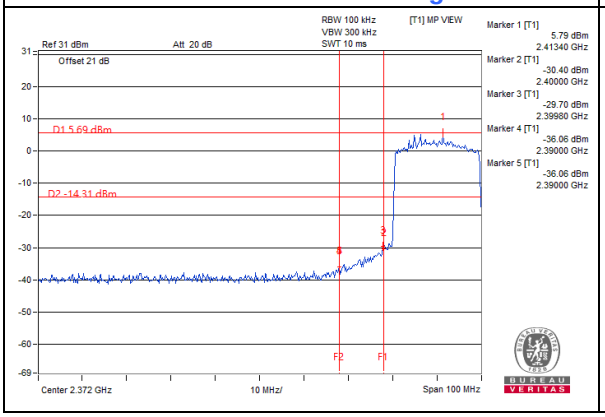


Chain1 : CH 11

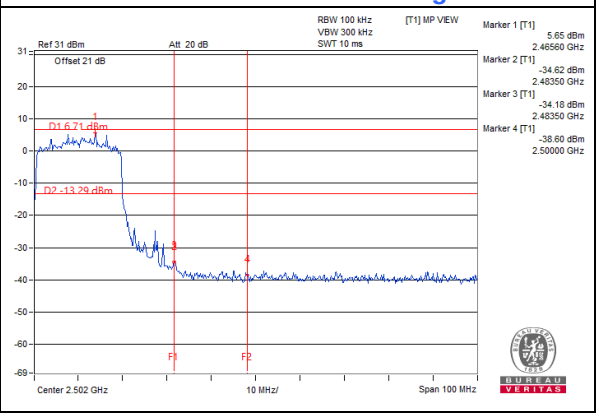




Chain1 : CH 1 Band edge

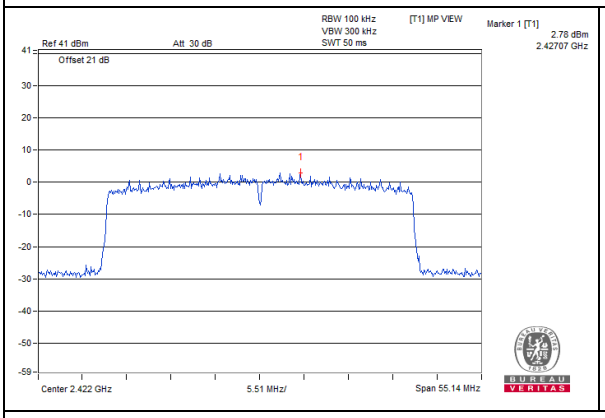


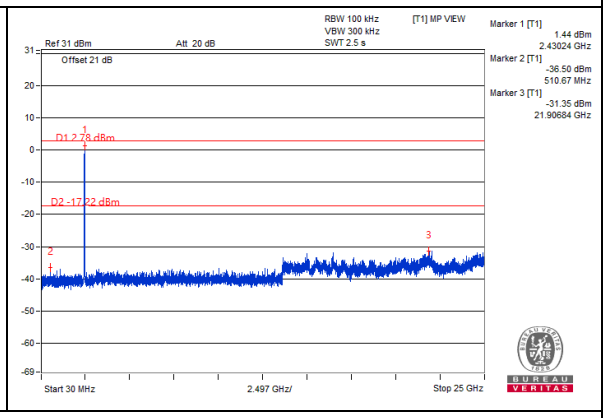
Chain1 : CH 11 Band edge



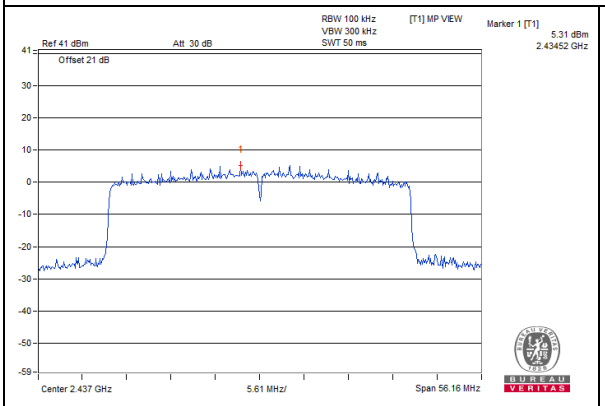
VHT40 CDD

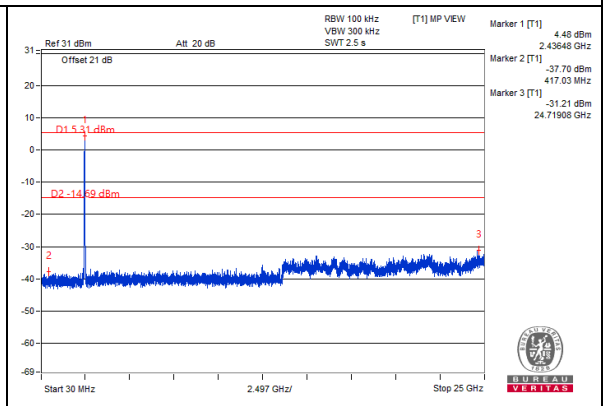
Chain0 : CH 3



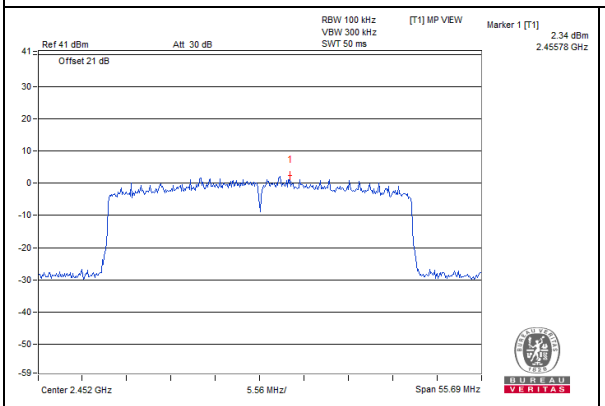


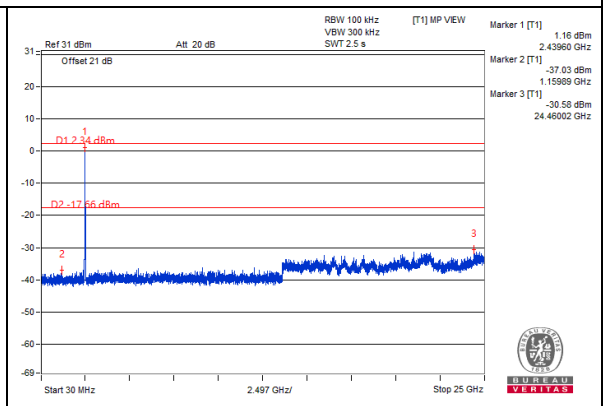
Chain0 : CH 6



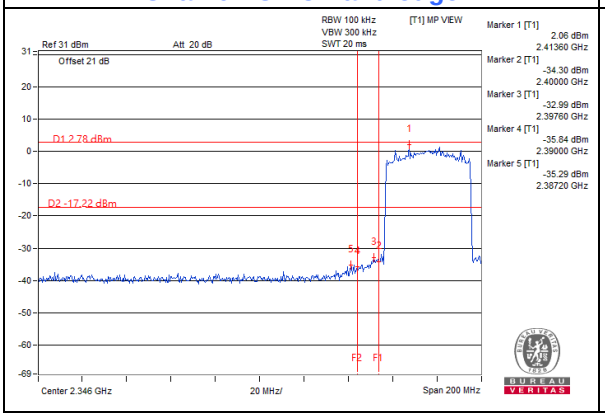


Chain0 : CH 9

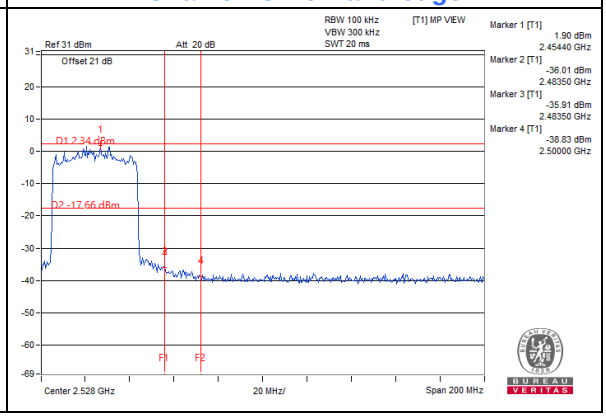




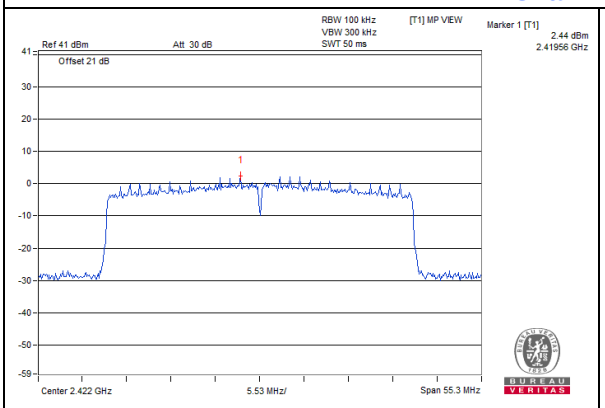
Chain0 : CH 3 Band edge

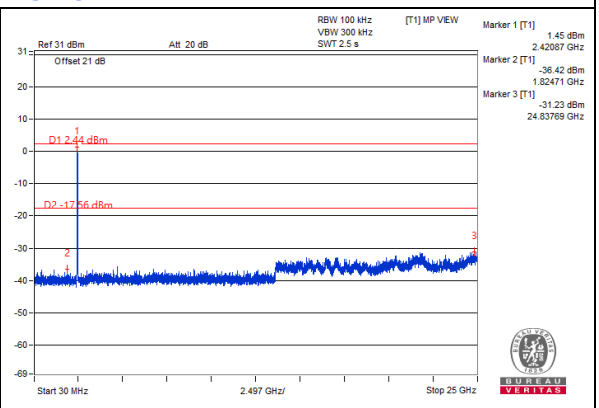


Chain0 : CH 9 Band edge

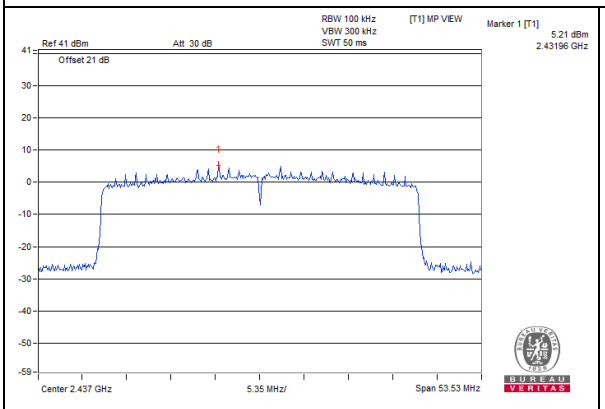


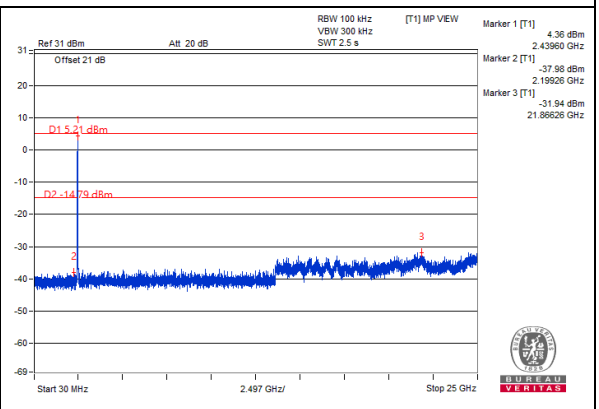
Chain1 : CH 3



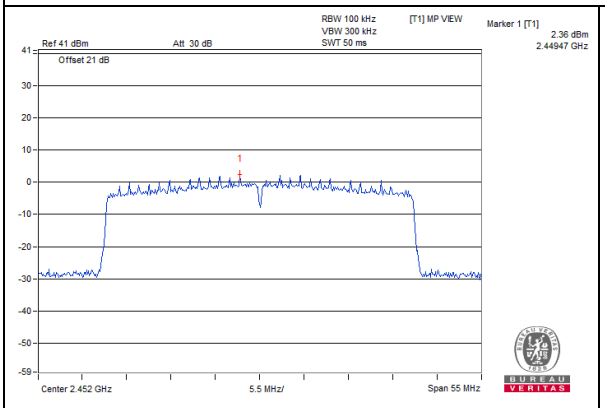


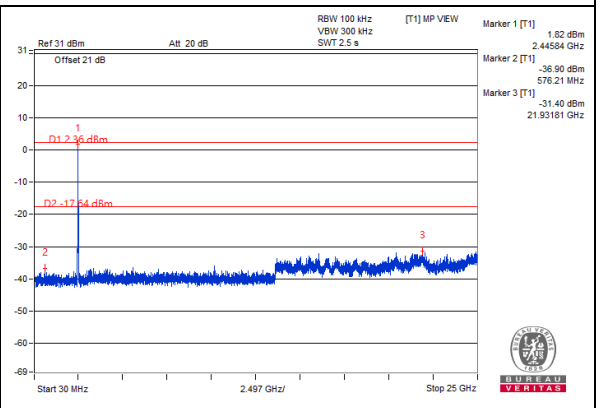
Chain1 : CH 6



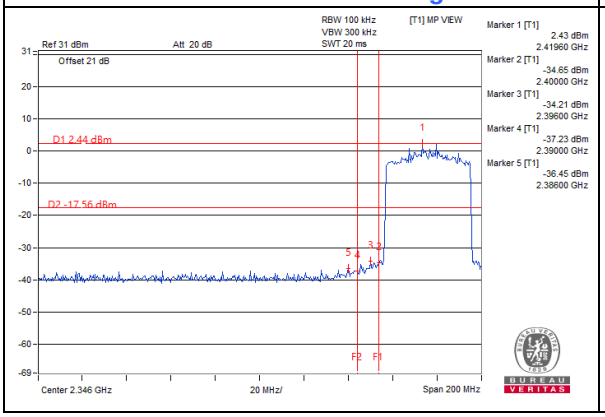


Chain1 : CH 9

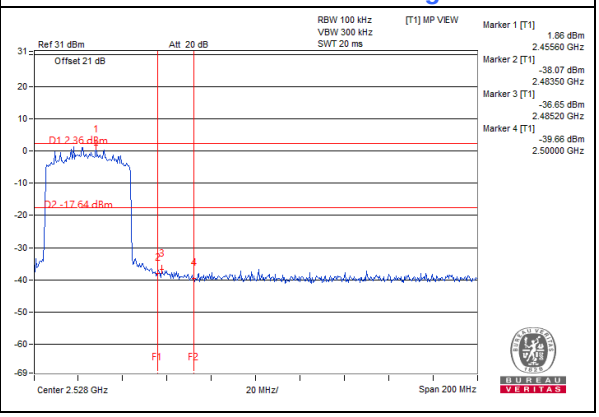




Chain1 : CH 3 Band edge

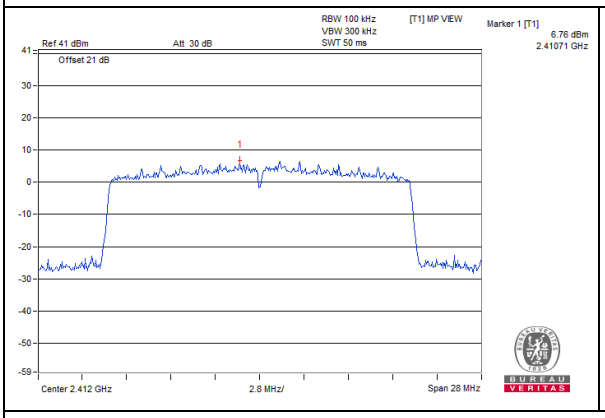


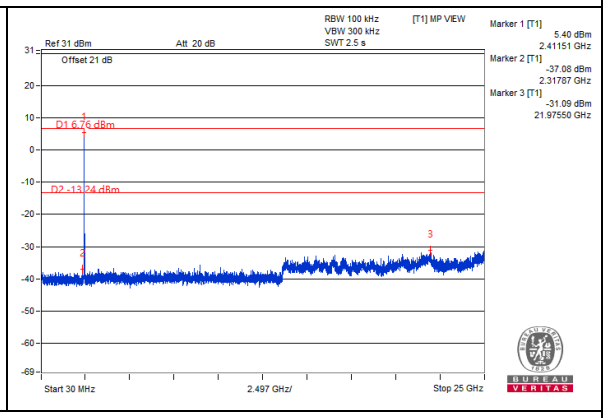
Chain1 : CH 9 Band edge



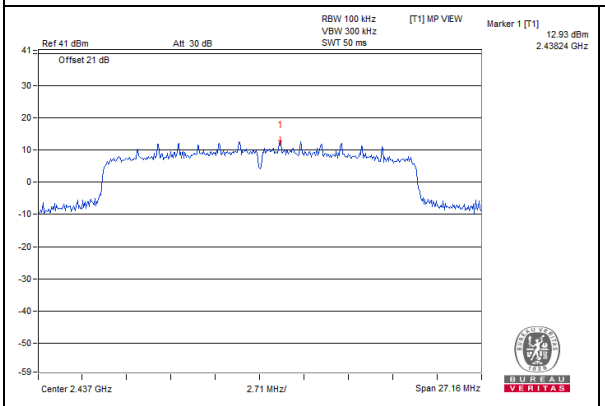
802.11ax (HE20) CDD

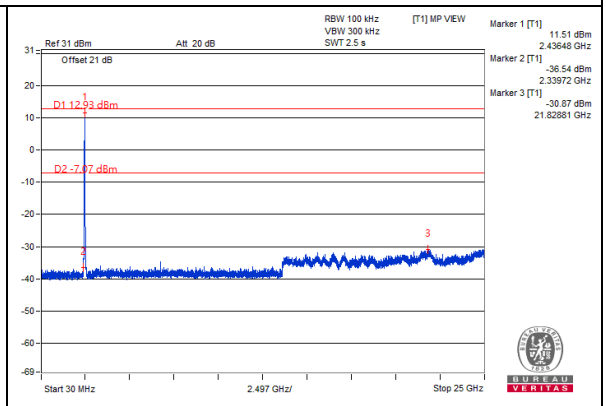
Chain0 : CH 1



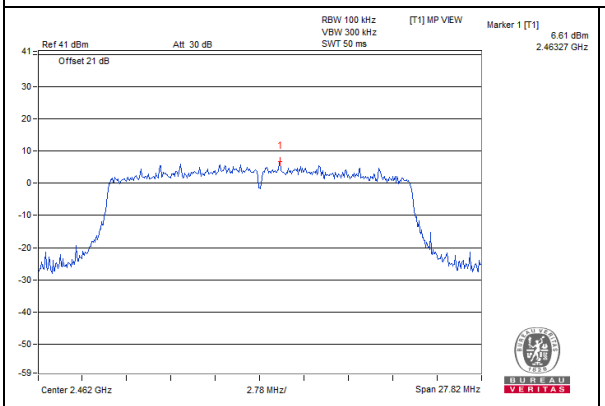


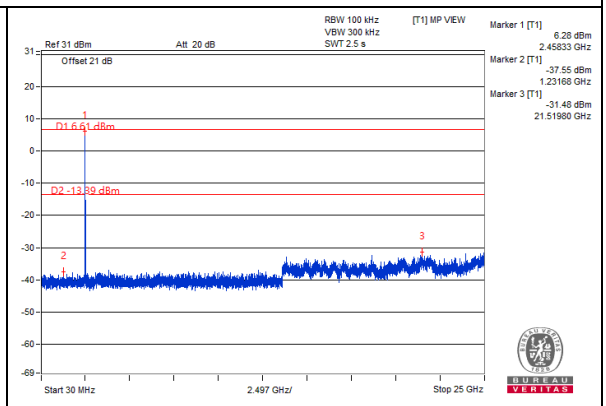
Chain0 : CH 6



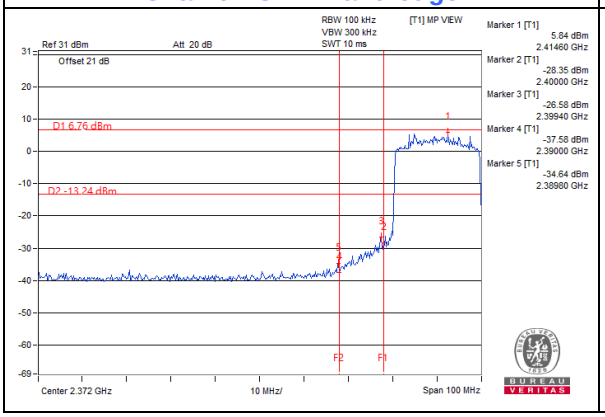


Chain0 : CH 11

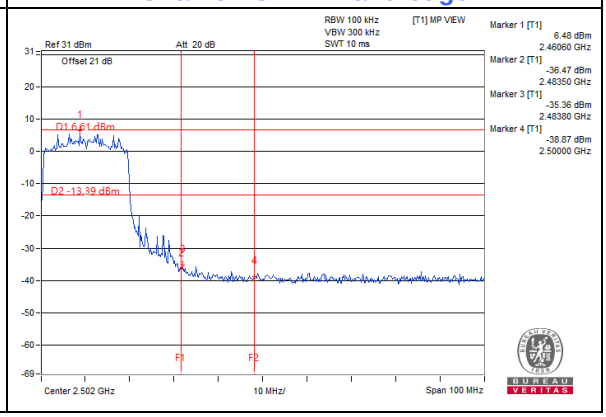




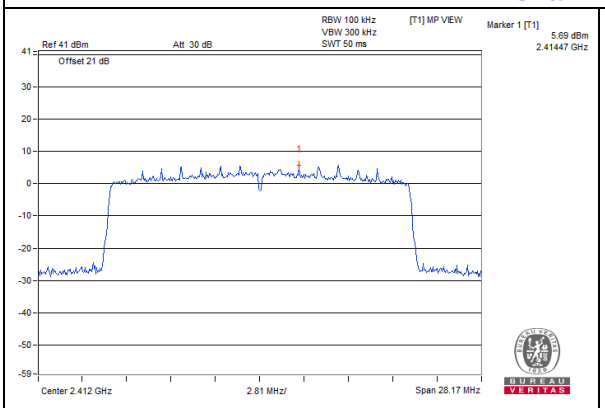
Chain0 : CH 1 Band edge

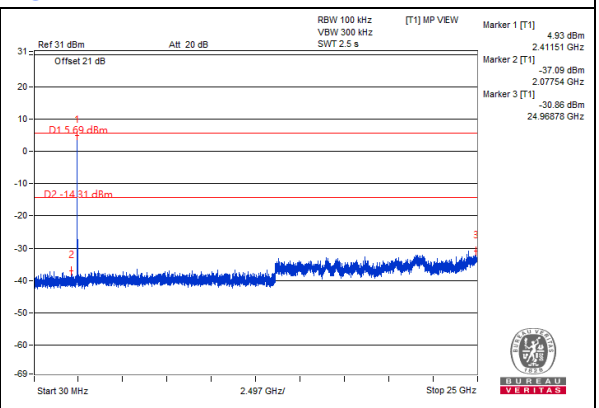


Chain0 : CH 11 Band edge

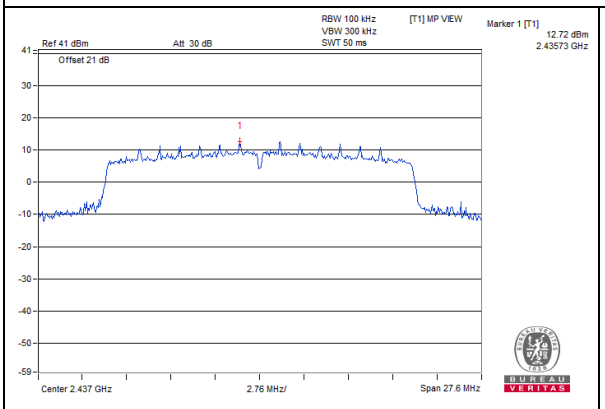


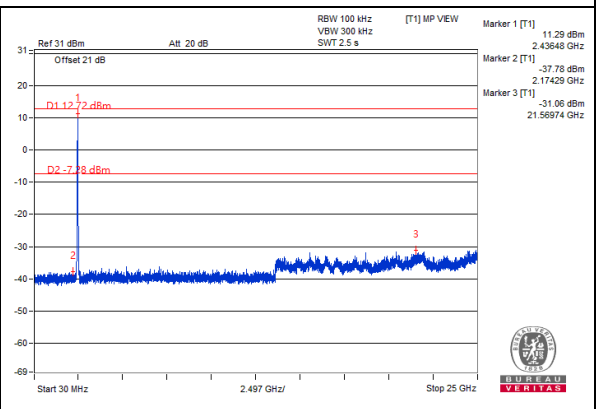
Chain1 : CH 1



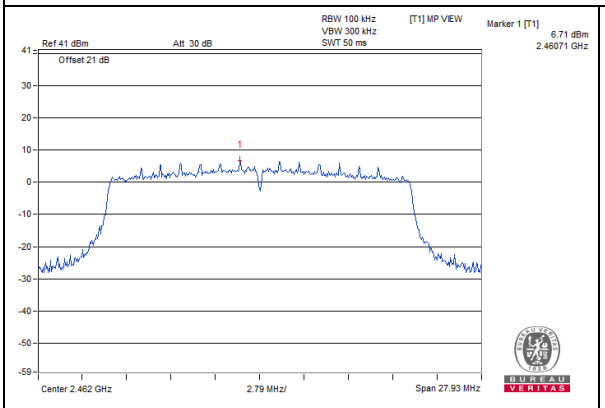


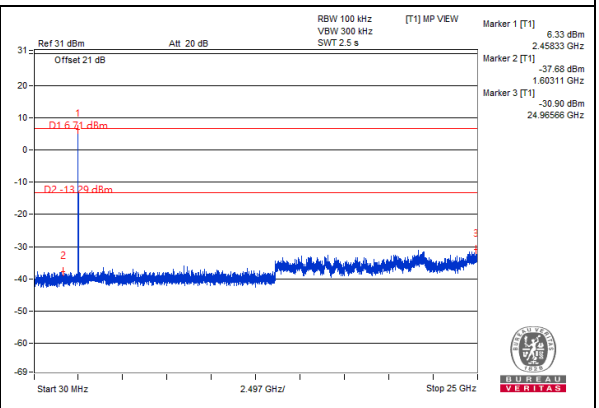
Chain1 : CH 6



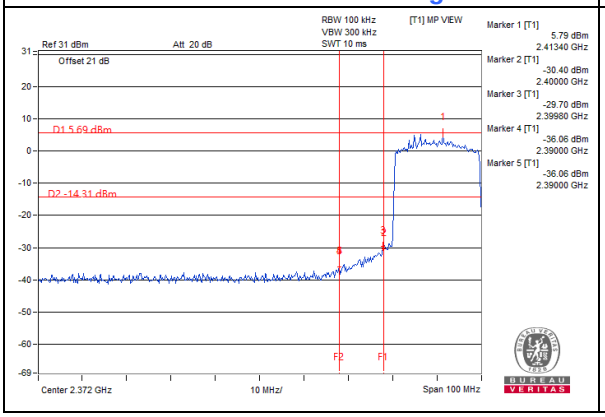


Chain1 : CH 11

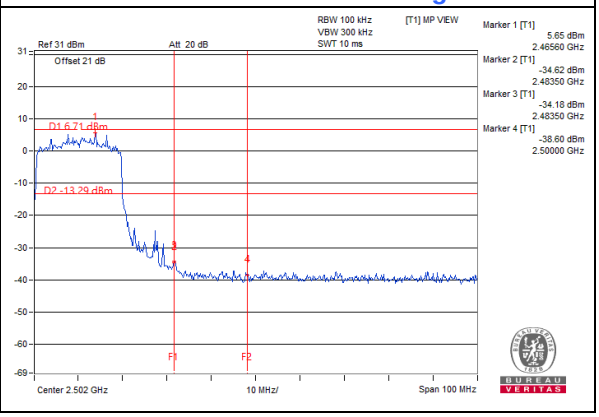




Chain1 : CH 1 Band edge

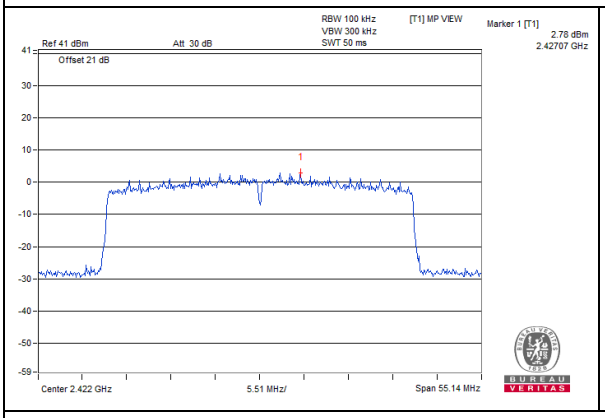


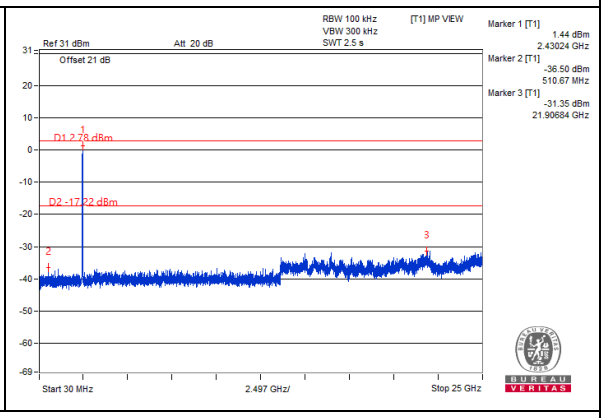
Chain1 : CH 11 Band edge



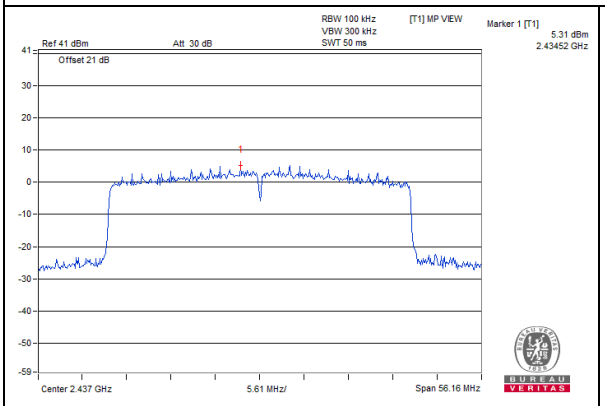
802.11ax (HE40) CDD

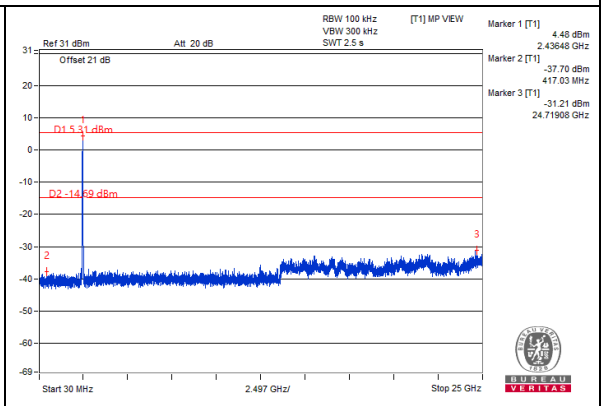
Chain0 : CH 3



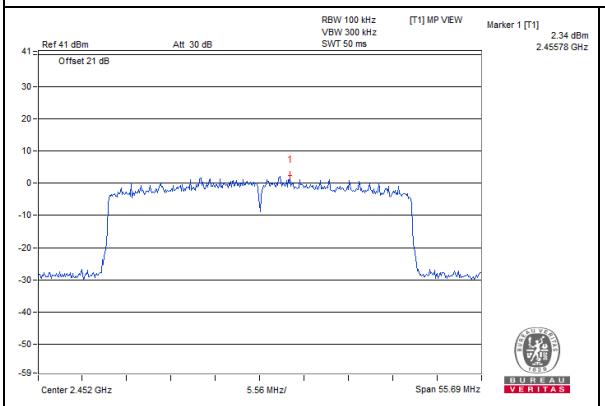


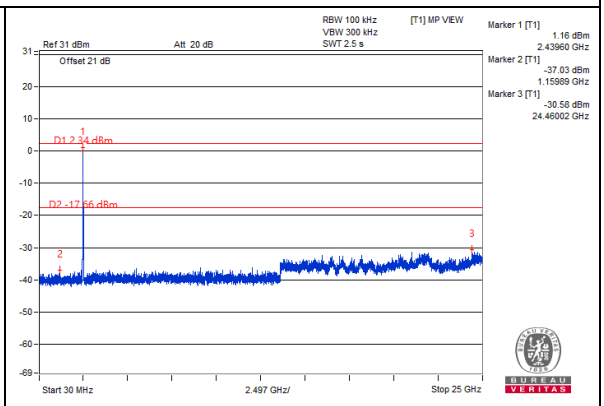
Chain0 : CH 6



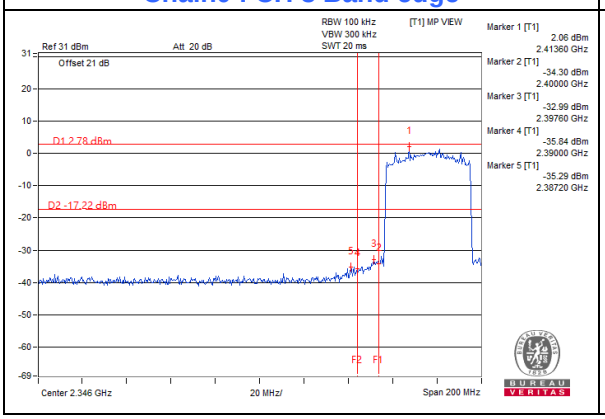


Chain0 : CH 9

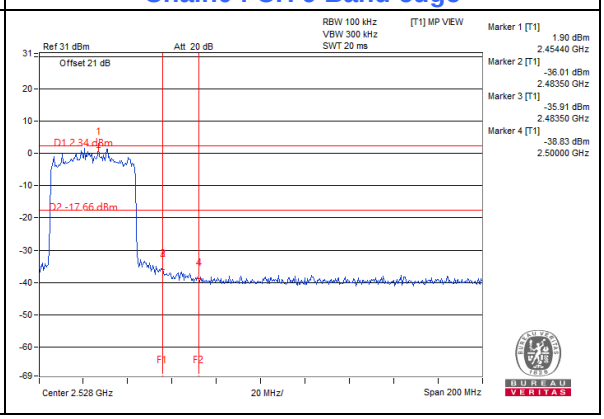




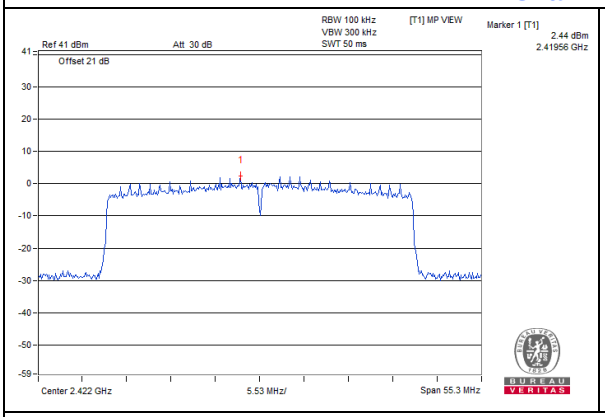
Chain0 : CH 3 Band edge

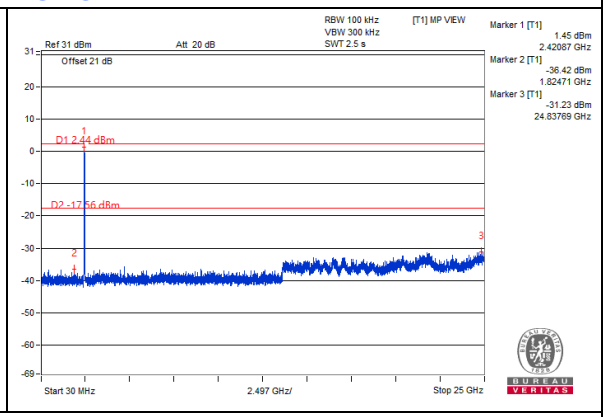


Chain0 : CH 9 Band edge

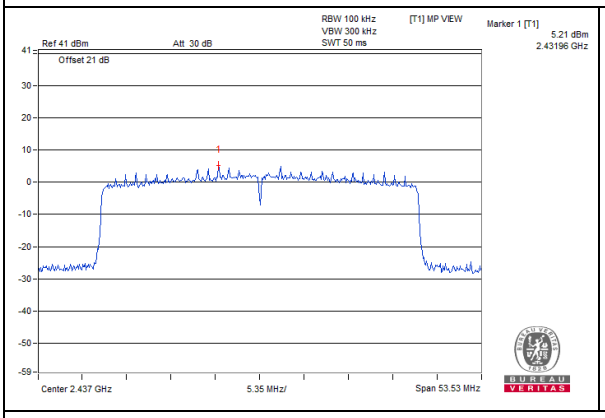


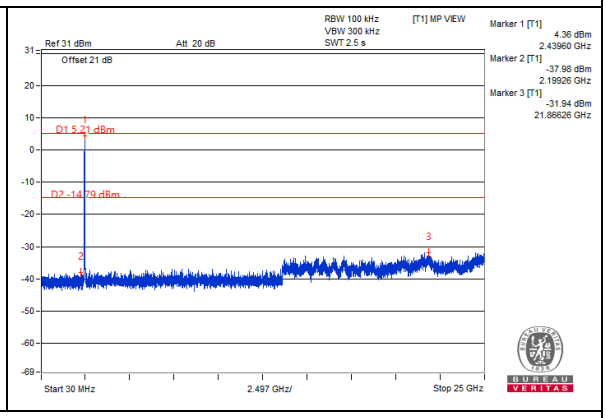
Chain1 : CH 3



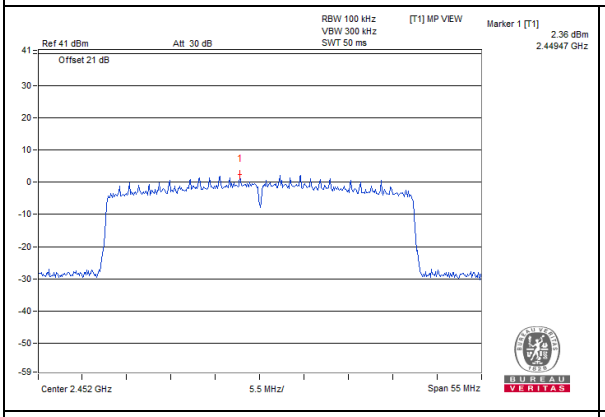


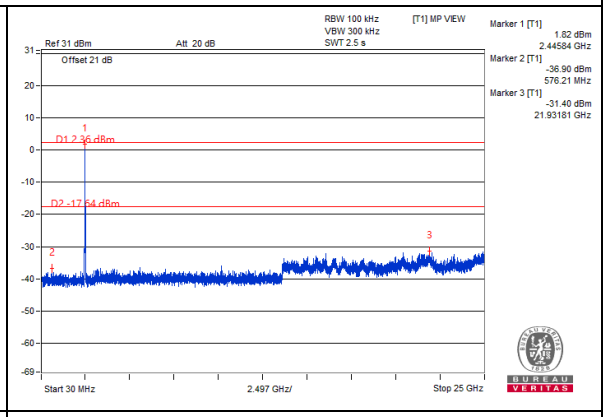
Chain1 : CH 6



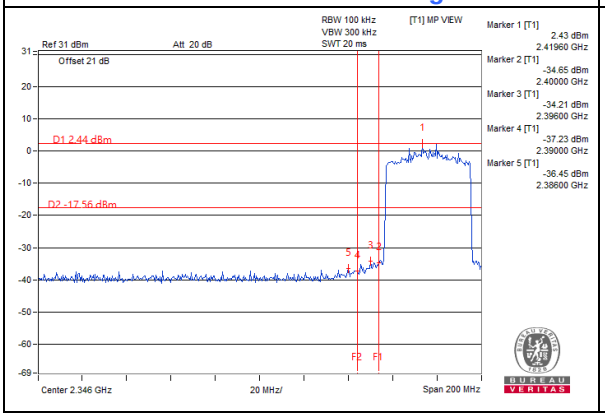


Chain1 : CH 9

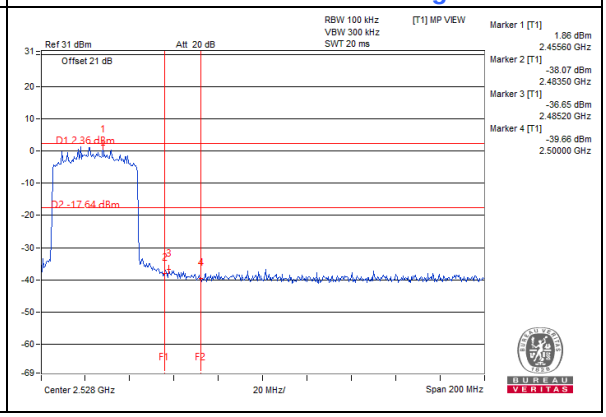




Chain1 : CH 3 Band edge

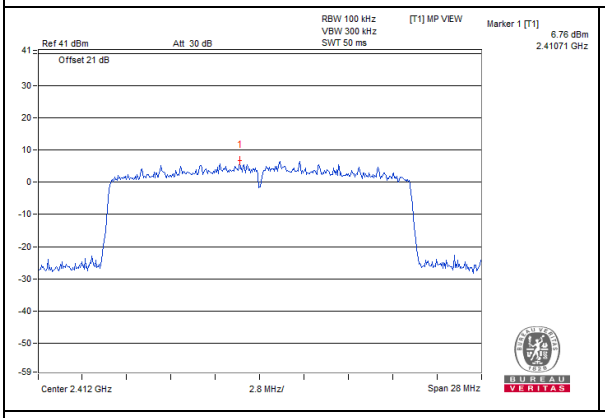


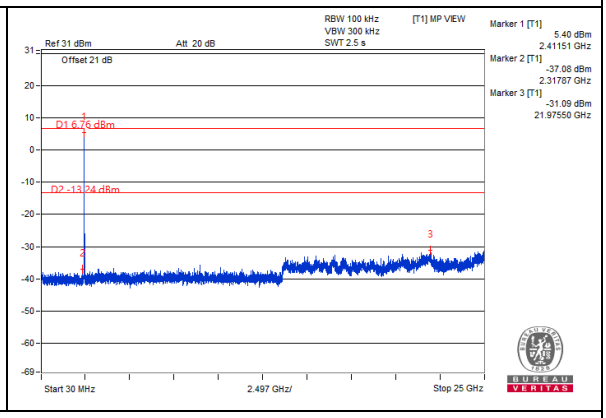
Chain1 : CH 9 Band edge



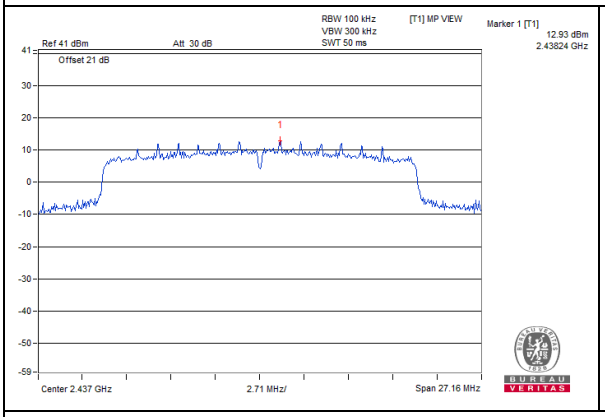
VHT20 BF

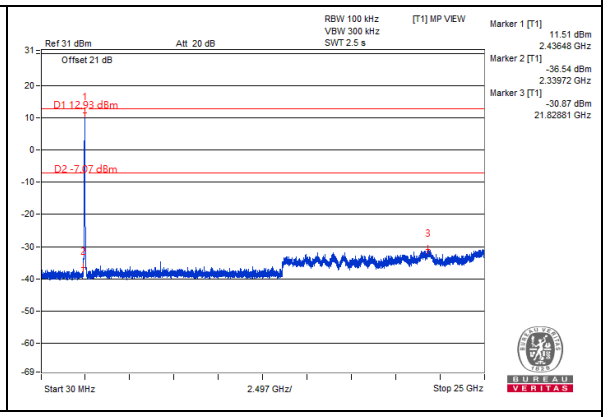
Chain0 : CH 1



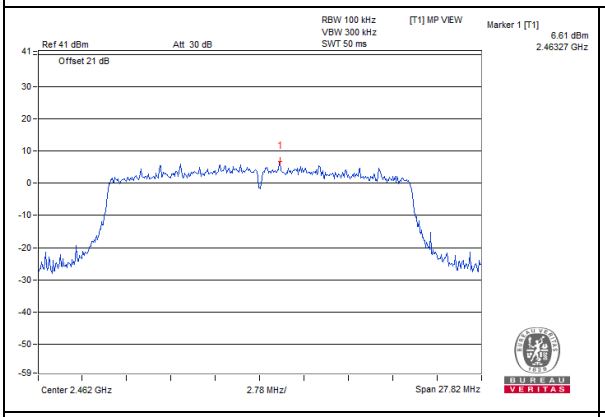


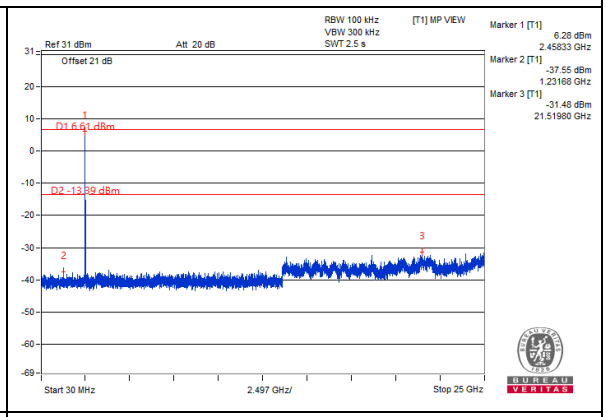
Chain0 : CH 6



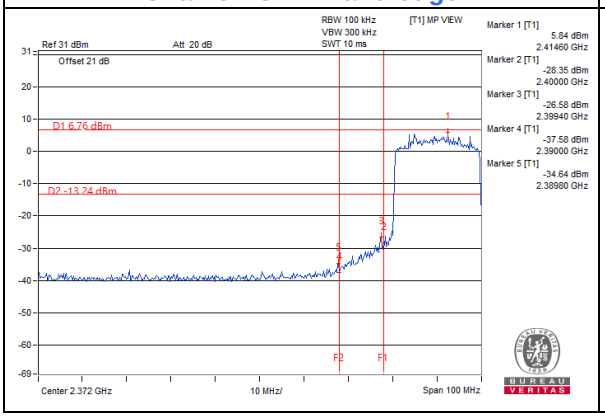


Chain0 : CH 11

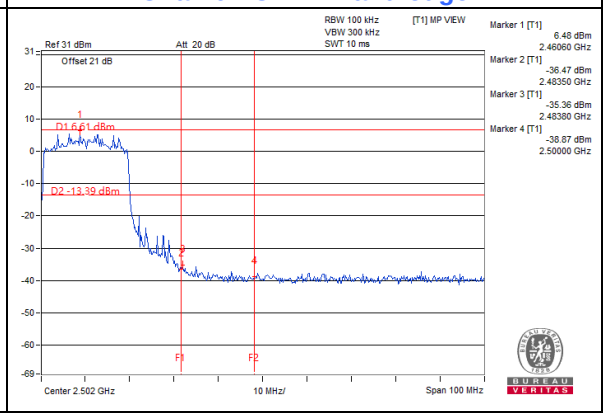




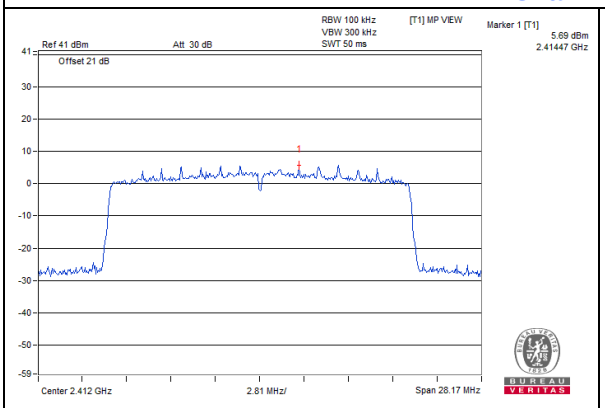
Chain0 : CH 1 Band edge

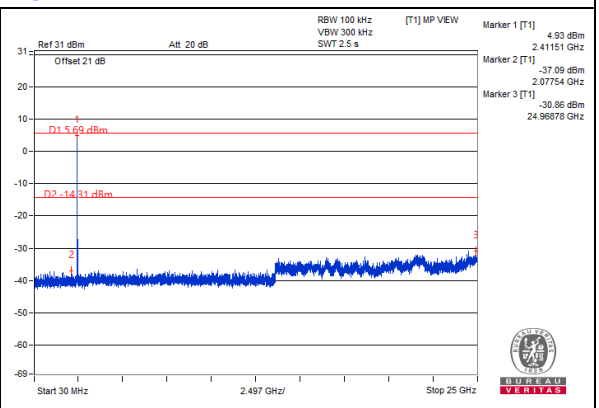


Chain0 : CH 11 Band edge

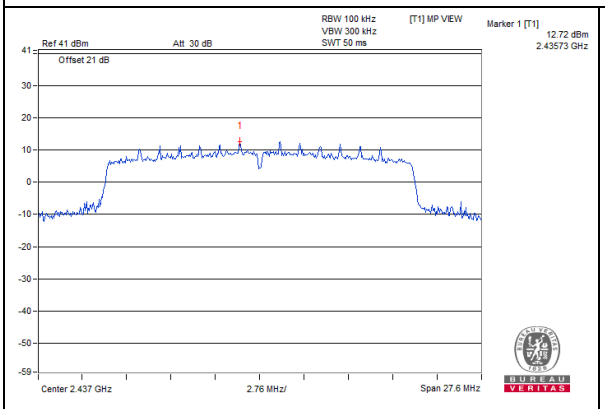


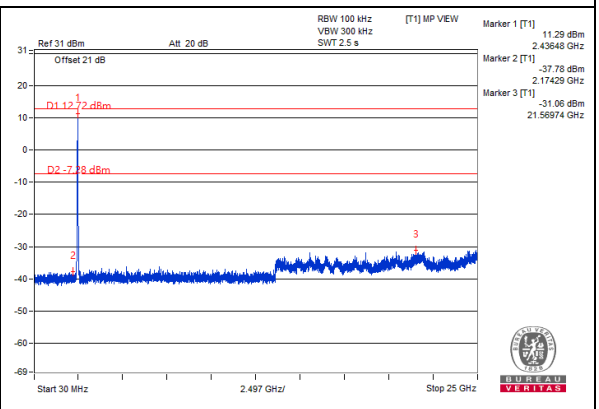
Chain1 : CH 1



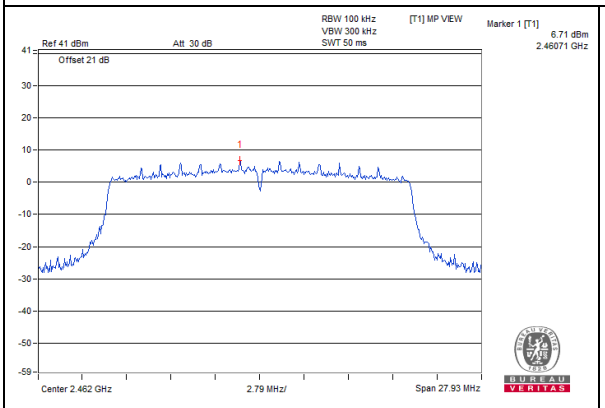


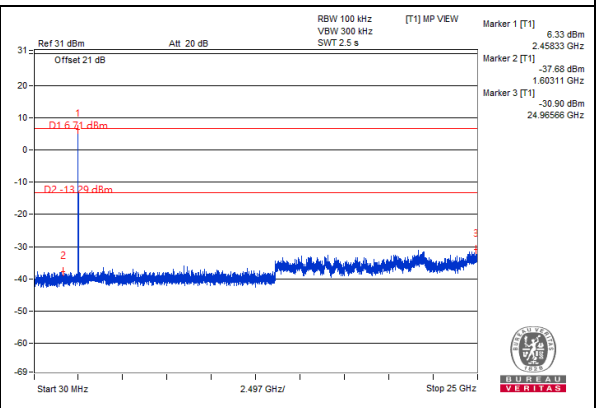
Chain1 : CH 6



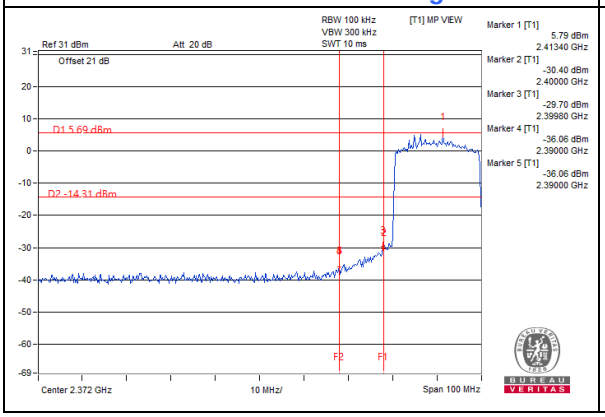


Chain1 : CH 11

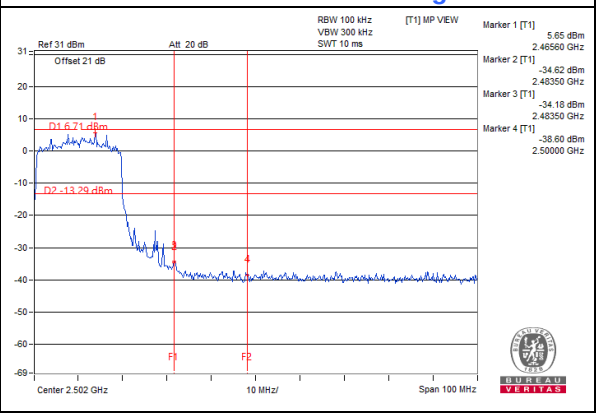




Chain1 : CH 1 Band edge

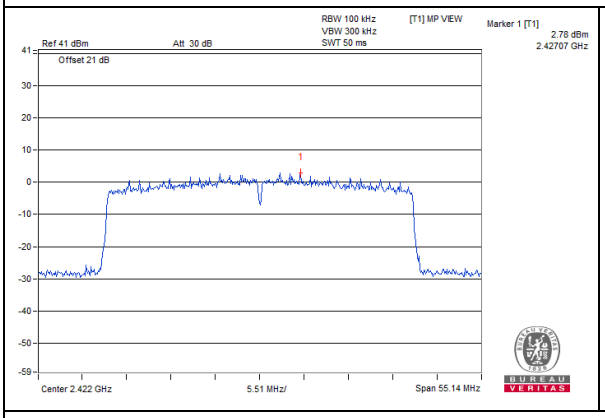


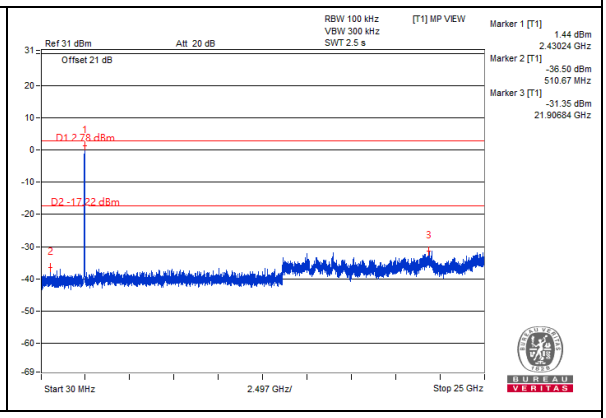
Chain1 : CH 11 Band edge



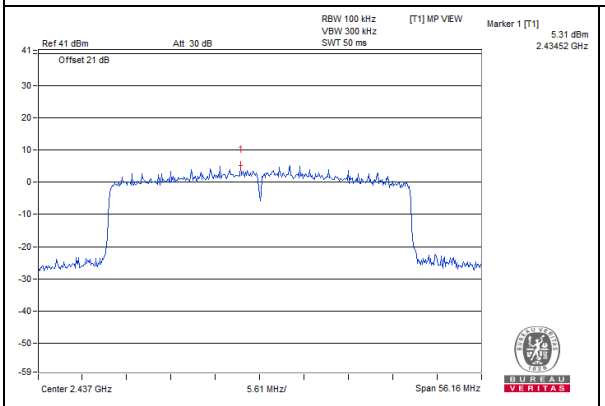
VHT40 BF

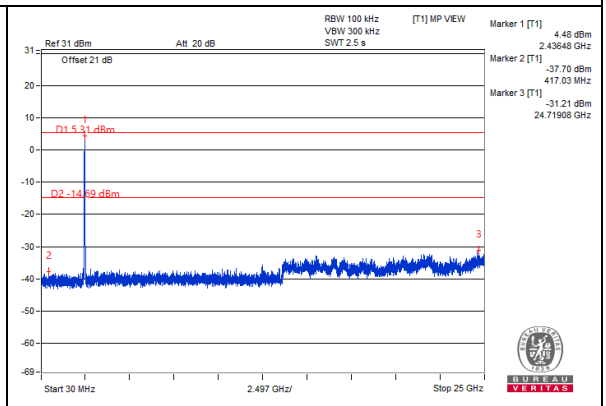
Chain0 : CH 3



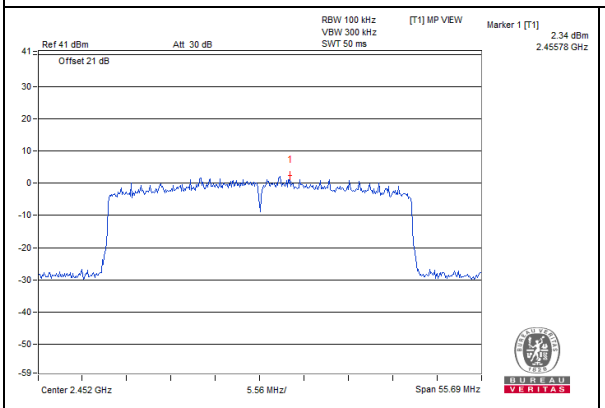


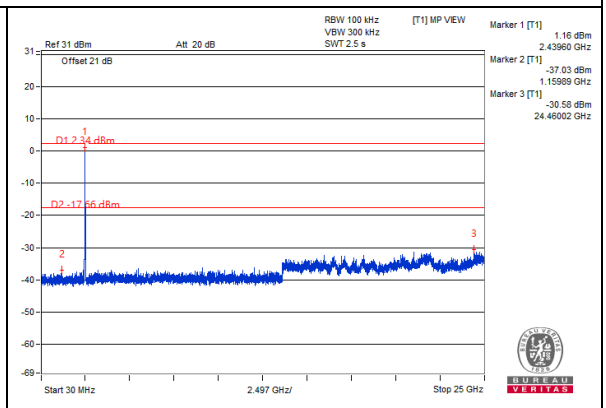
Chain0 : CH 6



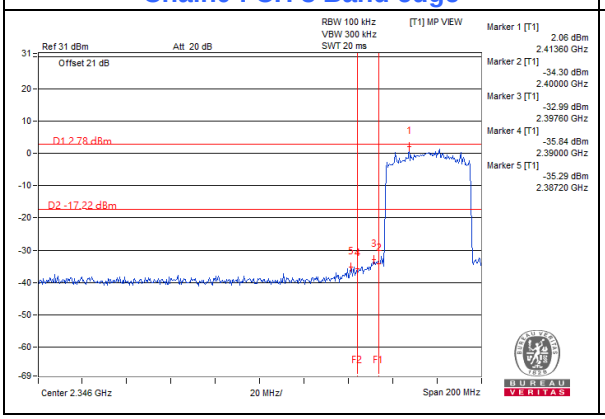


Chain0 : CH 9

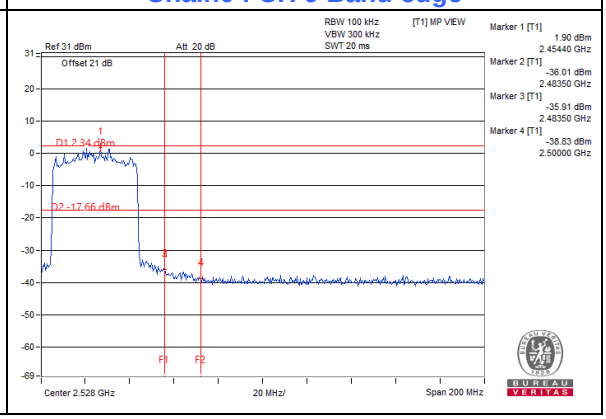




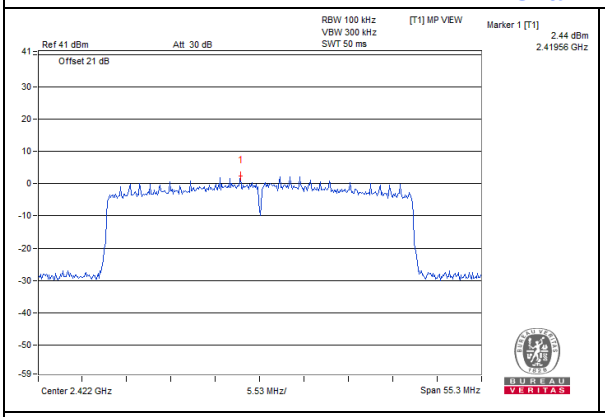
Chain0 : CH 3 Band edge

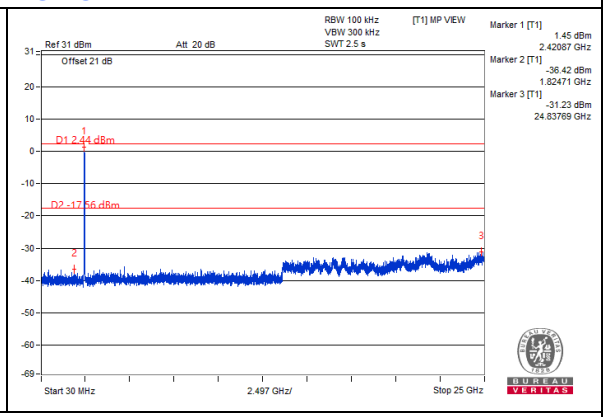


Chain0 : CH 9 Band edge

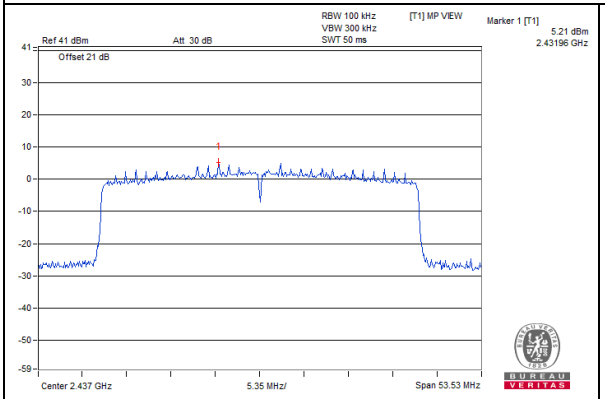


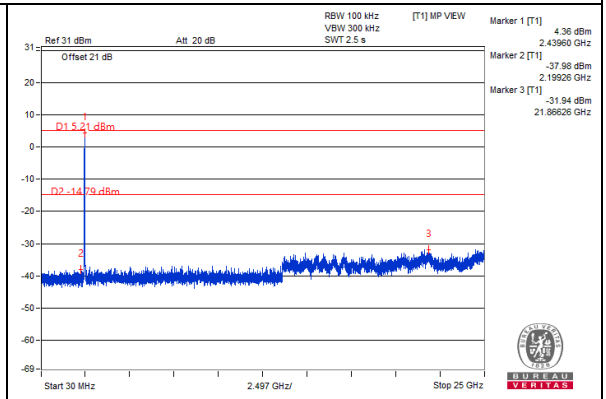
Chain1 : CH 3



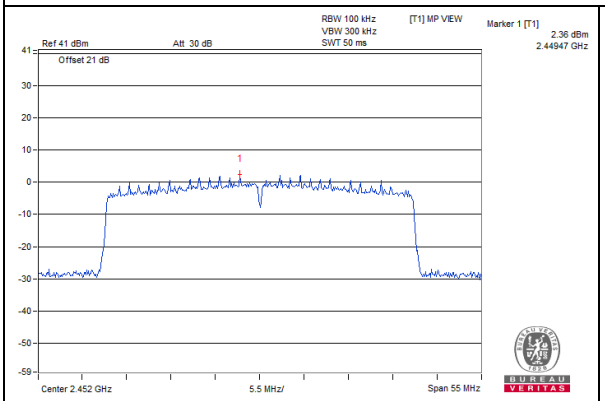


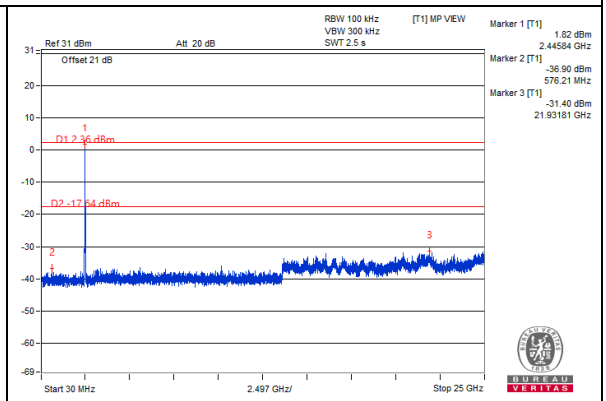
Chain1 : CH 6



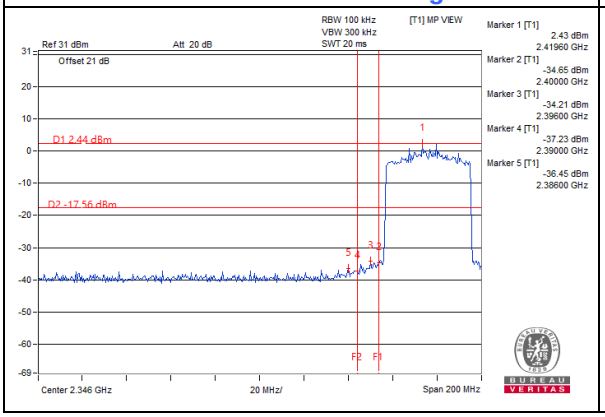


Chain1 : CH 9

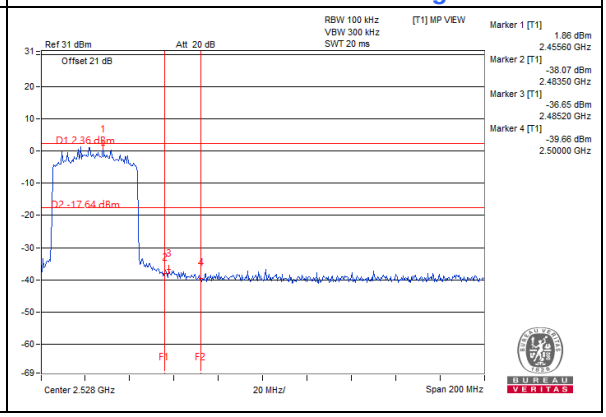




Chain1 : CH 3 Band edge

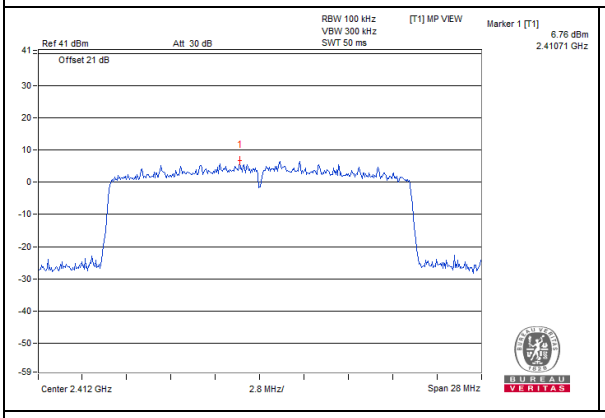


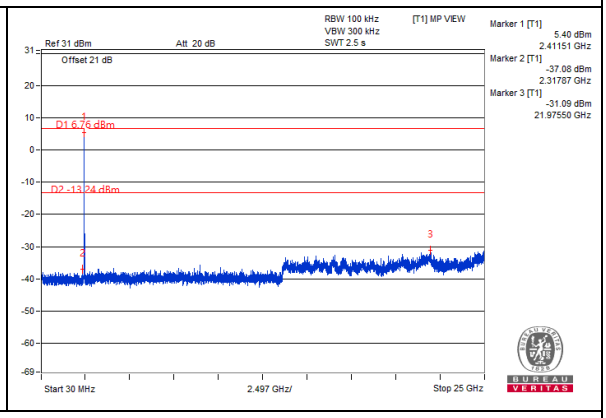
Chain1 : CH 9 Band edge



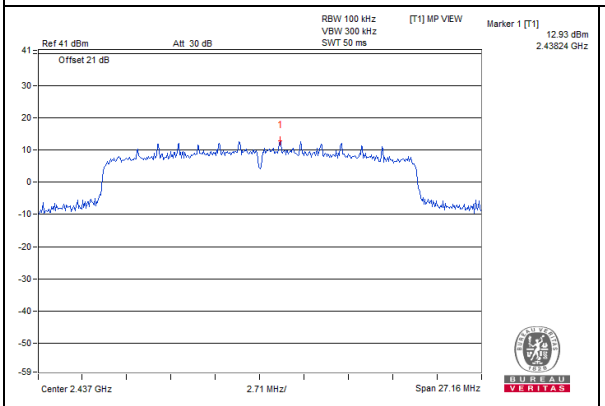
802.11ax (HE20) BF

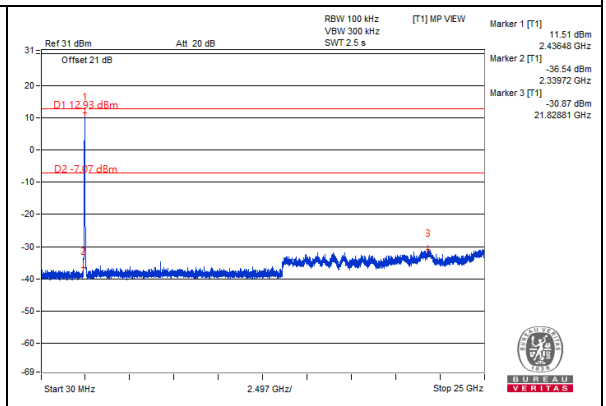
Chain0 : CH 1



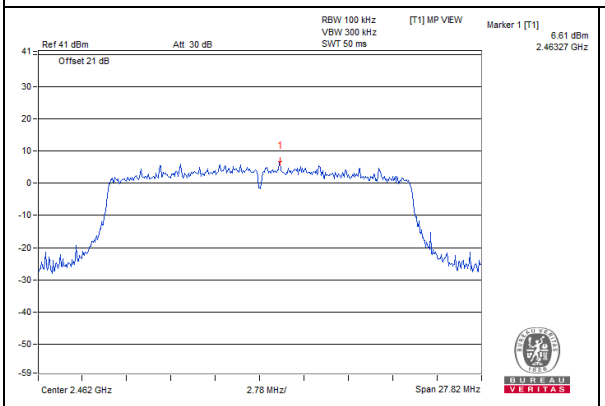


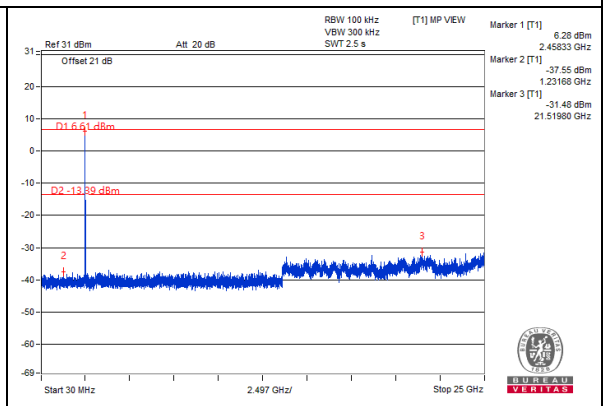
Chain0 : CH 6



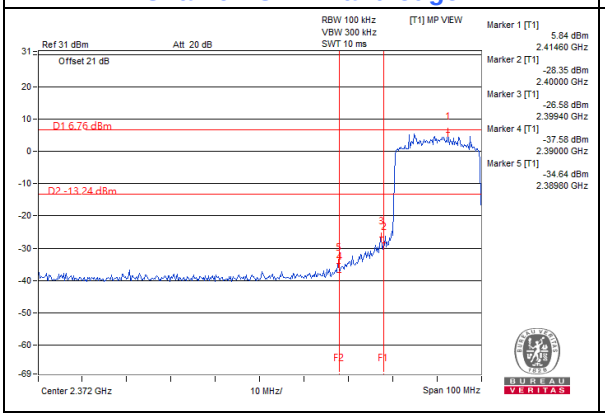


Chain0 : CH 11

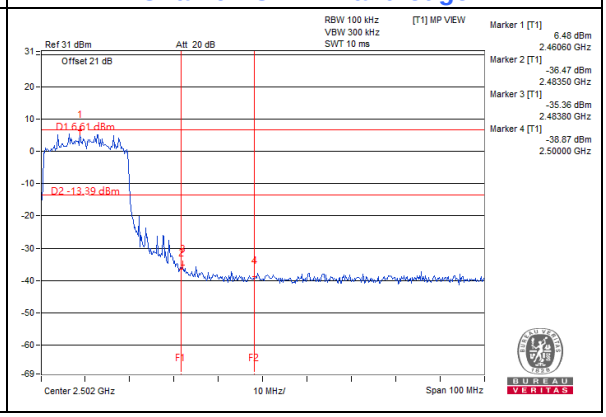




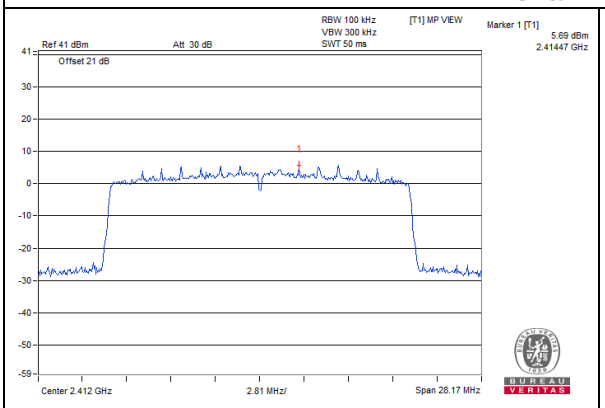
Chain0 : CH 1 Band edge

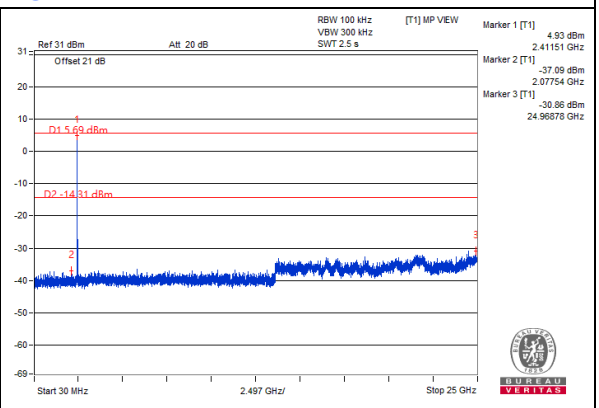


Chain0 : CH 11 Band edge

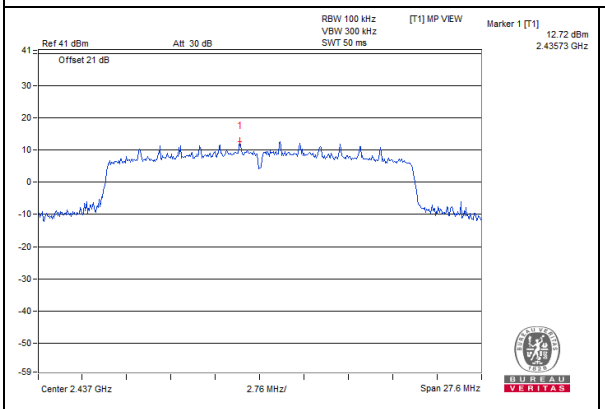


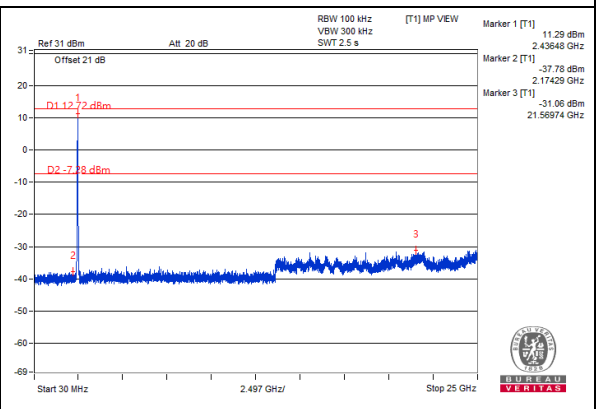
Chain1 : CH 1



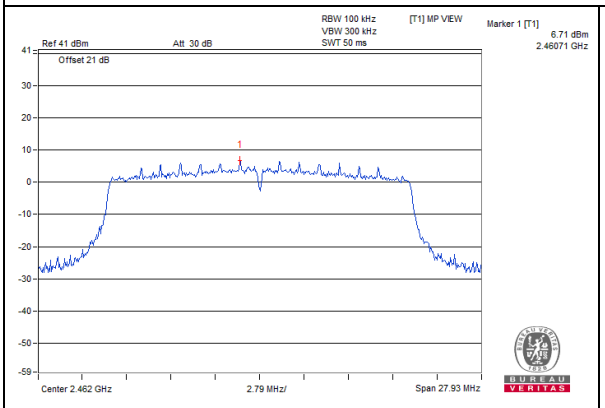


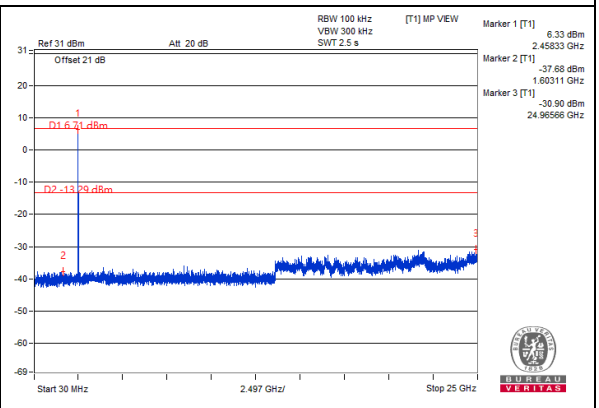
Chain1 : CH 6



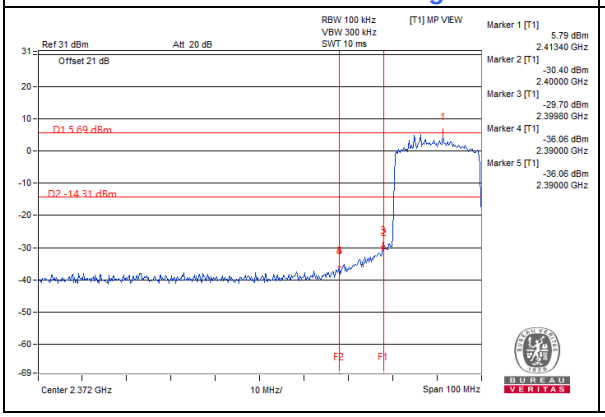


Chain1 : CH 11

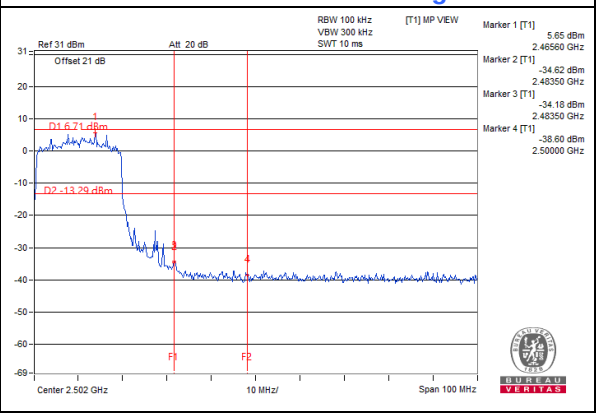




Chain1 : CH 1 Band edge

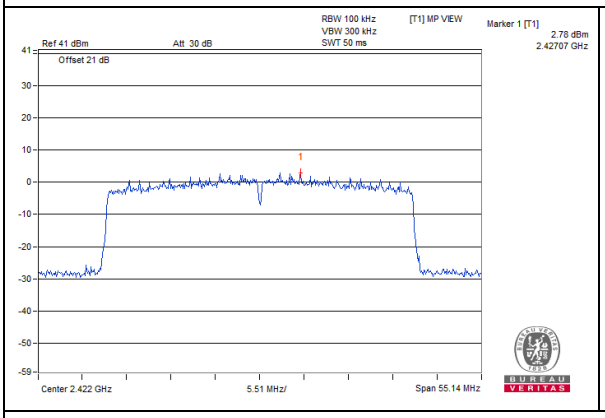


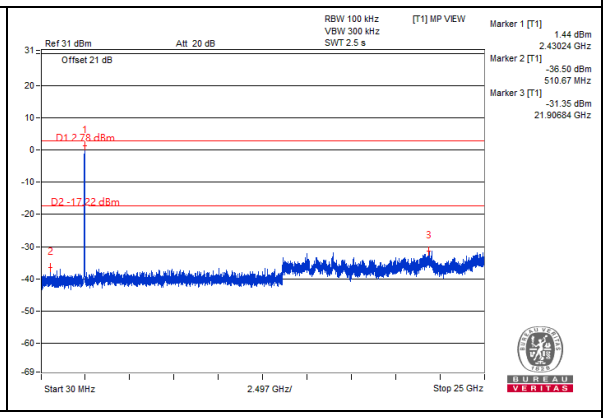
Chain1 : CH 11 Band edge



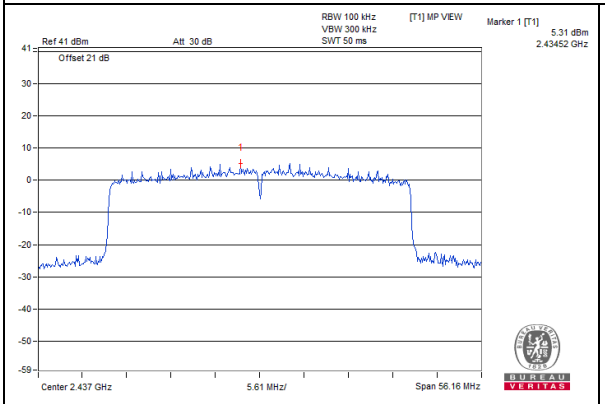
802.11ax (HE40) BF

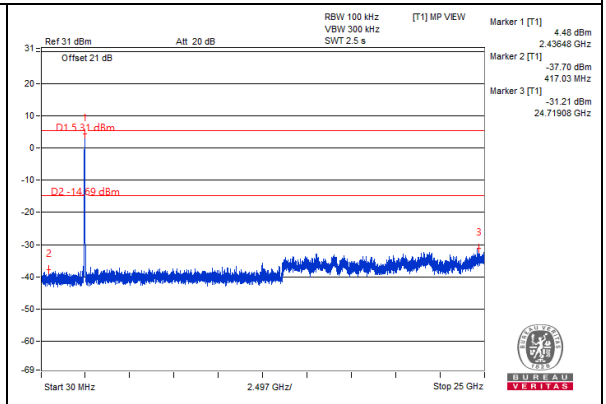
Chain0 : CH 3



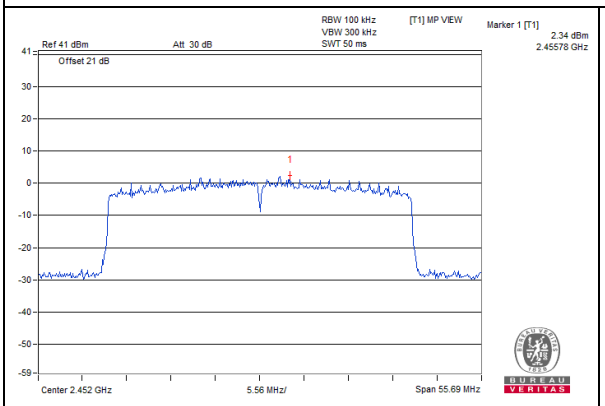


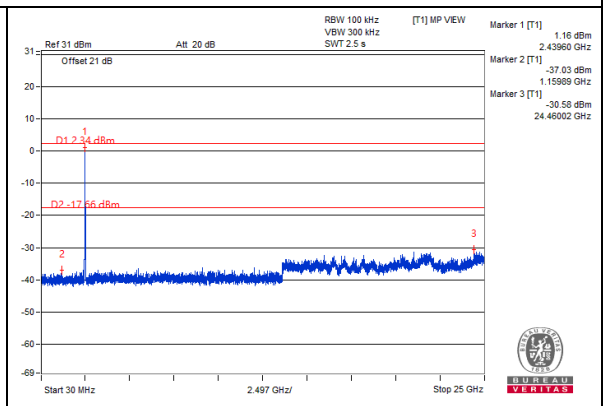
Chain0 : CH 6



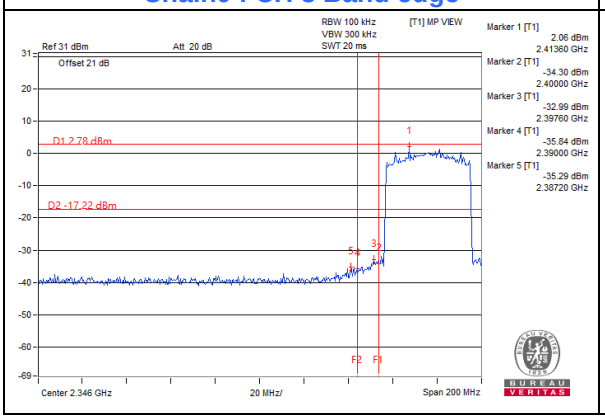


Chain0 : CH 9

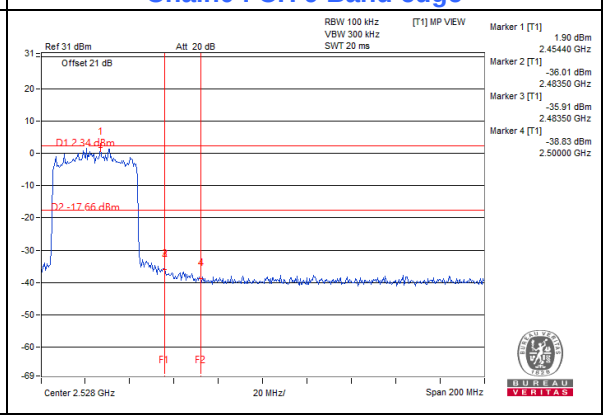




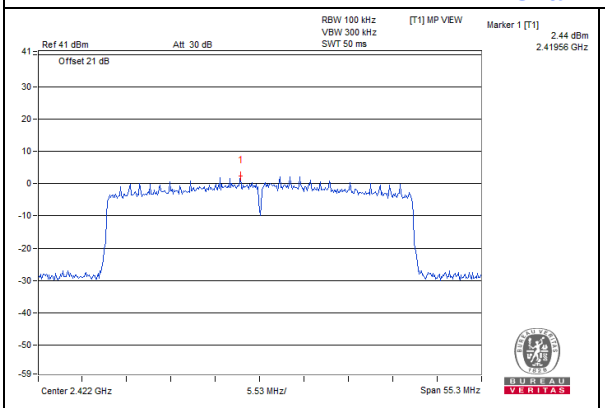
Chain0 : CH 3 Band edge

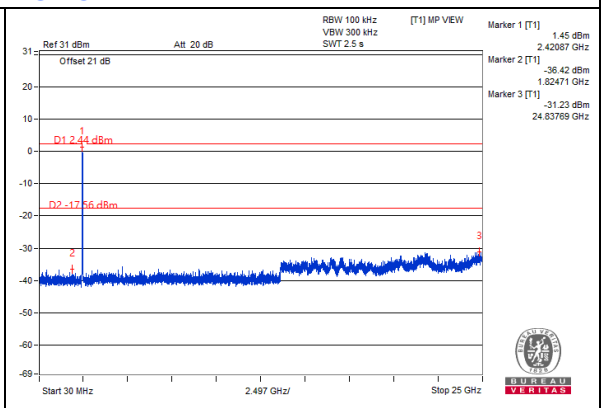


Chain0 : CH 9 Band edge

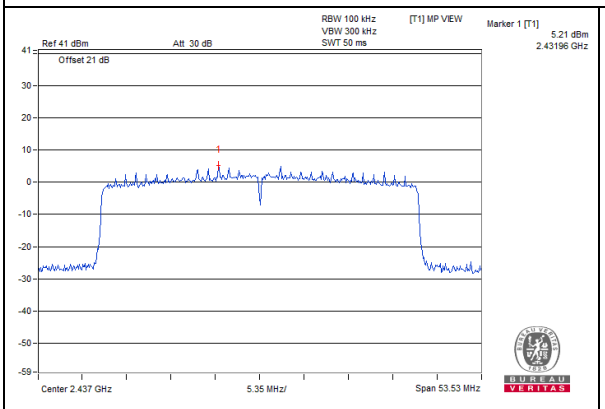


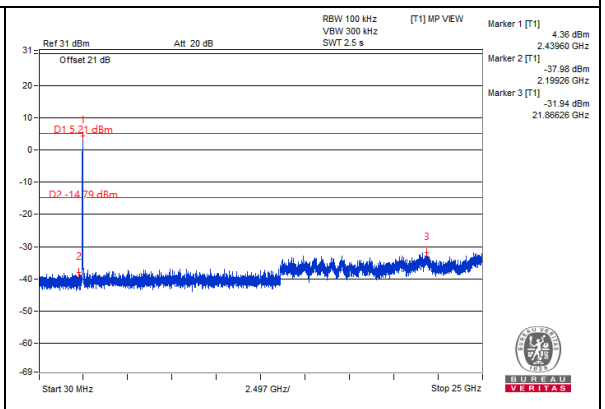
Chain1 : CH 3



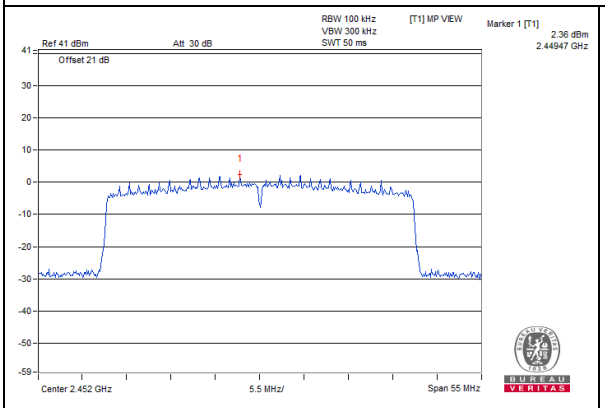


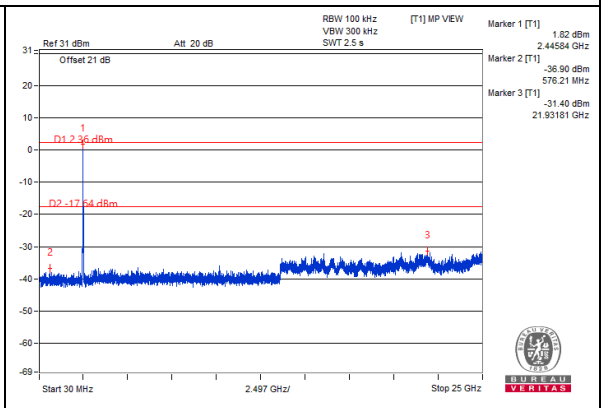
Chain1 : CH 6



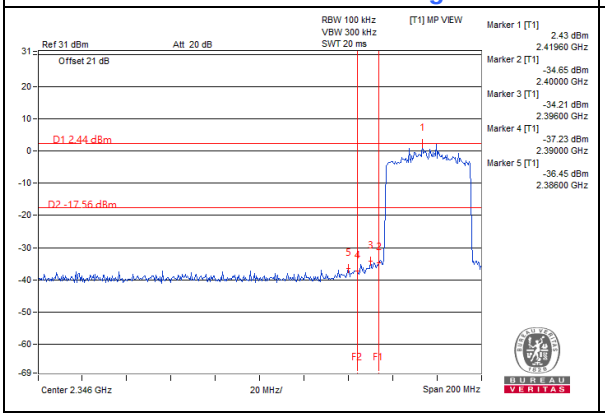


Chain1 : CH 9

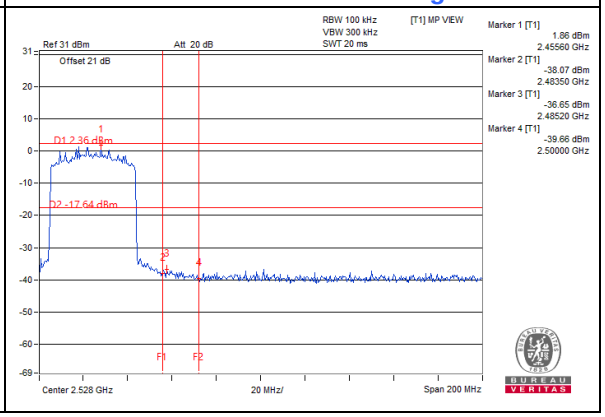




Chain1 : CH 3 Band edge



Chain1 : CH 9 Band edge



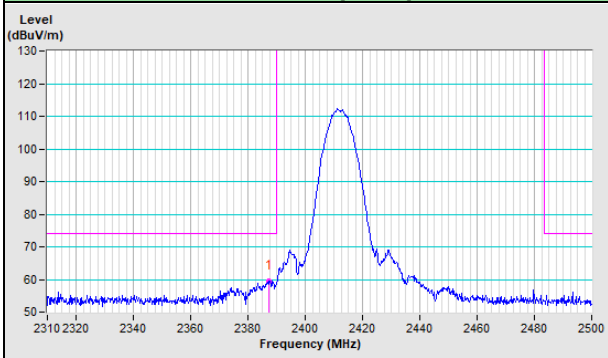
5 Pictures of Test Arrangements

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

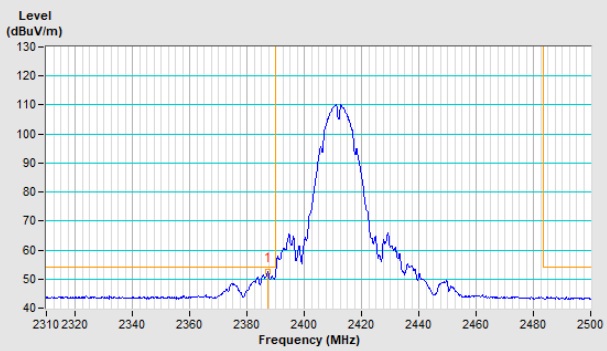
Annex A - Band-Edge Measurement

802.11b Channel 1

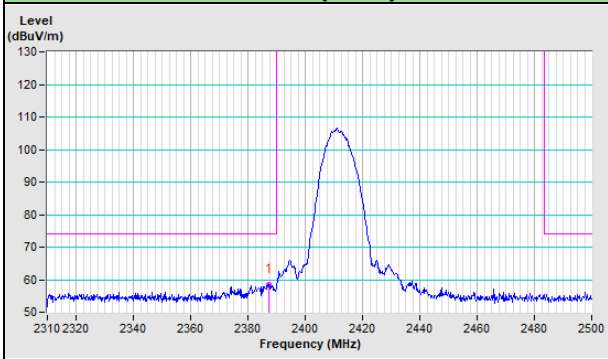
Horizontal (Peak)



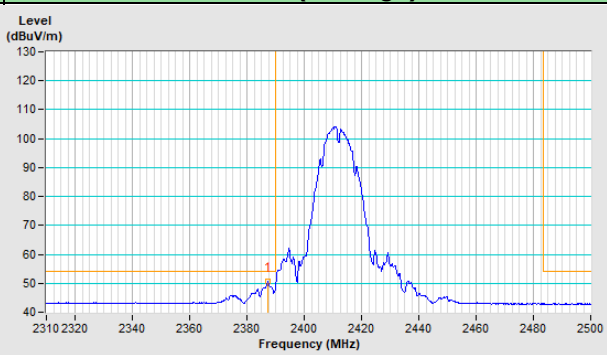
Horizontal (Average)



Vertical (Peak)

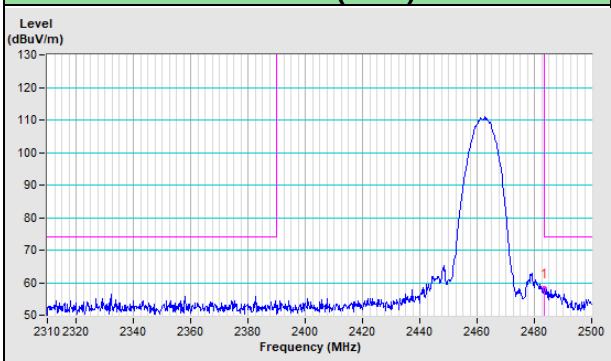


Vertical (Average)

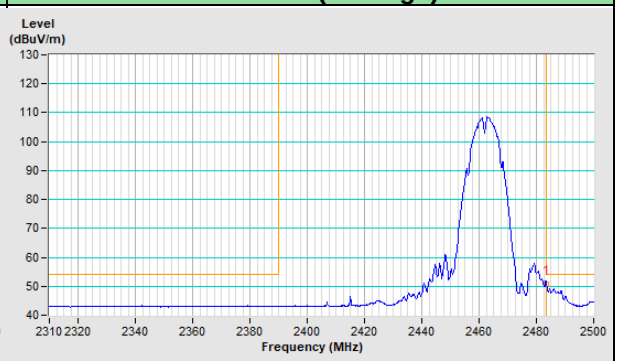


802.11b Channel 11

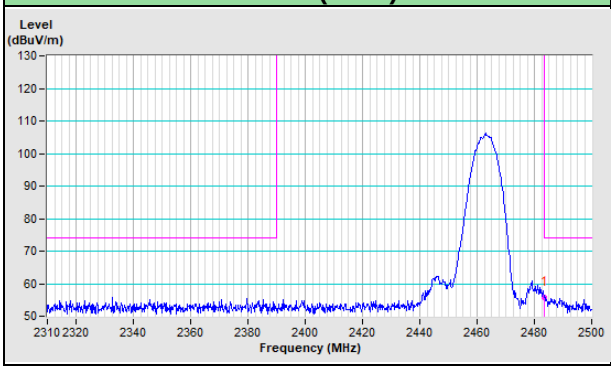
Horizontal (Peak)



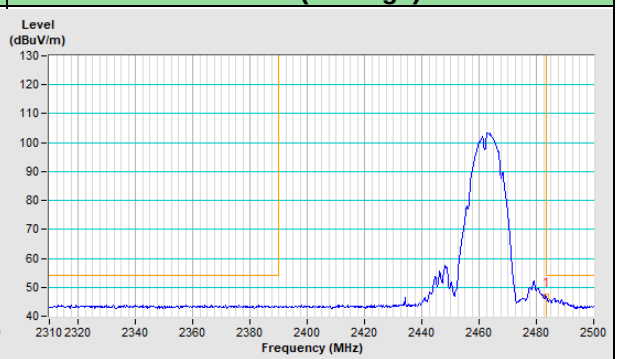
Horizontal (Average)



Vertical (Peak)

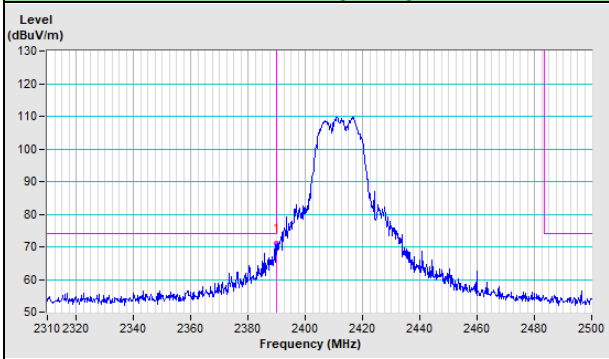


Vertical (Average)

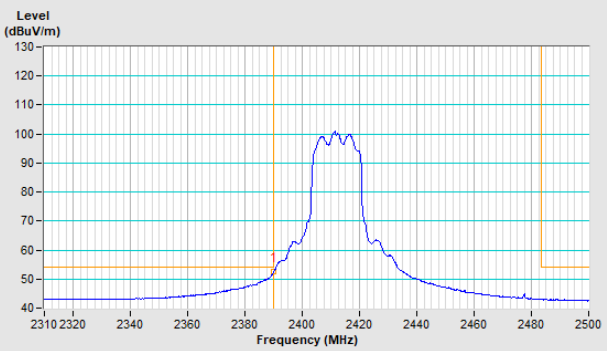


802.11g Channel 1

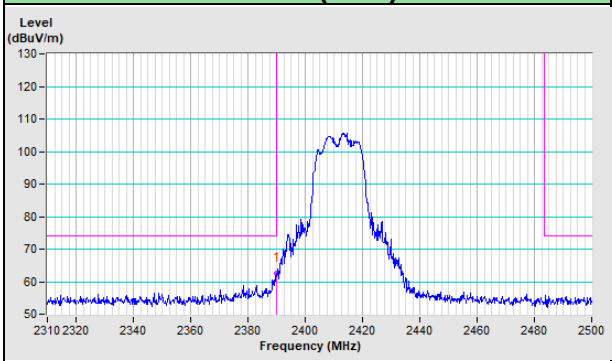
Horizontal (Peak)



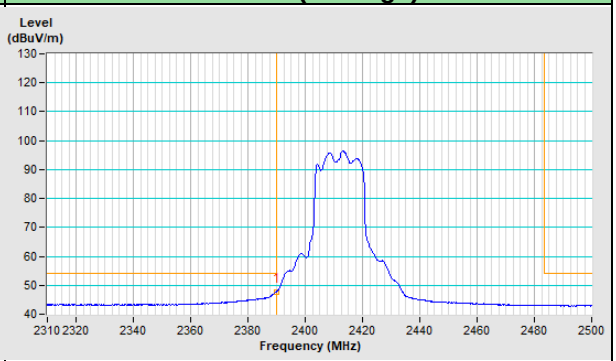
Horizontal (Average)



Vertical (Peak)

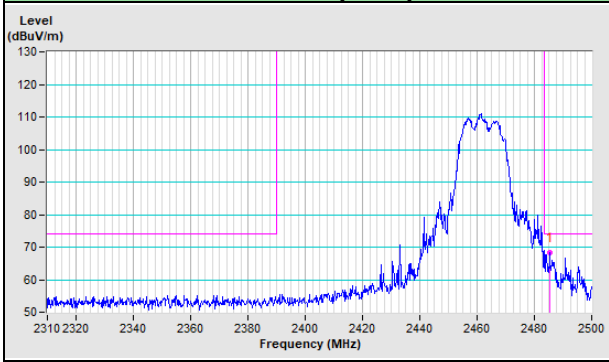


Vertical (Average)

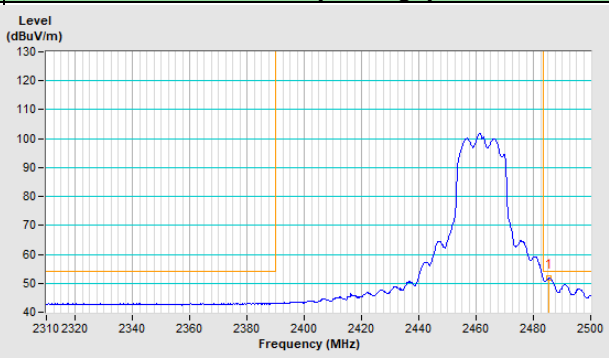


802.11g Channel 11

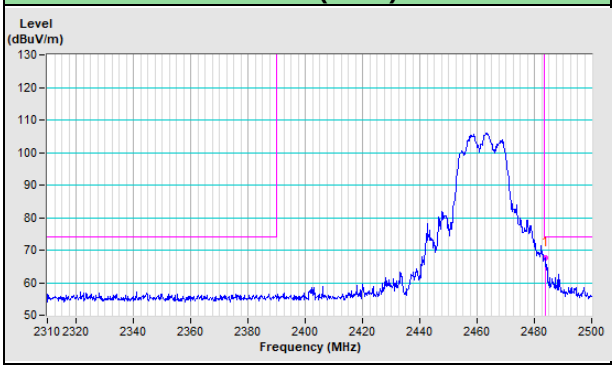
Horizontal (Peak)



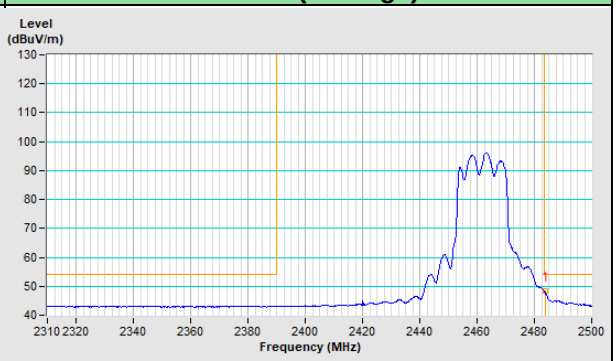
Horizontal (Average)



Vertical (Peak)

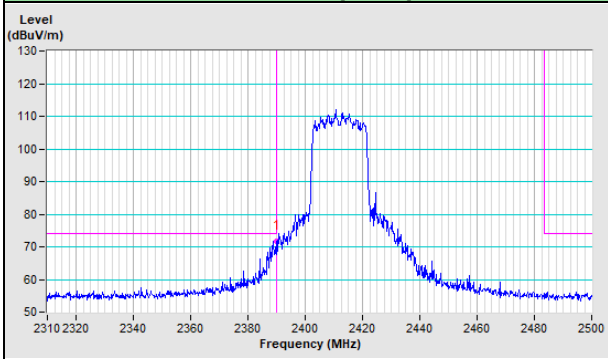


Vertical (Average)

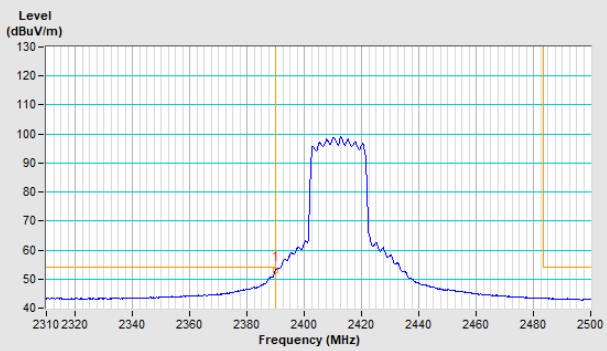


802.11ax (HE20) Channel 1

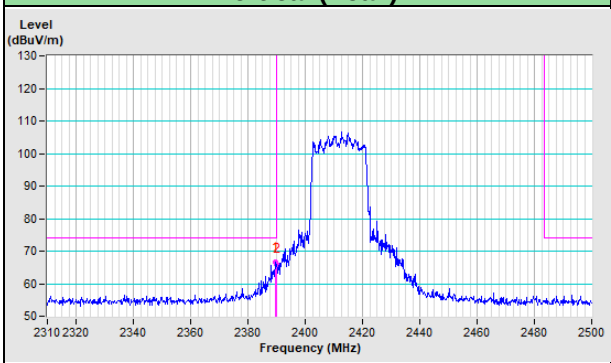
Horizontal (Peak)



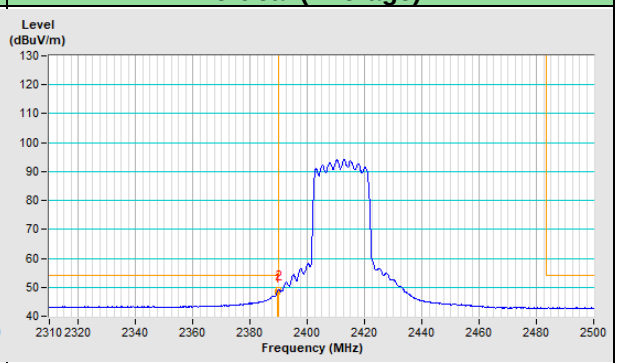
Horizontal (Average)



Vertical (Peak)

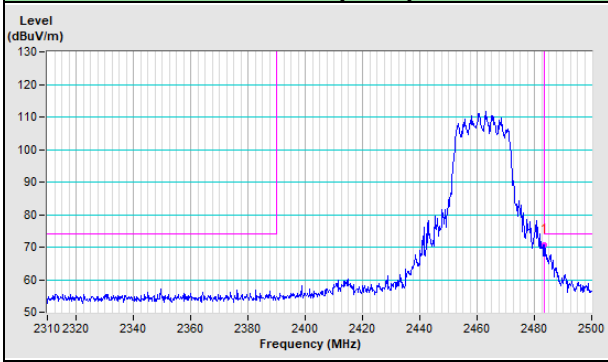


Vertical (Average)

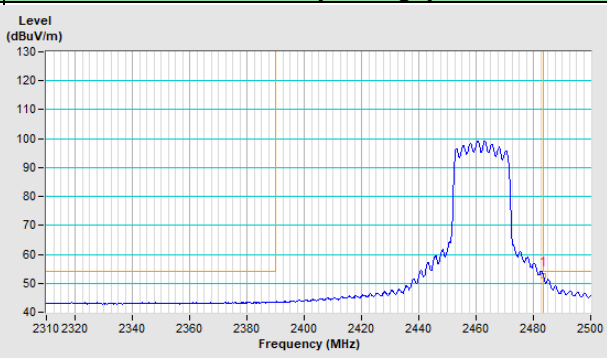


802.11ax (HE20) Channel 11

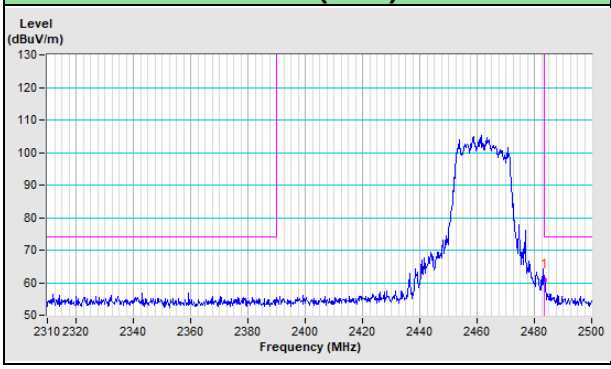
Horizontal (Peak)



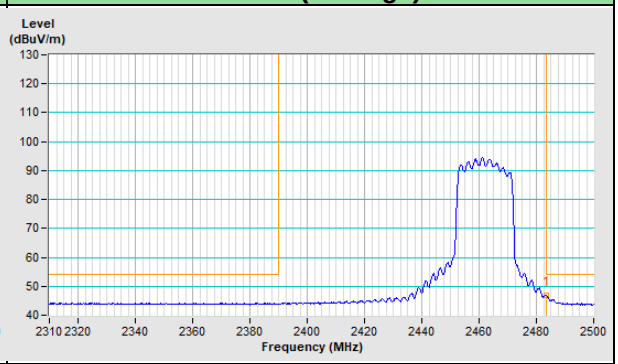
Horizontal (Average)



Vertical (Peak)

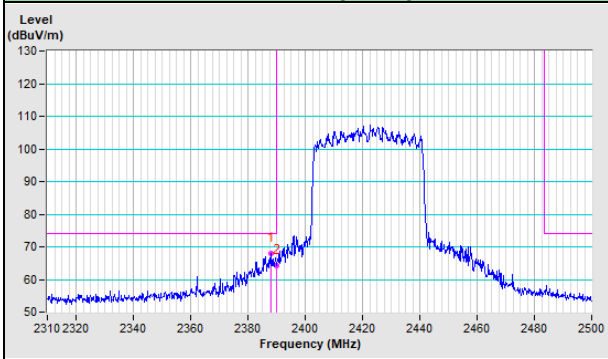


Vertical (Average)

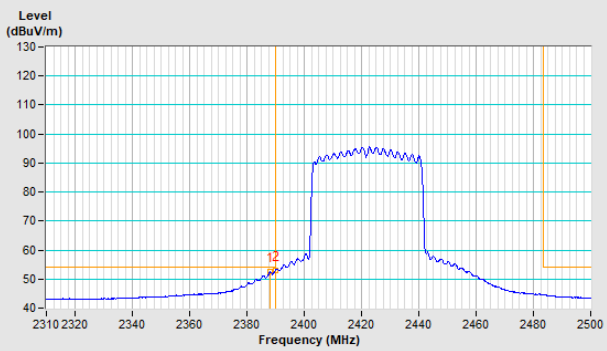


802.11ax (HE40) Channel 3

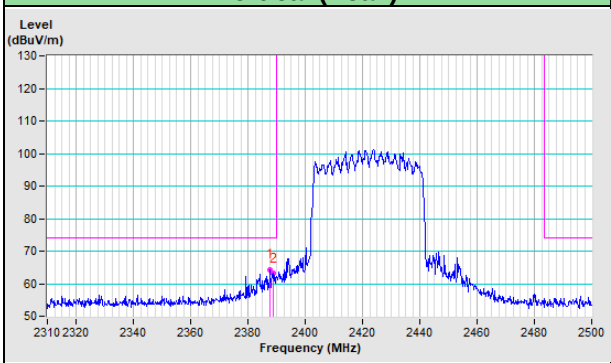
Horizontal (Peak)



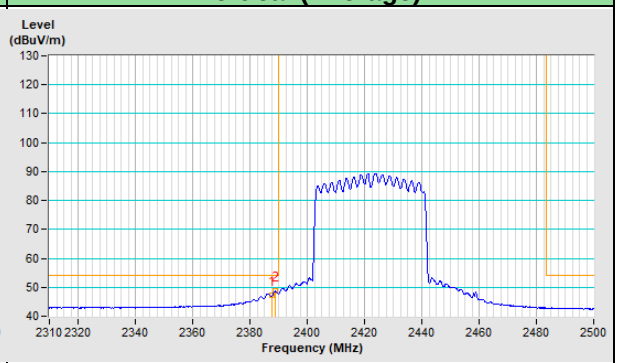
Horizontal (Average)



Vertical (Peak)

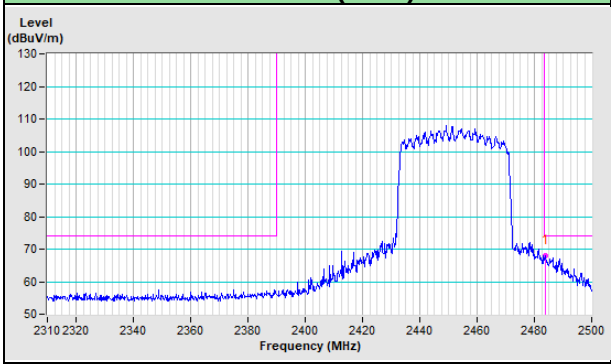


Vertical (Average)

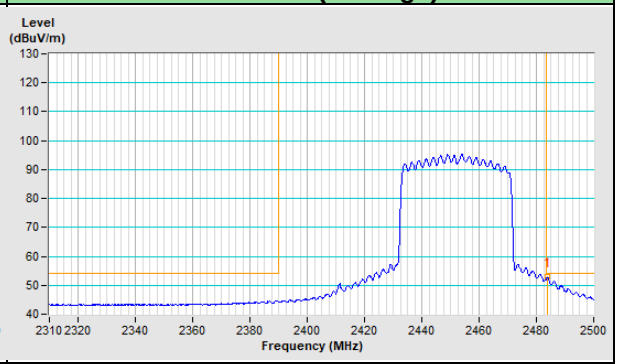


802.11ax (HE40) Channel 9

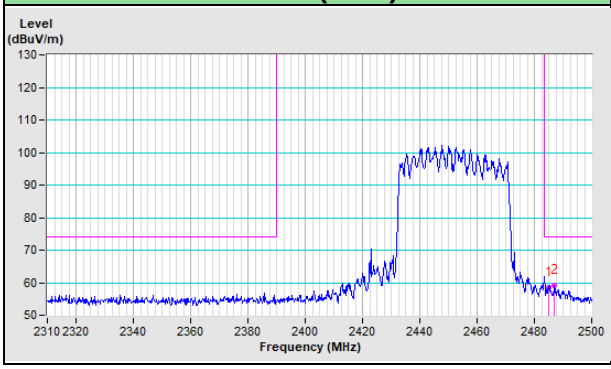
Horizontal (Peak)



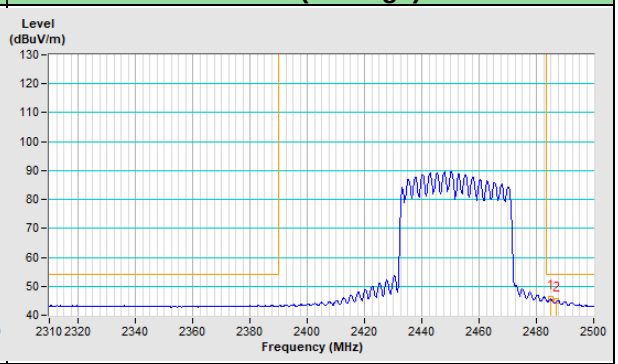
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



Appendix – Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

--- END ---