FCC Test Report

Report No.:	RFBEMT-WTW-P21090660-2
FCC ID:	2AYRA-08321
Test Model:	MR2000
Variant Model:	MR20MS, MR20EC, ME20WH (Refer to item 3.1 for more details)
Received Date:	Sep. 30, 2021
Test Date:	Oct. 06 ~ Nov. 04, 2021
Issued Date:	Jan. 18, 2022
Applicant:	Linksys USA, Inc.
Address:	121 Theory, Irvine, CA 92617, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
Test Location (2):	No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan
FCC Registration / Designation Number (1):	788550 / TW0003
FCC Registration / Designation Number (2):	281270 / TW0032

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBEMT-WTW-P21090660-2	Original release.	Jan. 18, 2022

1 Certificate of Conformity

Product:	AX3000 DUAL-BAND WIFI 6 ROUTER
Brand:	LINKSYS
Test Model:	MR2000
Variant Model:	MR20MS, MR20EC, ME20WH (Refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	Linksys USA, Inc.
Test Date:	Oct. 06 ~ Nov. 04, 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 RF characteristics under the conditions specified in this report.

Prepared by : Pettie Chen , **Date:** Jan. 18, 2022

Pettie Chen / Senior Specialist

Approved by : Jeremy Lin , **Date:** Jan. 18, 2022

Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -9.46dB at 0.66600MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2390.00MHz, 2483.50MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is ipex(MHF) not a standard connector.

Note:

1. For 2.4G band compliance with rule 15.247(d) of the band-edge items, the test plots were recorded in Annex A. Test Procedures refer to report 4.1.3.
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	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	AX3000 DUAL-BAND WIFI 6 ROUTER
Brand	LINKSYS
Test Model	MR2000
Variant Model	MR20MS, MR20EC, ME20WH
Model Difference	for Marketing purpose
Sample Status	Engineering sample
Power Supply Rating	12Vdc (From adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 400Mbps 802.11ax: up to 573.5Mbps
Operating Frequency	2412~2462MHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20), 802.11n (VHT20), 802.11ax (HE20): 11 802.11n (HT40), 802.11n (VHT40), 802.11ax (HE40): 7
Output Power	CDD Mode: 216.560mW Beamforming Mode: 183.461mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Cable Supplied	1.0m non-shielded RJ45 Cable

Note:

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

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

* The bandwidth and modulation are similar for HT20/HT40/VHT20/VHT40 on 802.11n mode and HE20/HE40 on 802.11ax mode. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)
* For 802.11n and 802.11ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

2. The antenna information is listed as below.

Antenna Type	Dipole	
Connector Type	ipex(MHF)	
Frequency	Antenna Gain (dBi)	
	Chain 0	Chain 1
2400~2483.5MHz	3.70	4.09
5150~5250MHz	3.65	3.46
5250~5350MHz	3.57	3.54
5470~5725MHz	3.81	3.75
5725~5850MHz	3.81	3.75
5850~5925MHz	3.71	3.48

*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. The EUT uses following adapters.

Adapter 1	
Brand	Ktec
Model	KSA-18W-120150VU
Input Power	100-240Vac~50/60Hz, 0.5A
Output Power	12Vdc, 1.5A
Power line	1.5m non-shielded cable without core

Adapter 2	
Brand	Moso
Model	MSA-C1500IC12.0-18P-US
Input Power	100-240Vac~50/60Hz, 0.7A max
Output Power	12Vdc, 1.5A
Power line	1.5m non-shielded cable without core

Adapter 3	
Brand	Ktec
Model	KSA-18W-120150D5
Input Power	100-240Vac~50/60Hz, 0.5A
Output Power	12Vdc, 1.5A
Power line	1.5m non-shielded cable without core

Adapter 4	
Brand	Moso
Model	MSA-C1500IC12.0-18P-zz
Input Power	100-240Vac~50/60Hz, 0.7A
Output Power	12Vdc, 1.5A
Power line	1.5m non-shielded cable without core

* Adapter 1 & 3, 2 & 4 are identical to each other, except the plug type for different country, therefore only adapter 1 & 2 were for final test and presented in the test report.

4. WLAN 2.4GHz & 5.0GHz & BT technology can transmit at same time.

3.2 Description of Test Modes

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

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

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter 1
B	-	√	√	-	Power from adapter 2

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

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-": Means no effect.

Radiated Emission Test (Above 1GHz):

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	-
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	-
	802.11ax (HE20)	1 to 11	1, 6, 11	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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A, B	802.11ax (HE40)	3 to 9	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.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A, B	802.11ax (HE40)	3 to 9	6	OFDMA	BPSK	MCS0	-

Conducted Output Power Measurement:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
A	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Bandwidth, Power Spectral Density and Conducted Out of Band Emission Measurement:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
A	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0
A	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0

Test Condition:

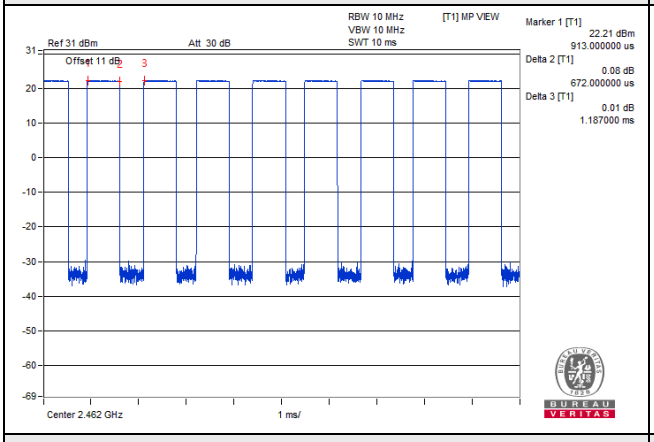
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	24 deg. C, 66% RH	120Vac, 60Hz	Raymond Lee
RE<1G	21 deg. C, 65% RH	120Vac, 60Hz	Greg Lin
PLC	25 deg. C, 68% RH 25 deg. C, 75% RH	120Vac, 60Hz	Raymond Lee Hans Wu
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Alan Wu

3.3 Duty Cycle of Test Signal

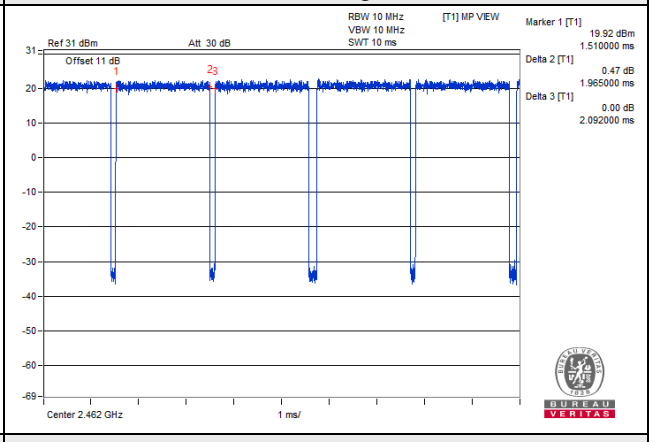
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = 0.672/1.187 = 0.566, Duty factor = 10 * log (1/0.566) = 2.47
802.11g: Duty cycle = 1.965/2.092 = 0.939, Duty factor = 10 * log (1/0.939) = 0.27
802.11ax (HE20): Duty cycle = 5.43/5.93 = 0.916, Duty factor = 10 * log (1/0.916) = 0.38
802.11ax (HE40): Duty cycle = 5.42/5.945 = 0.912, Duty factor = 10 * log (1/0.912) = 0.40

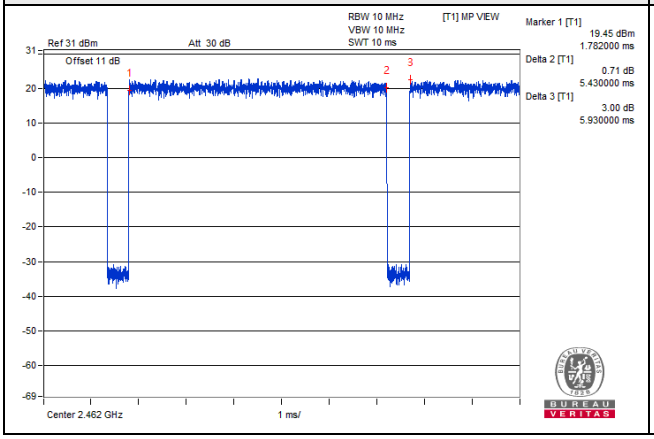
802.11b



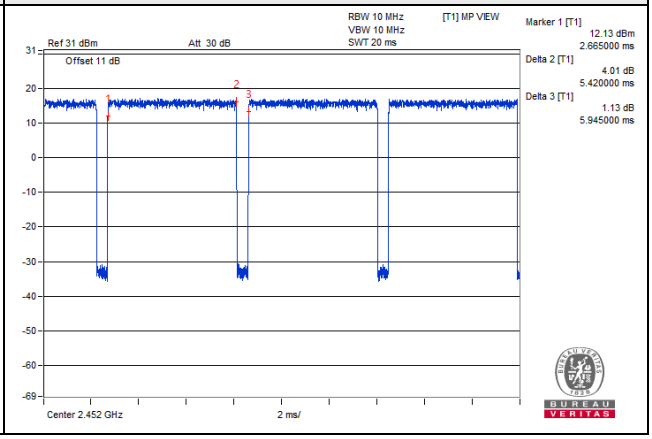
802.11g



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.

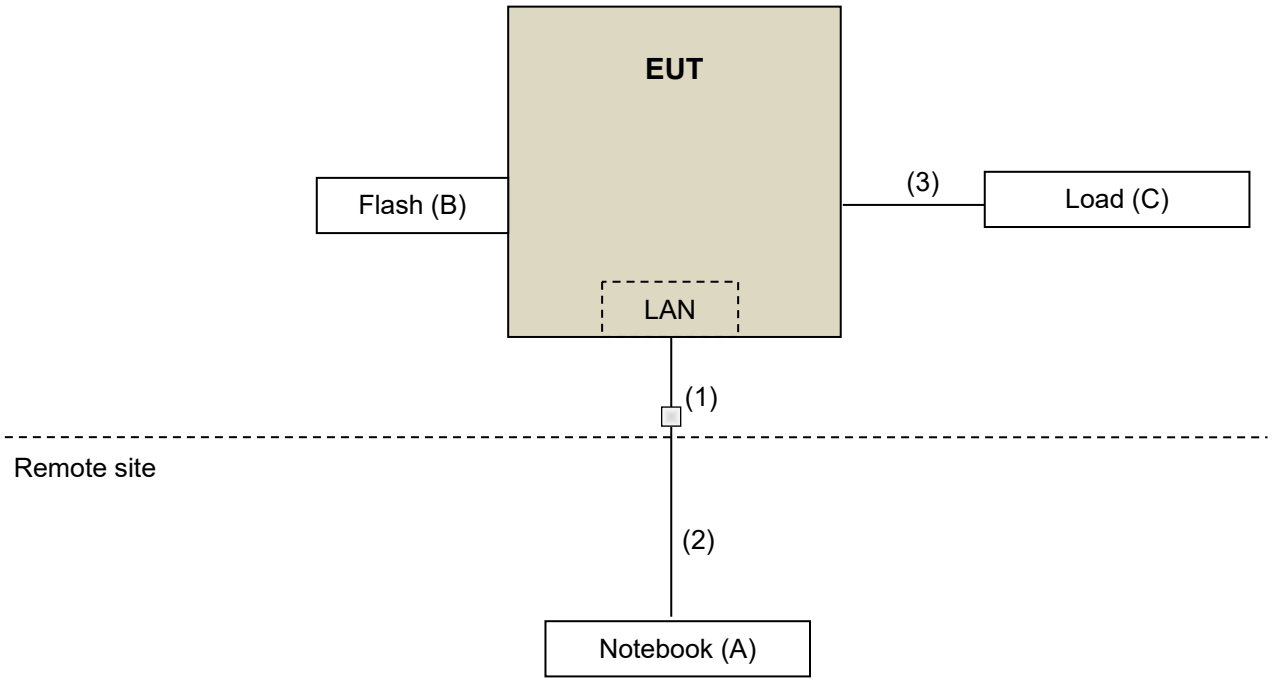
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	Lenovo	20J4 MD A003TW	PF-11H9AK	FCC DoC Approved	-
B.	Flash	Transcend	16GB	NA	NA	-
C.	Load	NA	NA	NA	NA	-

Note:

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

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1	N	0	RJ45, Cat5e, Accessory
2.	LAN cable	1	10	N	0	RJ45, Cat5e
3.	LAN cable	4	1.5	N	0	RJ45, Cat5e

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

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

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

References Test Guidance:
KDB 558074 D01 15.247 Meas Guidance v05r02
KDB 662911 D01 Multiple Transmitter Output v02r01

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

Note:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Rohde & Schwarz	ESR3	102783	Dec. 21, 2020	Dec. 20, 2021
Spectrum Analyzer KEYSIGHT	N9020B	MY60110513	Dec. 21, 2020	Dec. 20, 2021
BILOG Antenna SCHWARZBECK	VULB9168	1214	Nov. 04, 2020	Nov. 03, 2021
			Oct. 28, 2021	Oct. 27, 2022
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1170	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	995	Nov. 22, 2020	Nov. 21, 2021
Preamplifier EMCI	EMC330N	980798	Jan. 12, 2021	Jan. 11, 2022
Preamplifier EMCI	EMC118A45SE	980809	Jan. 12, 2021	Jan. 11, 2022
Preamplifier EMCI	EMC184045SE	980786	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMC104-SM-SM-(9000+2000+1000)	201244+ 201232+ 210103	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMCCFD400-NM-NM-(9000+300+500)	201251+ 201249+ 201248	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMC101G-KM-KM-(5000+3000+2000)	201261+201258+201249	Jan. 12, 2021	Jan. 11, 2022
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFA-515BSN	NA	NA	NA
Turn Table Max-Full	MFT-201SS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208676	NA	NA
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 19, 2021	Jan. 18, 2022
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 11, 2021	Jan. 10, 2022

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in WM Chamber 9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

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

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

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

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

Note:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

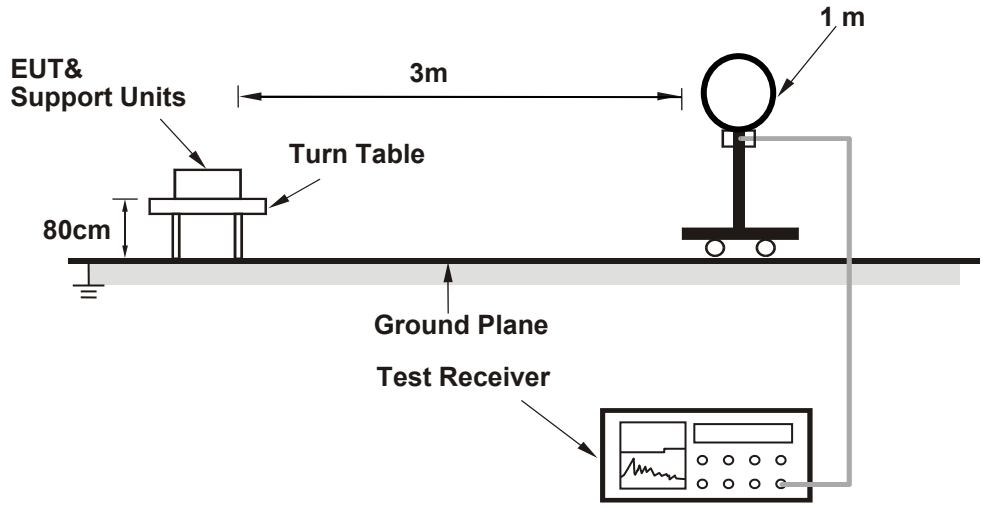
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

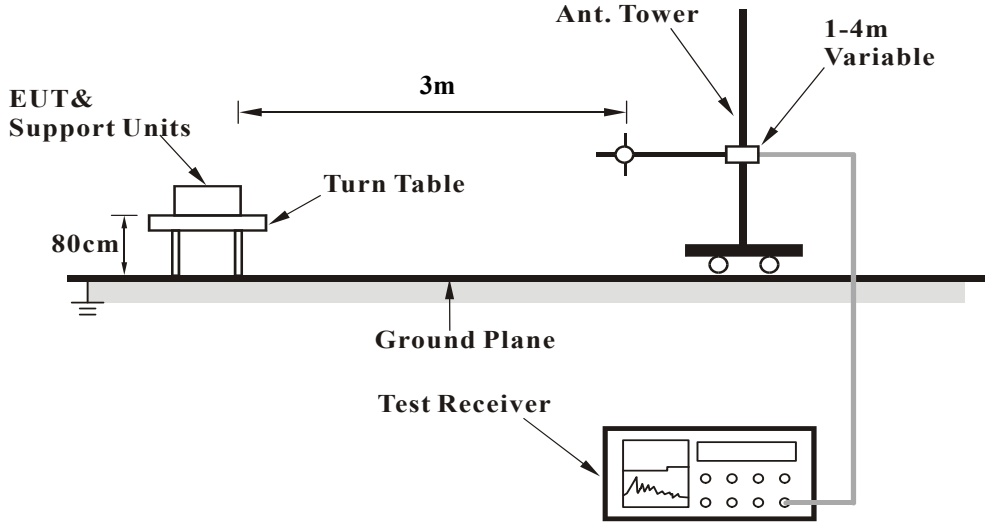
No deviation.

4.1.5 Test Setup

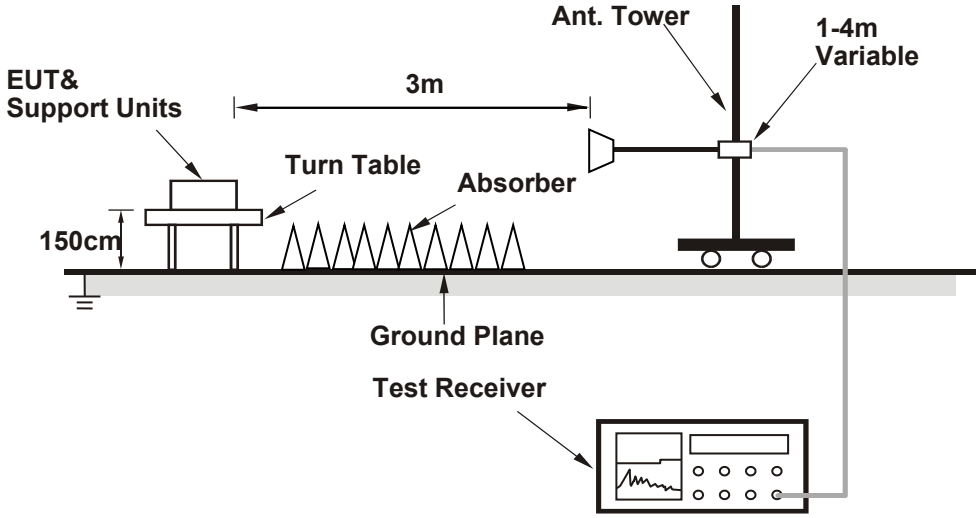
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz worst-Case data:

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.4 PK	74.0	-15.6	1.81 H	222	26.7	31.7
2	2390.00	45.8 AV	54.0	-8.2	1.81 H	226	14.1	31.7
3	*2412.00	101.2 PK			1.81 H	226	69.4	31.8
4	*2412.00	99.7 AV			1.81 H	226	67.9	31.8
5	4824.00	50.9 PK	74.0	-23.1	1.27 H	133	48.6	2.3
6	4824.00	48.3 AV	54.0	-5.7	1.27 H	133	46.0	2.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	60.6 PK	74.0	-13.4	1.59 V	215	28.9	31.7
2	2390.00	51.6 AV	54.0	-2.4	1.59 V	215	19.9	31.7
3	*2412.00	112.5 PK			1.59 V	215	80.7	31.8
4	*2412.00	110.2 AV			1.59 V	215	78.4	31.8
5	4824.00	55.5 PK	74.0	-18.5	1.22 V	301	53.2	2.3
6	4824.00	52.9 AV	54.0	-1.1	1.22 V	301	50.6	2.3

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.9 PK			1.39 H	289	70.1	31.8
2	*2437.00	101.4 AV			1.39 H	289	69.6	31.8
3	4874.00	50.4 PK	74.0	-23.6	1.14 H	126	47.9	2.5
4	4874.00	48.1 AV	54.0	-5.9	1.14 H	126	45.6	2.5
5	7311.00	55.4 PK	74.0	-18.6	1.03 H	305	47.6	7.8
6	7311.00	50.8 AV	54.0	-3.2	1.03 H	305	43.0	7.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	113.7 PK			1.84 V	159	81.9	31.8
2	*2437.00	111.5 AV			1.87 V	159	79.7	31.8
3	4874.00	55.8 PK	74.0	-18.2	1.48 V	300	53.3	2.5
4	4874.00	52.8 AV	54.0	-1.2	1.48 V	300	50.3	2.5
5	7311.00	55.2 PK	74.0	-18.8	2.20 V	150	47.4	7.8
6	7311.00	48.8 AV	54.0	-5.2	2.20 V	150	41.0	7.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	100.0 PK			1.72 H	227	68.1	31.9
2	*2462.00	97.6 AV			1.72 H	227	65.7	31.9
3	2483.50	61.3 PK	74.0	-12.7	1.72 H	221	29.4	31.9
4	2483.50	50.3 AV	54.0	-3.7	1.72 H	227	18.4	31.9
5	4924.00	51.5 PK	74.0	-22.5	1.33 H	89	48.8	2.7
6	4924.00	48.2 AV	54.0	-5.8	1.33 H	89	45.5	2.7
7	7386.00	57.8 PK	74.0	-16.2	1.03 H	305	49.9	7.9
8	7386.00	51.3 AV	54.0	-2.7	1.03 H	305	43.4	7.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	112.0 PK			1.75 V	220	80.1	31.9
2	*2462.00	110.1 AV			1.75 V	220	78.2	31.9
3	2483.50	62.6 PK	74.0	-11.4	1.75 V	220	30.7	31.9
4	2483.50	51.8 AV	54.0	-2.2	1.75 V	220	19.9	31.9
5	4924.00	55.3 PK	74.0	-18.7	1.30 V	296	52.6	2.7
6	4924.00	52.3 AV	54.0	-1.7	1.30 V	296	49.6	2.7
7	7386.00	56.0 PK	74.0	-18.0	2.06 V	67	48.1	7.9
8	7386.00	49.1 AV	54.0	-4.9	2.06 V	67	41.2	7.9

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

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.2 PK	74.0	-16.8	1.84 H	223	25.5	31.7
2	2390.00	45.7 AV	54.0	-8.3	1.84 H	223	14.0	31.7
3	*2412.00	105.8 PK			1.84 H	223	74.0	31.8
4	*2412.00	96.7 AV			1.84 H	223	64.9	31.8
5	4824.00	51.8 PK	74.0	-22.2	1.26 H	114	49.5	2.3
6	4824.00	39.5 AV	54.0	-14.5	1.26 H	114	37.2	2.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.2 PK	74.0	-9.8	1.98 V	172	32.5	31.7
2	2390.00	52.5 AV	54.0	-1.5	1.98 V	172	20.8	31.7
3	*2412.00	118.6 PK			1.98 V	172	86.8	31.8
4	*2412.00	109.2 AV			1.98 V	172	77.4	31.8
5	4824.00	52.4 PK	74.0	-21.6	1.42 V	334	50.1	2.3
6	4824.00	42.8 AV	54.0	-11.2	1.42 V	334	40.5	2.3

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.9 PK	74.0	-16.1	1.75 H	236	26.2	31.7
2	2390.00	47.3 AV	54.0	-6.7	1.75 H	236	15.6	31.7
3	*2437.00	104.7 PK			1.75 H	236	72.9	31.8
4	*2437.00	95.5 AV			1.75 H	236	63.7	31.8
5	2483.50	59.3 PK	74.0	-14.7	1.75 H	236	27.4	31.9
6	2483.50	50.3 AV	54.0	-3.7	1.75 H	236	18.4	31.9
7	4874.00	49.3 PK	74.0	-24.7	1.35 H	128	46.8	2.5
8	4874.00	40.3 AV	54.0	-13.7	1.35 H	128	37.8	2.5
9	7311.00	63.4 PK	74.0	-10.6	1.06 H	304	55.6	7.8
10	7311.00	50.8 AV	54.0	-3.2	1.06 H	304	43.0	7.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.8 PK	74.0	-12.2	2.36 V	180	30.1	31.7
2	2390.00	51.7 AV	54.0	-2.3	2.36 V	180	20.0	31.7
3	*2437.00	117.2 PK			1.71 V	171	85.4	31.8
4	*2437.00	108.8 AV			1.71 V	171	77.0	31.8
5	2483.50	62.6 PK	74.0	-11.4	2.36 V	180	30.7	31.9
6	2483.50	52.8 AV	54.0	-1.2	1.71 V	171	20.9	31.9
7	4874.00	52.2 PK	74.0	-21.8	1.44 V	298	49.7	2.5
8	4874.00	42.8 AV	54.0	-11.2	1.44 V	298	40.3	2.5
9	7311.00	60.9 PK	74.0	-13.1	1.92 V	64	53.1	7.8
10	7311.00	48.7 AV	54.0	-5.3	1.92 V	64	40.9	7.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.1 PK			1.77 H	303	73.2	31.9
2	*2462.00	95.5 AV			1.77 H	303	63.6	31.9
3	2483.50	58.1 PK	74.0	-15.9	1.77 H	303	26.2	31.9
4	2483.50	46.1 AV	54.0	-7.9	1.77 H	303	14.2	31.9
5	4924.00	49.8 PK	74.0	-24.2	1.58 H	100	47.1	2.7
6	4924.00	38.0 AV	54.0	-16.0	1.58 H	100	35.3	2.7
7	7386.00	63.8 PK	74.0	-10.2	1.06 H	298	55.9	7.9
8	7386.00	52.3 AV	54.0	-1.7	1.06 H	298	44.4	7.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	117.1 PK			1.34 V	208	85.2	31.9
2	*2462.00	108.4 AV			1.34 V	208	76.5	31.9
3	2483.50	64.8 PK	74.0	-9.2	1.34 V	208	32.9	31.9
4	2483.50	52.6 AV	54.0	-1.4	1.34 V	208	20.7	31.9
5	4924.00	51.6 PK	74.0	-22.4	1.52 V	312	48.9	2.7
6	4924.00	41.8 AV	54.0	-12.2	1.52 V	312	39.1	2.7
7	7386.00	59.6 PK	74.0	-14.4	1.02 V	287	51.7	7.9
8	7386.00	49.2 AV	54.0	-4.8	1.02 V	287	41.3	7.9

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

802.11ax (HE20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.0 PK	74.0	-17.0	1.56 H	226	25.3	31.7
2	2390.00	45.2 AV	54.0	-8.8	1.56 H	226	13.5	31.7
3	*2412.00	106.6 PK			1.56 H	226	74.8	31.8
4	*2412.00	95.1 AV			1.56 H	226	63.3	31.8
5	4824.00	45.9 PK	74.0	-28.1	1.59 H	103	43.6	2.3
6	4824.00	36.6 AV	54.0	-17.4	1.59 H	103	34.3	2.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	63.9 PK	74.0	-10.1	1.79 V	138	32.2	31.7
2	2390.00	52.9 AV	54.0	-1.1	1.79 V	138	21.2	31.7
3	*2412.00	117.0 PK			1.79 V	138	85.2	31.8
4	*2412.00	107.1 AV			1.79 V	138	75.3	31.8
5	4824.00	50.2 PK	74.0	-23.8	1.55 V	301	47.9	2.3
6	4824.00	39.9 AV	54.0	-14.1	1.55 V	301	37.6	2.3

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	59.6 PK	74.0	-14.4	1.70 H	225	27.9	31.7
2	2390.00	47.3 AV	54.0	-6.7	1.70 H	225	15.6	31.7
3	*2437.00	107.1 PK			1.70 H	225	75.3	31.8
4	*2437.00	95.0 AV			1.70 H	225	63.2	31.8
5	2483.50	58.8 PK	74.0	-15.2	1.70 H	225	26.9	31.9
6	2483.50	47.4 AV	54.0	-6.6	1.70 H	225	15.5	31.9
7	4874.00	48.9 PK	74.0	-25.1	1.62 H	99	46.4	2.5
8	4874.00	39.1 AV	54.0	-14.9	1.62 H	99	36.6	2.5
9	7311.00	62.0 PK	74.0	-12.0	1.01 H	302	54.2	7.8
10	7311.00	51.0 AV	54.0	-3.0	1.01 H	302	43.2	7.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.4 PK	74.0	-11.6	1.67 V	166	30.7	31.7
2	2390.00	51.5 AV	54.0	-2.5	1.67 V	166	19.8	31.7
3	*2437.00	119.6 PK			1.67 V	166	87.8	31.8
4	*2437.00	109.1 AV			1.67 V	166	77.3	31.8
5	2483.50	62.4 PK	74.0	-11.6	1.67 V	166	30.5	31.9
6	2483.50	52.7 AV	54.0	-1.3	1.67 V	166	20.8	31.9
7	4874.00	51.3 PK	74.0	-22.7	1.53 V	311	48.8	2.5
8	4874.00	42.2 AV	54.0	-11.8	1.53 V	311	39.7	2.5
9	7311.00	61.9 PK	74.0	-12.1	2.22 V	83	54.1	7.8
10	7311.00	50.3 AV	54.0	-3.7	2.22 V	83	42.5	7.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.7 PK			1.78 H	229	71.8	31.9
2	*2462.00	93.8 AV			1.78 H	229	61.9	31.9
3	2483.50	58.3 PK	74.0	-15.7	1.78 H	229	26.4	31.9
4	2483.50	45.7 AV	54.0	-8.3	1.78 H	229	13.8	31.9
5	4924.00	47.6 PK	74.0	-26.4	1.54 H	98	44.9	2.7
6	4924.00	37.2 AV	54.0	-16.8	1.54 H	98	34.5	2.7
7	7386.00	63.5 PK	74.0	-10.5	1.04 H	300	55.6	7.9
8	7386.00	50.2 AV	54.0	-3.8	1.04 H	300	42.3	7.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	118.4 PK			1.75 V	207	86.5	31.9
2	*2462.00	106.7 AV			1.75 V	207	74.8	31.9
3	2483.50	65.3 PK	74.0	-8.7	1.75 V	207	33.4	31.9
4	2483.50	52.9 AV	54.0	-1.1	1.75 V	207	21.0	31.9
5	4924.00	50.5 PK	74.0	-23.5	1.58 V	303	47.8	2.7
6	4924.00	39.8 AV	54.0	-14.2	1.58 V	303	37.1	2.7
7	7386.00	53.5 PK	74.0	-20.5	2.17 V	75	45.6	7.9
8	7386.00	44.4 AV	54.0	-9.6	2.17 V	75	36.5	7.9

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

802.11ax (HE40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	57.3 PK	74.0	-16.7	1.83 H	227	25.6	31.7
2	2390.00	45.0 AV	54.0	-9.0	1.83 H	227	13.3	31.7
3	*2422.00	102.7 PK			1.83 H	227	70.9	31.8
4	*2422.00	92.0 AV			1.83 H	227	60.2	31.8
5	4844.00	47.4 PK	74.0	-26.6	1.58 H	93	45.0	2.4
6	4844.00	35.7 AV	54.0	-18.3	1.58 H	93	33.3	2.4
7	7266.00	55.4 PK	74.0	-18.6	1.06 H	314	47.7	7.7
8	7266.00	44.9 AV	54.0	-9.1	1.06 H	314	37.2	7.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	64.0 PK	74.0	-10.0	1.90 V	180	32.3	31.7
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**1.90 V**	**180**	**21.3**	**31.7**
3	*2422.00	113.8 PK			1.90 V	180	82.0	31.8
4	*2422.00	103.5 AV			1.90 V	180	71.7	31.8
5	4844.00	46.8 PK	74.0	-27.2	1.56 V	298	44.4	2.4
6	4844.00	36.9 AV	54.0	-17.1	1.56 V	298	34.5	2.4
7	7266.00	52.0 PK	74.0	-22.0	2.26 V	85	44.3	7.7
8	7266.00	41.4 AV	54.0	-12.6	2.26 V	85	33.7	7.7

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.4 PK	74.0	-17.6	1.55 H	229	24.7	31.7
2	2390.00	44.5 AV	54.0	-9.5	1.55 H	229	12.8	31.7
3	*2437.00	100.8 PK			1.55 H	229	69.0	31.8
4	*2437.00	90.9 AV			1.55 H	229	59.1	31.8
5	2483.50	58.2 PK	74.0	-15.8	1.55 H	229	26.3	31.9
6	2483.50	46.2 AV	54.0	-7.8	1.55 H	229	14.3	31.9
7	4874.00	45.2 PK	74.0	-28.8	1.29 H	120	42.7	2.5
8	4874.00	35.2 AV	54.0	-18.8	1.29 H	120	32.7	2.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.8 PK	74.0	-12.2	1.72 V	223	30.1	31.7
2	2390.00	49.4 AV	54.0	-4.6	1.72 V	223	17.7	31.7
3	*2437.00	113.8 PK			1.72 V	223	82.0	31.8
4	*2437.00	102.5 AV			1.72 V	223	70.7	31.8
5	2483.50	65.2 PK	74.0	-8.8	1.72 V	223	33.3	31.9
6	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.72 V**	**223**	**21.1**	**31.9**
7	4874.00	45.5 PK	74.0	-28.5	1.59 V	308	43.0	2.5
8	4874.00	36.2 AV	54.0	-17.8	1.59 V	308	33.7	2.5

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	99.2 PK			1.55 H	220	67.3	31.9
2	*2452.00	88.3 AV			1.55 H	220	56.4	31.9
3	2483.50	58.4 PK	74.0	-15.6	1.55 H	220	26.5	31.9
4	2483.50	45.9 AV	54.0	-8.1	1.55 H	220	14.0	31.9
5	4904.00	47.5 PK	74.0	-26.5	1.55 H	96	44.8	2.7
6	4904.00	35.7 AV	54.0	-18.3	1.55 H	96	33.0	2.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	111.8 PK			1.75 V	137	79.9	31.9
2	*2452.00	101.2 AV			1.75 V	137	69.3	31.9
3	2483.50	65.2 PK	74.0	-8.8	1.75 V	137	33.3	31.9
4	**2483.50**	**53.0 AV**	**54.0**	**-1.0**	**1.75 V**	**137**	**21.1**	**31.9**
5	4904.00	47.7 PK	74.0	-26.3	1.53 V	306	45.0	2.7
6	4904.00	36.2 AV	54.0	-17.8	1.53 V	306	33.5	2.7

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

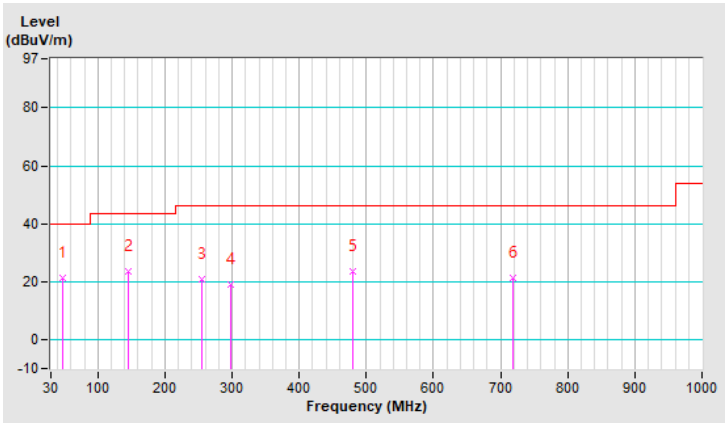
Below 1GHz worst-case data: 802.11ax (HE40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	48.28	21.2 QP	40.0	-18.8	1.99 H	283	39.4	-18.2
2	145.28	23.5 QP	43.5	-20.0	1.99 H	96	42.0	-18.5
3	254.93	20.9 QP	46.0	-25.1	1.49 H	64	40.4	-19.5
4	297.10	18.9 QP	46.0	-27.1	1.00 H	237	36.8	-17.9
5	479.86	23.7 QP	46.0	-22.3	1.99 H	71	37.2	-13.5
6	717.43	21.1 QP	46.0	-24.9	1.99 H	275	30.3	-9.2

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

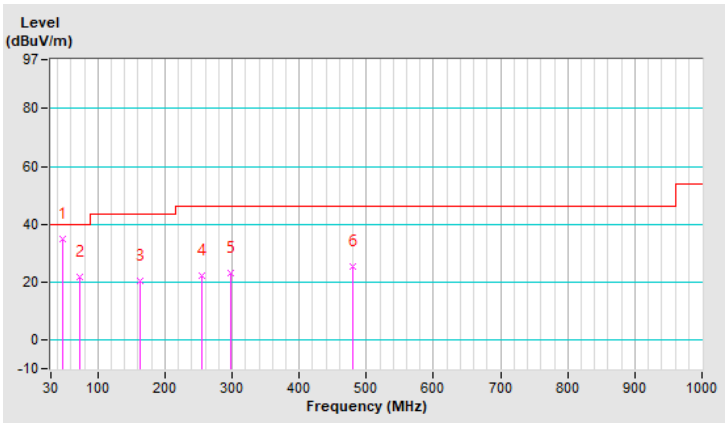


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	A

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	48.28	34.8 QP	40.0	-5.2	1.01 V	18	53.0	-18.2
2	73.58	21.6 QP	40.0	-18.4	1.01 V	310	43.1	-21.5
3	162.14	20.6 QP	43.5	-22.9	1.50 V	136	39.0	-18.4
4	254.93	22.0 QP	46.0	-24.0	1.01 V	110	41.5	-19.5
5	297.10	23.3 QP	46.0	-22.7	1.01 V	344	41.2	-17.9
6	479.86	25.5 QP	46.0	-20.5	1.01 V	282	39.0	-13.5

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

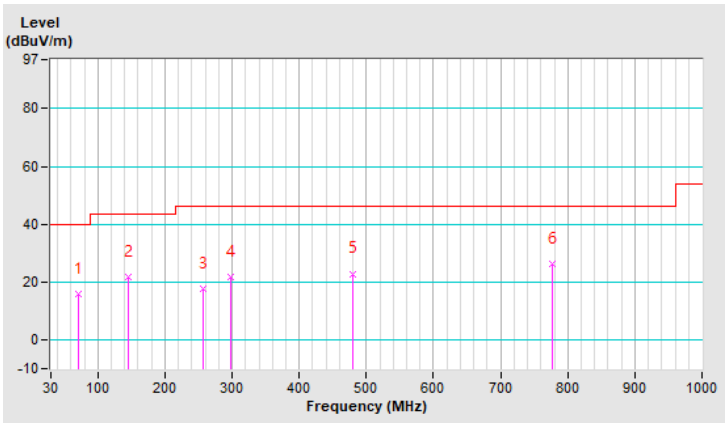


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	70.77	15.7 QP	40.0	-24.3	1.99 H	286	36.3	-20.6
2	145.28	21.7 QP	43.5	-21.8	1.99 H	68	40.2	-18.5
3	256.33	17.7 QP	46.0	-28.3	1.49 H	358	37.2	-19.5
4	297.10	21.6 QP	46.0	-24.4	1.00 H	240	39.5	-17.9
5	479.86	22.9 QP	46.0	-23.1	1.99 H	274	36.4	-13.5
6	777.88	26.1 QP	46.0	-19.9	1.49 H	208	34.1	-8.0

Remarks:

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

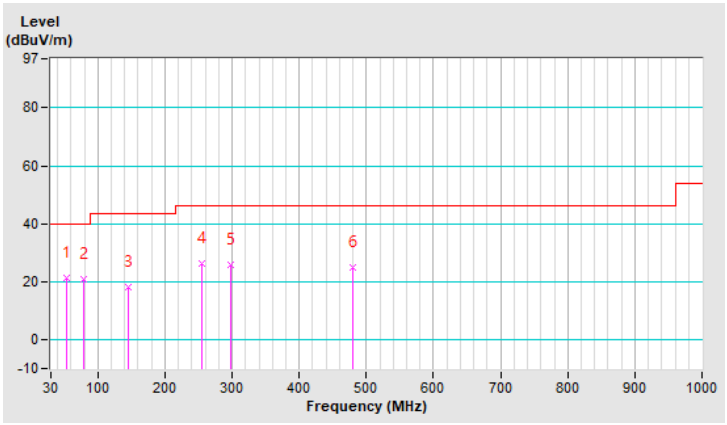


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	52.49	21.1 QP	40.0	-18.9	1.01 V	34	39.4	-18.3
2	79.20	20.7 QP	40.0	-19.3	1.01 V	124	43.6	-22.9
3	145.28	18.0 QP	43.5	-25.5	1.01 V	2	36.5	-18.5
4	254.93	26.4 QP	46.0	-19.6	1.01 V	121	45.9	-19.5
5	297.10	26.0 QP	46.0	-20.0	1.01 V	348	43.9	-17.9
6	479.86	24.8 QP	46.0	-21.2	1.01 V	173	38.3	-13.5

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 04, 2020	Dec. 03, 2021
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 16, 2021	Jan. 15, 2022
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 25, 2021	Feb. 24, 2022
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 07, 2021	Sep. 06, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

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

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.

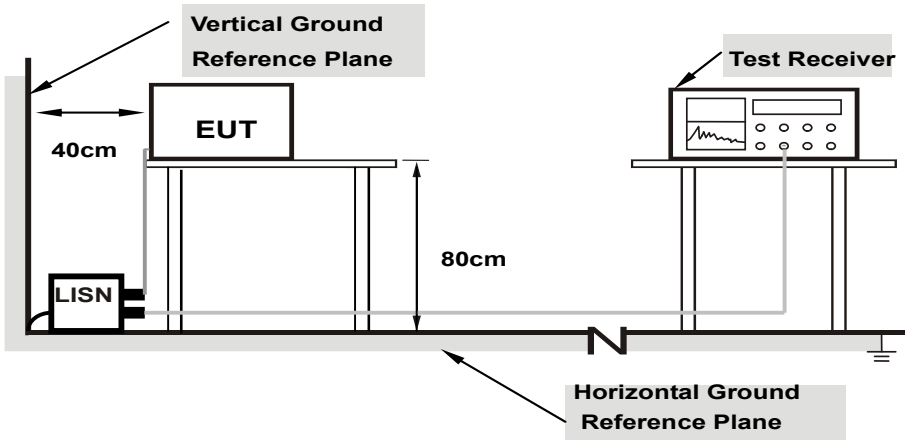
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit – 20dB) was not recorded.

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

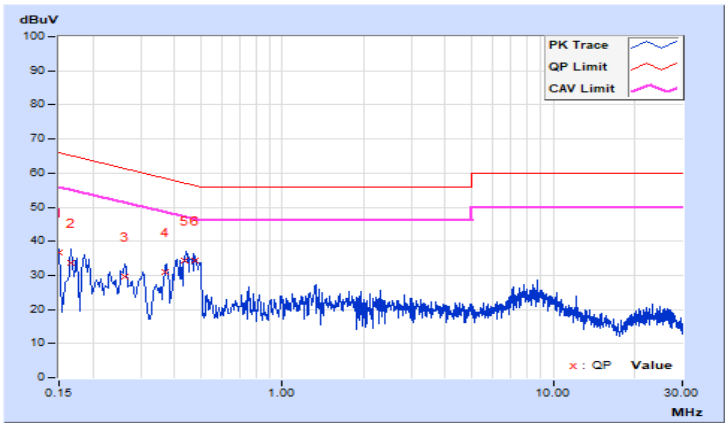
Worst-case data: 802.11ax (HE40)

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.71	27.14	13.67	36.85	23.38	66.00	56.00	-29.15	-32.62
2	0.16579	9.71	23.82	9.42	33.53	19.13	65.17	55.17	-31.64	-36.04
3	0.26083	9.72	20.03	11.37	29.75	21.09	61.40	51.40	-31.65	-30.31
4	0.36931	9.73	21.18	13.65	30.91	23.38	58.52	48.52	-27.61	-25.14
5	0.43714	9.73	24.55	18.04	34.28	27.77	57.12	47.12	-22.84	-19.35
6	0.47400	9.73	24.49	15.48	34.22	25.21	56.44	46.44	-22.22	-21.23

Remarks:

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

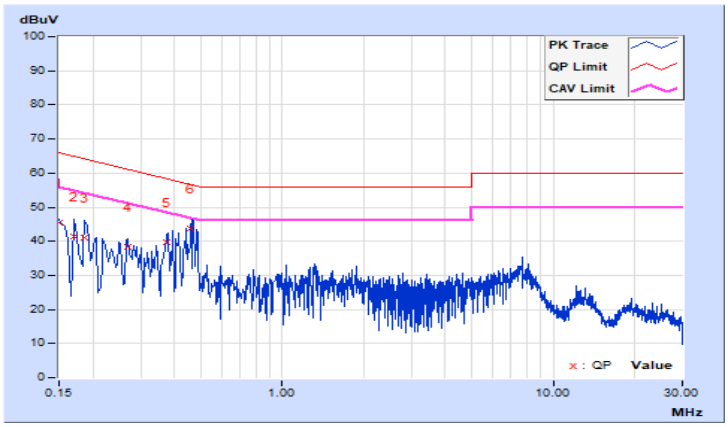


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.76	35.83	23.19	45.59	32.95	66.00	56.00	-20.41	-23.05
2	0.16932	9.77	31.63	20.92	41.40	30.69	64.99	54.99	-23.59	-24.30
3	0.18519	9.77	31.29	21.59	41.06	31.36	64.25	54.25	-23.19	-22.89
4	0.26779	9.78	28.65	17.71	38.43	27.49	61.19	51.19	-22.76	-23.70
5	0.37224	9.79	29.84	24.45	39.63	34.24	58.45	48.45	-18.82	-14.21
6	0.45716	9.79	33.94	15.98	43.73	25.77	56.74	46.74	-13.01	-20.97

Remarks:

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

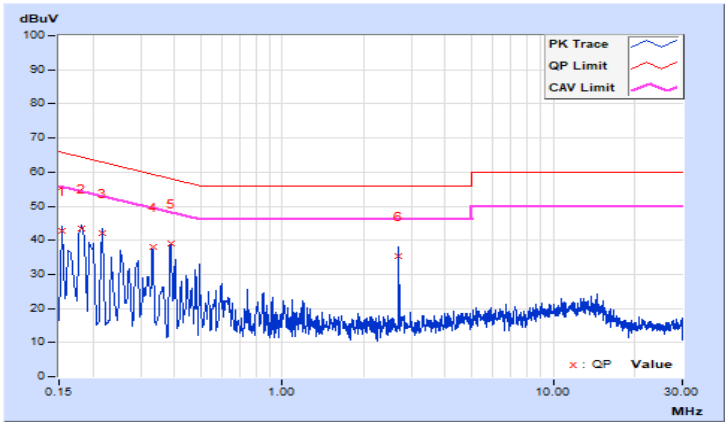


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.71	33.15	18.85	42.86	28.56	65.78	55.78	-22.92	-27.22
2	0.18180	9.71	33.65	18.72	43.36	28.43	64.40	54.40	-21.04	-25.97
3	0.21800	9.71	32.21	12.91	41.92	22.62	62.89	52.89	-20.97	-30.27
4	0.33237	9.72	28.48	11.84	38.20	21.56	59.39	49.39	-21.19	-27.83
5	0.38827	9.73	29.36	15.93	39.09	25.66	58.10	48.10	-19.01	-22.44
6	2.69800	9.78	25.43	6.22	35.21	16.00	56.00	46.00	-20.79	-30.00

Remarks:

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

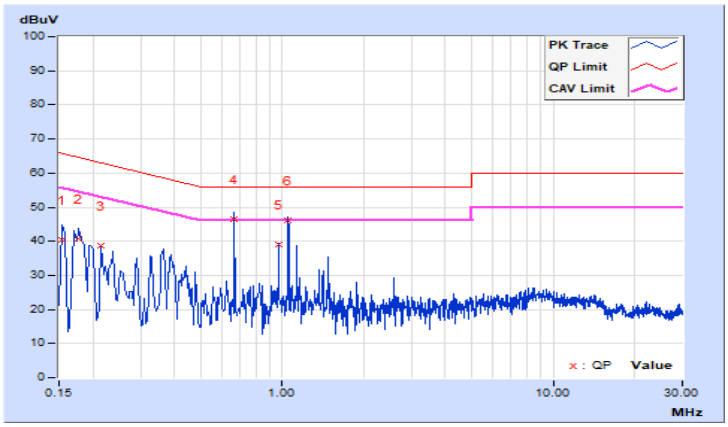


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.77	30.48	18.30	40.25	28.07	65.78	55.78	-25.53	-27.71
2	0.17800	9.77	31.06	17.80	40.83	27.57	64.58	54.58	-23.75	-27.01
3	0.21400	9.77	28.89	13.15	38.66	22.92	63.05	53.05	-24.39	-30.13
4	**0.66600**	**9.80**	**36.74**	**20.25**	**46.54**	**30.05**	**56.00**	**46.00**	**-9.46**	**-15.95**
5	0.97000	9.82	29.17	12.28	38.99	22.10	56.00	46.00	-17.01	-23.90
6	1.05400	9.82	36.32	23.57	46.14	33.39	56.00	46.00	-9.86	-12.61

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.

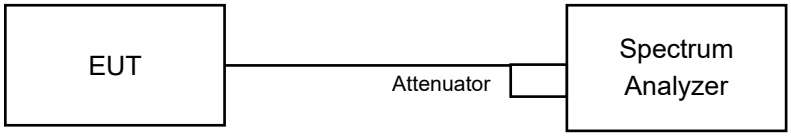


4.3 6dB Bandwidth Measurement

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

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	8.11	7.15	0.5	Pass
6	2437	7.63	7.60	0.5	Pass
11	2462	7.62	8.06	0.5	Pass

802.11g

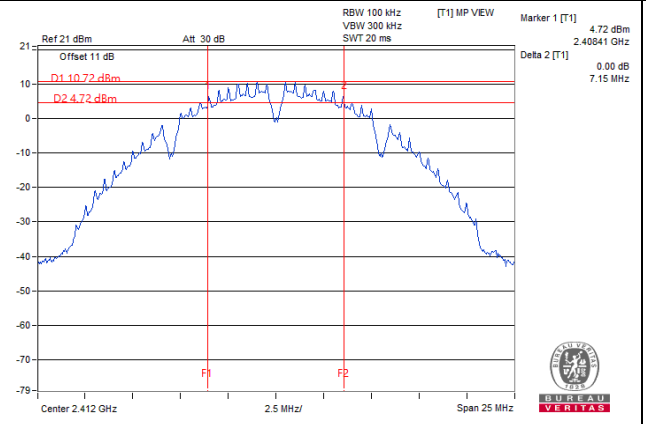
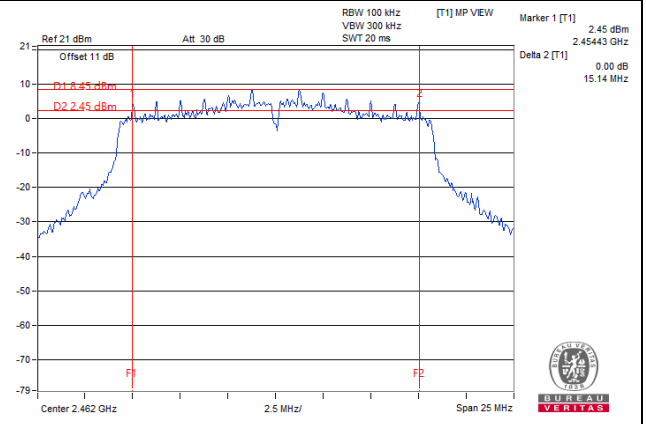
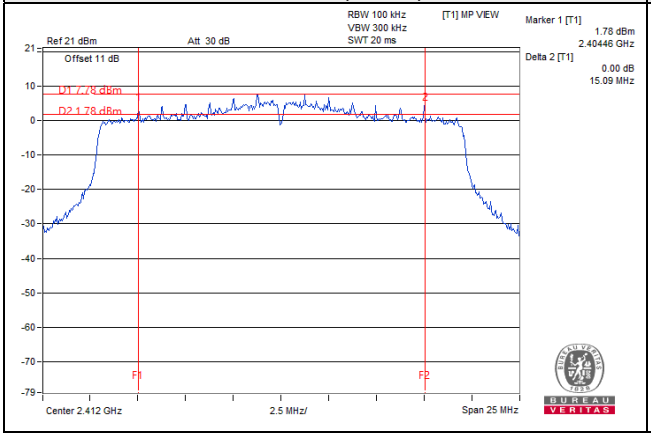
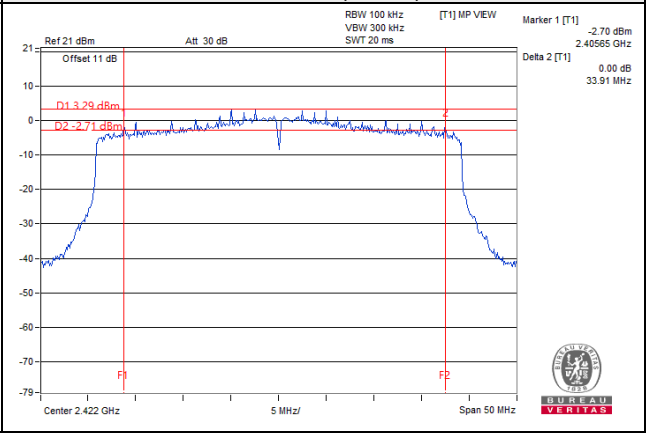
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.15	15.16	0.5	Pass
6	2437	15.15	15.15	0.5	Pass
11	2462	15.14	15.15	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.17	15.09	0.5	Pass
6	2437	15.38	15.13	0.5	Pass
11	2462	15.13	15.14	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.27	33.91	0.5	Pass
6	2437	35.07	35.11	0.5	Pass
9	2452	35.23	35.16	0.5	Pass

Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11ax (HE20)	802.11ax (HE40)
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

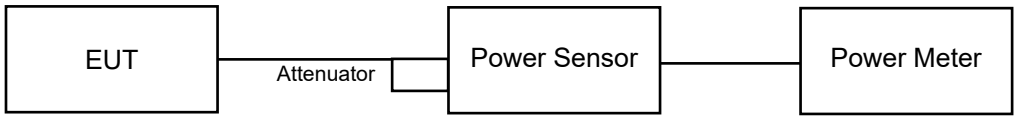
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as item 4.3.6.

4.4.7 Test Results

CDD Mode

802.11b

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	18.72	18.44	144.296	21.59	30	Pass
6	2437	18.63	18.58	145.056	21.62	30	Pass
11	2462	19.51	19.43	177.031	22.48	30	Pass

802.11g

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.81	18.03	123.928	20.93	30	Pass
6	2437	20.41	20.28	216.560	23.36	30	Pass
11	2462	17.92	17.88	123.320	20.91	30	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	16.66	16.82	94.429	19.75	30	Pass
6	2437	19.66	19.59	183.461	22.64	30	Pass
11	2462	15.62	15.73	73.886	18.69	30	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	15.66	15.61	73.204	18.65	30	Pass
6	2437	16.23	16.11	82.808	19.18	30	Pass
9	2452	13.62	13.55	45.661	16.60	30	Pass

Beamforming Mode

802.11ax (HE20)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	16.66	16.82	94.429	19.75	29.09	Pass
6	2437	19.66	19.59	183.461	22.64	29.09	Pass
11	2462	15.62	15.73	73.886	18.69	29.09	Pass

Note: Beamforming Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.91dBi dBi > 6dBi, so the power limit shall be reduced to 30-(6.91-6) = 29.09dBm.

802.11ax (HE40)

Channel	Frequency (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	15.66	15.61	73.204	18.65	29.09	Pass
6	2437	16.23	16.11	82.808	19.18	29.09	Pass
9	2452	13.62	13.55	45.661	16.60	29.09	Pass

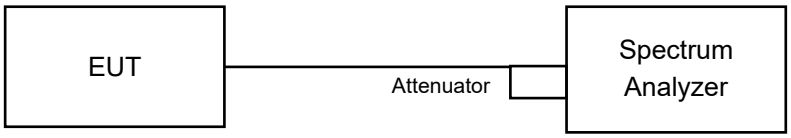
Note: Beamforming Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.91dBi dBi > 6dBi, so the power limit shall be reduced to 30-(6.91-6) = 29.09dBm.

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 band during any time interval of continuous transmission.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For Average Power (Duty cycle < 98%)
a) Measure the duty cycle (x).
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to “free run”.
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as item 4.3.6.

4.5.7 Test Results

802.11b

TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-19.41	3.01	2.47	-13.93	7.09	Pass
	6	2437	-19.99	3.01	2.47	-14.51	7.09	Pass
	11	2462	-19.63	3.01	2.47	-14.15	7.09	Pass
1	1	2412	-20.21	3.01	2.47	-14.73	7.09	Pass
	6	2437	-20.00	3.01	2.47	-14.52	7.09	Pass
	11	2462	-18.45	3.01	2.47	-12.97	7.09	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional Gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.91dBi > 6dBi, so the power density limit shall be reduced to 8 - (6.91 - 6) = 7.09dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11g

TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-16.00	3.01	0.27	-12.72	7.09	Pass
	6	2437	-13.65	3.01	0.27	-10.37	7.09	Pass
	11	2462	-17.50	3.01	0.27	-14.22	7.09	Pass
1	1	2412	-15.87	3.01	0.27	-12.59	7.09	Pass
	6	2437	-14.20	3.01	0.27	-10.92	7.09	Pass
	11	2462	-16.82	3.01	0.27	-13.54	7.09	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional Gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.91dBi > 6dBi, so the power density limit shall be reduced to 8 - (6.91 - 6) = 7.09dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

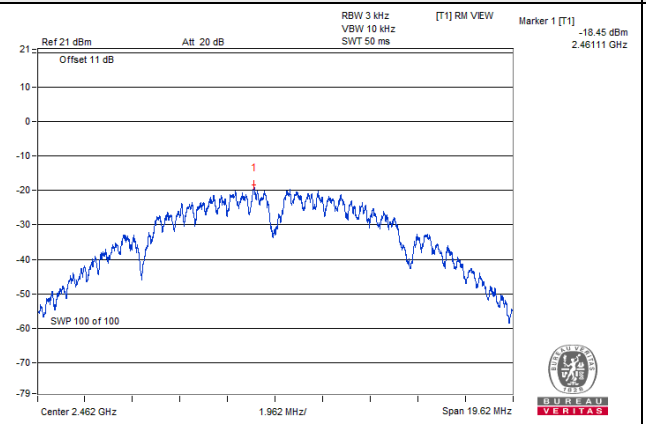
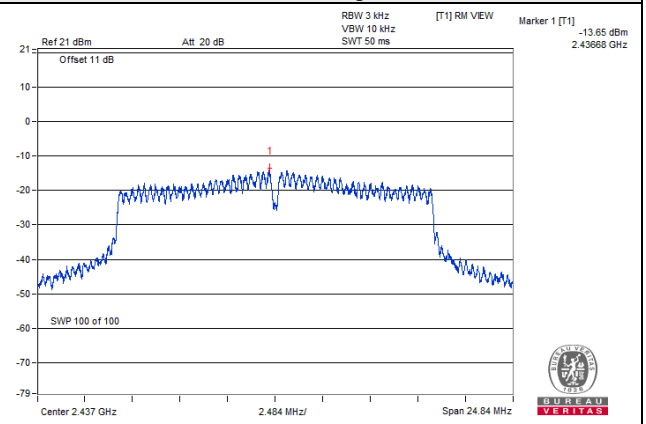
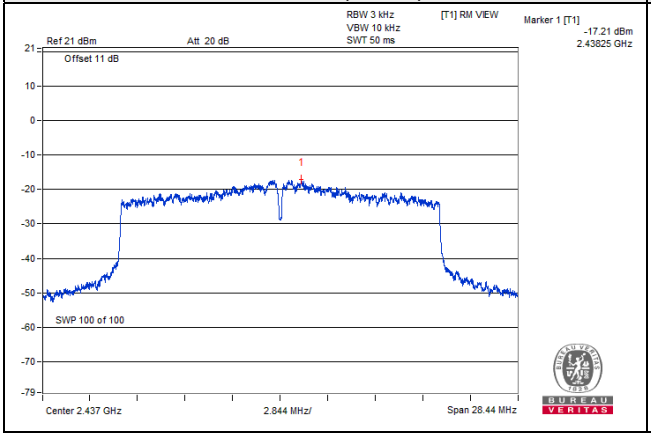
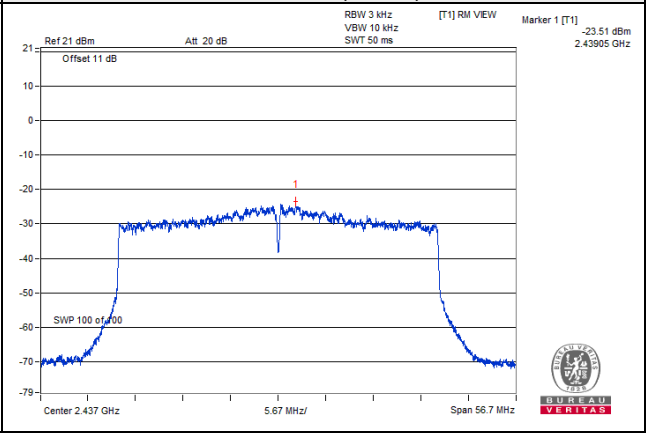
TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-20.42	3.01	0.38	-17.03	7.09	Pass
	6	2437	-17.21	3.01	0.38	-13.82	7.09	Pass
	11	2462	-20.85	3.01	0.38	-17.46	7.09	Pass
1	1	2412	-19.82	3.01	0.38	-16.43	7.09	Pass
	6	2437	-17.22	3.01	0.38	-13.83	7.09	Pass
	11	2462	-20.59	3.01	0.38	-17.20	7.09	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional Gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.91dBi > 6dBi, so the power density limit shall be reduced to 8 - (6.91 - 6) = 7.09dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

TX chain	Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/3kHz)	10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-24.02	3.01	0.40	-20.61	7.09	Pass
	6	2437	-24.01	3.01	0.40	-20.60	7.09	Pass
	9	2452	-26.08	3.01	0.40	-22.67	7.09	Pass
1	3	2422	-24.27	3.01	0.40	-20.86	7.09	Pass
	6	2437	-23.51	3.01	0.40	-20.10	7.09	Pass
	9	2452	-25.98	3.01	0.40	-22.57	7.09	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional Gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/2$] = 6.91dBi > 6dBi, so the power density limit shall be reduced to 8 - (6.91 - 6) = 7.09dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

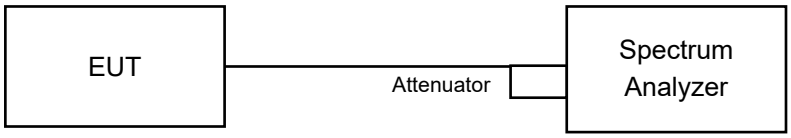
Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11ax (HE20)	802.11ax (HE40)
	

4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

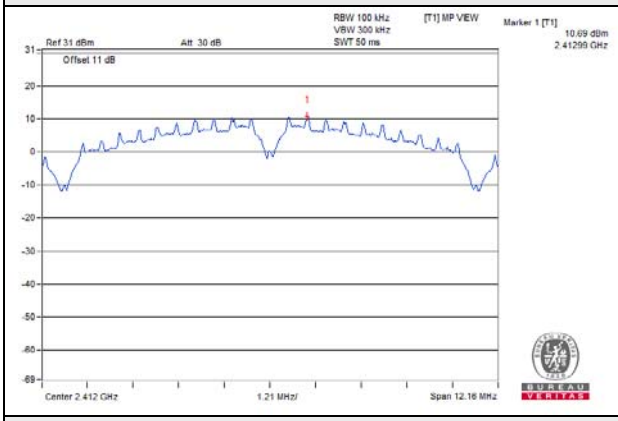
Same as item 4.3.6.

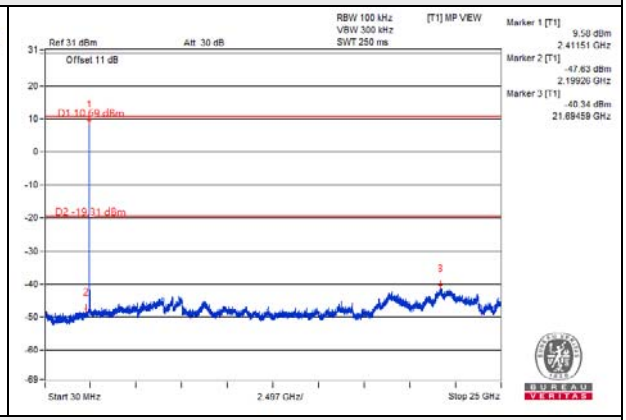
4.6.7 Test Results

The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

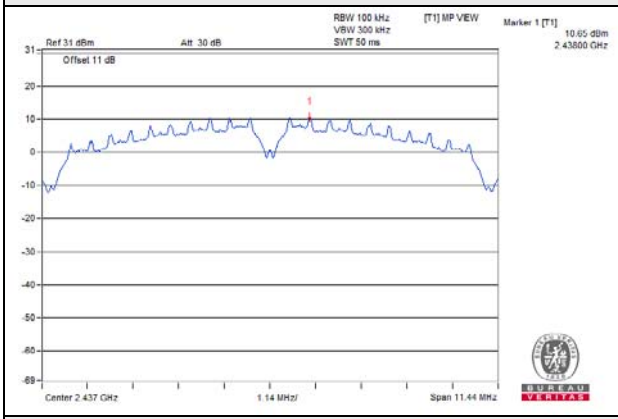
802.11b_Chain 0

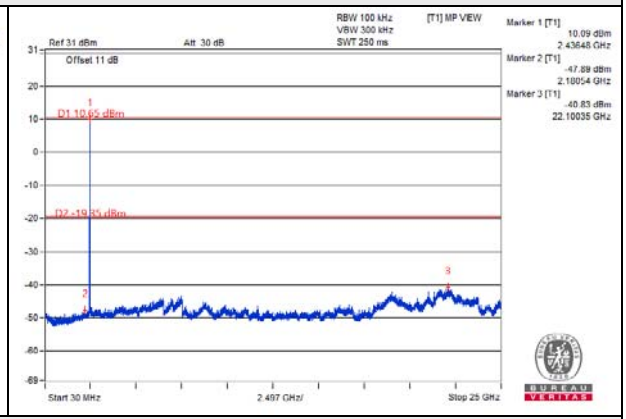
CH 1



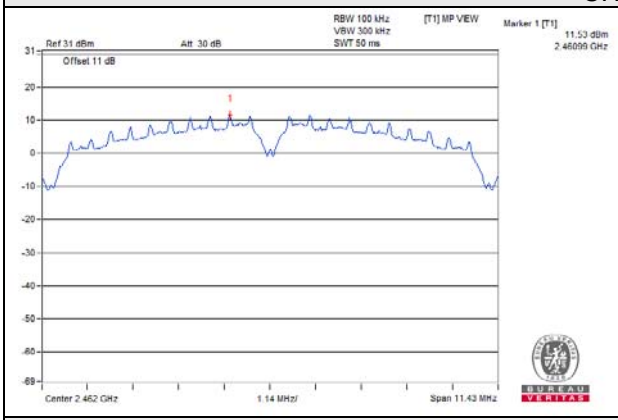


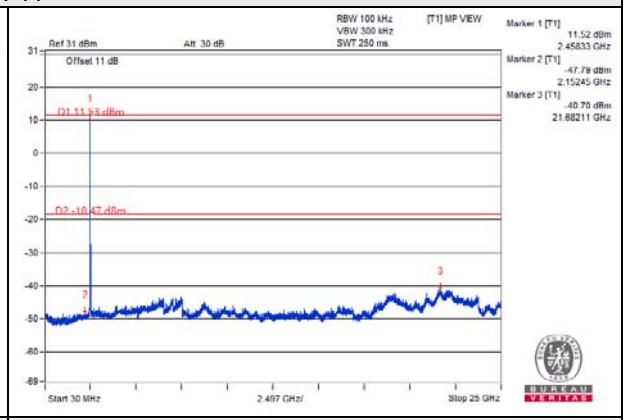
CH 6



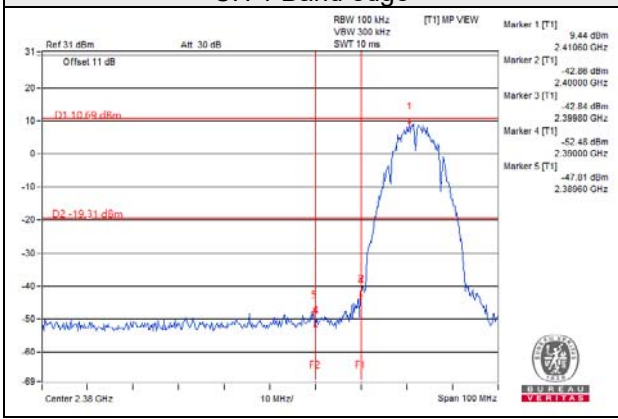


CH 11

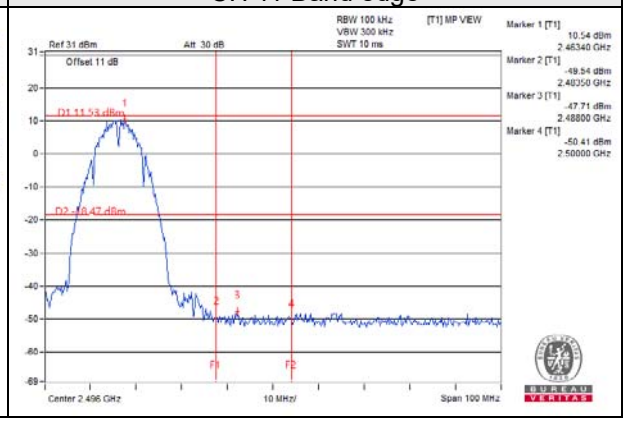




CH 1 Band edge

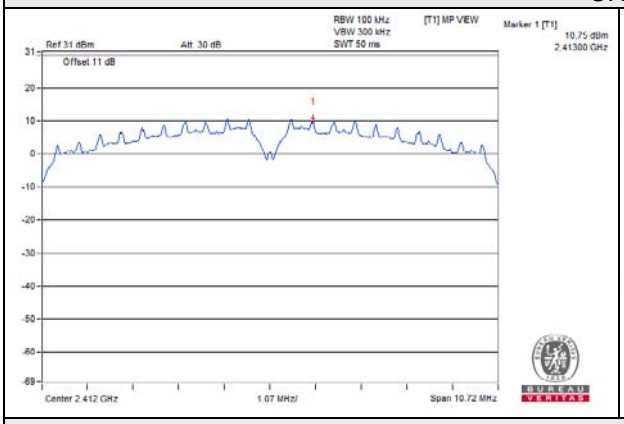


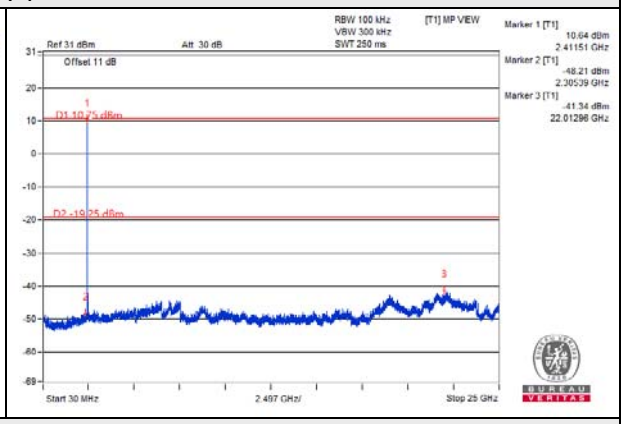
CH 11 Band edge



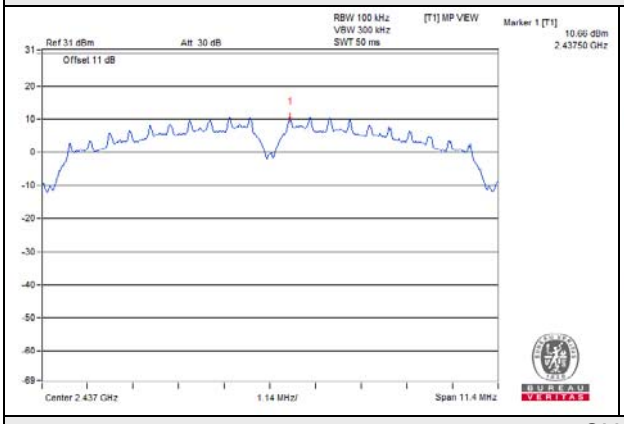
802.11b_Chain 1

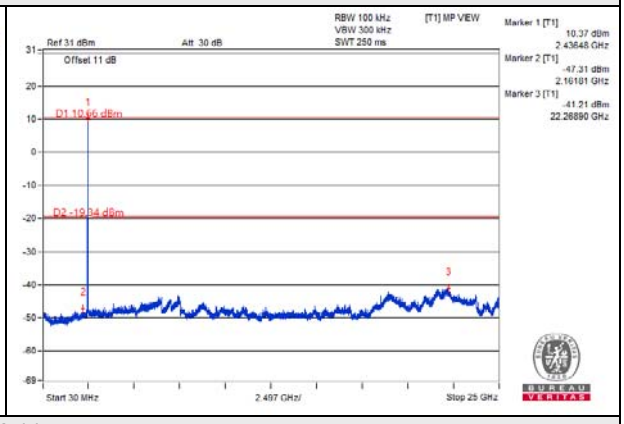
CH 1



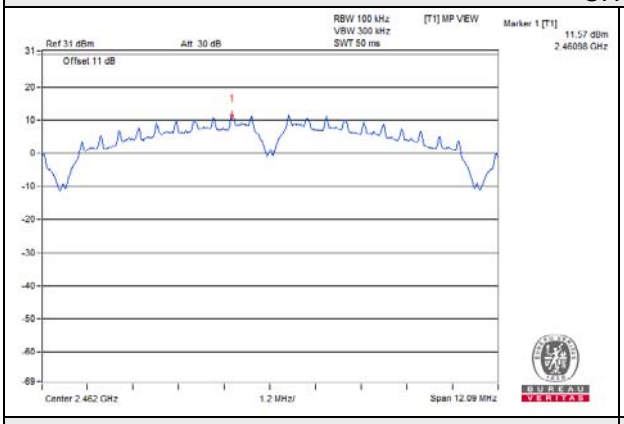


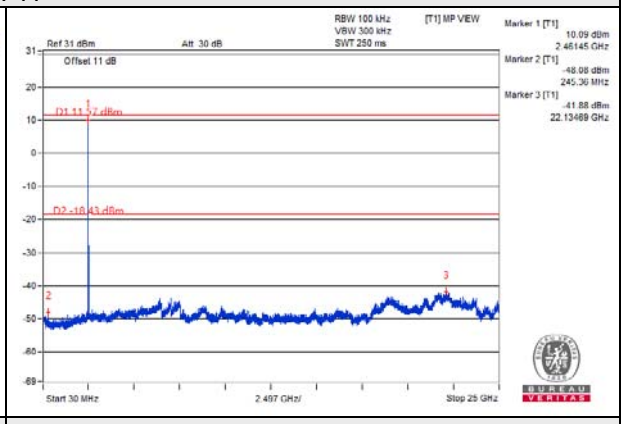
CH 6



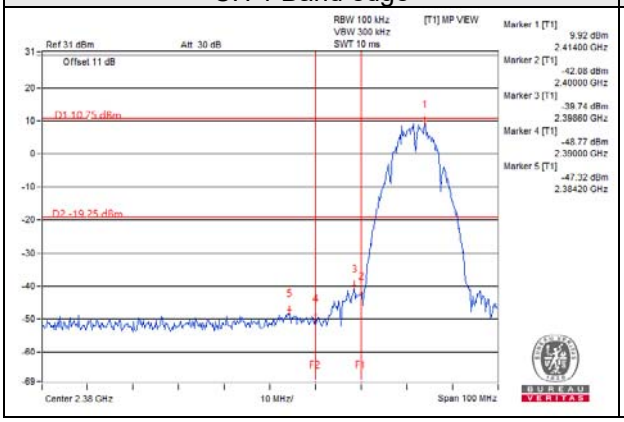


CH 11

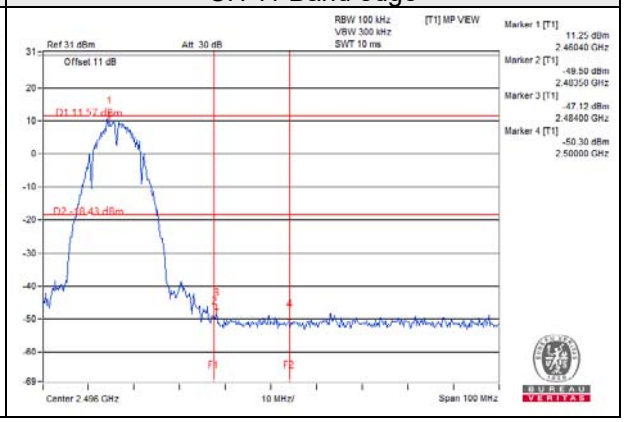




CH 1 Band edge

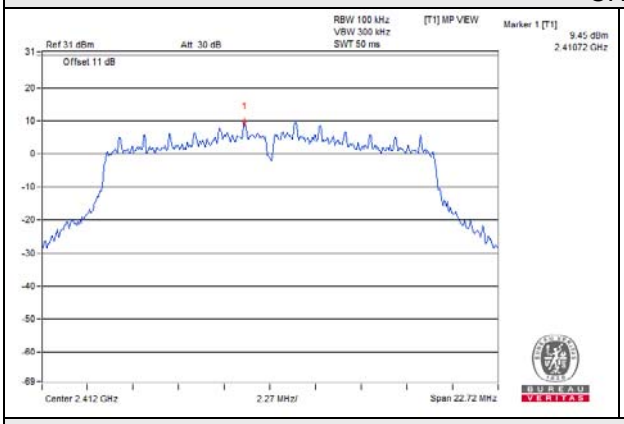


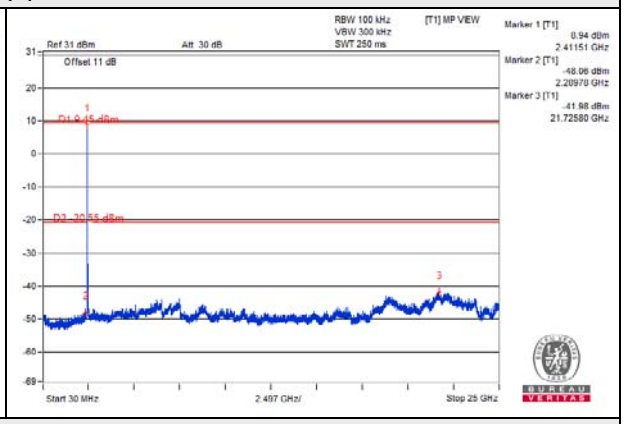
CH 11 Band edge



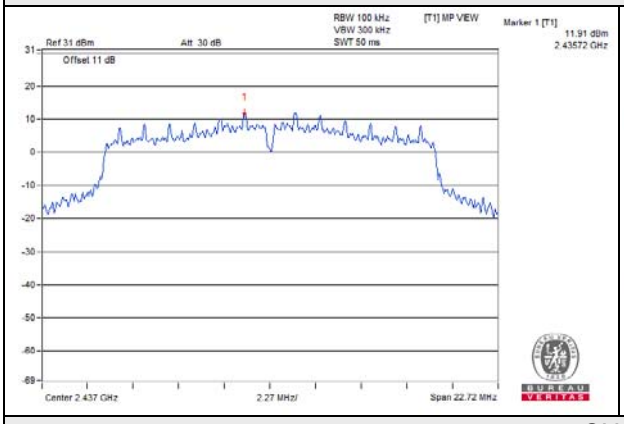
802.11g_Chain 0

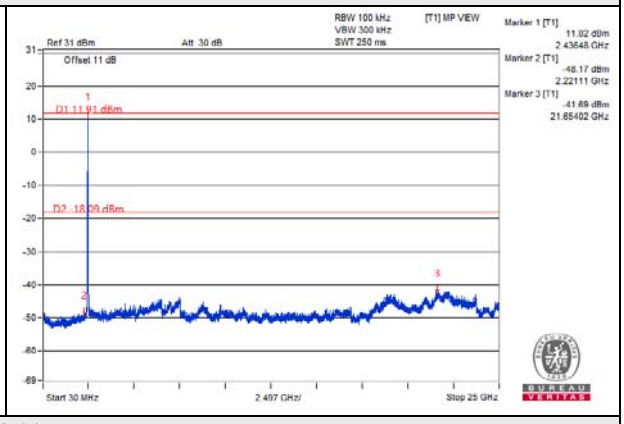
CH 1



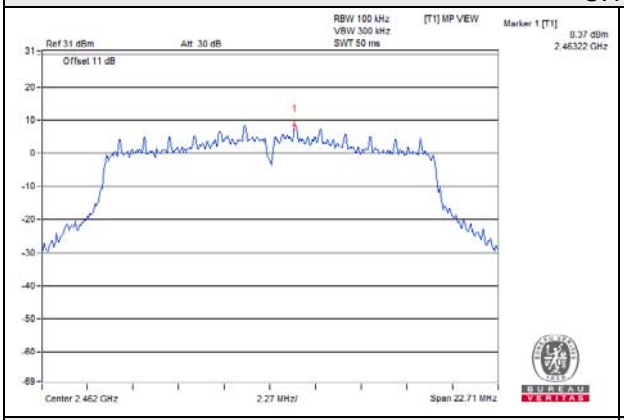


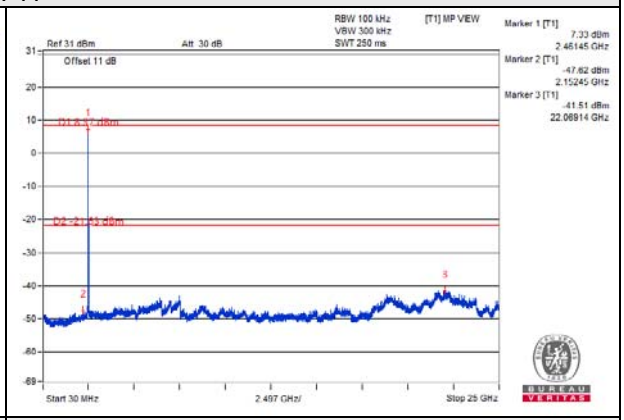
CH 6



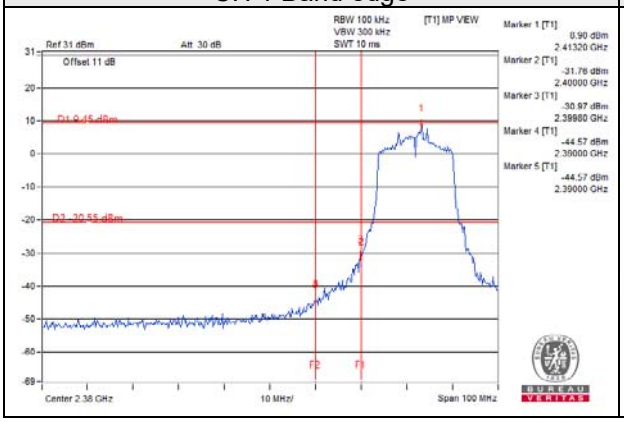


CH 11

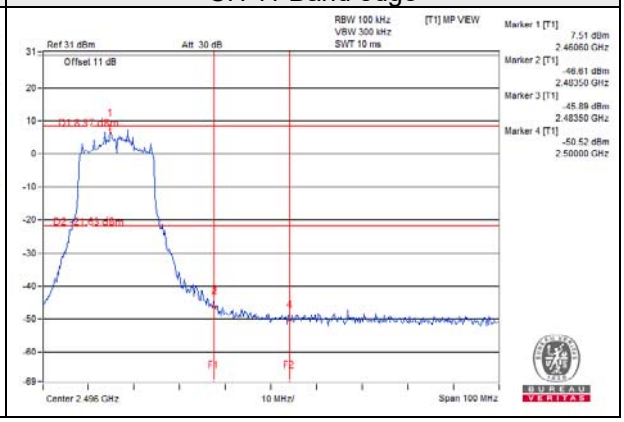




CH 1 Band edge

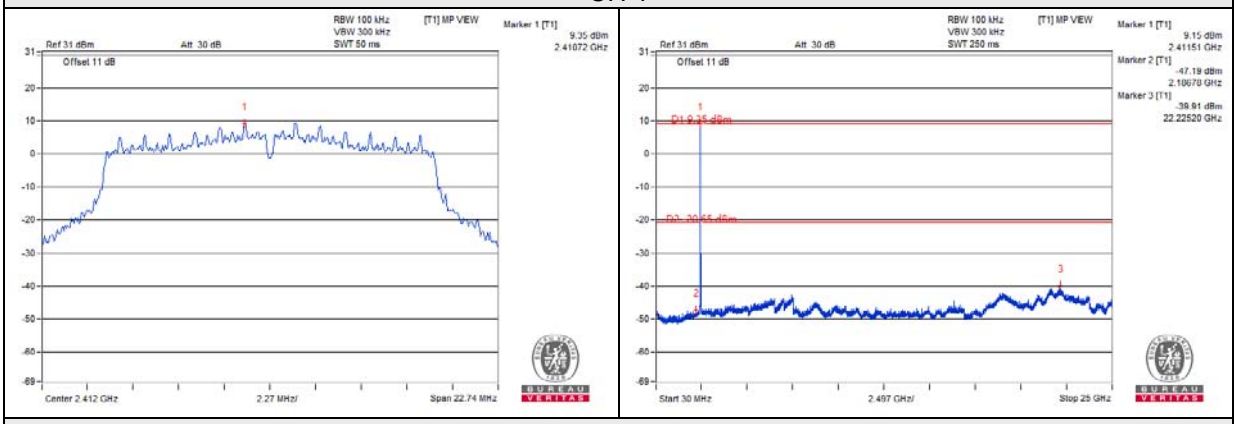


CH 11 Band edge

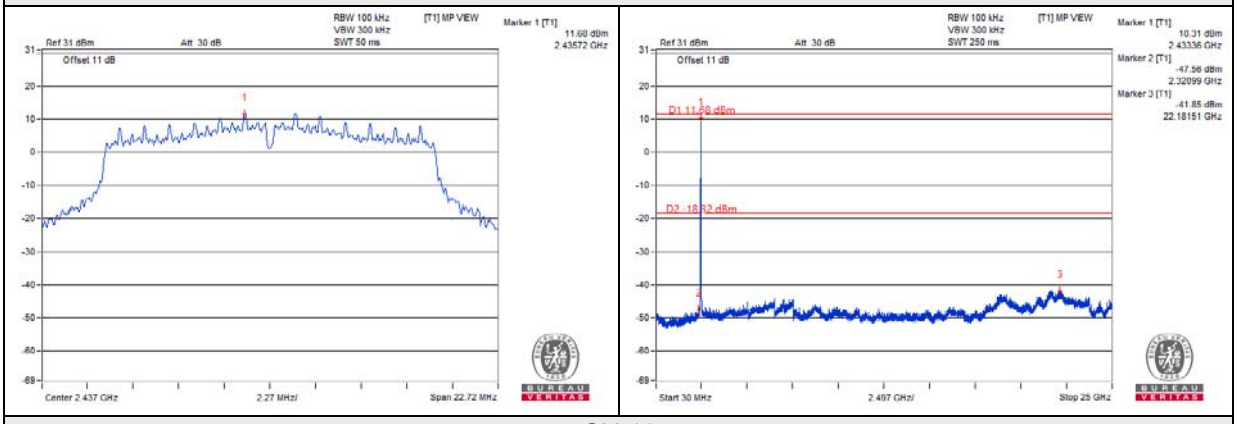


802.11g_Chain 1

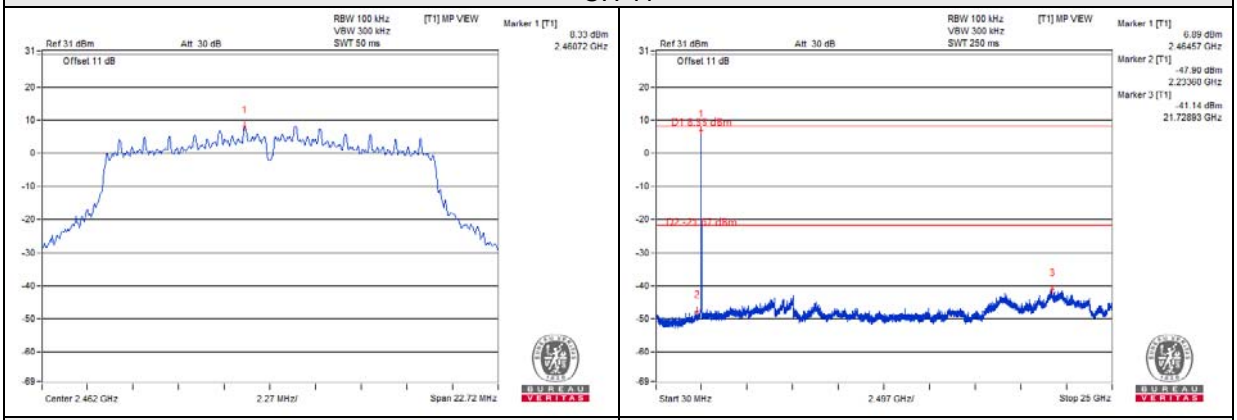
CH 1



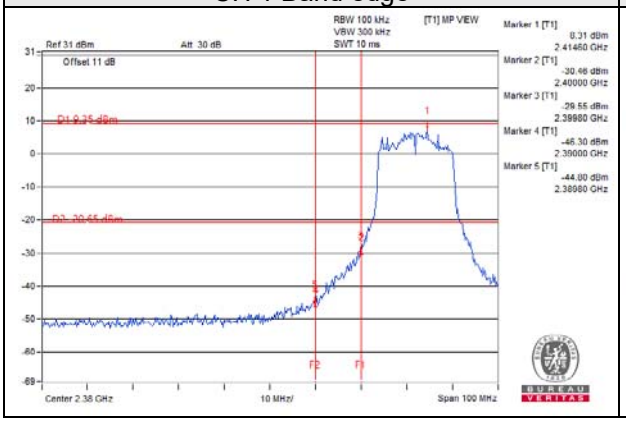
CH 6



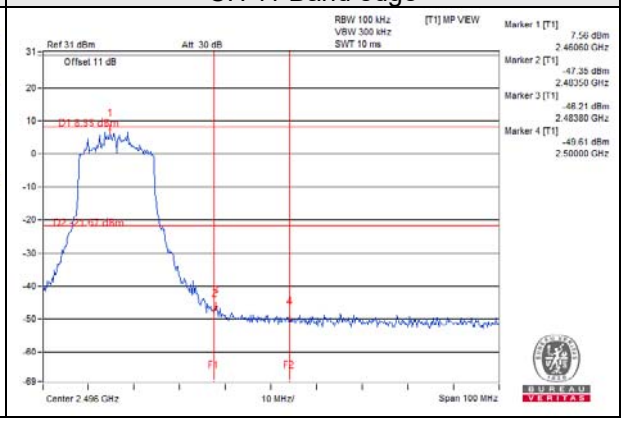
CH 11



CH 1 Band edge

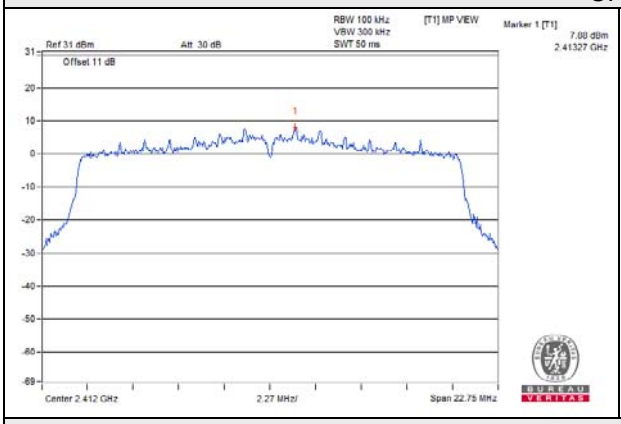


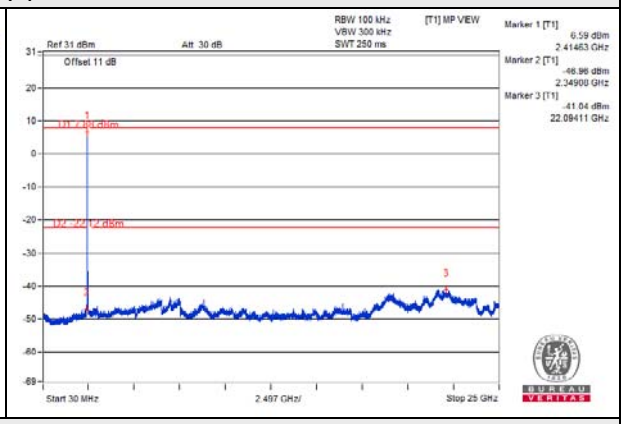
CH 11 Band edge



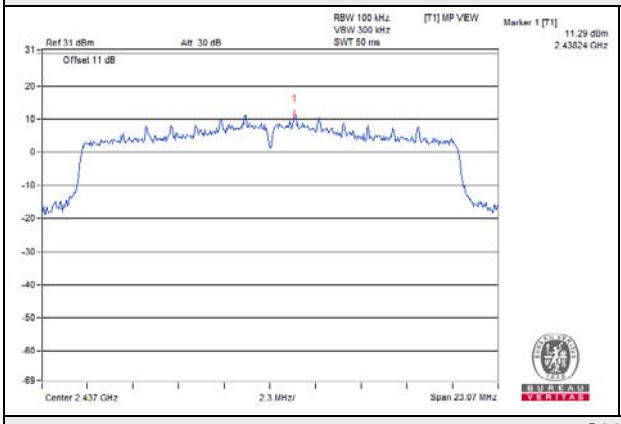
802.11ax (HE20)_Chain 0

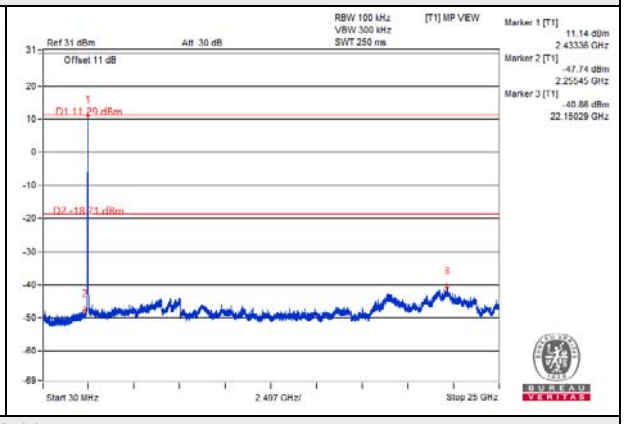
CH 1



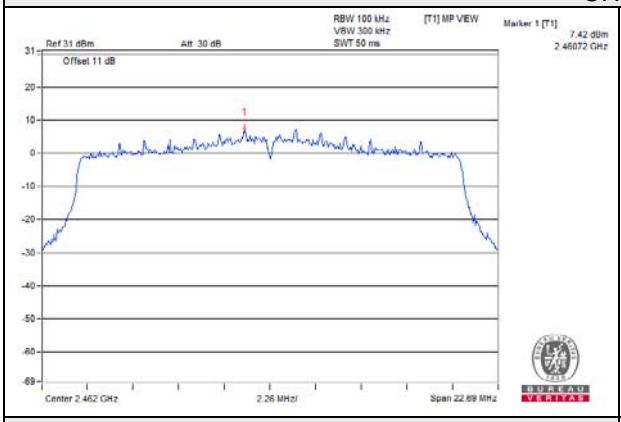


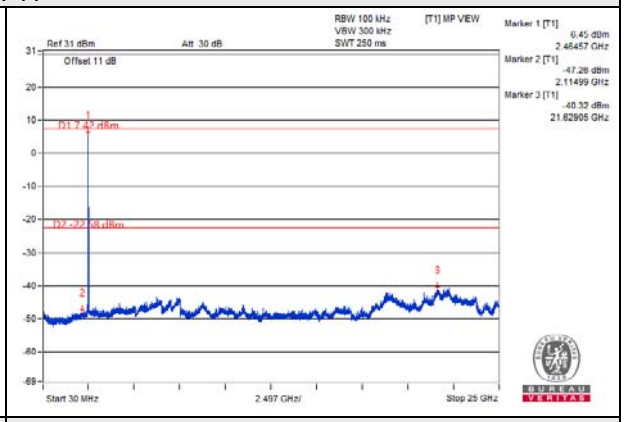
CH 6



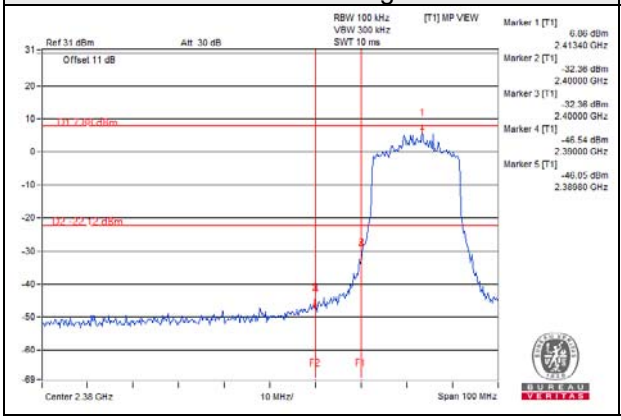


CH 11

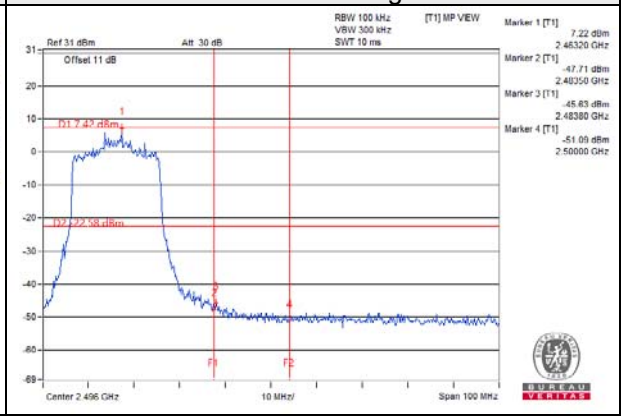




CH 1 Band edge

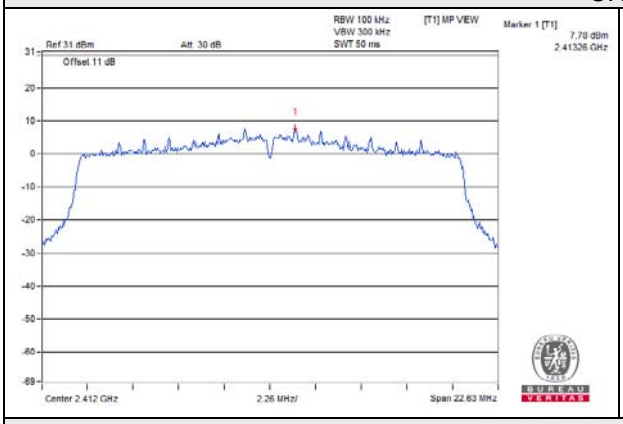


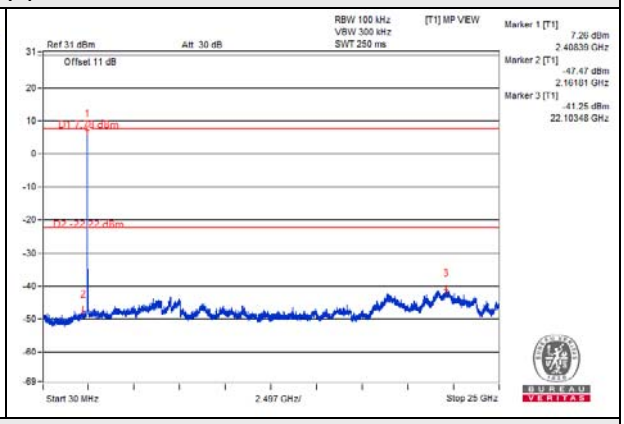
CH 11 Band edge



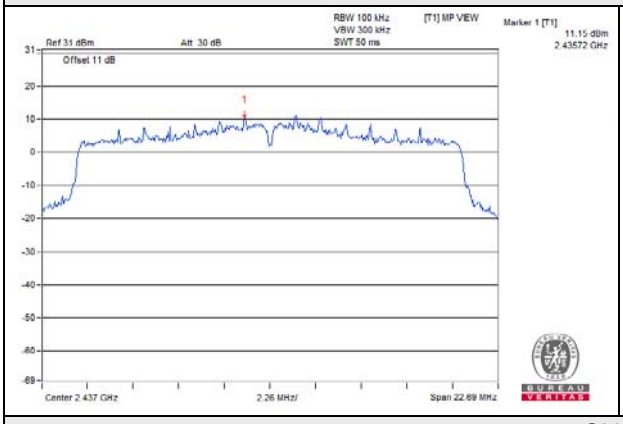
802.11ax (HE20)_Chain 1

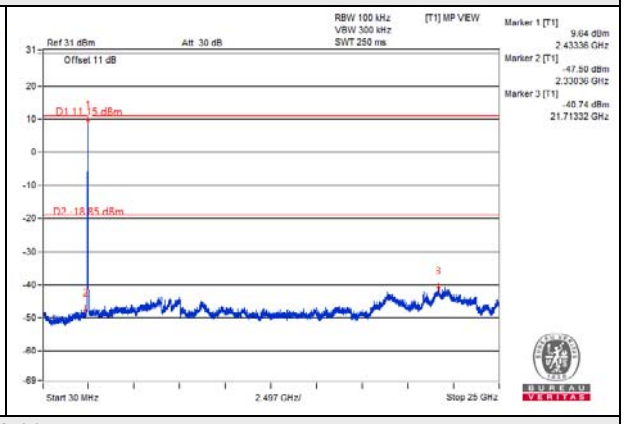
CH 1



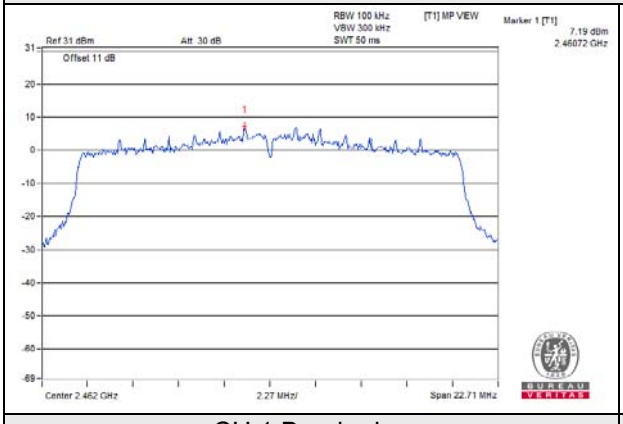


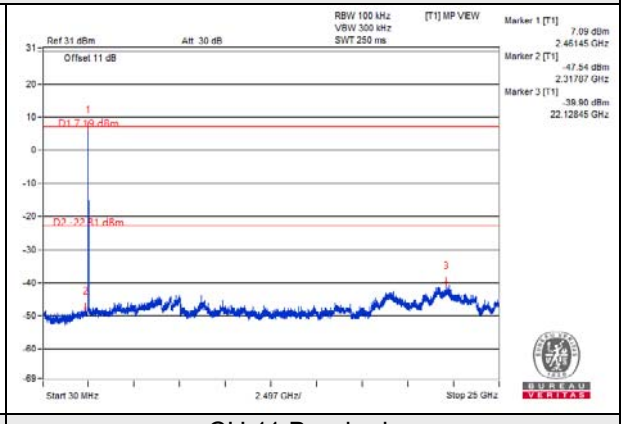
CH 6



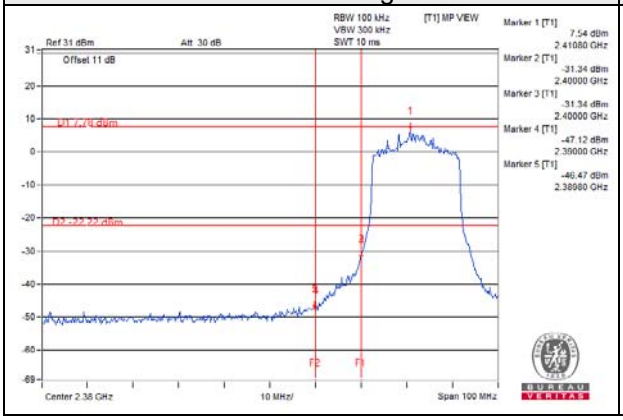


CH 11

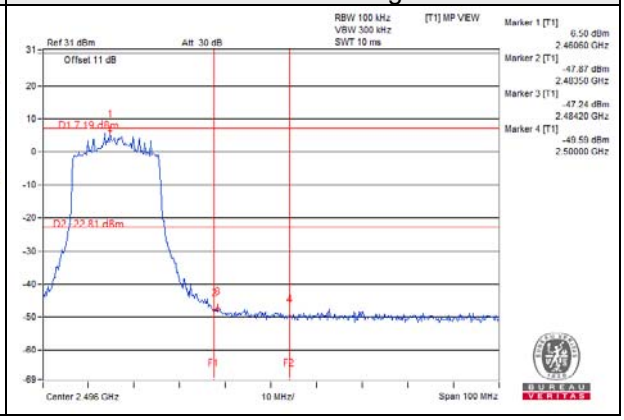




CH 1 Band edge

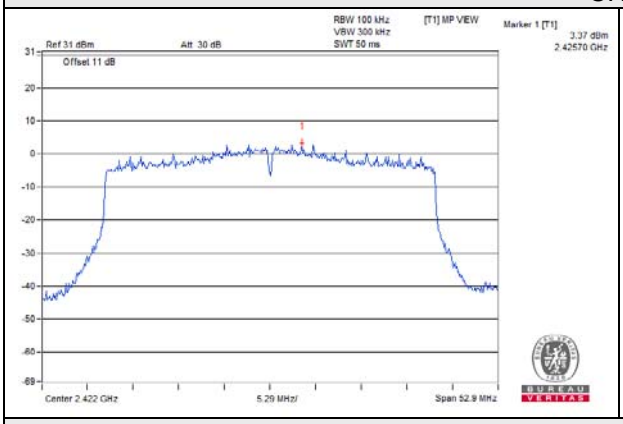


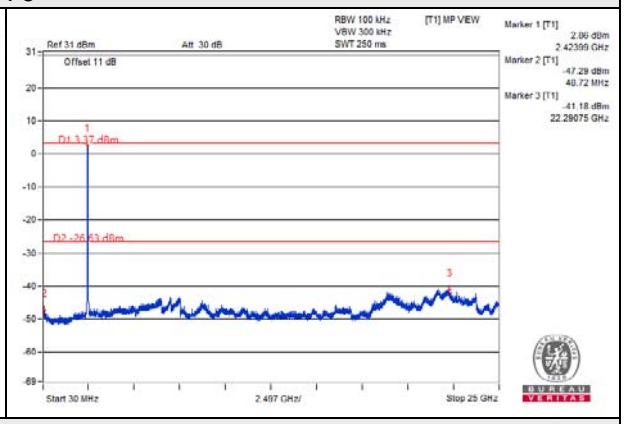
CH 11 Band edge



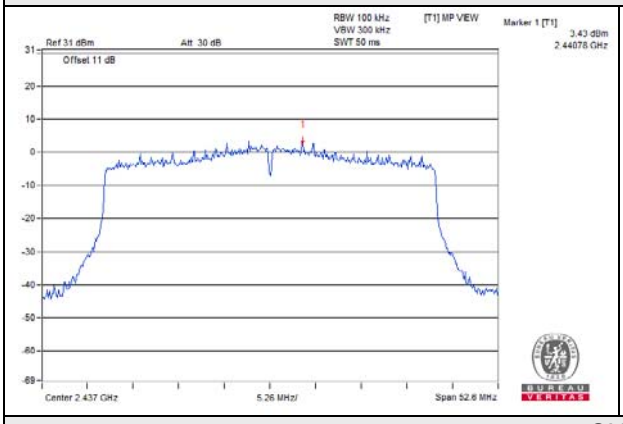
802.11ax (HE40)_Chain 0

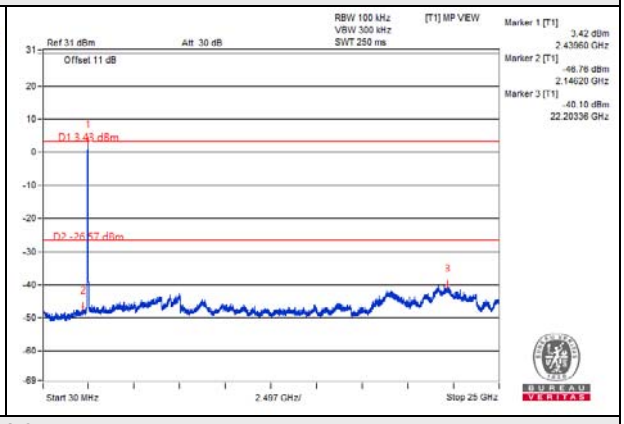
CH 3



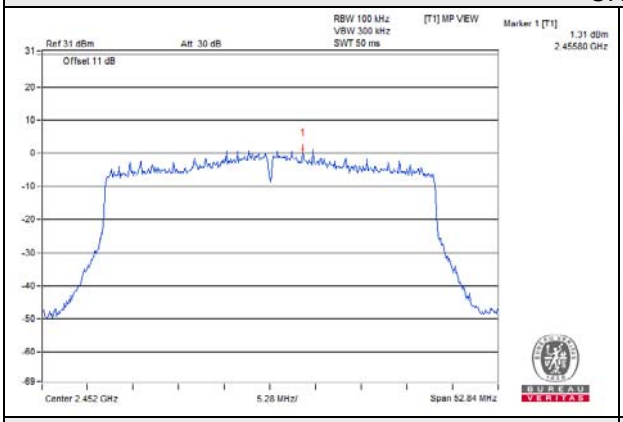


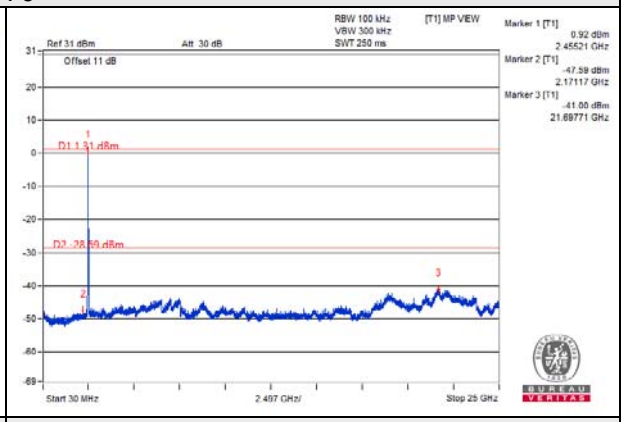
CH 6



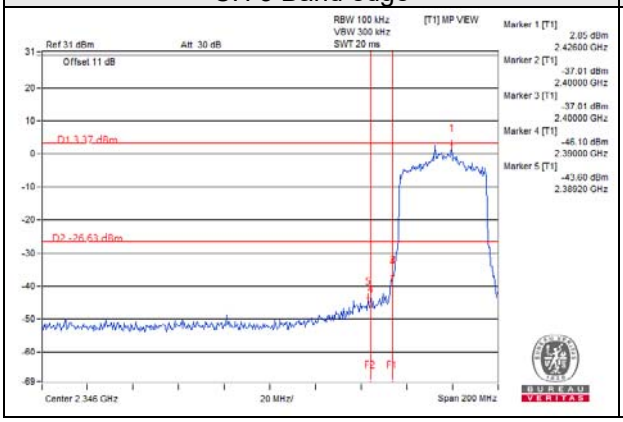


CH 9

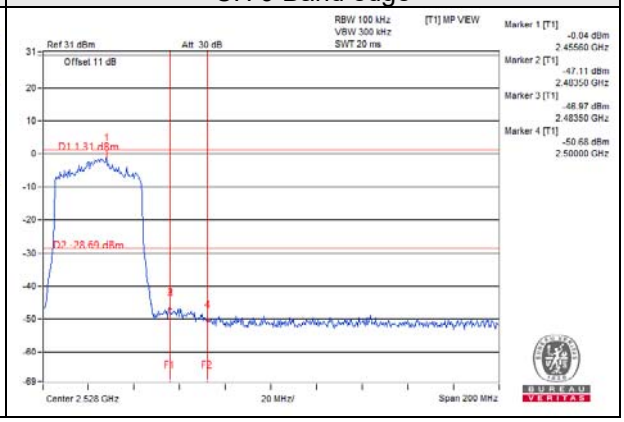




CH 3 Band edge

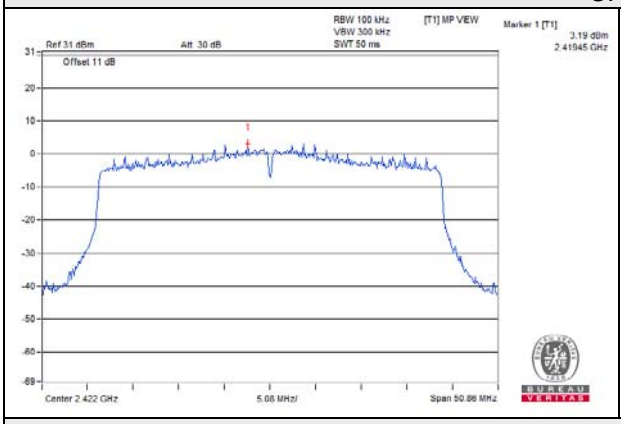


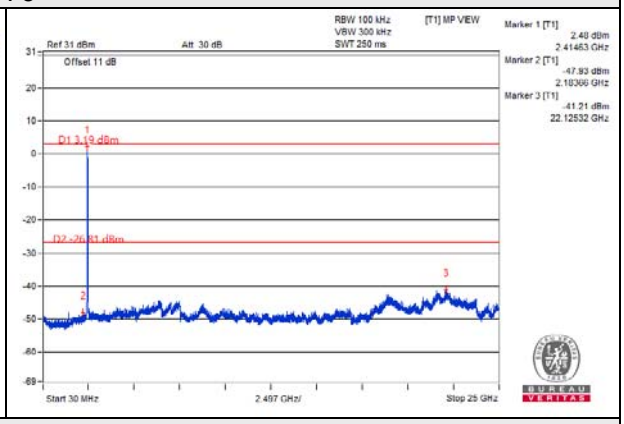
CH 9 Band edge



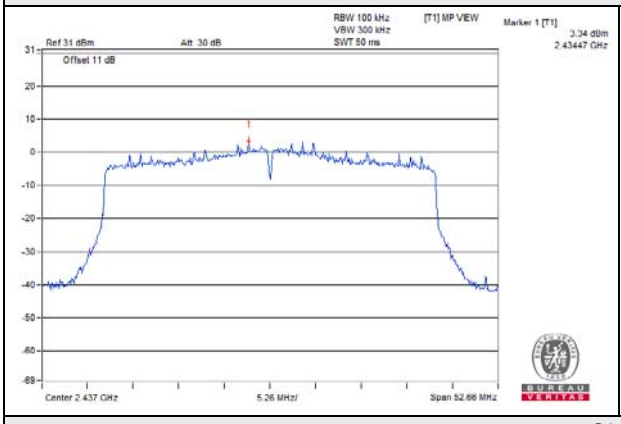
802.11ax (HE40)_Chain 1

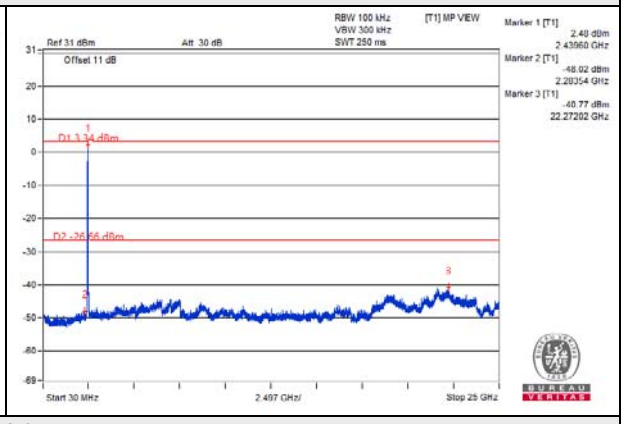
CH 3



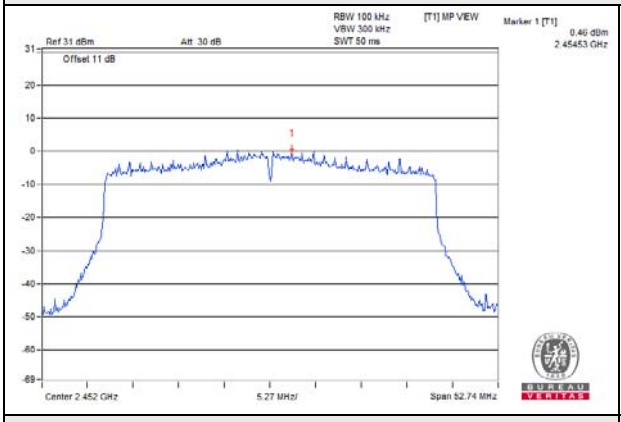


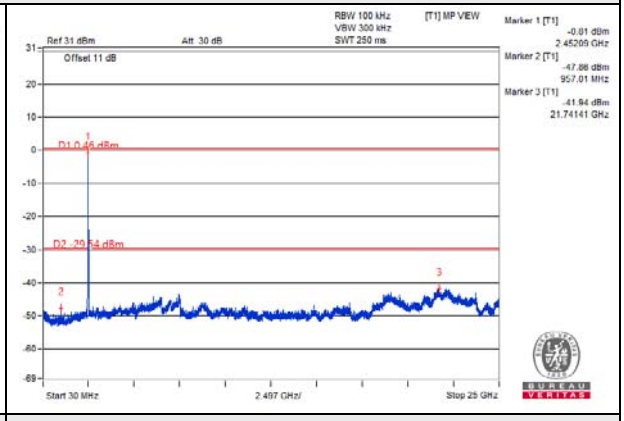
CH 6



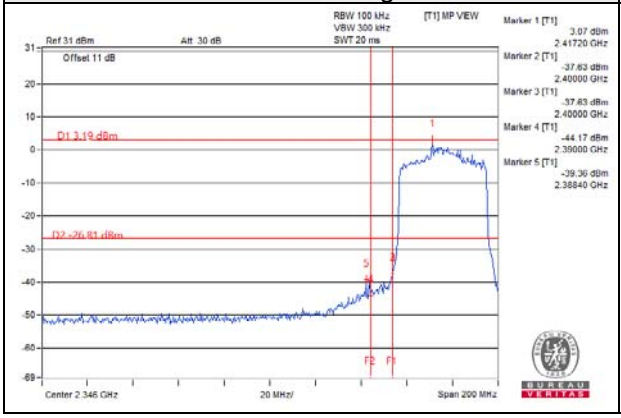


CH 9

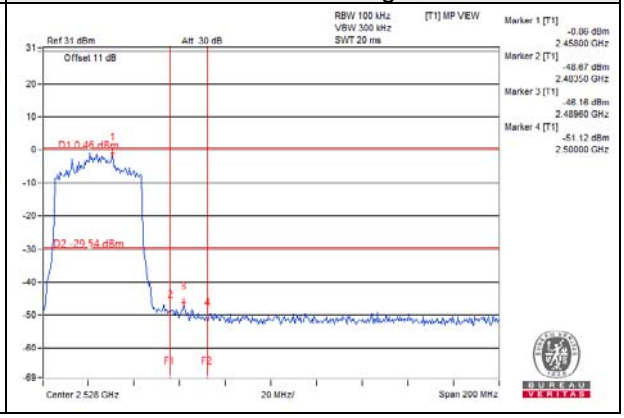




CH 3 Band edge



CH 9 Band edge



5 Pictures of Test Arrangements

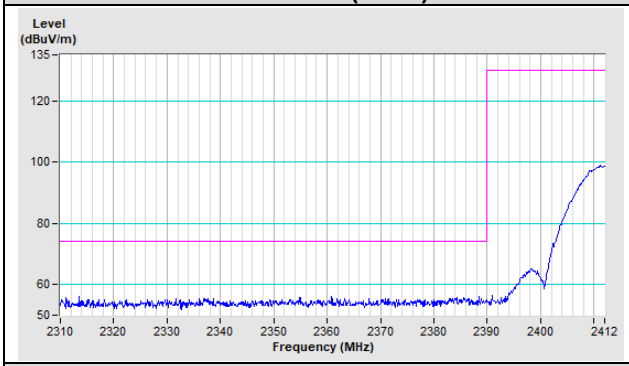
Please refer to the attached file (Test Setup Photo).

Annex A- Band Edge Measurement

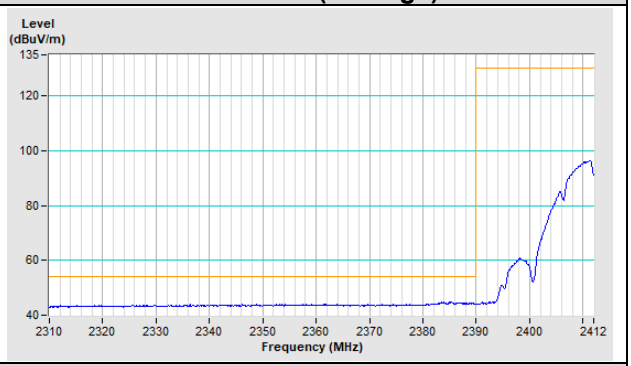
802.11b

Channel 1

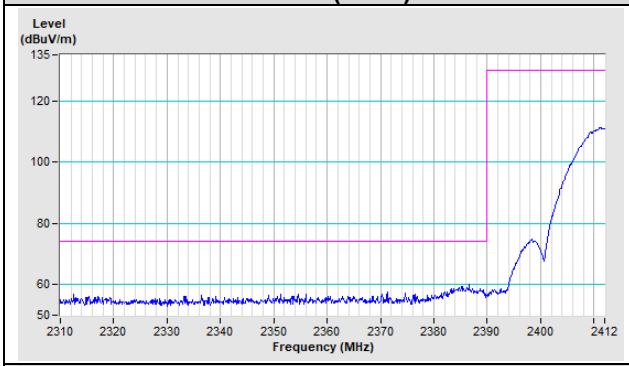
Horizontal (Peak)



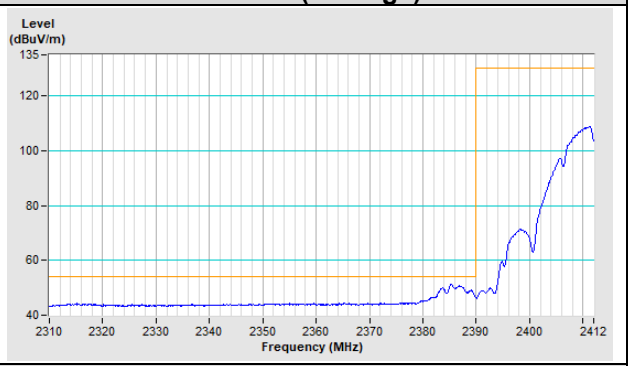
Horizontal (Average)



Vertical (Peak)

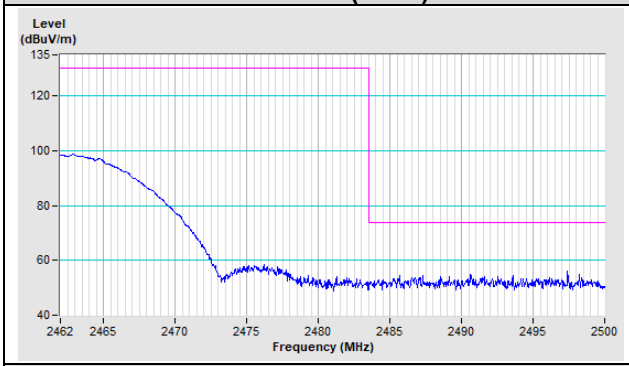


Vertical (Average)

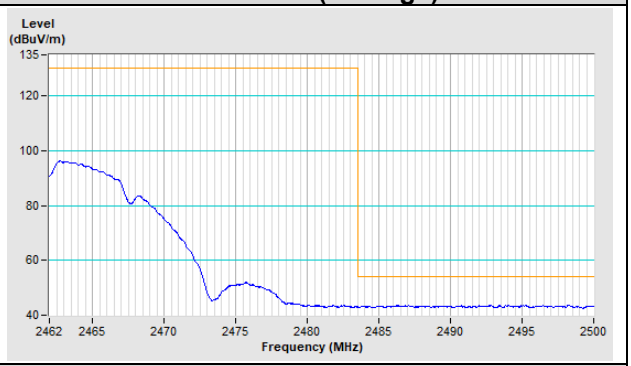


Channel 11

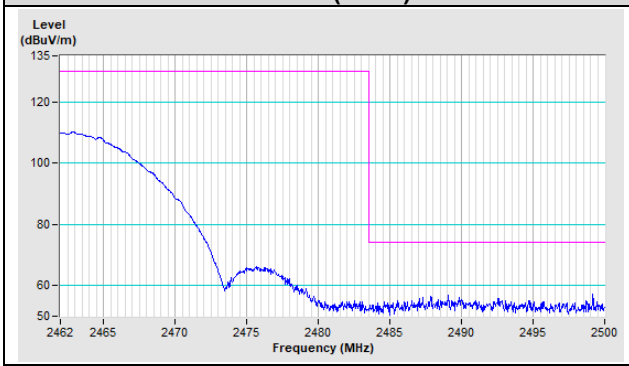
Horizontal (Peak)



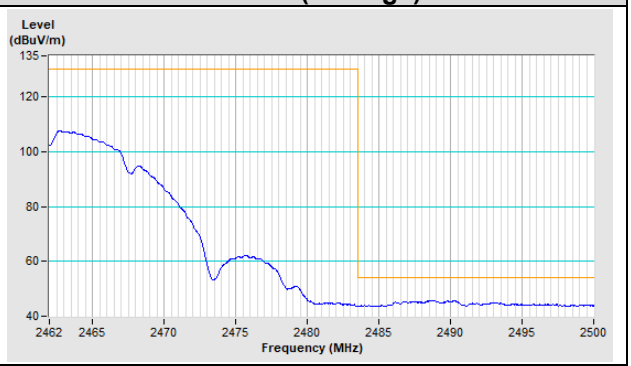
Horizontal (Average)



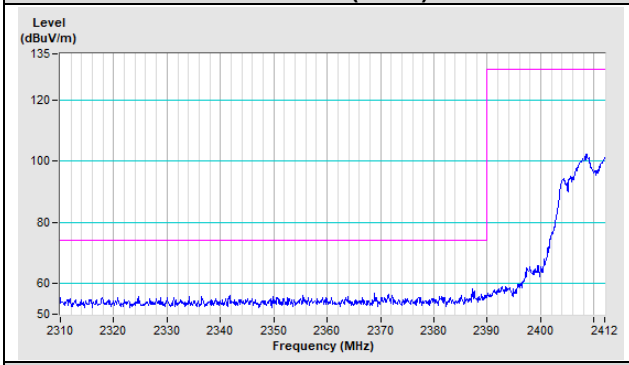
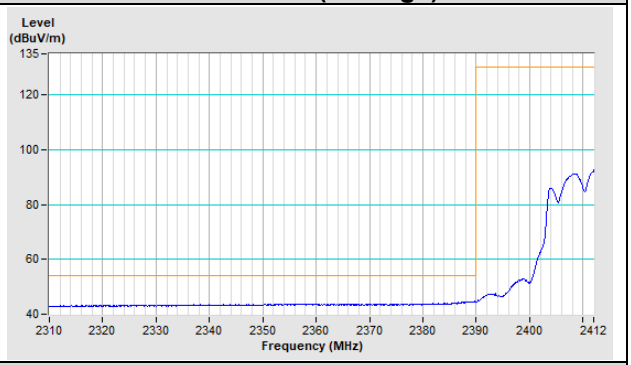
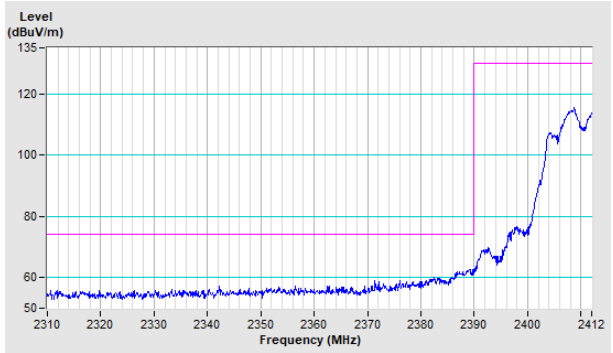
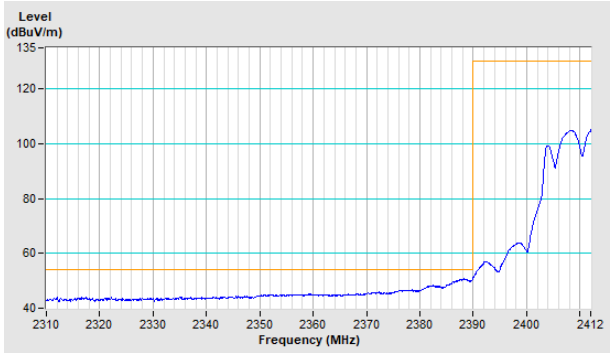
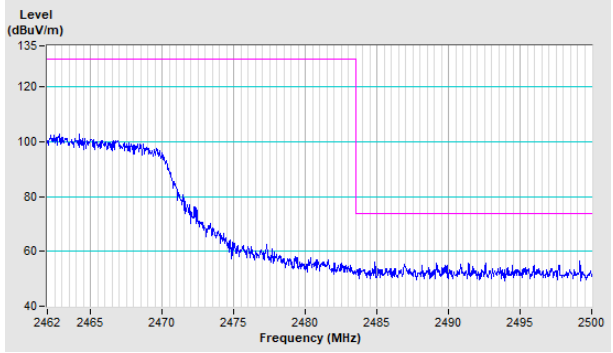
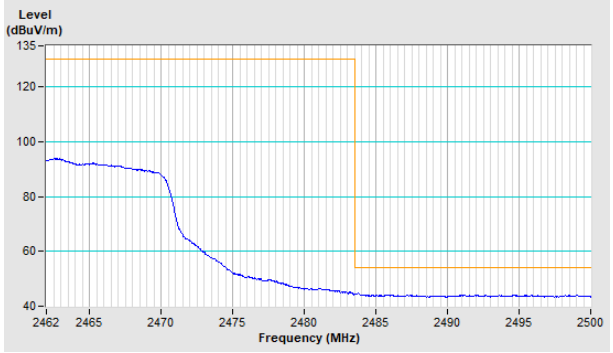
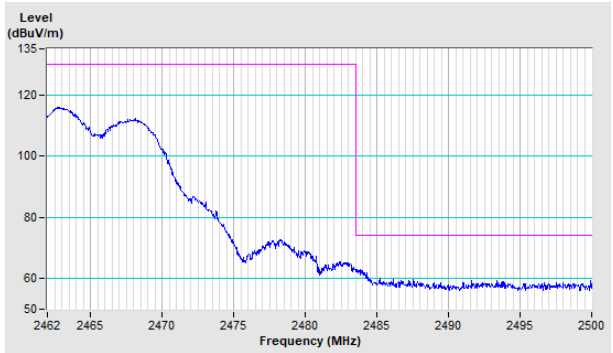
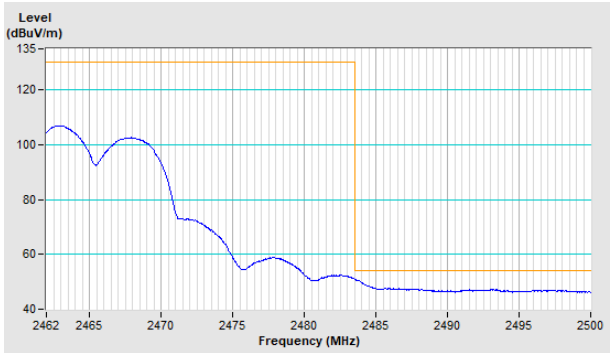
Vertical (Peak)



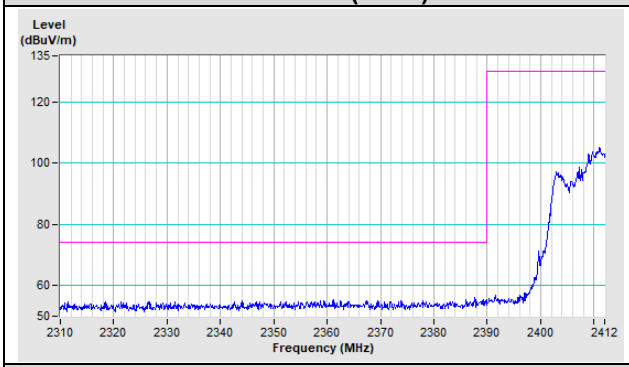
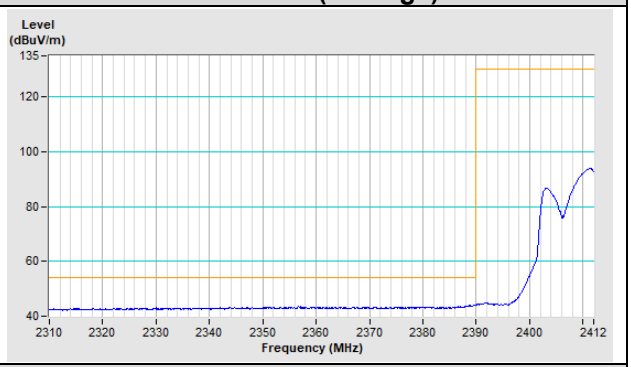
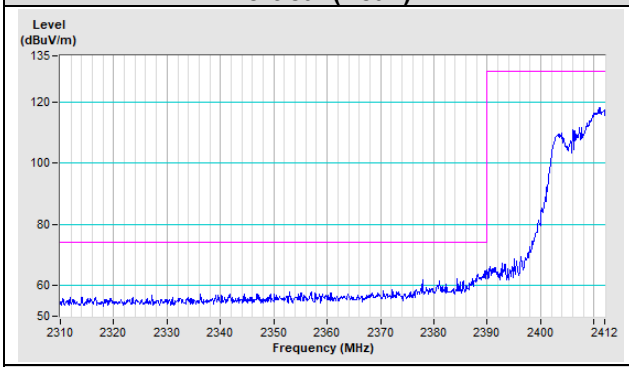
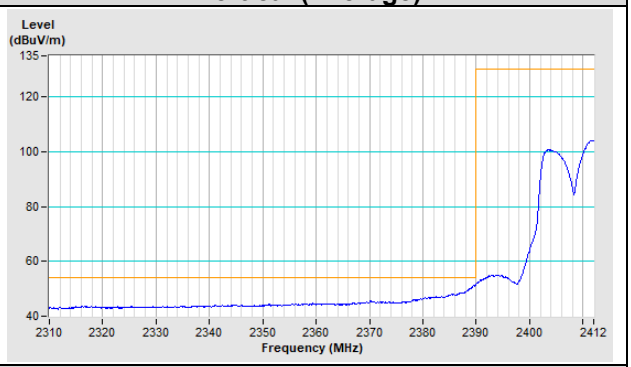
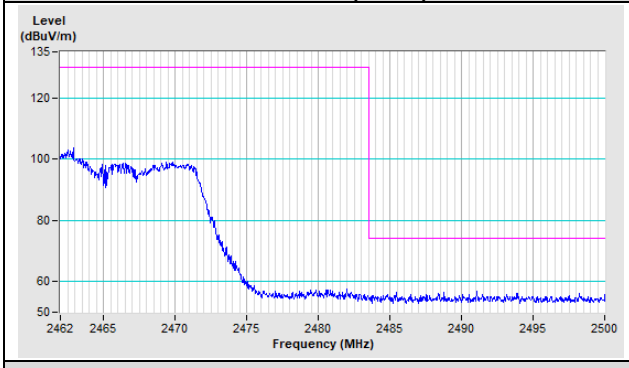
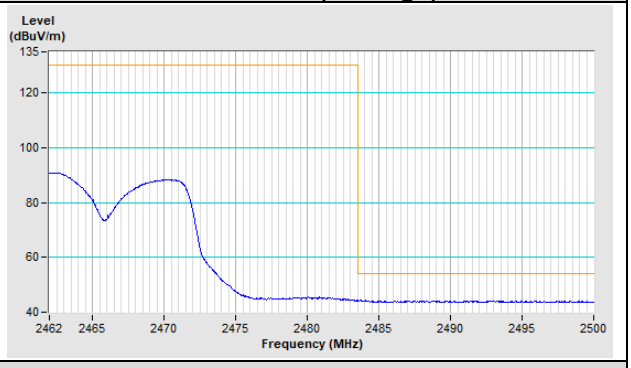
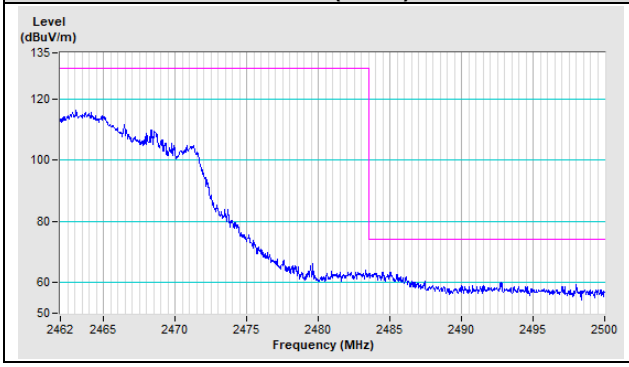
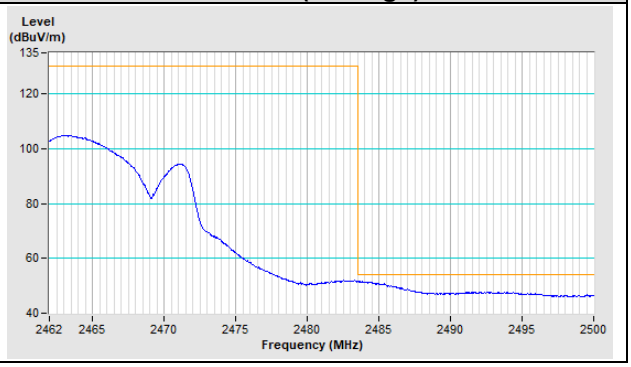
Vertical (Average)



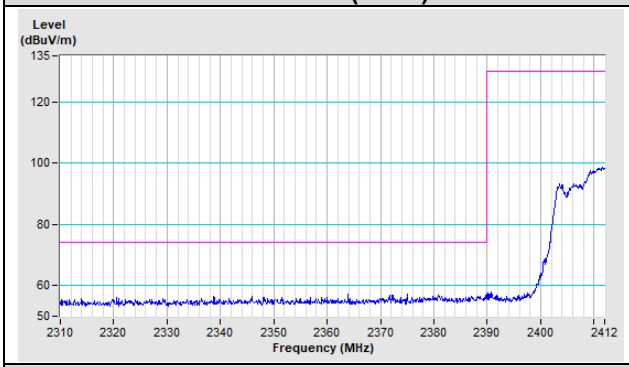
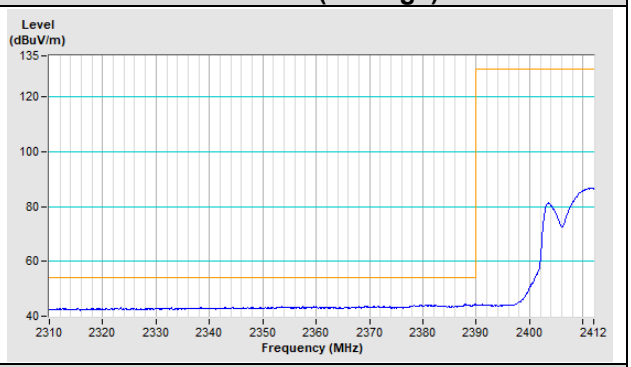
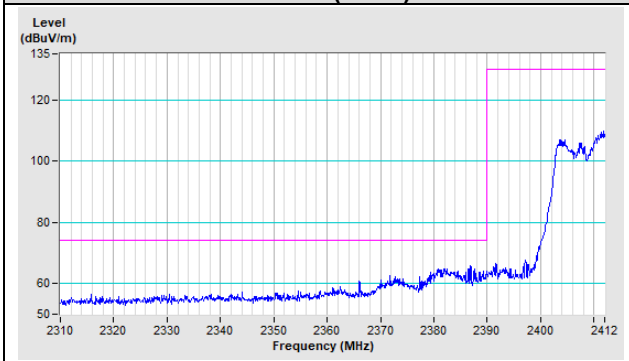
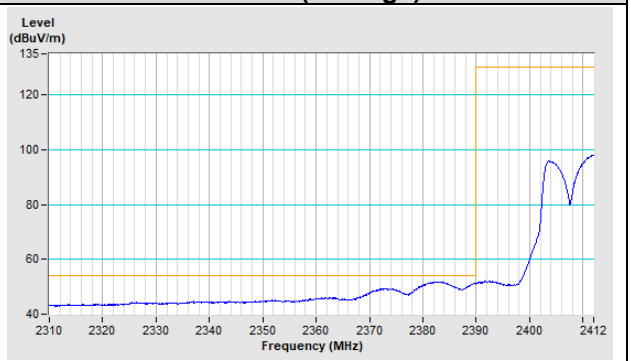
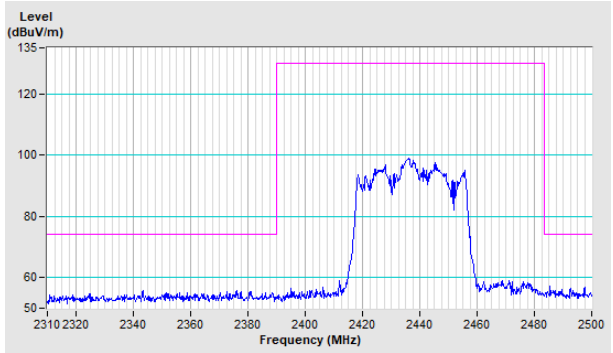
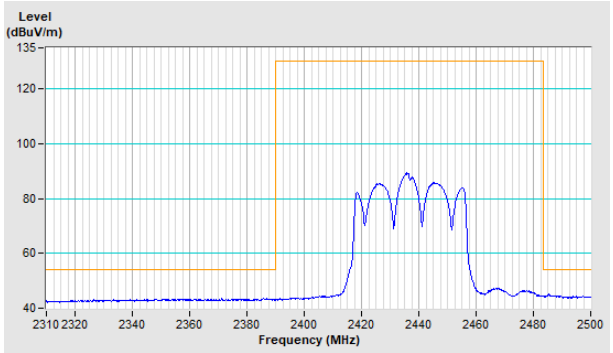
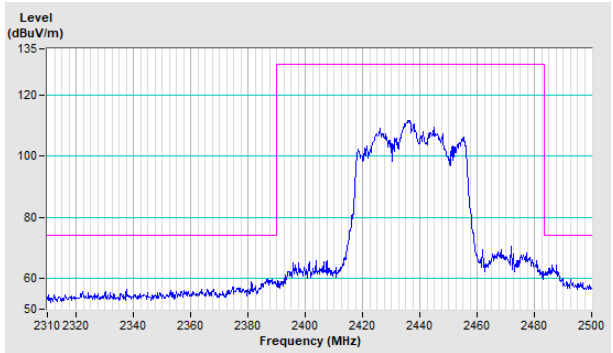
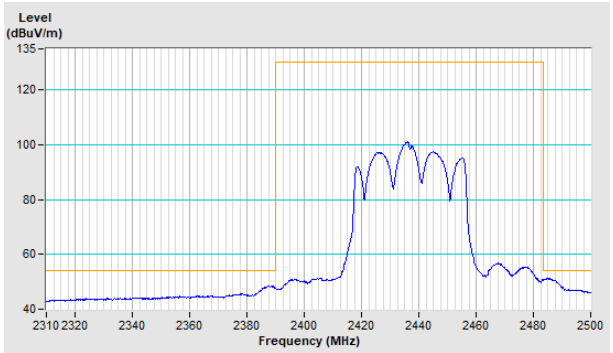
802.11g

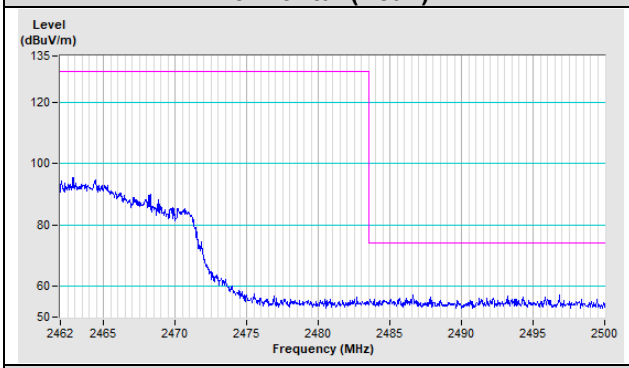
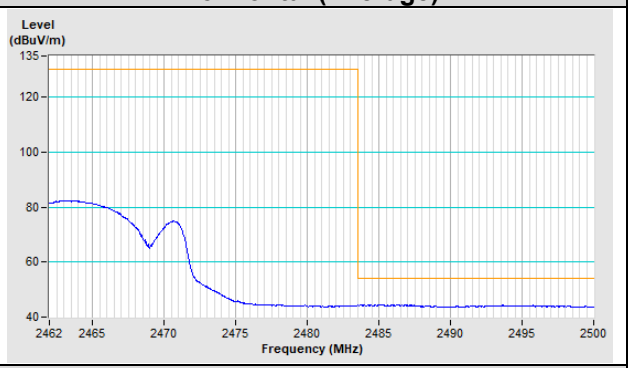
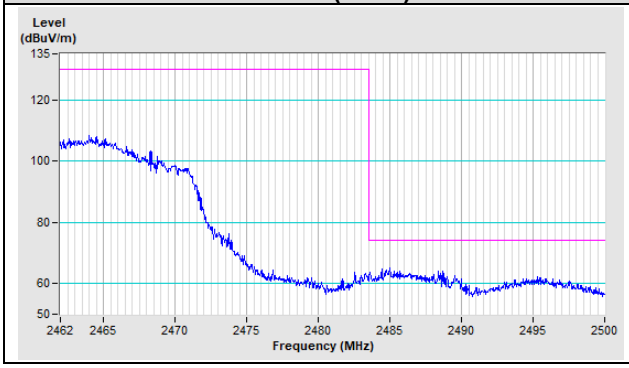
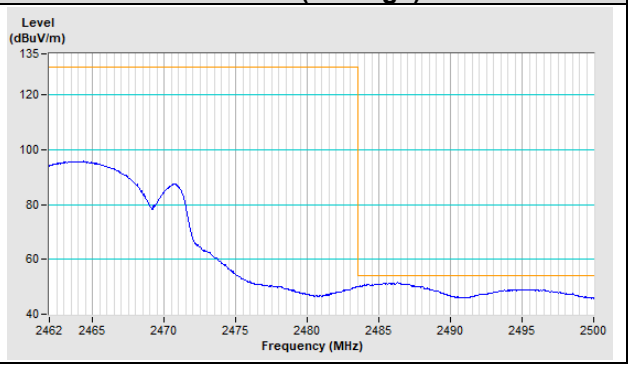
Channel 1	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
Channel 11	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11ax (HE20)

Channel 1	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
Channel 11	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11ax (HE40)

Channel 3	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
Channel 6	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

Channel 9	
Horizontal (Peak)	**Horizontal (Average)**
	
Vertical (Peak)	**Vertical (Average)**
	

Appendix – Information of the Testing Laboratories

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

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Web Site: www.bureauveritas-adt.com

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

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