FCC Test Report

Report No.:	RF200609C14
FCC ID:	PY320100484
Test Model:	SXR80
Series Model:	SXS80
Received Date:	Jun. 09, 2020
Test Date:	Jul. 04 ~ Jul. 10, 2020
Issued Date:	Jul. 16, 2020
Applicant:	NETGEAR, INC.
Address:	350 East Plumeria Drive, San Jose, CA 95134, 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
FCC Registration / Designation Number(1):	788550 / TW0003
Test Location (2):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan.
FCC Registration / Designation Number(2):	723255 / TW2022

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF200609C14	Original release	Jul. 16, 2020

1 Certificate of Conformity

Product:	Orbi Pro WiFi 6 Router / Orbi Pro WiFi 6 Satellite
Brand:	NETGEAR
Test Model:	SXR80
Series Model:	SXS80
Sample Status:	Engineering sample
Applicant:	NETGEAR, INC.
Test Date:	Jul. 04 ~ Jul. 10, 2020
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

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

Prepared by : Pettie Chen , **Date:** Jul. 16, 2020

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Jul. 16, 2020

Bruce Chen / Senior 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 -7.52dB at 0.34141MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2390.00, 2488.70MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX 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	1.8 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.0 dB
	30MHz ~ 1GHz	4.9 dB
Radiated Emissions above 1 GHz	1 GHz ~ 6GHz	5.1 dB
	6GHz ~ 18GHz	4.9 dB
	18GHz ~ 40GHz	5.2 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Orbi Pro WiFi 6 Router / Orbi Pro WiFi 6 Satellite
Brand	NETGEAR
Test Model	SXR80
Series Model	SXS80
Model Difference	Refer to Note for more details
Sample Status	Engineering sample
Power Supply Rating	12Vdc (adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b:11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11n (HT20/40): up to MCS31 802.11n (VHT20/40): up to MCS9 802.11ax: up to MCS11
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: 953.202mW Beamforming Mode: 825.155mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Cable Supplied	NA

Note:

1. All models are electrically identical except software firmware. Model: SXR80 is the representative for final test.

Brand	Model	Product Name	RF module	Difference
NETGEAR	SXR80	Orbi Pro WiFi 6 Router	RF module 1	Software firmware: SXR80-V1.0.0.34 Master mode only
			RF module 2	
	SXS80	Orbi Pro WiFi 6 Satellite	RF module 1	Software firmware: SXS80-V1.0.0.34 Master mode and Client mode
			RF module 2	

*RF module 1: 5GHz Band 4 only, RF module 2: 2.4GHz Band & 5GHz Band 1 only

2. The EUT uses following adapters.

Adapter 1	
Brand	NETGEAR
Model	AD2150F10
P/N	332-11093-01
Input Power	100-120Vac~50/60Hz 1.0A
Output Power	12Vdc / 3.5A
Power Cable	1.8m non-shielded power cable without core

Adapter 2	
Brand	NETGEAR
Model	2ABN042F NA
P/N	332-10888-01
Input Power	100-240Vac~50/60Hz 1.3A
Output Power	12.0Vdc / 3.5A
Power Cable	1.85m non-shielded power cable without core

*After pre-testing, Adapter 2 is the worst case for the final tests.

3. The EUT uses following antennas.

Antenna Type	Dipole	
Antenna Connector	i-pex(MHF)	
Directional Gain (dBi)		
2.4GHz Band	5GHz U-NII-1	5GHz U-NII-3
6.81	7.56	7.88

4. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

Modulation Mode	CDD Mode	Beamforming Mode	TX Function
802.11b	Support	Not Support	4TX
802.11g	Support	Not Support	4TX
802.11n (HT20)	Support	Not Support	4TX
802.11n (HT40)	Support	Not Support	4TX
802.11ac (VHT20)	Support	Support	4TX
802.11ac (VHT40)	Support	Support	4TX
802.11ax (HE20)	Support	Support	4TX
802.11ax (HE40)	Support	Support	4TX

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

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

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20), 802.11ac (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), 802.11ac (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	
-	√	√	√	√	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 is designed to be positioned on the X-plane only.
2. Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.

Radiated Emission Test (Above 1GHz):

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

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

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

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	-
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	-
	802.11n (VHT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	-
	802.11n (VHT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5	-
	802.11ax (HE20)	1 to 11	1, 6, 11	OFDMA	BPSK	MCS0	-
	802.11ax (HE40)	3 to 9	3, 6, 9	OFDMA	BPSK	MCS0	-

*802.11n (VHT20), 802.11n (VHT40) are for Conducted Output Power Measurement only.

Test Condition:

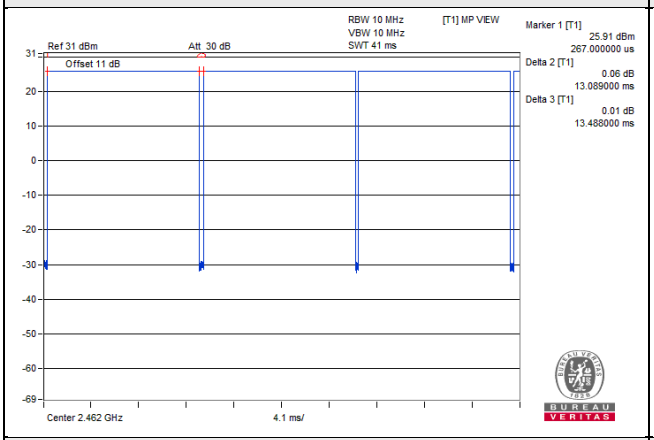
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	22 deg. C, 70% RH	120Vac, 60Hz	Ryan Du
RE<1G	22 deg. C, 70% RH	120Vac, 60Hz	Ryan Du
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Sampson Chen
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Frank Liu

3.3 Duty Cycle of Test Signal

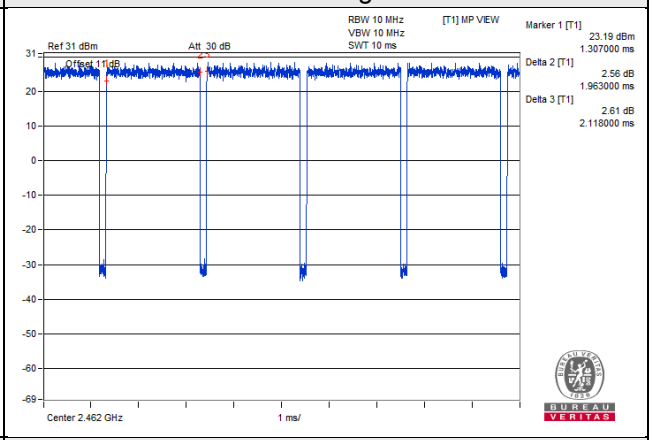
Duty cycle of test signal is > 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = 13.089/13.488 = 0.97, Duty factor = 10 * log (1/0.97) = 0.13
802.11g: Duty cycle = 1.963/2.118 = 0.927, Duty factor = 10 * log (1/0.927) = 0.33
802.11ax (HE20): Duty cycle = 5.436/5.712 = 0.952, Duty factor = 10 * log (1/0.952) = 0.22
802.11ax (HE40): Duty cycle = 5.424/5.795 = 0.935, Duty factor = 10 * log (1/0.935) = 0.29

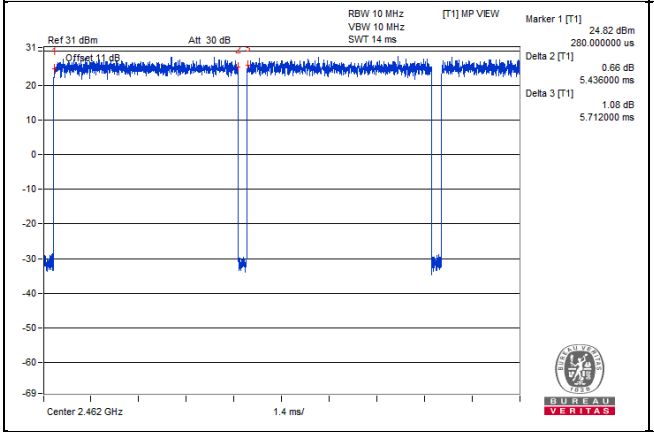
802.11b



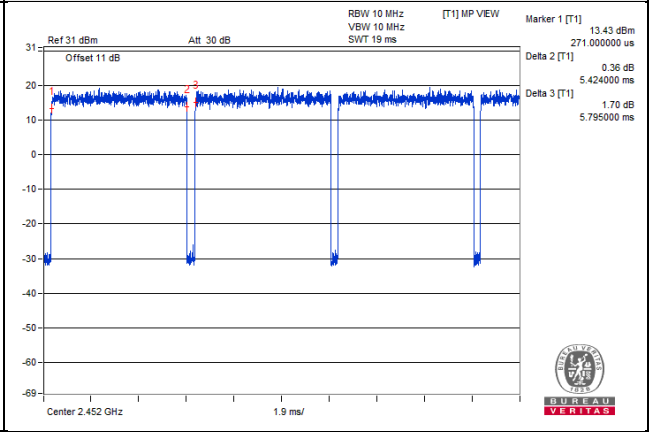
802.11g



802.11ax (HE20)



802.11ax (HE40)



3.4 Description of Support Units

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

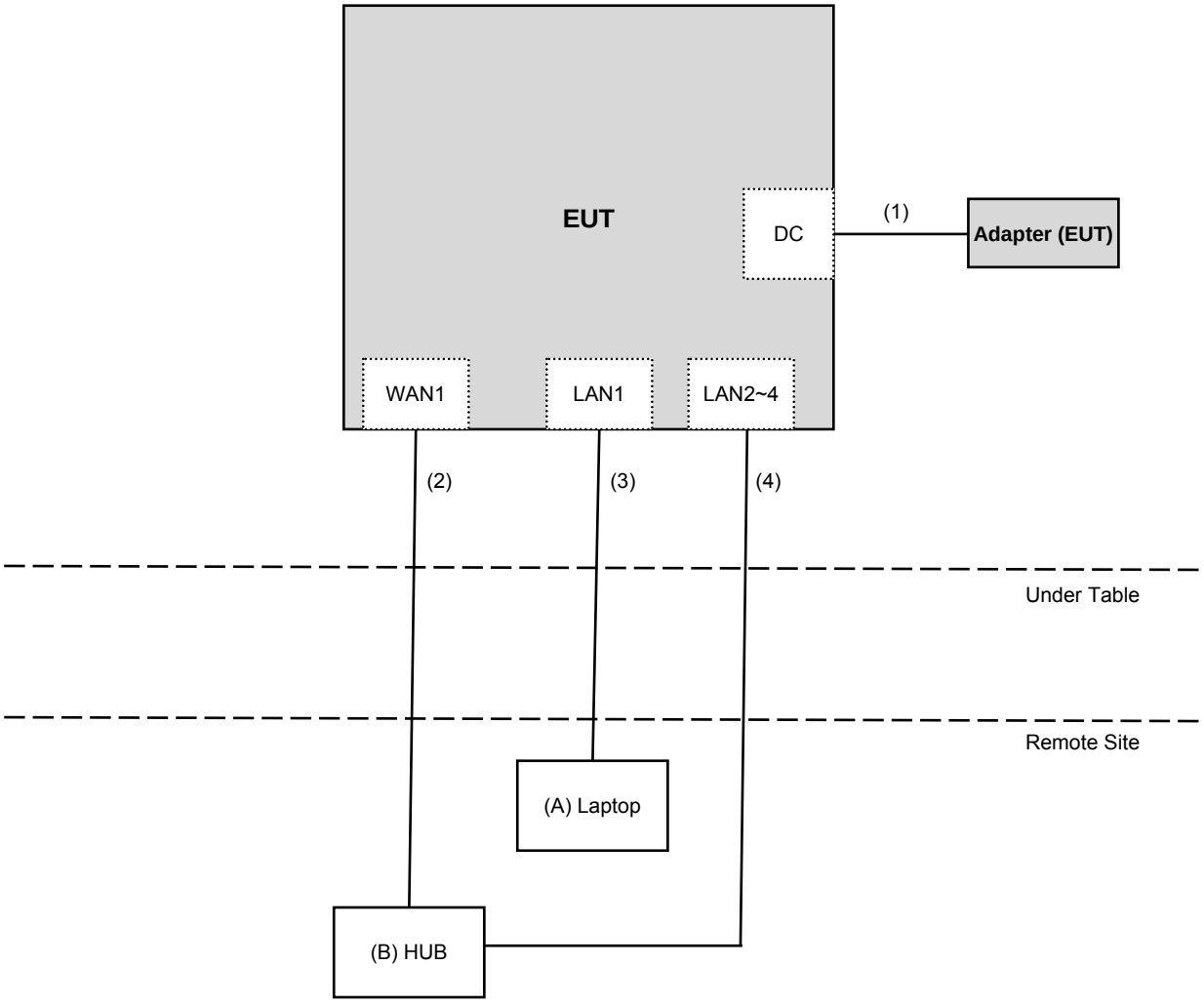
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Lenovo	81A4	YD02YN76	PD93165NGU	-
B.	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC Approved	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.85	N	0	Accessory of EUT
2.	RJ45 cable	1	10	N	0	-
3.	RJ45 cable	1	10	N	0	-
4.	RJ45 cable	3	10	N	0	-

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 Agilent	N9038A	MY51210202	Dec. 13, 2019	Dec. 12, 2020
Pre-Amplifier EMCI	EMC001340	980142	May 25, 2020	May 24, 2021
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	NA	LOOPCAB-001	Jan. 08, 2020	Jan. 07, 2021
RF Cable	NA	LOOPCAB-002	Jan. 08, 2020	Jan. 07, 2021
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Oct. 23, 2019	Oct. 22, 2020
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 11, 2019	Nov. 10, 2020
RF Cable	8D	966-4-1	Mar. 18, 2020	Mar. 17, 2021
RF Cable	8D	966-4-2	Mar. 18, 2020	Mar. 17, 2021
RF Cable	8D	966-4-3	Mar. 18, 2020	Mar. 17, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-4-01	Sep. 26, 2019	Sep. 25, 2020
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 24, 2019	Nov. 23, 2020
Pre-Amplifier EMCI	EMC12630SE	980385	Aug. 15, 2019	Aug. 14, 2020
RF Cable	EMC104-SM-SM-1200	160923	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-2000	180502	Apr. 29, 2020	Apr. 28, 2021
RF Cable	EMC104-SM-SM-6000	180418	Apr. 29, 2020	Apr. 28, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 24, 2019	Nov. 23, 2020
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	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 Hsinchu 966 Chamber No. 4.

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.

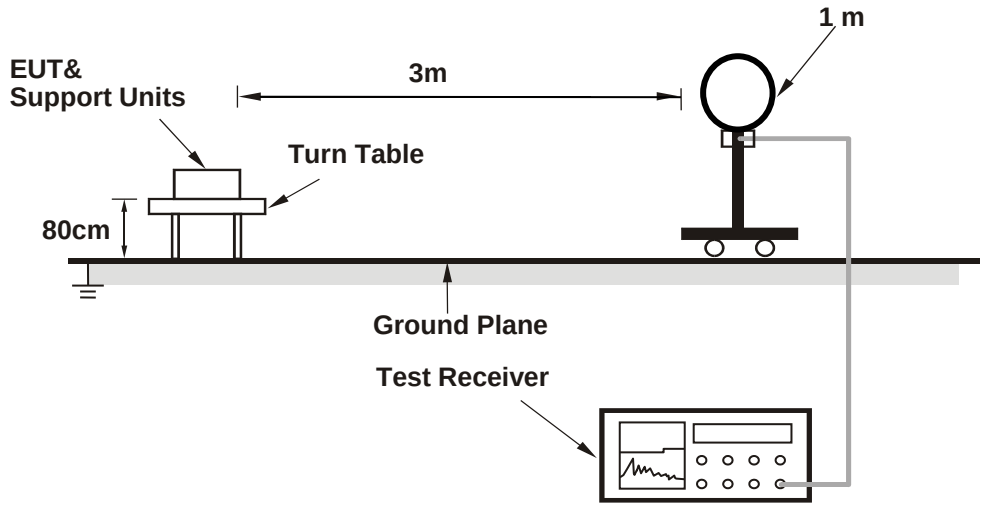
Note:
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above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

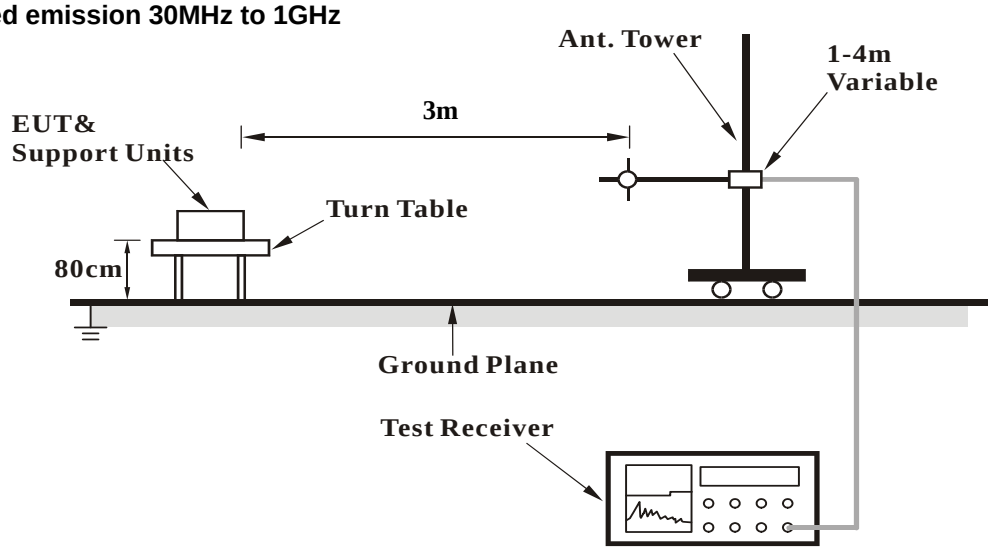
No deviation.

4.1.5 Test Setup

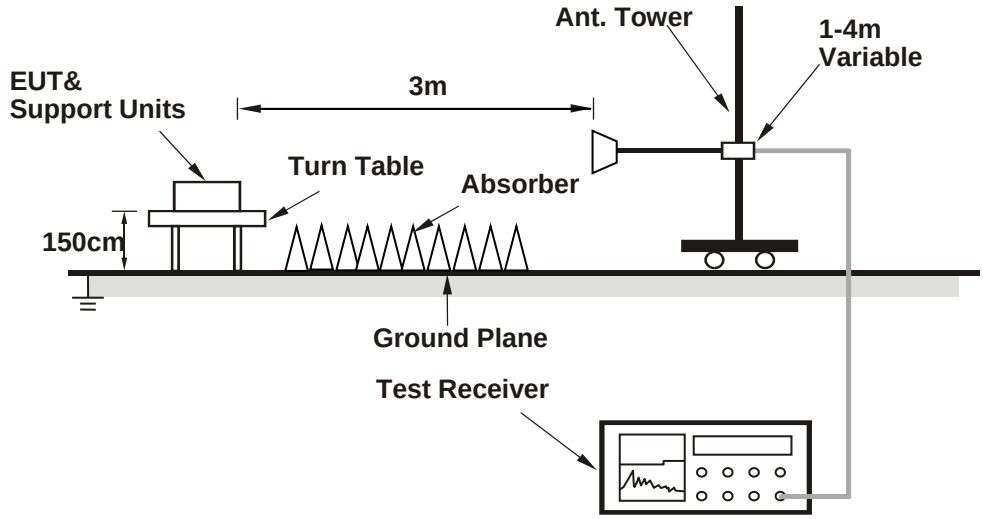
For Radiated emission below 30MHz



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	2387.56	56.1 PK	74.0	-17.9	1.57 H	178	57.9	-1.8
2	2387.56	44.4 AV	54.0	-9.6	1.57 H	178	46.2	-1.8
3	*2412.00	113.7 PK			1.57 H	178	115.5	-1.8
4	*2412.00	111.4 AV			1.57 H	178	113.2	-1.8
5	4824.00	44.7 PK	74.0	-29.3	1.62 H	199	42.5	2.2
6	4824.00	41.4 AV	54.0	-12.6	1.62 H	199	39.2	2.2
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	62.9 PK	74.0	-11.1	1.36 V	202	64.7	-1.8
2	2390.00	53.6 AV	54.0	-0.4	1.36 V	202	55.4	-1.8
3	*2412.00	123.6 PK			1.36 V	202	125.4	-1.8
4	*2412.00	121.3 AV			1.36 V	202	123.1	-1.8
5	4824.00	42.8 PK	74.0	-31.2	1.50 V	26	40.6	2.2
6	4824.00	39.5 AV	54.0	-14.5	1.50 V	26	37.3	2.2

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.
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	55.6 PK	74.0	-18.4	1.24 H	281	57.4	-1.8
2	2390.00	42.5 AV	54.0	-11.5	1.24 H	281	44.3	-1.8
3	*2437.00	115.7 PK			1.24 H	281	117.5	-1.8
4	*2437.00	113.4 AV			1.24 H	281	115.2	-1.8
5	2483.50	55.4 PK	74.0	-18.6	1.24 H	281	57.3	-1.9
6	2483.50	42.0 AV	54.0	-12.0	1.24 H	281	43.9	-1.9
7	4874.00	47.6 PK	74.0	-26.4	1.62 H	199	45.5	2.1
8	4874.00	44.0 AV	54.0	-10.0	1.62 H	199	41.9	2.1
9	7311.00	47.7 PK	74.0	-26.3	1.53 H	253	38.6	9.1
10	7311.00	35.4 AV	54.0	-18.6	1.53 H	253	26.3	9.1
11	12185.00	50.4 PK	74.0	-23.6	1.56 H	260	36.9	13.5
12	12185.00	42.2 AV	54.0	-11.8	1.56 H	260	28.7	13.5
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	62.0 PK	74.0	-12.0	2.47 V	42	63.8	-1.8
2	2390.00	51.8 AV	54.0	-2.2	2.47 V	42	53.6	-1.8
3	*2437.00	126.9 PK			2.47 V	42	128.7	-1.8
4	*2437.00	124.7 AV			2.47 V	42	126.5	-1.8
5	2483.50	62.6 PK	74.0	-11.4	2.47 V	42	64.5	-1.9
6	2483.50	50.2 AV	54.0	-3.8	2.47 V	42	52.1	-1.9
7	4874.00	45.5 PK	74.0	-28.5	1.50 V	34	43.4	2.1
8	4874.00	42.3 AV	54.0	-11.7	1.50 V	34	40.2	2.1
9	7311.00	47.5 PK	74.0	-26.5	1.48 V	3	38.4	9.1
10	7311.00	34.5 AV	54.0	-19.5	1.48 V	3	25.4	9.1
11	12185.00	50.9 PK	74.0	-23.1	1.66 V	344	37.4	13.5
12	12185.00	42.6 AV	54.0	-11.4	1.66 V	344	29.1	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.
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	110.9 PK			1.53 H	66	112.7	-1.8
2	*2462.00	108.5 AV			1.53 H	66	110.3	-1.8
3	2487.21	55.7 PK	74.0	-18.3	1.53 H	66	57.6	-1.9
4	2487.21	43.9 AV	54.0	-10.1	1.53 H	66	45.8	-1.9
5	4924.00	44.4 PK	74.0	-29.6	1.60 H	213	42.1	2.3
6	4924.00	41.0 AV	54.0	-13.0	1.60 H	213	38.7	2.3
7	7386.00	44.9 PK	74.0	-29.1	1.52 H	259	35.5	9.4
8	7386.00	31.9 AV	54.0	-22.1	1.52 H	259	22.5	9.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	121.4 PK			1.39 V	202	123.2	-1.8
2	*2462.00	119.4 AV			1.39 V	202	121.2	-1.8
3	2488.70	60.4 PK	74.0	-13.6	1.39 V	202	62.3	-1.9
4	**2488.70**	**53.9 AV**	**54.0**	**-0.1**	**1.39 V**	**202**	**55.8**	**-1.9**
5	4924.00	42.6 PK	74.0	-31.4	1.50 V	30	40.3	2.3
6	4924.00	39.5 AV	54.0	-14.5	1.50 V	30	37.2	2.3
7	7386.00	44.3 PK	74.0	-29.7	1.53 V	6	34.9	9.4
8	7386.00	31.4 AV	54.0	-22.6	1.53 V	6	22.0	9.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	57.3 PK	74.0	-16.7	1.21 H	167	59.1	-1.8
2	2390.00	45.8 AV	54.0	-8.2	1.21 H	167	47.6	-1.8
3	*2412.00	113.5 PK			1.21 H	167	115.3	-1.8
4	*2412.00	104.1 AV			1.21 H	167	105.9	-1.8
5	4824.00	42.4 PK	74.0	-31.6	1.52 H	205	40.2	2.2
6	4824.00	39.4 AV	54.0	-14.6	1.52 H	205	37.2	2.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.2 PK	74.0	-6.8	1.12 V	172	69.0	-1.8
2	2390.00	53.6 AV	54.0	-0.4	1.12 V	172	55.4	-1.8
3	*2412.00	124.2 PK			1.12 V	172	126.0	-1.8
4	*2412.00	115.3 AV			1.12 V	172	117.1	-1.8
5	4824.00	41.3 PK	74.0	-32.7	1.49 V	10	39.1	2.2
6	4824.00	37.7 AV	54.0	-16.3	1.49 V	10	35.5	2.2

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.
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	55.5 PK	74.0	-18.5	1.21 H	285	57.3	-1.8
2	2390.00	42.3 AV	54.0	-11.7	1.21 H	285	44.1	-1.8
3	*2437.00	116.2 PK			1.21 H	285	118.0	-1.8
4	*2437.00	106.4 AV			1.21 H	285	108.2	-1.8
5	2483.50	55.6 PK	74.0	-18.4	1.21 H	285	57.5	-1.9
6	2483.50	42.1 AV	54.0	-11.9	1.21 H	285	44.0	-1.9
7	4874.00	42.5 PK	74.0	-31.5	1.56 H	200	40.4	2.1
8	4874.00	39.3 AV	54.0	-14.7	1.56 H	200	37.2	2.1
9	7311.00	45.2 PK	74.0	-28.8	1.51 H	253	36.1	9.1
10	7311.00	32.3 AV	54.0	-21.7	1.51 H	253	23.2	9.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.2 PK	74.0	-6.8	1.43 V	174	69.0	-1.8
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.43 V**	**174**	**55.7**	**-1.8**
3	*2437.00	127.3 PK			1.43 V	174	129.1	-1.8
4	*2437.00	117.8 AV			1.43 V	174	119.6	-1.8
5	2483.50	64.4 PK	74.0	-9.6	1.43 V	174	66.3	-1.9
6	2483.50	51.1 AV	54.0	-2.9	1.43 V	174	53.0	-1.9
7	4874.00	41.2 PK	74.0	-32.8	1.50 V	16	39.1	2.1
8	4874.00	37.8 AV	54.0	-16.2	1.50 V	16	35.7	2.1
9	7311.00	44.0 PK	74.0	-30.0	1.51 V	17	34.9	9.1
10	7311.00	31.0 AV	54.0	-23.0	1.51 V	17	21.9	9.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
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	112.2 PK			1.60 H	338	114.0	-1.8
2	*2462.00	102.4 AV			1.60 H	338	104.2	-1.8
3	2487.11	57.9 PK	74.0	-16.1	1.60 H	338	59.8	-1.9
4	2487.11	46.0 AV	54.0	-8.0	1.60 H	338	47.9	-1.9
5	4924.00	42.3 PK	74.0	-31.7	1.54 H	189	40.0	2.3
6	4924.00	38.9 AV	54.0	-15.1	1.54 H	189	36.6	2.3
7	7386.00	45.5 PK	74.0	-28.5	1.49 H	259	36.1	9.4
8	7386.00	32.3 AV	54.0	-21.7	1.49 H	259	22.9	9.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	124.5 PK			1.54 V	183	126.3	-1.8
2	*2462.00	114.4 AV			1.54 V	183	116.2	-1.8
3	2483.50	64.8 PK	74.0	-9.2	1.54 V	183	66.7	-1.9
4	2483.50	53.8 AV	54.0	-0.2	1.54 V	183	55.7	-1.9
5	4924.00	41.9 PK	74.0	-32.1	1.54 V	29	39.6	2.3
6	4924.00	38.2 AV	54.0	-15.8	1.54 V	29	35.9	2.3
7	7386.00	44.3 PK	74.0	-29.7	1.49 V	2	34.9	9.4
8	7386.00	31.5 AV	54.0	-22.5	1.49 V	2	22.1	9.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	2386.22	56.2 PK	74.0	-17.8	1.80 H	329	58.0	-1.8
2	2386.22	43.6 AV	54.0	-10.4	1.80 H	329	45.4	-1.8
3	*2412.00	112.4 PK			1.80 H	329	114.2	-1.8
4	*2412.00	100.4 AV			1.80 H	329	102.2	-1.8
5	4824.00	42.8 PK	74.0	-31.2	1.51 H	177	40.6	2.2
6	4824.00	39.1 AV	54.0	-14.9	1.51 H	177	36.9	2.2
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	63.0 PK	74.0	-11.0	1.50 V	203	64.8	-1.8
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.50 V**	**203**	**55.7**	**-1.8**
3	*2412.00	123.3 PK			1.50 V	203	125.1	-1.8
4	*2412.00	111.4 AV			1.50 V	203	113.2	-1.8
5	4824.00	41.4 PK	74.0	-32.6	1.55 V	40	39.2	2.2
6	4824.00	37.7 AV	54.0	-16.3	1.55 V	40	35.5	2.2

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.
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	55.2 PK	74.0	-18.8	1.17 H	283	57.0	-1.8
2	2390.00	42.1 AV	54.0	-11.9	1.17 H	283	43.9	-1.8
3	*2437.00	119.9 PK			1.17 H	283	121.7	-1.8
4	*2437.00	106.1 AV			1.17 H	283	107.9	-1.8
5	2493.60	55.1 PK	74.0	-18.9	1.17 H	283	57.0	-1.9
6	2493.60	41.9 AV	54.0	-12.1	1.17 H	283	43.8	-1.9
7	4874.00	42.6 PK	74.0	-31.4	1.52 H	176	40.5	2.1
8	4874.00	39.1 AV	54.0	-14.9	1.52 H	176	37.0	2.1
9	7311.00	46.1 PK	74.0	-27.9	1.54 H	272	37.0	9.1
10	7311.00	32.6 AV	54.0	-21.4	1.54 H	272	23.5	9.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.4 PK	74.0	-4.6	1.45 V	144	71.2	-1.8
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.45 V**	**144**	**55.7**	**-1.8**
3	*2437.00	129.4 PK			1.45 V	144	131.2	-1.8
4	*2437.00	117.0 AV			1.45 V	144	118.8	-1.8
5	2493.60	66.9 PK	74.0	-7.1	1.45 V	144	68.8	-1.9
6	2493.60	51.0 AV	54.0	-3.0	1.45 V	144	52.9	-1.9
7	4874.00	41.7 PK	74.0	-32.3	1.49 V	26	39.6	2.1
8	4874.00	38.1 AV	54.0	-15.9	1.49 V	26	36.0	2.1
9	7311.00	44.3 PK	74.0	-29.7	1.54 V	28	35.2	9.1
10	7311.00	31.6 AV	54.0	-22.4	1.54 V	28	22.5	9.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
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	115.3 PK			1.73 H	334	117.1	-1.8
2	*2462.00	102.3 AV			1.73 H	334	104.1	-1.8
3	2486.70	57.2 PK	74.0	-16.8	1.73 H	334	59.1	-1.9
4	2486.70	45.3 AV	54.0	-8.7	1.73 H	334	47.2	-1.9
5	4924.00	42.2 PK	74.0	-31.8	1.57 H	181	39.9	2.3
6	4924.00	38.9 AV	54.0	-15.1	1.57 H	181	36.6	2.3
7	7386.00	44.8 PK	74.0	-29.2	1.48 H	251	35.4	9.4
8	7386.00	31.9 AV	54.0	-22.1	1.48 H	251	22.5	9.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	126.5 PK			1.50 V	196	128.3	-1.8
2	*2462.00	114.7 AV			1.50 V	196	116.5	-1.8
3	2486.70	66.2 PK	74.0	-7.8	1.50 V	196	68.1	-1.9
4	2486.70	53.8 AV	54.0	-0.2	1.50 V	196	55.7	-1.9
5	4924.00	42.1 PK	74.0	-31.9	1.50 V	27	39.8	2.3
6	4924.00	38.3 AV	54.0	-15.7	1.50 V	27	36.0	2.3
7	7386.00	44.5 PK	74.0	-29.5	1.59 V	22	35.1	9.4
8	7386.00	31.5 AV	54.0	-22.5	1.59 V	22	22.1	9.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	1.46 H	163	59.1	-1.8
2	2390.00	44.9 AV	54.0	-9.1	1.46 H	163	46.7	-1.8
3	*2422.00	106.3 PK			1.46 H	163	108.1	-1.8
4	*2422.00	94.2 AV			1.46 H	163	96.0	-1.8
5	4844.00	40.3 PK	74.0	-33.7	1.49 H	203	38.1	2.2
6	4844.00	37.0 AV	54.0	-17.0	1.49 H	203	34.8	2.2
7	7266.00	45.8 PK	74.0	-28.2	1.45 H	265	36.8	9.0
8	7266.00	32.6 AV	54.0	-21.4	1.45 H	265	23.6	9.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2385.80	65.4 PK	74.0	-8.6	1.54 V	195	67.2	-1.8
2	2385.80	53.6 AV	54.0	-0.4	1.54 V	195	55.4	-1.8
3	*2422.00	120.8 PK			1.54 V	195	122.6	-1.8
4	*2422.00	107.9 AV			1.54 V	195	109.7	-1.8
5	4844.00	39.8 PK	74.0	-34.2	1.54 V	34	37.6	2.2
6	4844.00	36.2 AV	54.0	-17.8	1.54 V	34	34.0	2.2
7	7266.00	44.3 PK	74.0	-29.7	1.52 V	30	35.3	9.0
8	7266.00	31.5 AV	54.0	-22.5	1.52 V	30	22.5	9.0

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.
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	2373.50	55.9 PK	74.0	-18.1	1.23 H	281	57.8	-1.9
2	2373.50	42.7 AV	54.0	-11.3	1.23 H	281	44.6	-1.9
3	*2437.00	111.8 PK			1.23 H	281	113.6	-1.8
4	*2437.00	99.0 AV			1.23 H	281	100.8	-1.8
5	2493.90	54.9 PK	74.0	-19.1	1.23 H	281	56.8	-1.9
6	2493.90	41.7 AV	54.0	-12.3	1.23 H	281	43.6	-1.9
7	4874.00	42.1 PK	74.0	-31.9	1.49 H	184	40.0	2.1
8	4874.00	38.9 AV	54.0	-15.1	1.49 H	184	36.8	2.1
9	7311.00	45.9 PK	74.0	-28.1	1.59 H	269	36.8	9.1
10	7311.00	32.4 AV	54.0	-21.6	1.59 H	269	23.3	9.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2373.50	67.5 PK	74.0	-6.5	1.50 V	149	69.4	-1.9
2	2373.50	53.7 AV	54.0	-0.3	1.50 V	149	55.6	-1.9
3	*2437.00	123.5 PK			1.50 V	149	125.3	-1.8
4	*2437.00	111.2 AV			1.50 V	149	113.0	-1.8
5	2493.90	66.6 PK	74.0	-7.4	1.50 V	149	68.5	-1.9
6	2493.90	53.5 AV	54.0	-0.5	1.50 V	149	55.4	-1.9
7	4874.00	41.6 PK	74.0	-32.4	1.48 V	23	39.5	2.1
8	4874.00	38.3 AV	54.0	-15.7	1.48 V	23	36.2	2.1
9	7311.00	44.5 PK	74.0	-29.5	1.57 V	22	35.4	9.1
10	7311.00	31.6 AV	54.0	-22.4	1.57 V	22	22.5	9.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
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	103.6 PK			1.50 H	335	105.4	-1.8
2	*2452.00	92.2 AV			1.50 H	335	94.0	-1.8
3	2486.59	57.1 PK	74.0	-16.9	1.50 H	335	59.0	-1.9
4	2486.59	44.8 AV	54.0	-9.2	1.50 H	335	46.7	-1.9
5	4904.00	40.2 PK	74.0	-33.8	1.53 H	191	38.1	2.1
6	4904.00	37.0 AV	54.0	-17.0	1.53 H	191	34.9	2.1
7	7356.00	46.4 PK	74.0	-27.6	1.43 H	268	37.2	9.2
8	7356.00	33.0 AV	54.0	-21.0	1.43 H	268	23.8	9.2
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	115.6 PK			1.55 V	193	117.4	-1.8
2	*2452.00	104.2 AV			1.55 V	193	106.0	-1.8
3	2488.60	67.1 PK	74.0	-6.9	1.55 V	193	69.0	-1.9
4	2488.60	53.8 AV	54.0	-0.2	1.55 V	193	55.7	-1.9
5	4904.00	39.4 PK	74.0	-34.6	1.58 V	26	37.3	2.1
6	4904.00	35.8 AV	54.0	-18.2	1.58 V	26	33.7	2.1
7	7356.00	44.5 PK	74.0	-29.5	1.54 V	15	35.3	9.2
8	7356.00	31.5 AV	54.0	-22.5	1.54 V	15	22.3	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.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

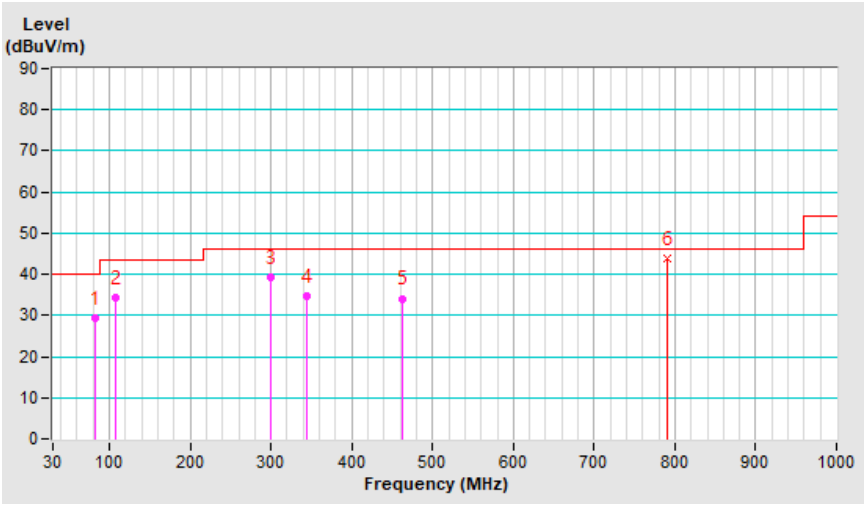
Below 1GHz worst-case data: 802.11ax (HE20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	81.73	29.4 QP	40.0	-10.6	2.00 H	272	42.4	-13.0
2	108.01	34.2 QP	43.5	-9.3	3.00 H	282	44.8	-10.6
3	299.13	39.1 QP	46.0	-6.9	1.00 H	84	45.6	-6.5
4	344.93	34.6 QP	46.0	-11.4	1.00 H	349	40.1	-5.5
5	462.74	34.1 QP	46.0	-11.9	2.00 H	133	36.0	-1.9
6	790.84	44.0 QP	46.0	-2.0	1.00 H	199	39.0	5.0

Remarks:

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

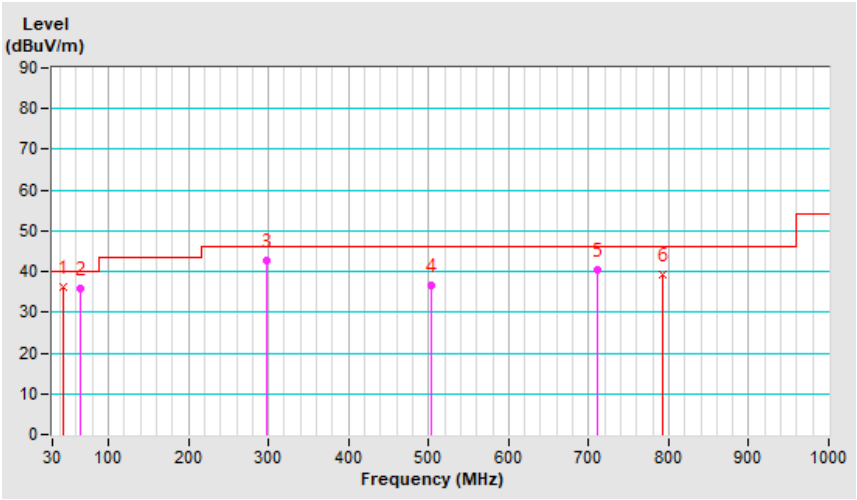


CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	43.22	36.3 QP	40.0	-3.7	1.00 V	142	44.3	-8.0
2	64.43	35.8 QP	40.0	-4.2	3.00 V	196	44.8	-9.0
3	296.90	42.7 QP	46.0	-3.3	2.00 V	185	49.3	-6.6
4	503.61	36.5 QP	46.0	-9.5	1.00 V	192	37.7	-1.2
5	710.93	40.4 QP	46.0	-5.6	1.50 V	112	37.6	2.8
6	792.01	39.4 QP	46.0	-6.6	1.99 V	236	34.3	5.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB 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 R&S	ESCS 30	847124/029	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 23, 2019	Oct. 22, 2020
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 23, 2019	Oct. 22, 2020
RF Cable	5D-FB	COCCAB-001	Sep. 27, 2019	Sep. 26, 2020
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 30, 2019	Aug. 29, 2020
Software BVADT	BVADT_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 Hsinchu Conduction 1.

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.

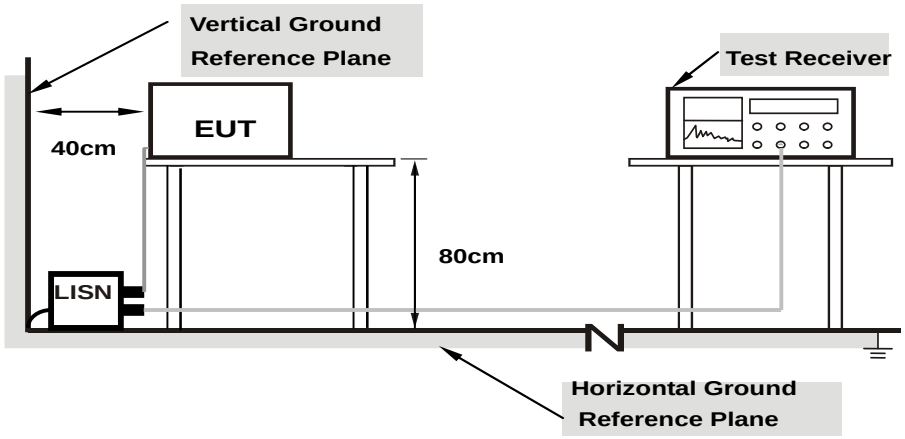
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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:

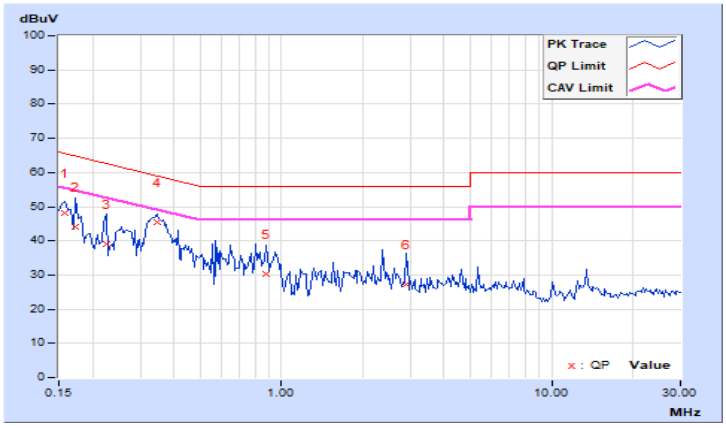
802.11ax (HE20)

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

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	0.15781	9.98	38.33	26.54	48.31	36.52	65.58	55.58	-17.27	-19.06
2	0.17344	9.98	34.03	21.05	44.01	31.03	64.79	54.79	-20.78	-23.76
3	0.22422	9.99	28.99	16.18	38.98	26.17	62.66	52.66	-23.68	-26.49
4	0.34531	10.00	35.53	30.27	45.53	40.27	59.07	49.07	-13.54	-8.80
5	0.87656	10.04	20.21	12.54	30.25	22.58	56.00	46.00	-25.75	-23.42
6	2.88672	10.20	17.12	9.11	27.32	19.31	56.00	46.00	-28.68	-26.69

Remarks:

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

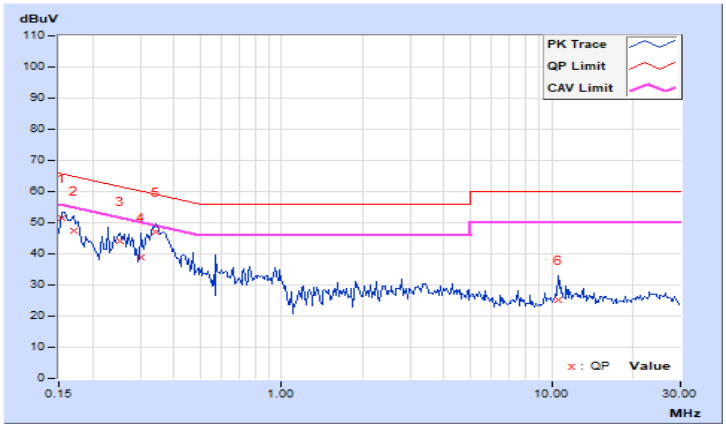


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	9.99	41.34	25.56	51.33	35.55	65.79	55.79	-14.46	-20.24
2	0.16953	9.99	37.49	23.65	47.48	33.64	64.98	54.98	-17.50	-21.34
3	0.25156	10.01	33.90	25.95	43.91	35.96	61.71	51.71	-17.80	-15.75
4	0.30234	10.02	29.04	18.11	39.06	28.13	60.18	50.18	-21.12	-22.05
5	**0.34141**	**10.02**	**37.16**	**31.63**	**47.18**	**41.65**	**59.17**	**49.17**	**-11.99**	**-7.52**
6	10.57422	10.63	14.55	7.63	25.18	18.26	60.00	50.00	-34.82	-31.74

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.

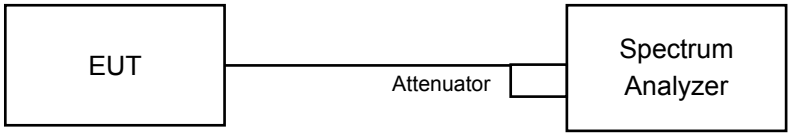


4.3 6dB Bandwidth Measurement

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 fromTest 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	Chain 2	Chain 3		
1	2412	8.09	8.08	8.09	8.08	0.5	Pass
6	2437	8.09	8.08	8.09	7.58	0.5	Pass
11	2462	8.09	7.58	8.09	8.09	0.5	Pass

802.11g

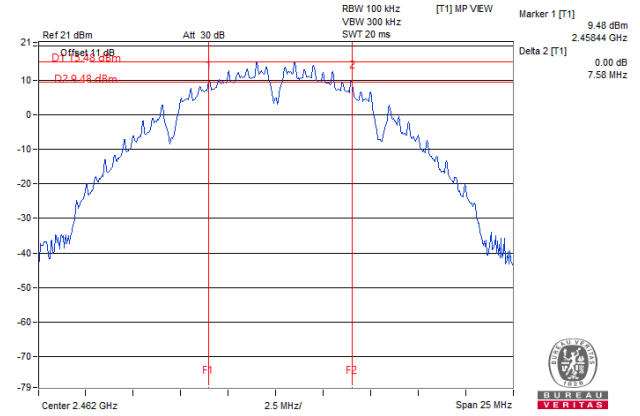
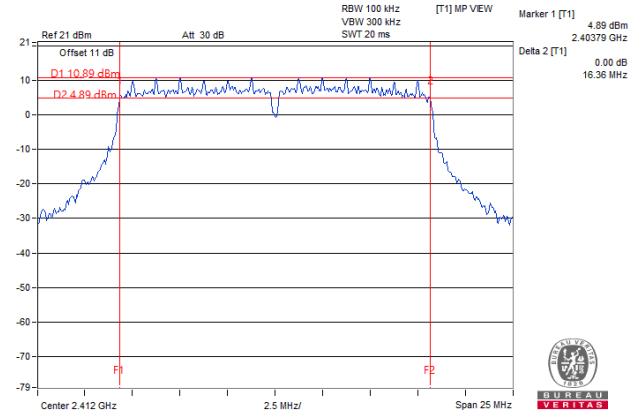
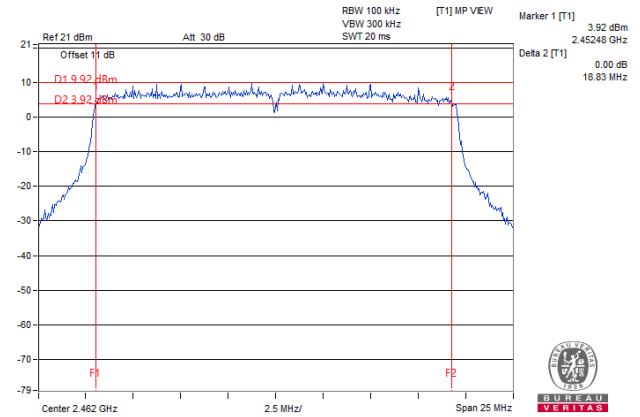
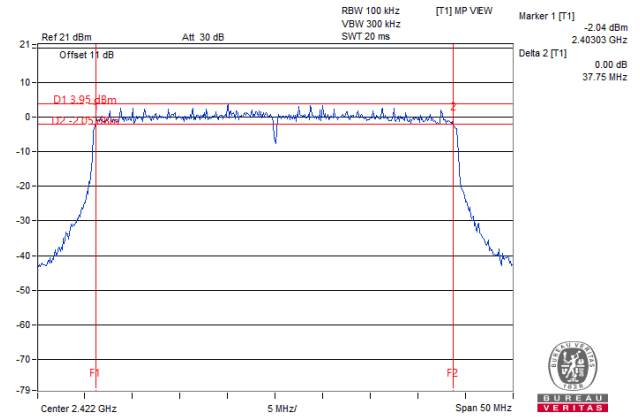
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	16.37	16.36	16.36	16.38	0.5	Pass
6	2437	16.37	16.36	16.36	16.38	0.5	Pass
11	2462	16.37	16.37	16.37	16.39	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	18.96	18.92	18.99	18.93	0.5	Pass
6	2437	19.00	18.97	18.93	18.90	0.5	Pass
11	2462	19.01	18.96	18.83	18.83	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	38.02	37.75	37.92	37.99	0.5	Pass
6	2437	38.07	38.03	37.82	38.14	0.5	Pass
9	2452	38.08	37.82	38.02	37.90	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

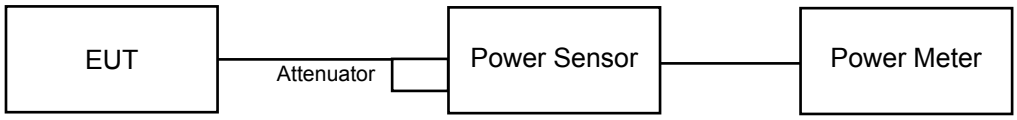
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	23.56	24.11	23.41	23.72	939.404	29.73	30	Pass
6	2437	23.42	23.88	23.39	23.65	914.141	29.61	30	Pass
11	2462	23.67	23.86	23.07	23.51	903.186	29.56	30	Pass

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	22.87	23.23	22.90	23.04	800.377	29.03	30	Pass
6	2437	23.56	23.78	23.67	23.92	945.181	29.76	30	Pass
11	2462	22.64	22.76	22.11	22.60	716.978	28.56	30	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.04	21.14	21.05	21.27	518.392	27.15	30	Pass
6	2437	23.72	24.08	23.29	23.71	939.631	29.73	30	Pass
11	2462	21.26	21.33	21.07	21.77	547.743	27.39	30	Pass

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	18.05	18.26	18.06	18.40	263.971	24.22	30	Pass
6	2437	20.76	20.85	20.53	20.75	472.573	26.74	30	Pass
9	2452	15.10	15.28	14.79	15.16	129.028	21.11	30	Pass

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.06	21.22	21.06	21.31	522.929	27.18	30	Pass
6	2437	23.76	24.15	23.37	23.77	**953.202**	29.79	30	Pass
11	2462	21.34	21.36	21.09	21.81	553.151	27.43	30	Pass

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	18.15	18.32	18.14	18.49	269.028	24.30	30	Pass
6	2437	20.81	20.92	20.54	20.81	477.842	26.79	30	Pass
9	2452	15.20	15.31	14.88	15.27	131.488	21.19	30	Pass

Beamforming Mode

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.04	21.14	21.05	21.27	518.392	27.15	29.19	Pass
6	2437	23.04	23.40	22.78	23.03	810.728	29.09	29.19	Pass
11	2462	21.26	21.33	21.07	21.77	547.743	27.39	29.19	Pass

*Directional gain = 6.81dBi > 6dBi, so the power limit shall be reduced to 30-(6.81-6) = 29.19dBm

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	18.05	18.26	18.06	18.40	263.971	24.22	29.19	Pass
6	2437	20.76	20.85	20.53	20.75	472.573	26.74	29.19	Pass
9	2452	15.10	15.28	14.79	15.16	129.028	21.11	29.19	Pass

*Directional gain = 6.81dBi > 6dBi, so the power limit shall be reduced to 30-(6.81-6) = 29.19dBm

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	21.06	21.22	21.06	21.31	522.929	27.18	29.19	Pass
6	2437	23.08	23.47	22.92	23.09	**825.155**	29.17	29.19	Pass
11	2462	21.34	21.36	21.09	21.81	553.151	27.43	29.19	Pass

*Directional gain = 6.81dBi > 6dBi, so the power limit shall be reduced to 30-(6.81-6) = 29.19dBm

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	18.15	18.32	18.14	18.49	269.028	24.30	29.19	Pass
6	2437	20.81	20.92	20.54	20.81	477.842	26.79	29.19	Pass
9	2452	15.20	15.31	14.88	15.27	131.488	21.19	29.19	Pass

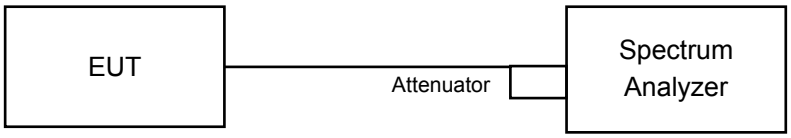
*Directional gain = 6.81dBi > 6dBi, so the power limit shall be reduced to 30-(6.81-6) = 29.19dBm

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For Average Power (Duty cycle ≥ 98%)
a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

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	Freq. (MHz)	PSD w/o Duty Factor (dBm/10kHz)	10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-10.01	6.02	0.13	-3.86	7.19	Pass
	6	2437	-10.08	6.02	0.13	-3.93	7.19	Pass
	11	2462	-9.23	6.02	0.13	-3.08	7.19	Pass
1	1	2412	-8.79	6.02	0.13	-2.64	7.19	Pass
	6	2437	-9.90	6.02	0.13	-3.75	7.19	Pass
	11	2462	-9.33	6.02	0.13	-3.18	7.19	Pass
2	1	2412	-9.76	6.02	0.13	-3.61	7.19	Pass
	6	2437	-9.72	6.02	0.13	-3.57	7.19	Pass
	11	2462	-10.10	6.02	0.13	-3.95	7.19	Pass
3	1	2412	-9.67	6.02	0.13	-3.52	7.19	Pass
	6	2437	-10.08	6.02	0.13	-3.93	7.19	Pass
	11	2462	-9.23	6.02	0.13	-3.08	7.19	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 6.81dBi > 6dBi, so the power density limit shall be reduced to 8-(6.81-6) = 7.19dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11g

TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/10kHz)	10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-14.46	6.02	0.33	-8.11	7.19	Pass
	6	2437	-13.49	6.02	0.33	-7.14	7.19	Pass
	11	2462	-14.63	6.02	0.33	-8.28	7.19	Pass
1	1	2412	-14.13	6.02	0.33	-7.78	7.19	Pass
	6	2437	-13.65	6.02	0.33	-7.3	7.19	Pass
	11	2462	-14.70	6.02	0.33	-8.35	7.19	Pass
2	1	2412	-14.27	6.02	0.33	-7.92	7.19	Pass
	6	2437	-13.76	6.02	0.33	-7.41	7.19	Pass
	11	2462	-14.75	6.02	0.33	-8.4	7.19	Pass
3	1	2412	-14.24	6.02	0.33	-7.89	7.19	Pass
	6	2437	-13.49	6.02	0.33	-7.14	7.19	Pass
	11	2462	-14.63	6.02	0.33	-8.28	7.19	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 6.81dBi > 6dBi, so the power density limit shall be reduced to 8-(6.81-6) = 7.19dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

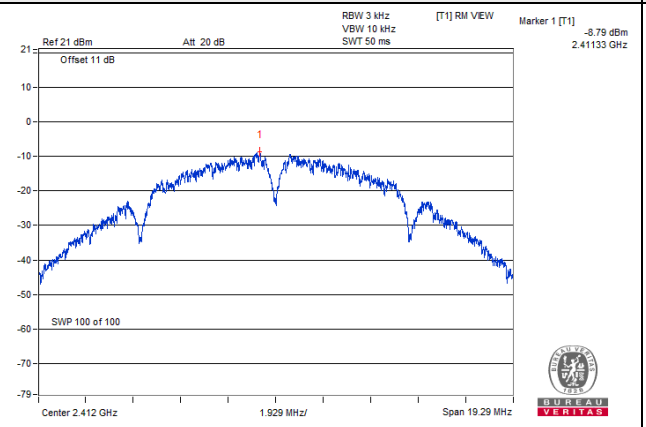
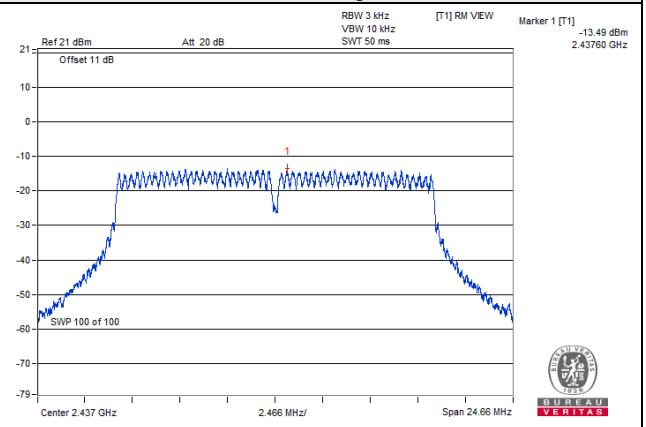
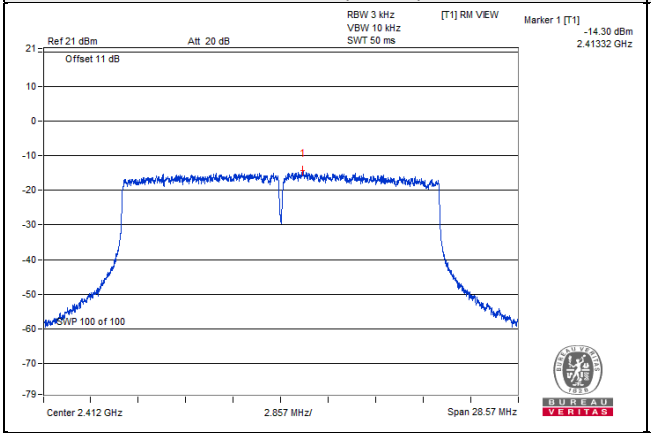
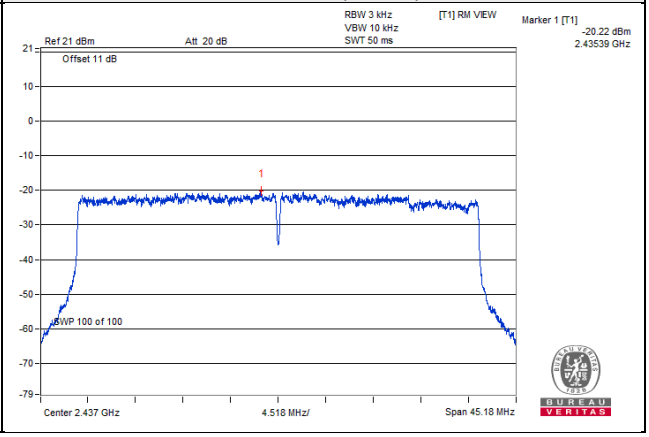
TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/10kHz)	10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	1	2412	-17.80	6.02	0.22	-11.56	7.19	Pass
	6	2437	-14.85	6.02	0.22	-8.61	7.19	Pass
	11	2462	-16.76	6.02	0.22	-10.52	7.19	Pass
1	1	2412	-17.17	6.02	0.22	-10.93	7.19	Pass
	6	2437	-14.47	6.02	0.22	-8.23	7.19	Pass
	11	2462	-17.03	6.02	0.22	-10.79	7.19	Pass
2	1	2412	-16.59	6.02	0.22	-10.35	7.19	Pass
	6	2437	-14.91	6.02	0.22	-8.67	7.19	Pass
	11	2462	-17.13	6.02	0.22	-10.89	7.19	Pass
3	1	2412	-14.30	6.02	0.22	-8.06	7.19	Pass
	6	2437	-14.85	6.02	0.22	-8.61	7.19	Pass
	11	2462	-16.76	6.02	0.22	-10.52	7.19	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 6.81dBi > 6dBi, so the power density limit shall be reduced to 8-(6.81-6) = 7.19dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

TX chain	Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/10kHz)	10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/10kHz)	Limit (dBm/3kHz)	Pass / Fail
0	3	2422	-23.20	6.02	0.29	-16.89	7.19	Pass
	6	2437	-20.66	6.02	0.29	-14.35	7.19	Pass
	9	2452	-26.27	6.02	0.29	-19.96	7.19	Pass
1	3	2422	-23.03	6.02	0.29	-16.72	7.19	Pass
	6	2437	-20.56	6.02	0.29	-14.25	7.19	Pass
	9	2452	-26.09	6.02	0.29	-19.78	7.19	Pass
2	3	2422	-22.55	6.02	0.29	-16.24	7.19	Pass
	6	2437	-20.22	6.02	0.29	-13.91	7.19	Pass
	9	2452	-25.54	6.02	0.29	-19.23	7.19	Pass
3	3	2422	-22.79	6.02	0.29	-16.48	7.19	Pass
	6	2437	-20.66	6.02	0.29	-14.35	7.19	Pass
	9	2452	-26.27	6.02	0.29	-19.96	7.19	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 6.81dBi > 6dBi, so the power density limit shall be reduced to 8-(6.81-6) = 7.19dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

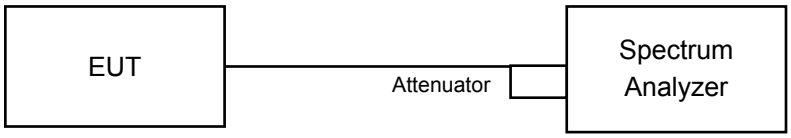
Spectrum Plot of Worst Value	
802.11b	802.11g
	
802.11ax (HE20)	802.11ax (HE40)
	

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

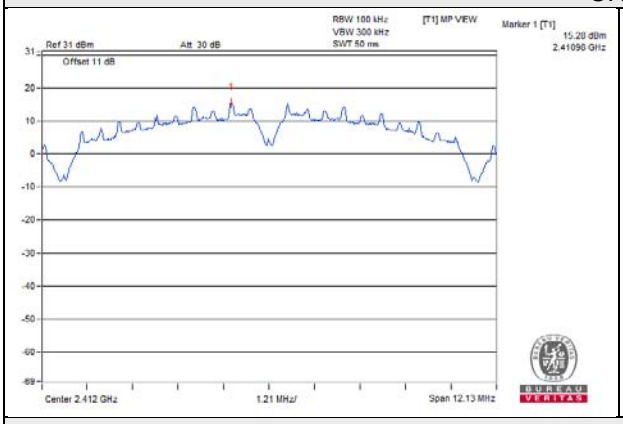
Same as item 4.3.6.

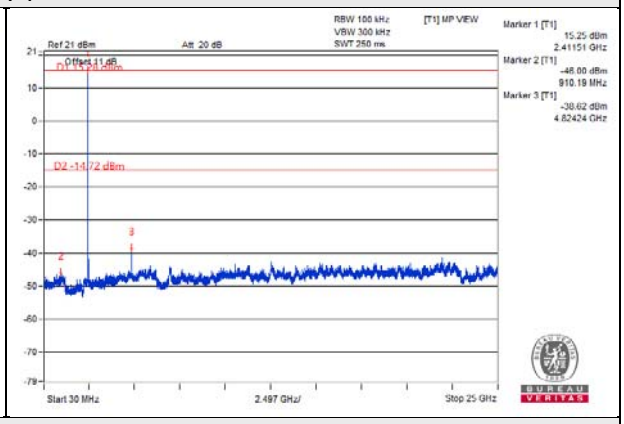
4.6.7 Test Results

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.

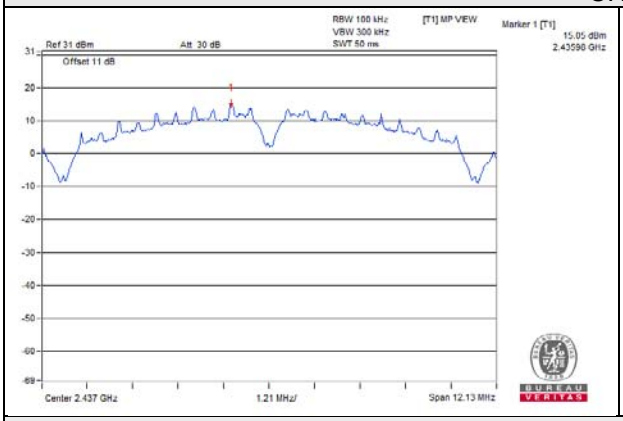
802.11b_Chain 0

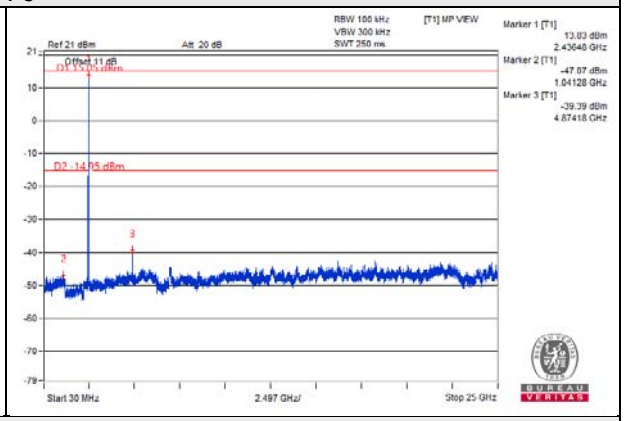
CH 1



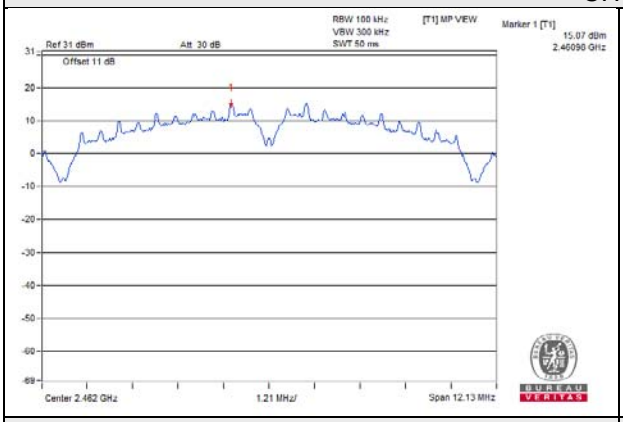


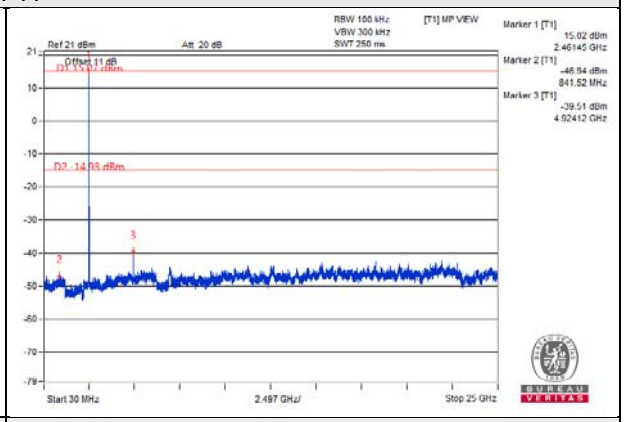
CH 6



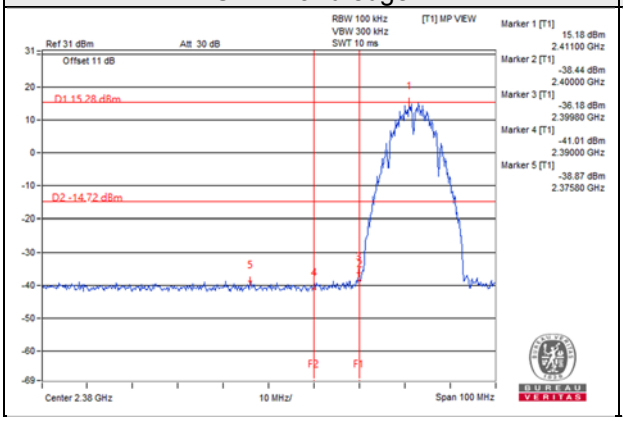


CH 11

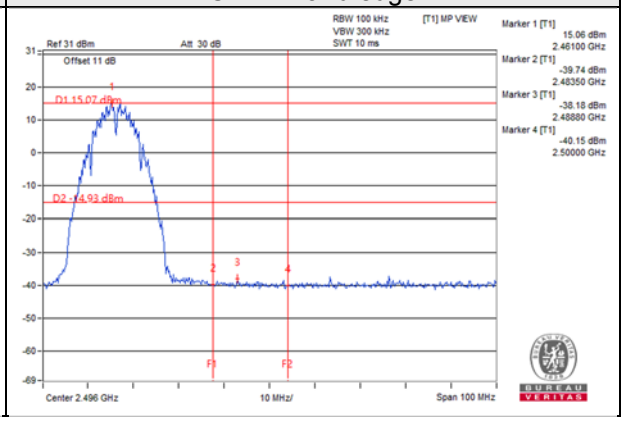




CH 1 Band edge

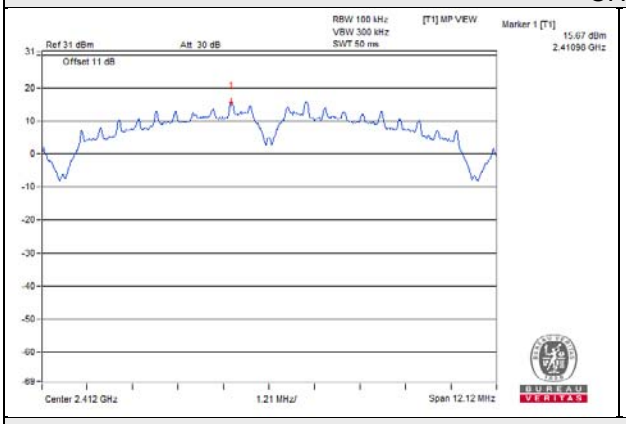


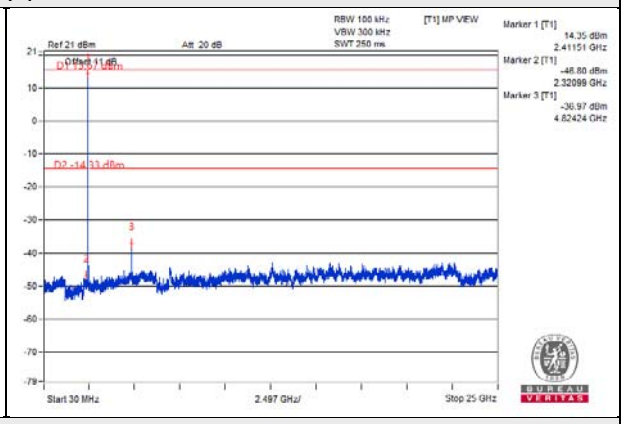
CH 11 Band edge



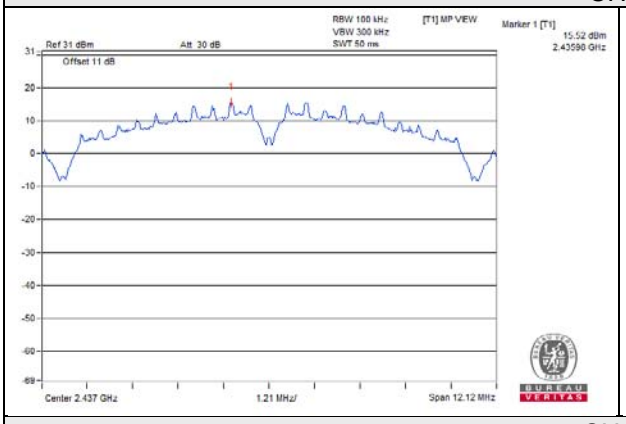
802.11b_Chain 1

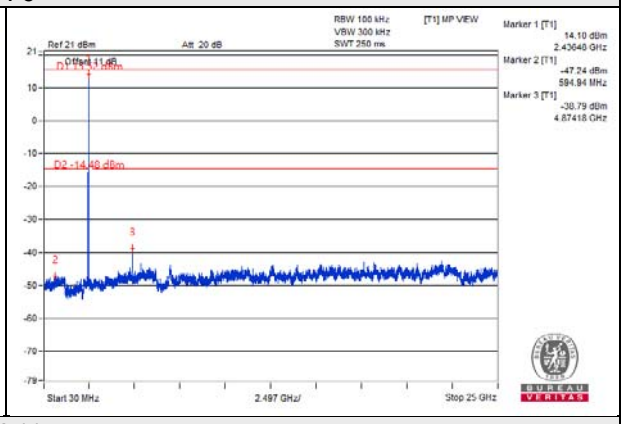
CH 1



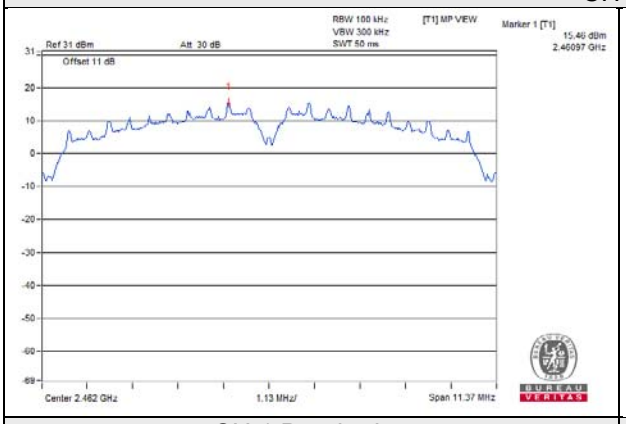


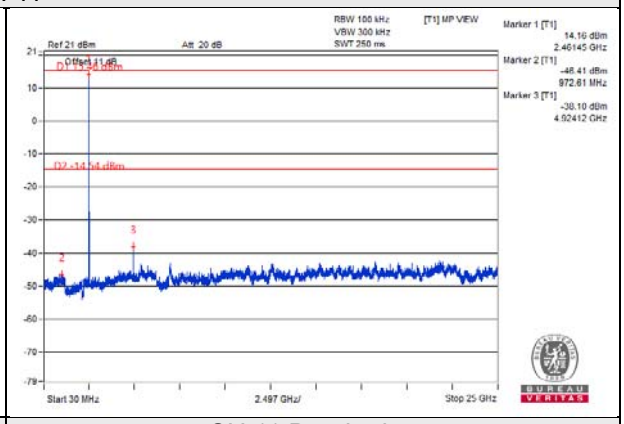
CH 6



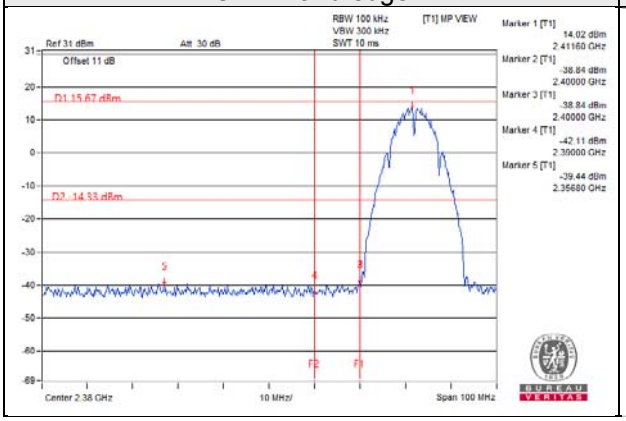


CH 11

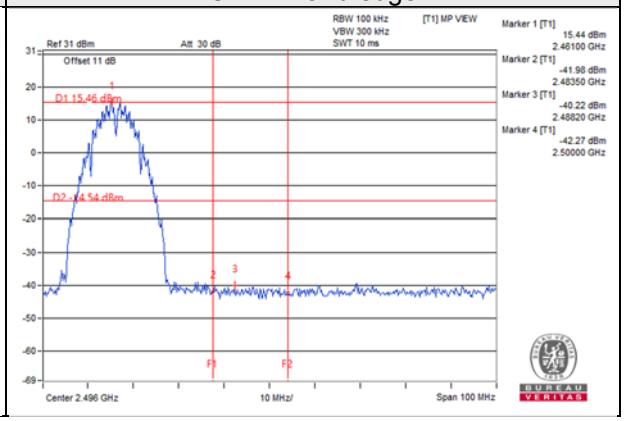




CH 1 Band edge

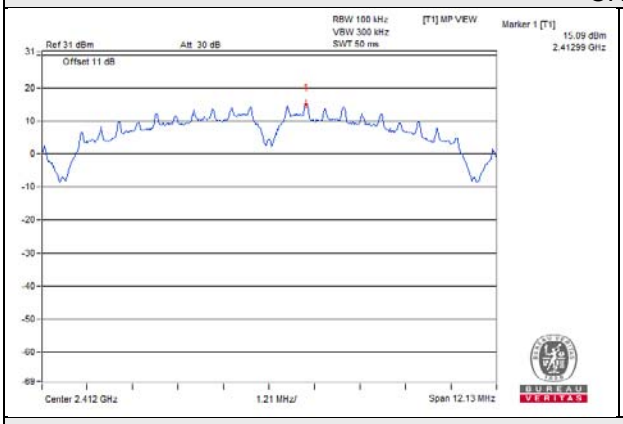


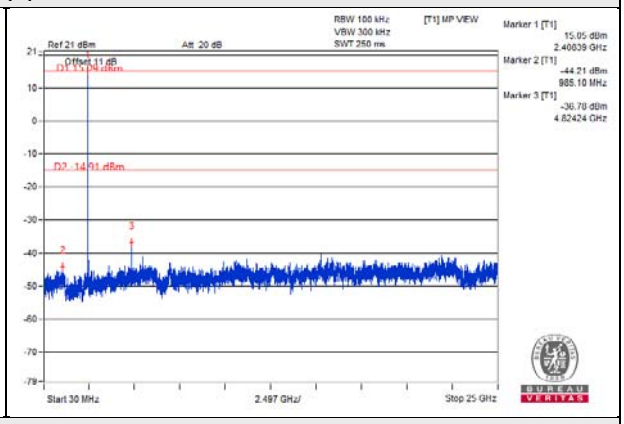
CH 11 Band edge



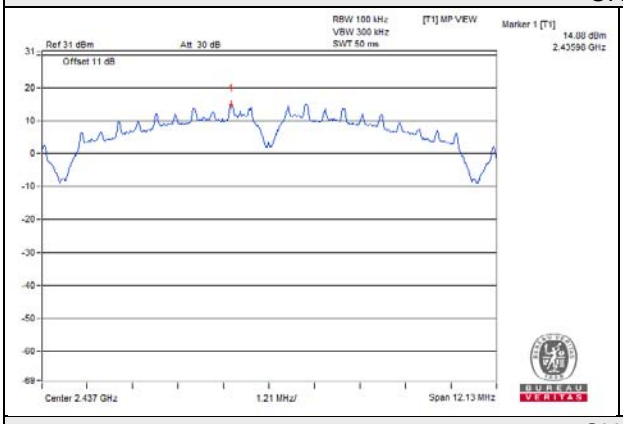
802.11b_Chain 2

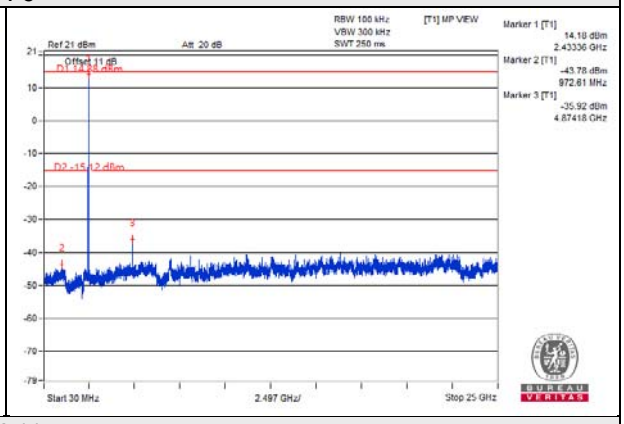
CH 1



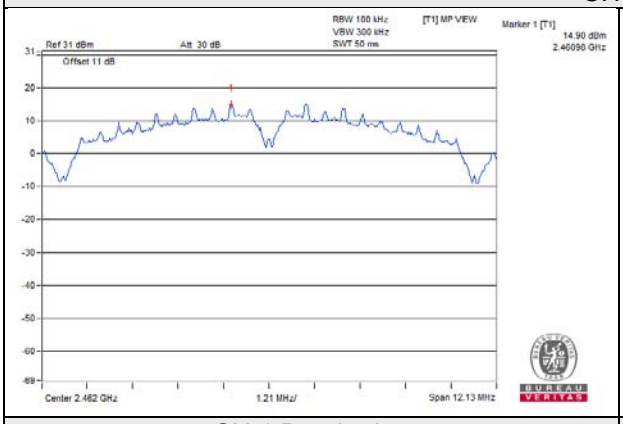


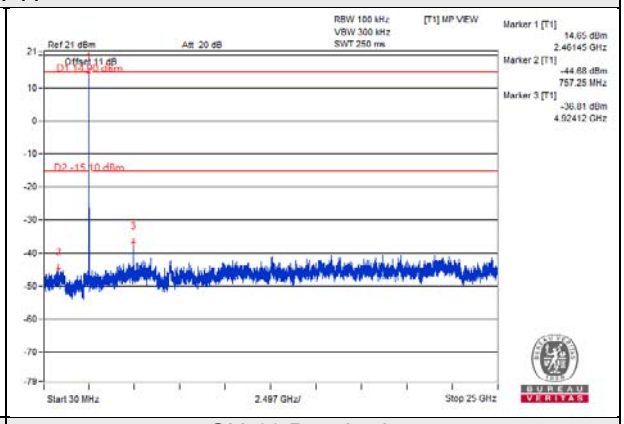
CH 6



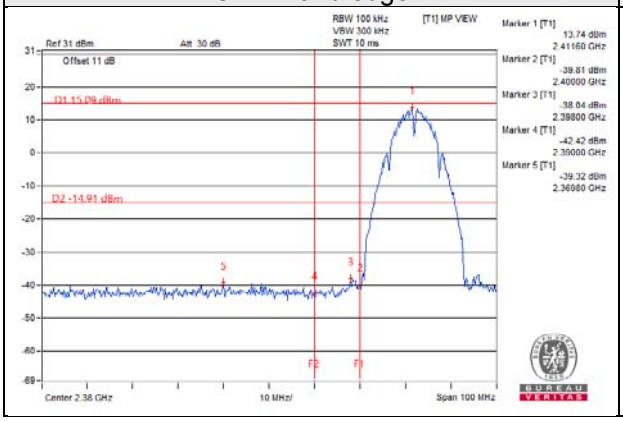


CH 11

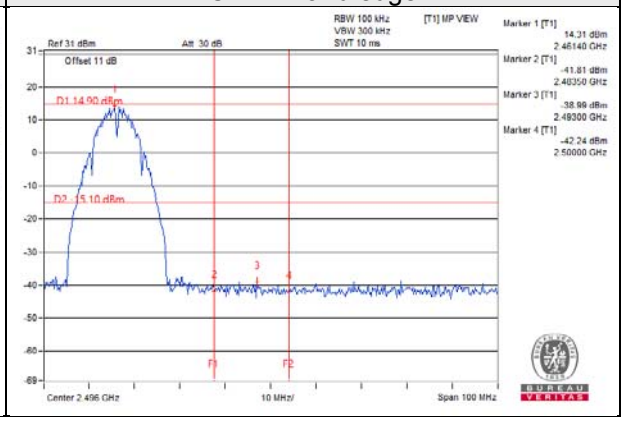




CH 1 Band edge

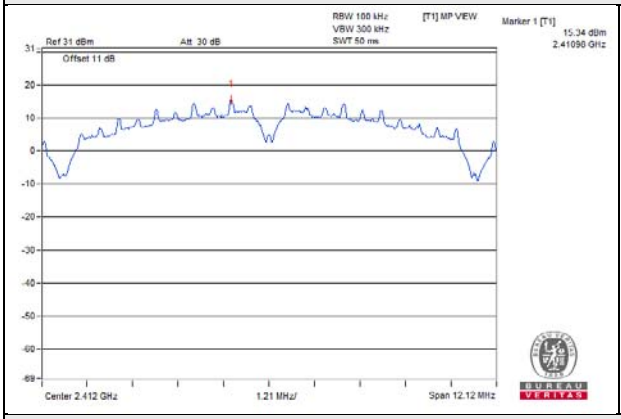


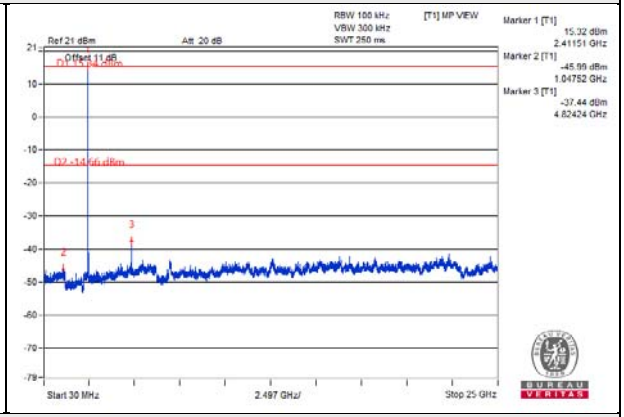
CH 11 Band edge



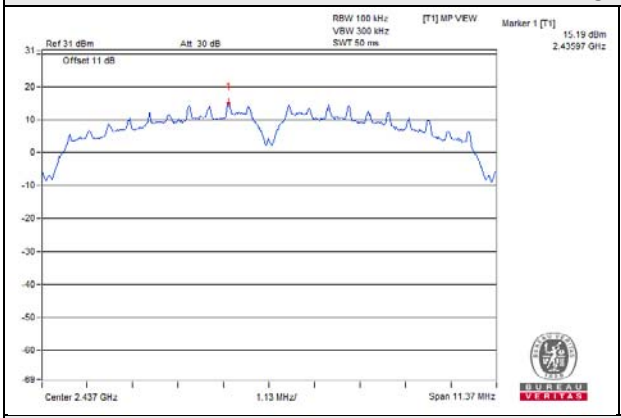
802.11b_Chain 3

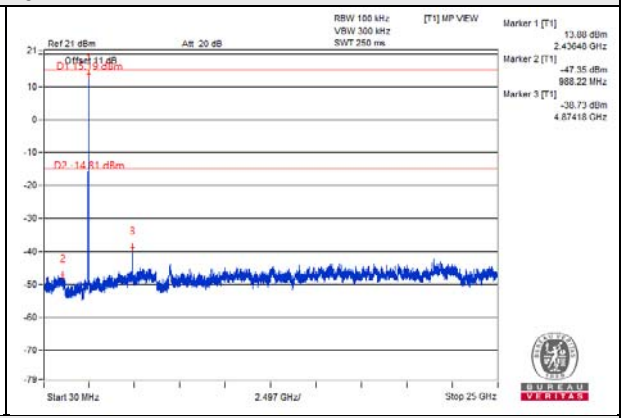
CH 1



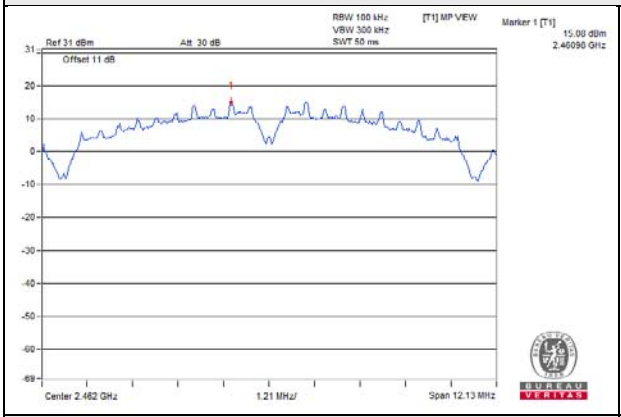


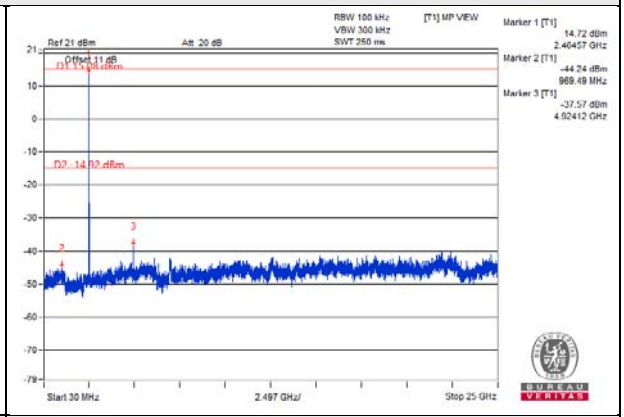
CH 6



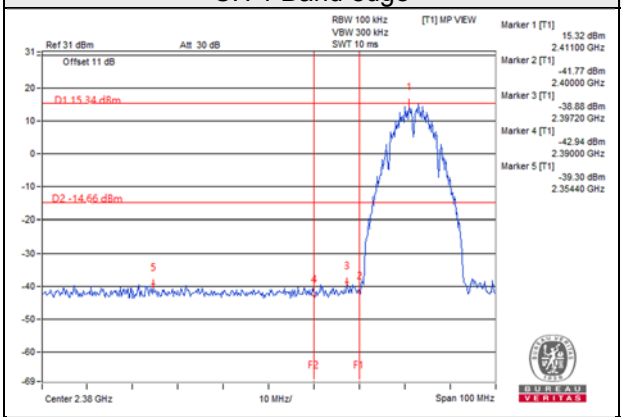


CH 11

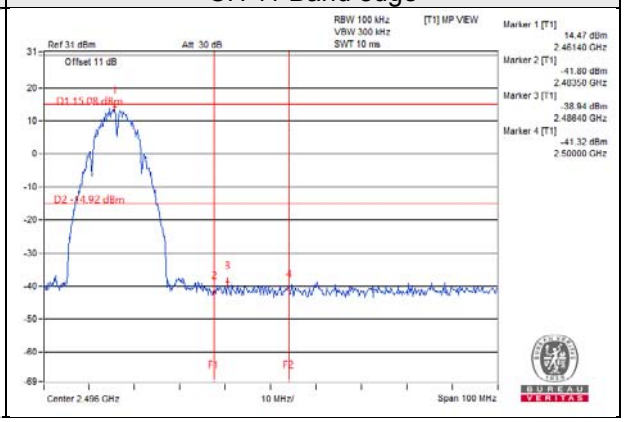




CH 1 Band edge

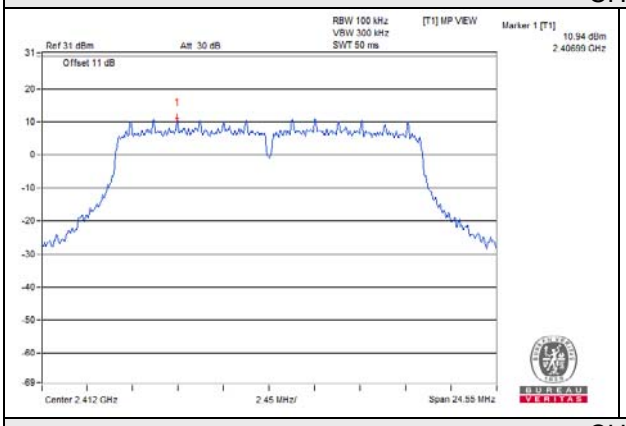


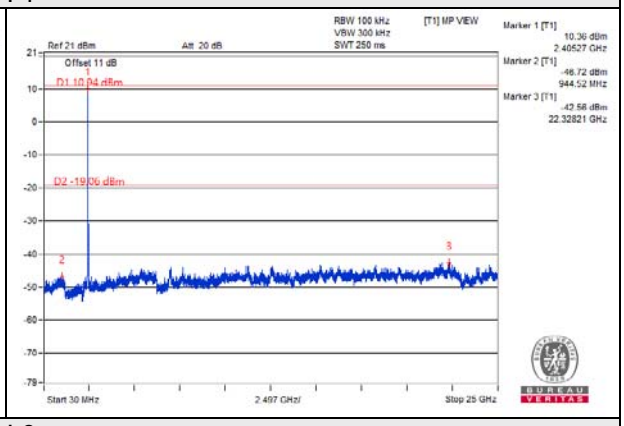
CH 11 Band edge



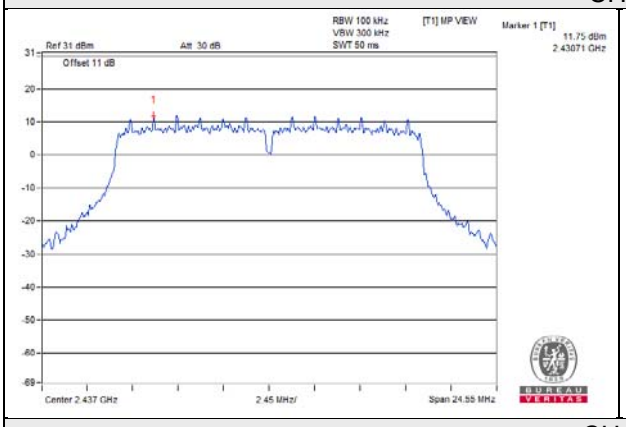
802.11g_Chain 0

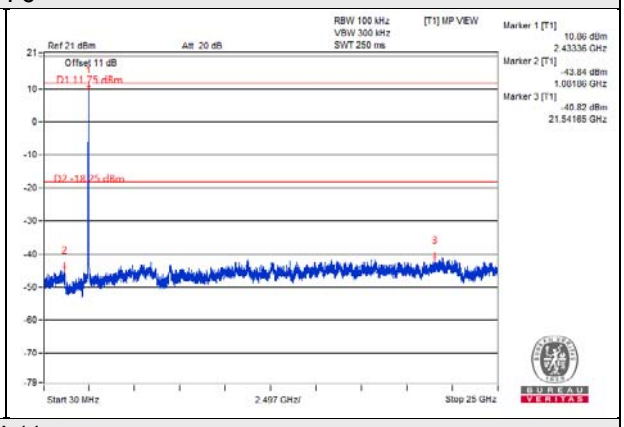
CH 1



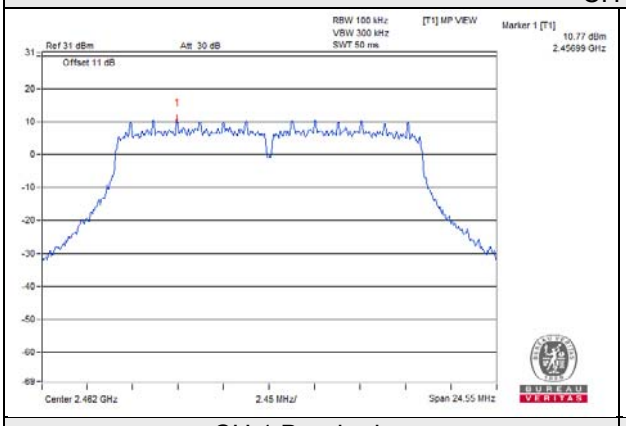


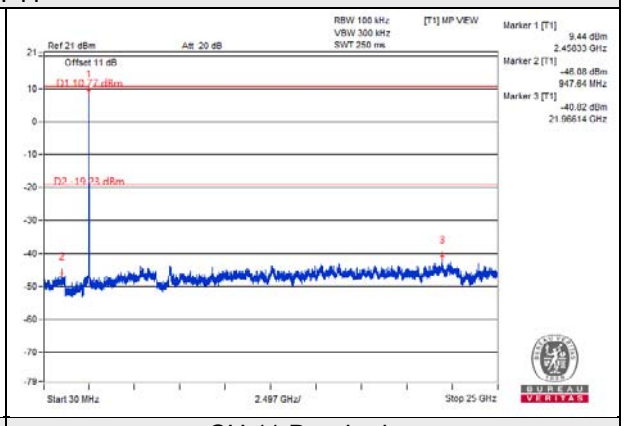
CH 6



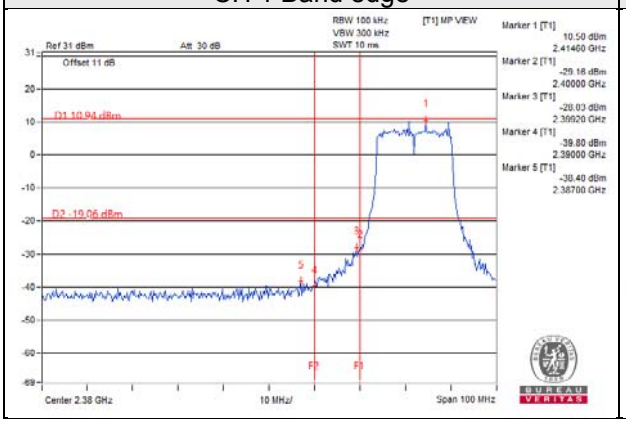


CH 11

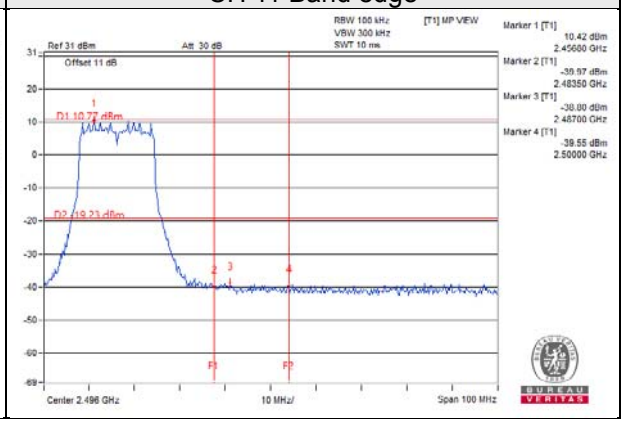




CH 1 Band edge

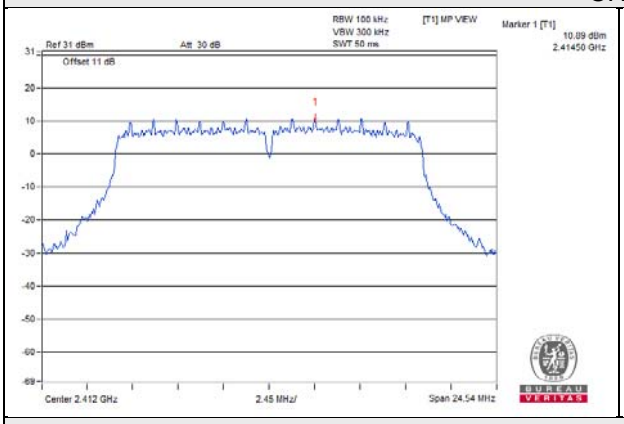


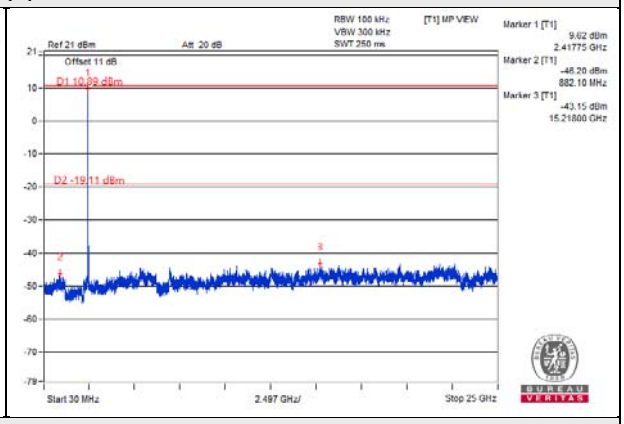
CH 11 Band edge



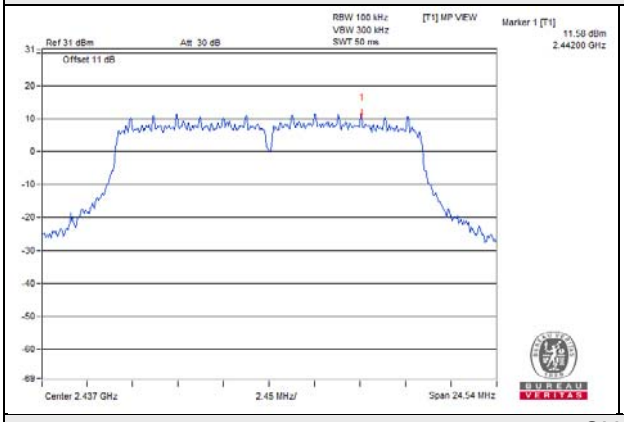
802.11g_Chain 1

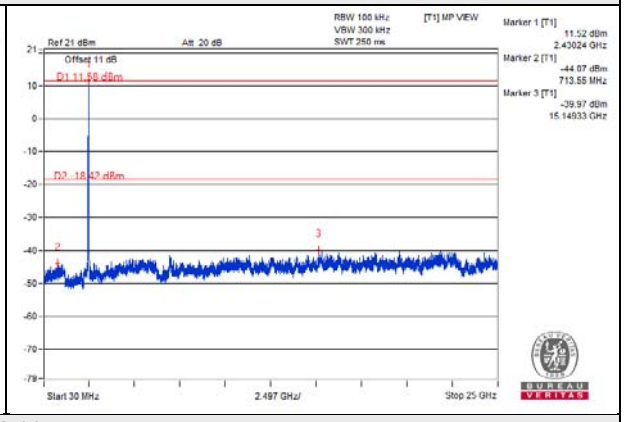
CH 1



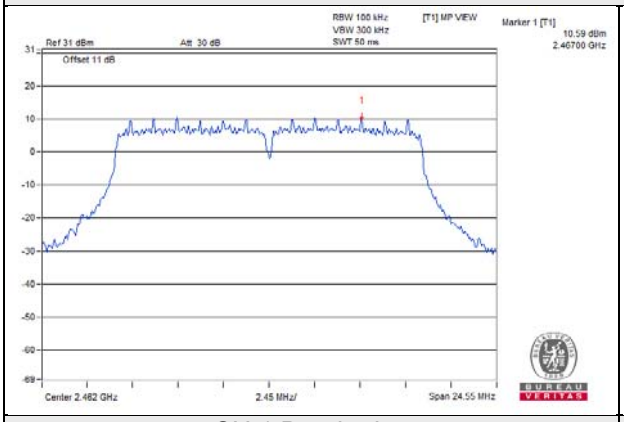


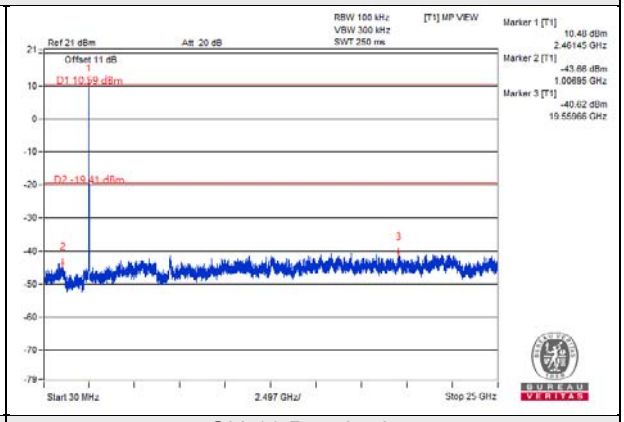
CH 6



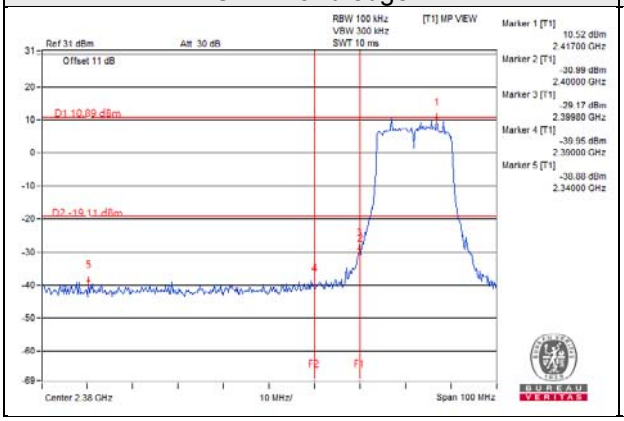


CH 11

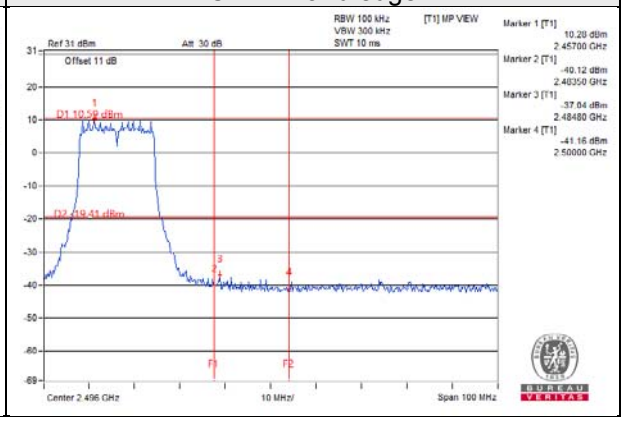




CH 1 Band edge

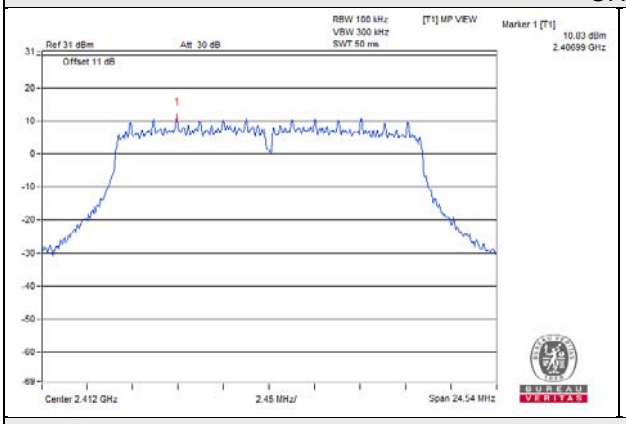


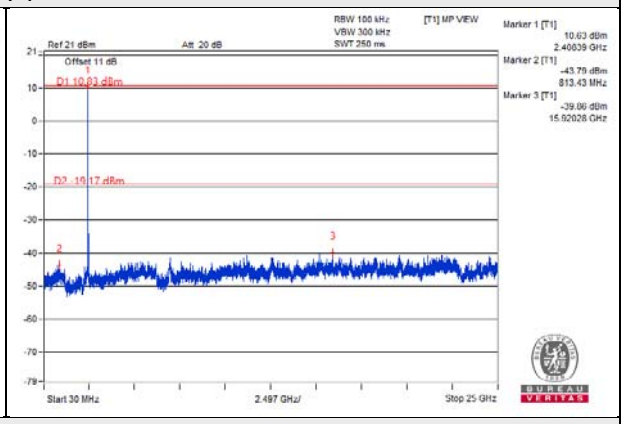
CH 11 Band edge



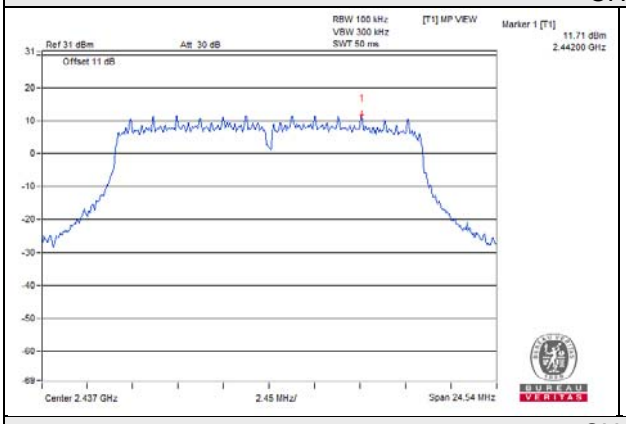
802.11g_Chain 2

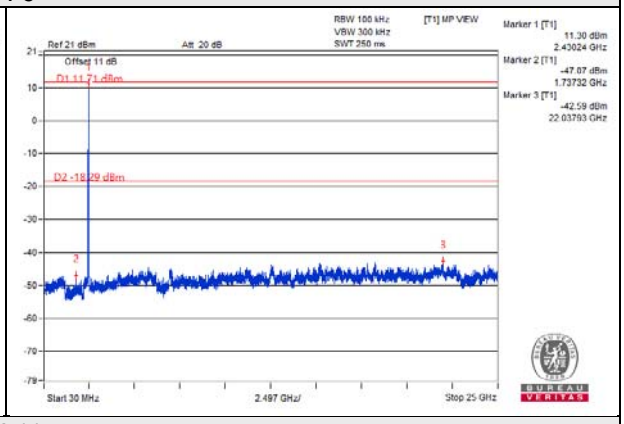
CH 1



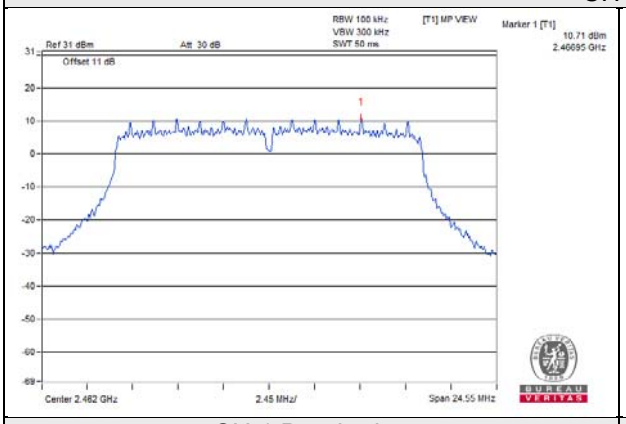


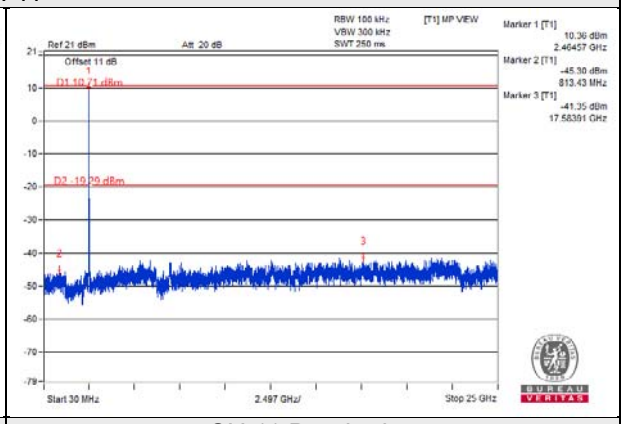
CH 6



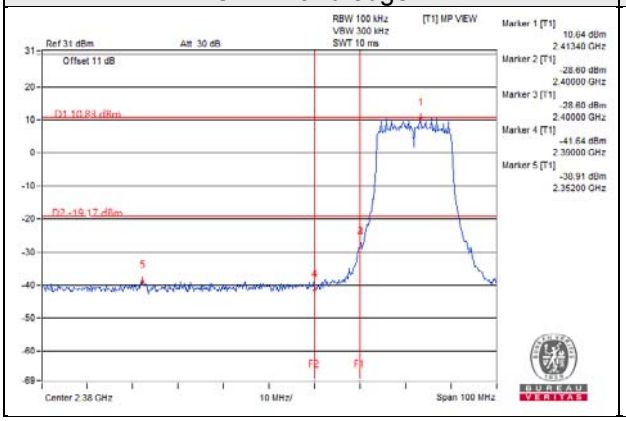


CH 11

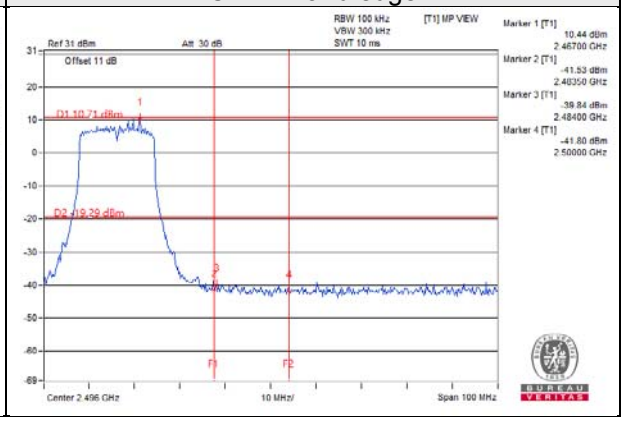




CH 1 Band edge

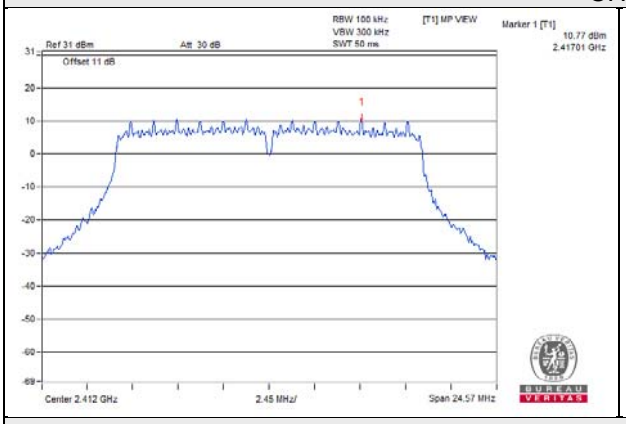


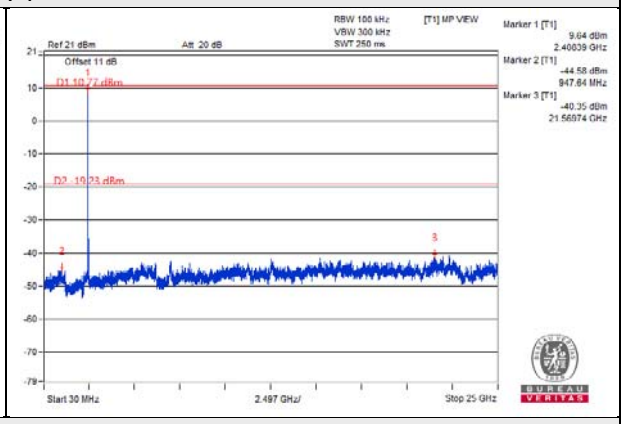
CH 11 Band edge



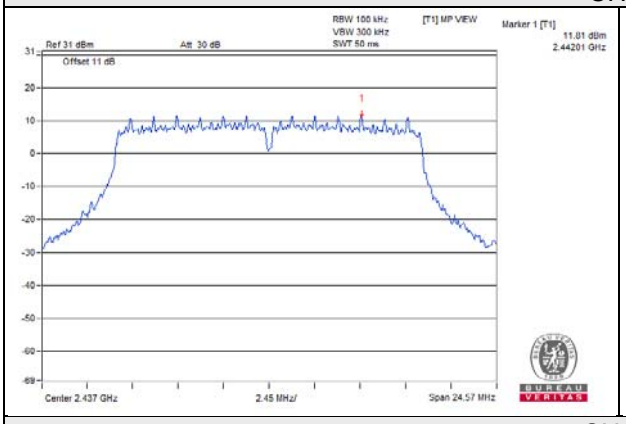
802.11g_Chain 3

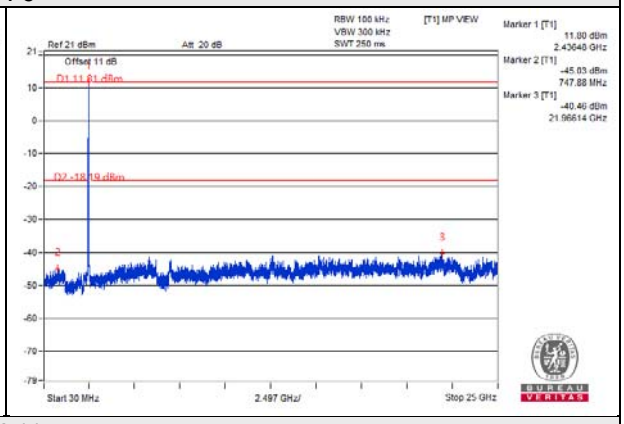
CH 1



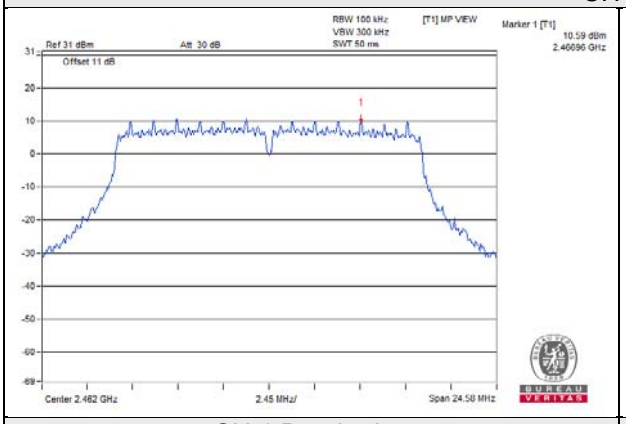


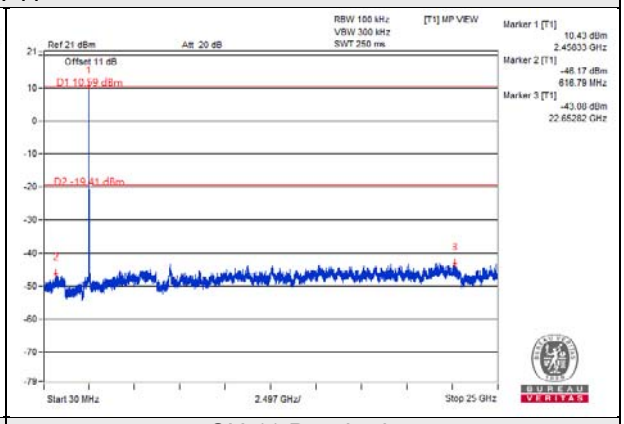
CH 6



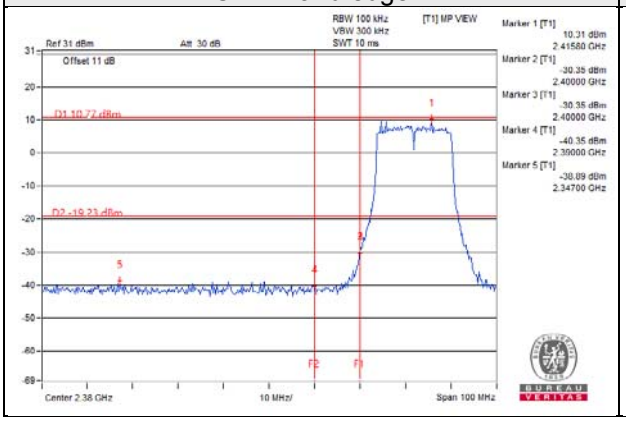


CH 11

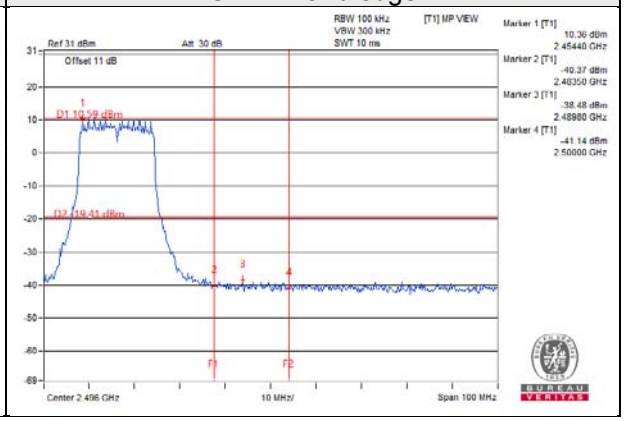




CH 1 Band edge

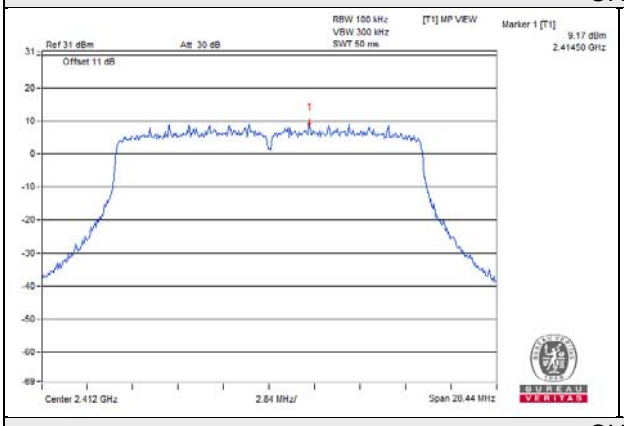


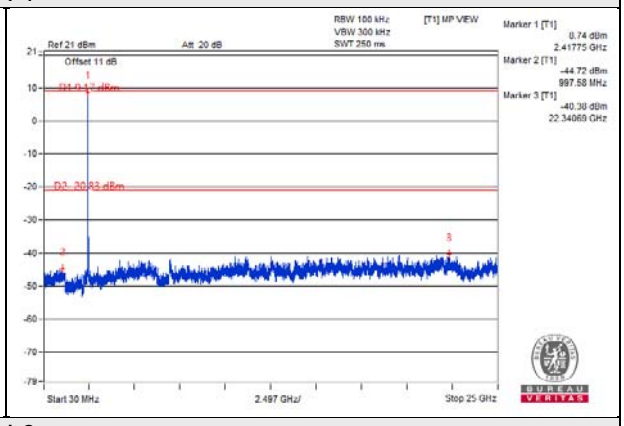
CH 11 Band edge



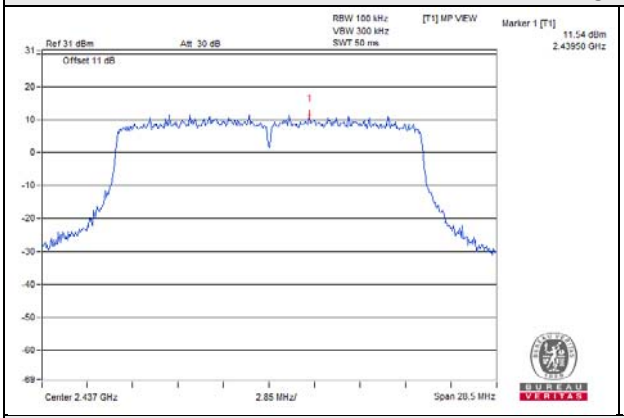
802.11ax (HE20)_Chain 0

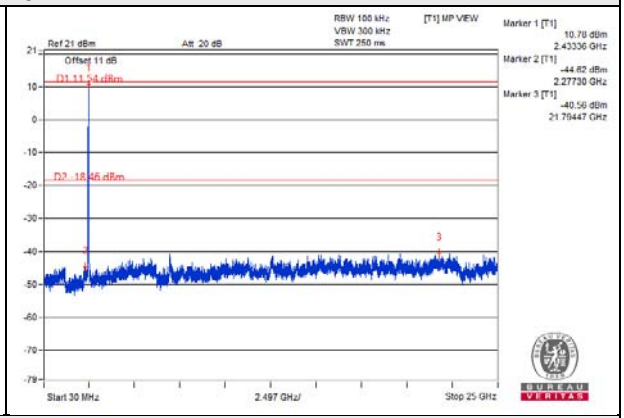
CH 1



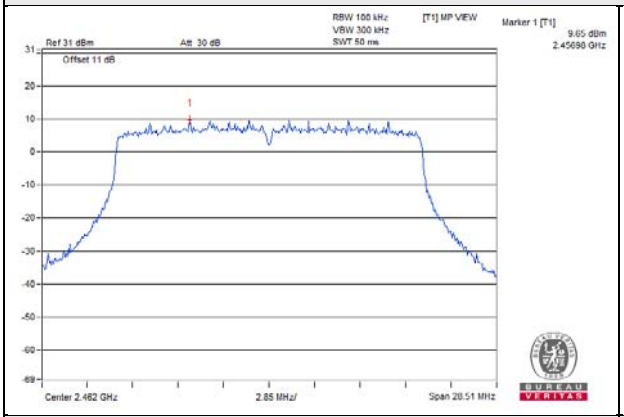


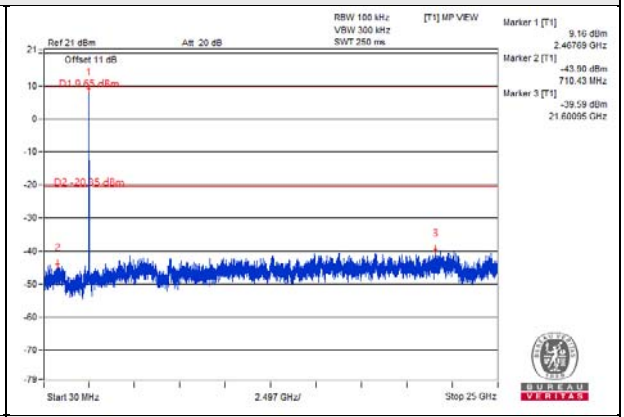
CH 6



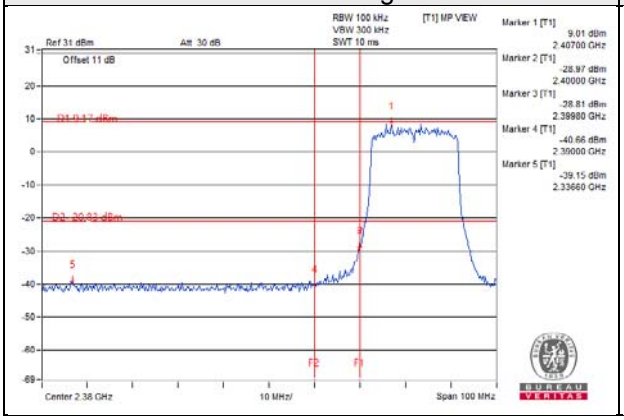


CH 11

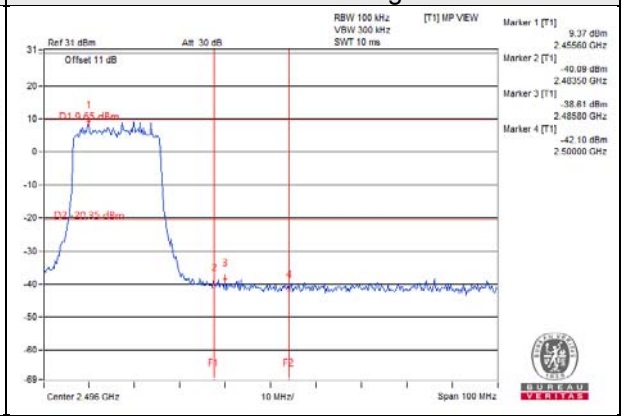




CH 1 Band edge

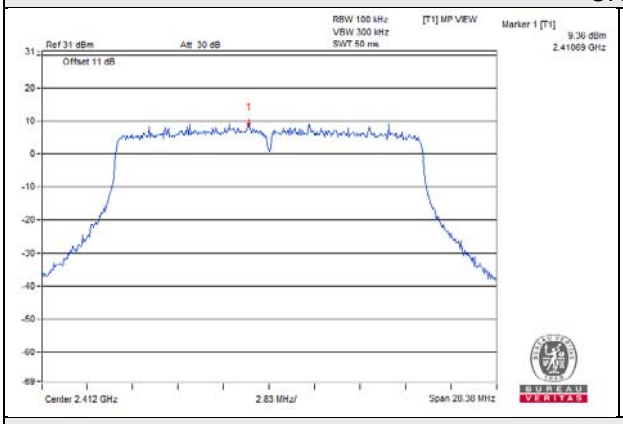


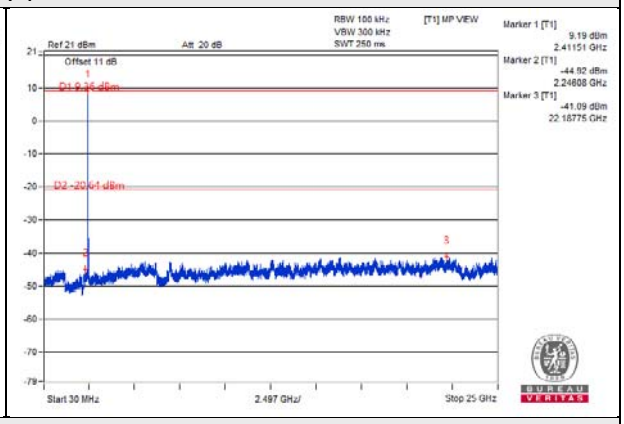
CH 11 Band edge



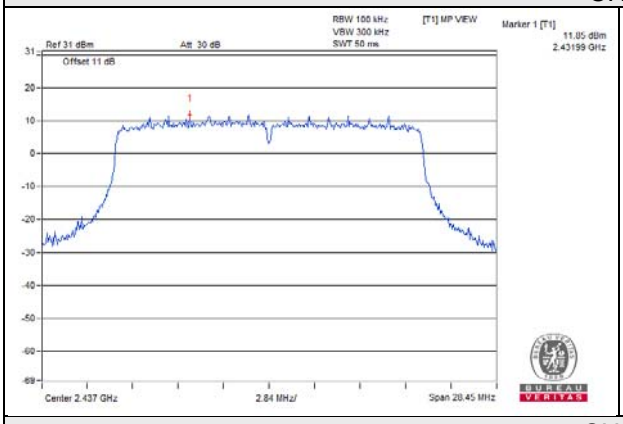
802.11ax (HE20)_Chain 1

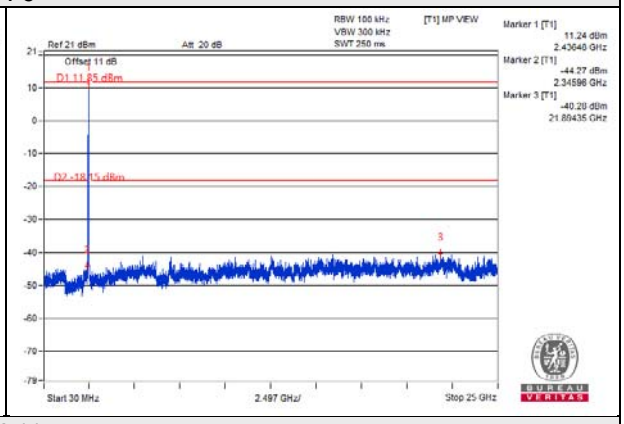
CH 1



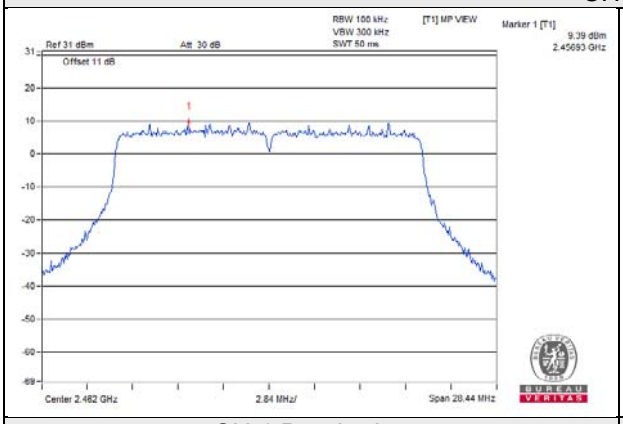


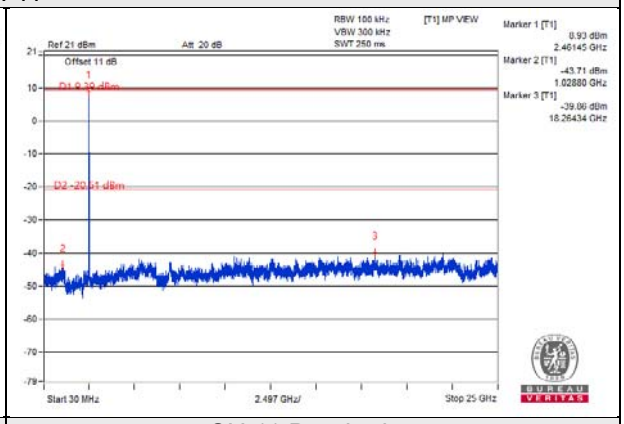
CH 6



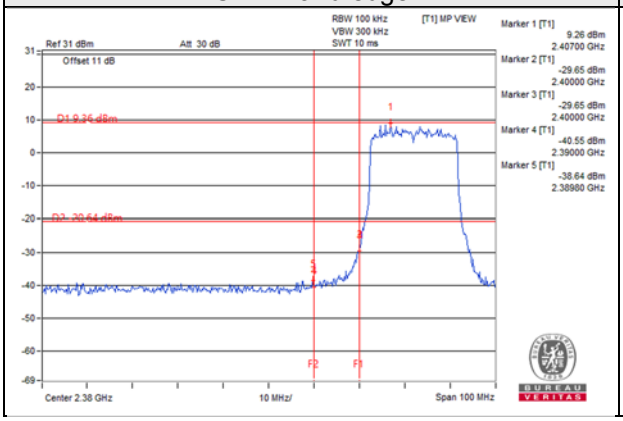


CH 11

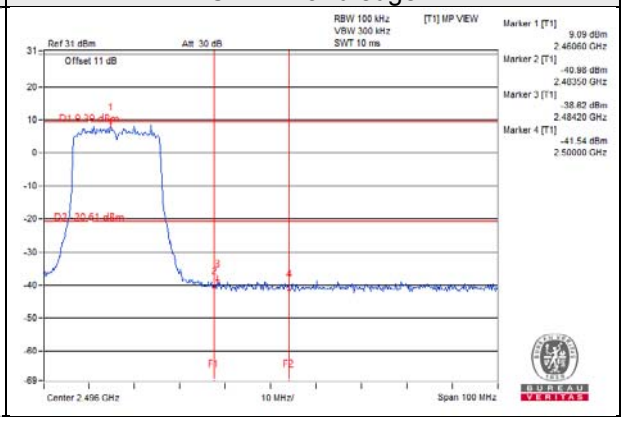




CH 1 Band edge

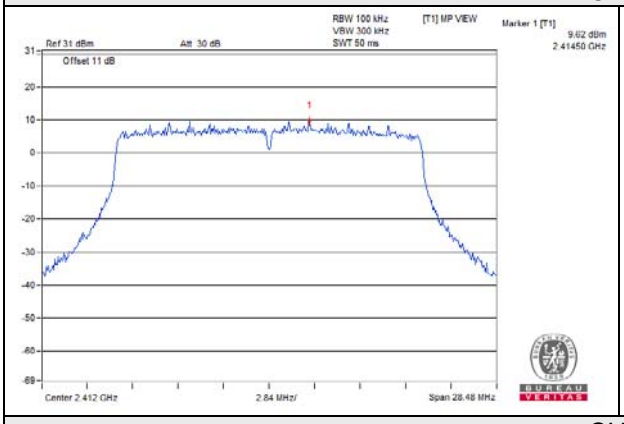


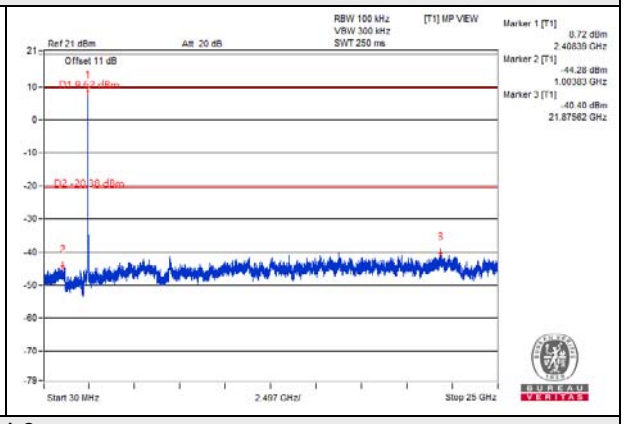
CH 11 Band edge



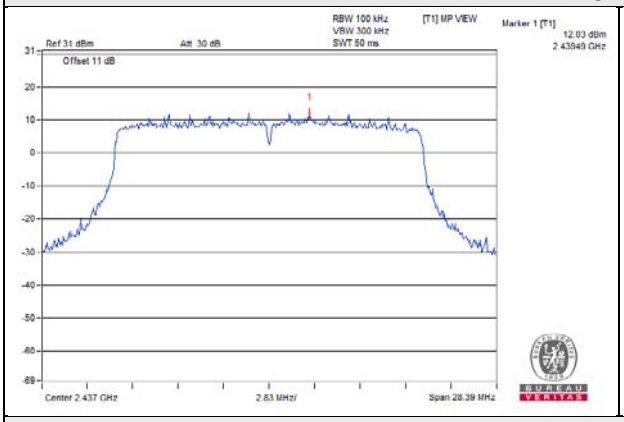
802.11ax (HE20)_Chain 2

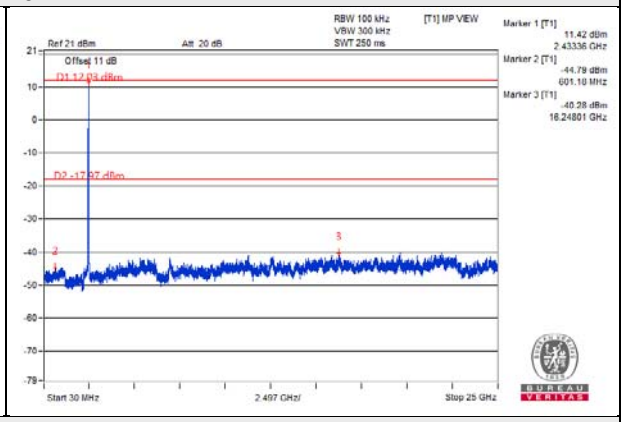
CH 1



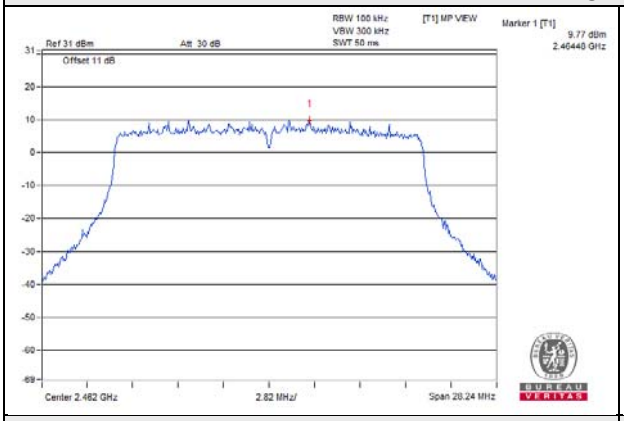


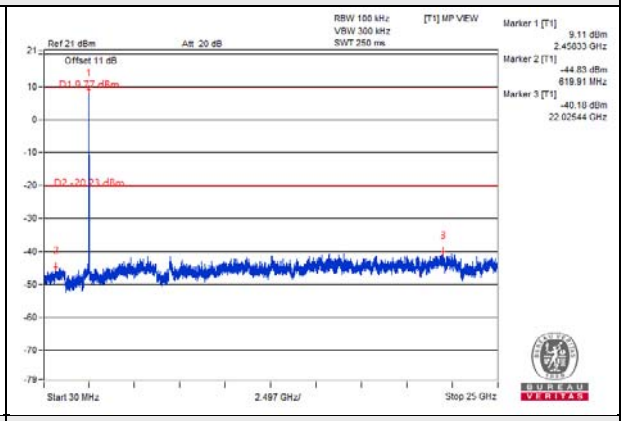
CH 6



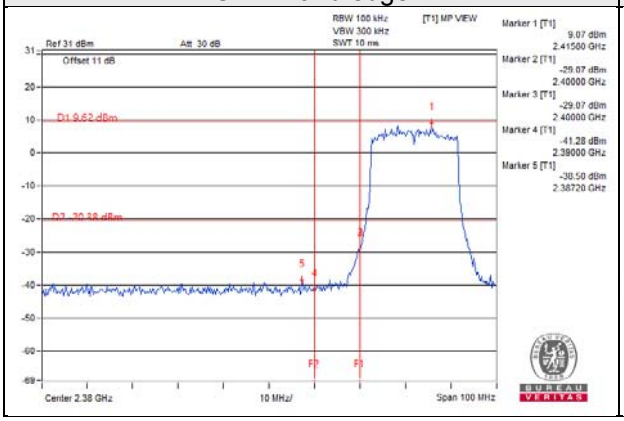


CH 11

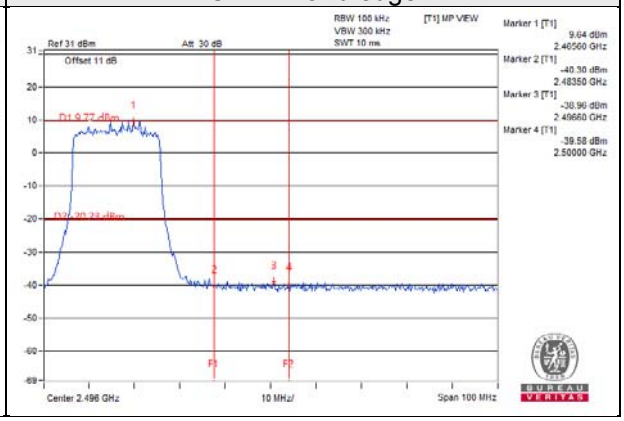




CH 1 Band edge

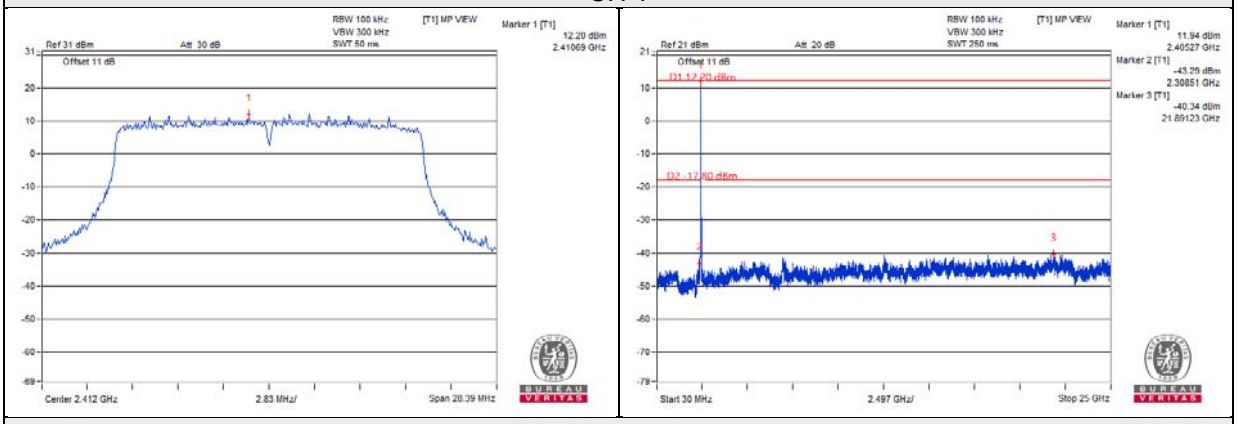


CH 11 Band edge

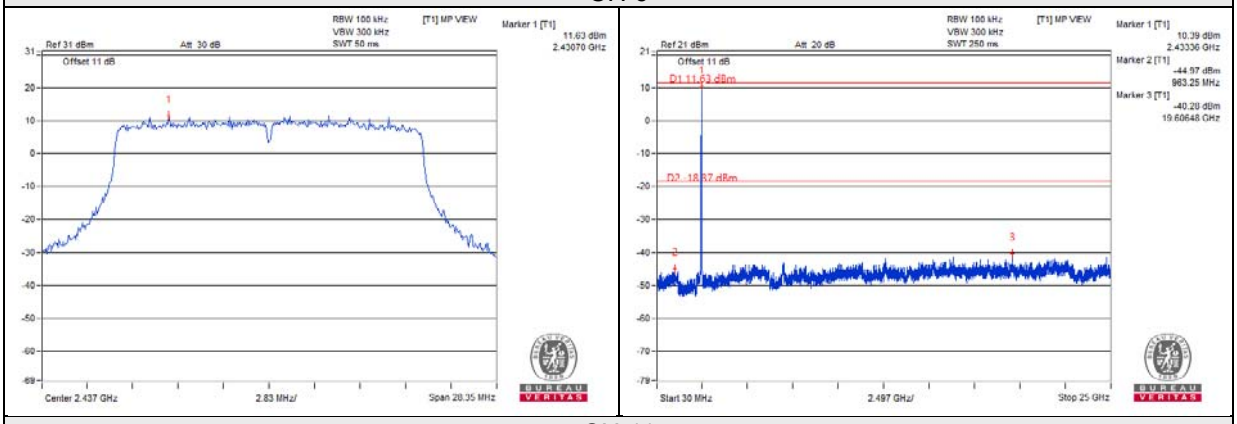


802.11ax (HE20)_Chain 3

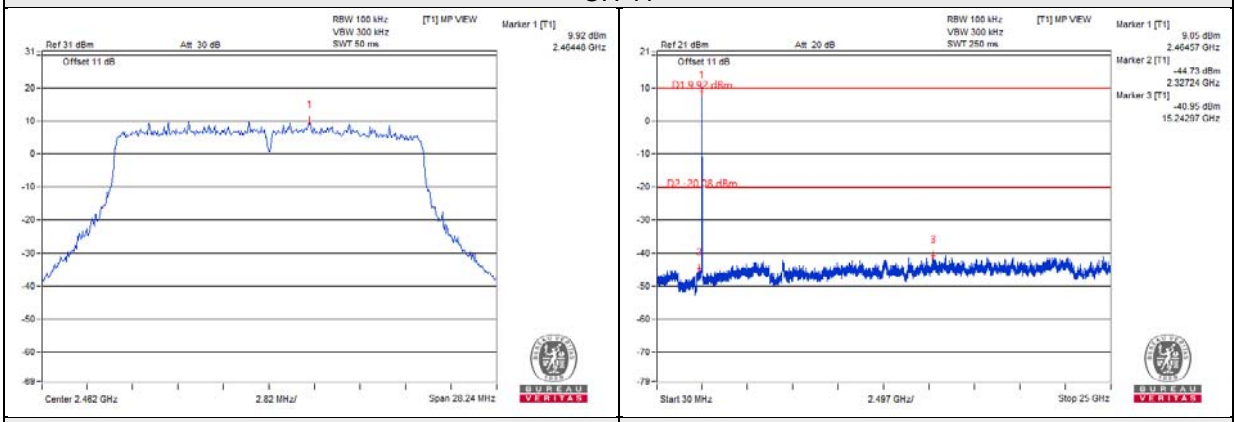
CH 1



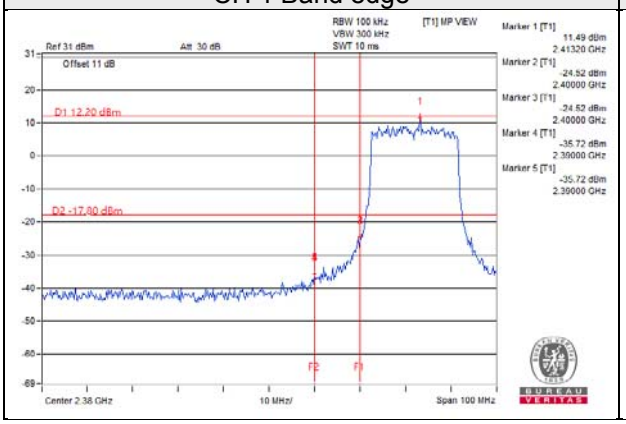
CH 6



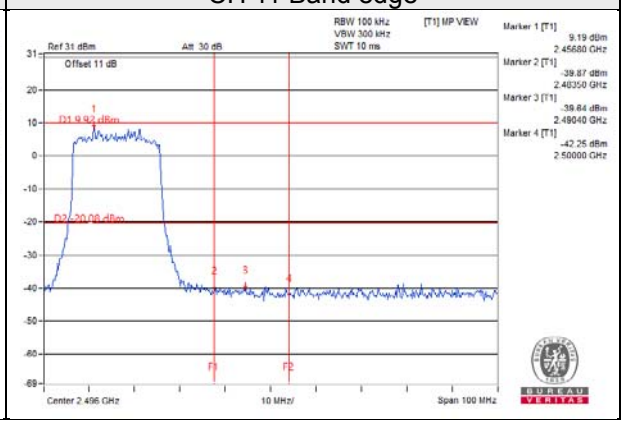
CH 11



CH 1 Band edge

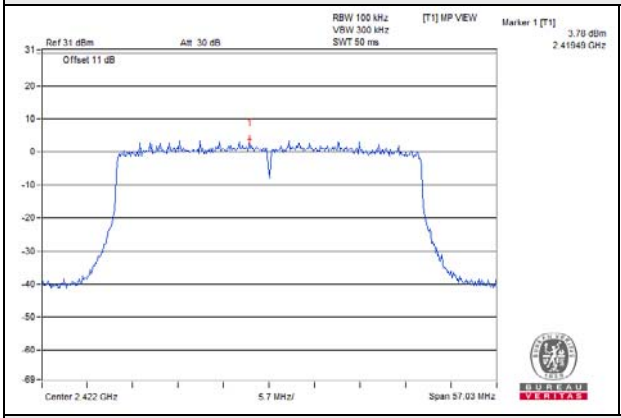


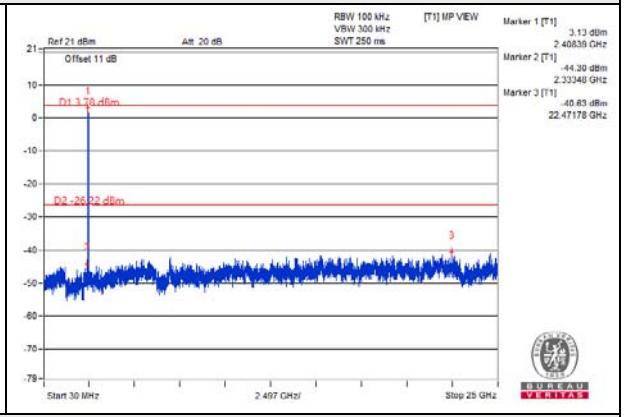
CH 11 Band edge



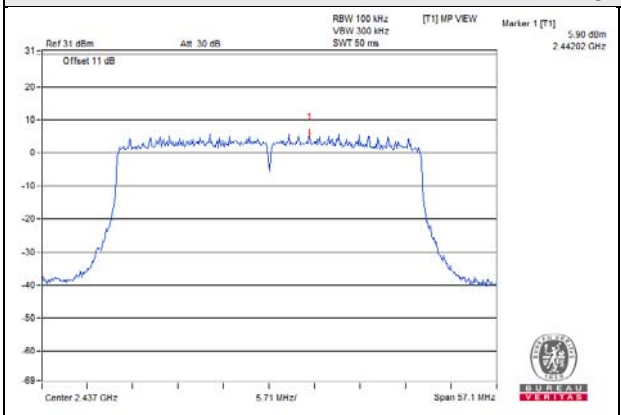
802.11ax (HE40)_Chain 0

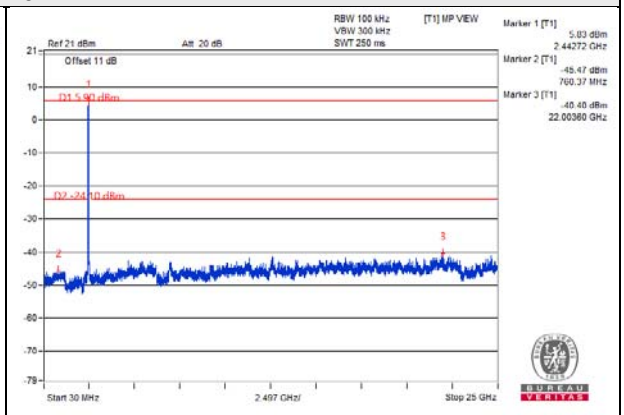
CH 3



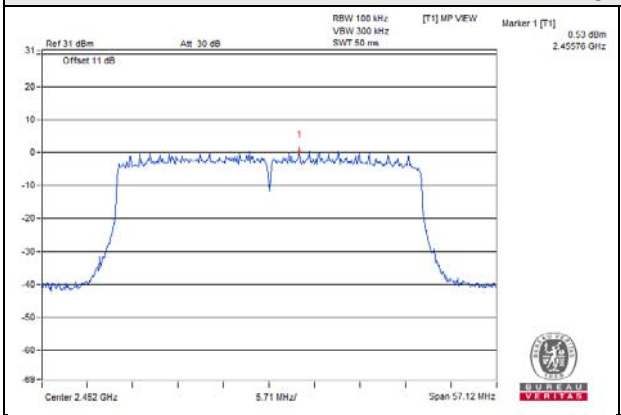


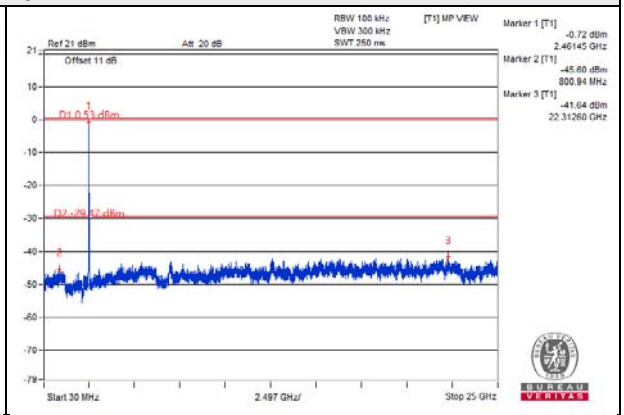
CH 6



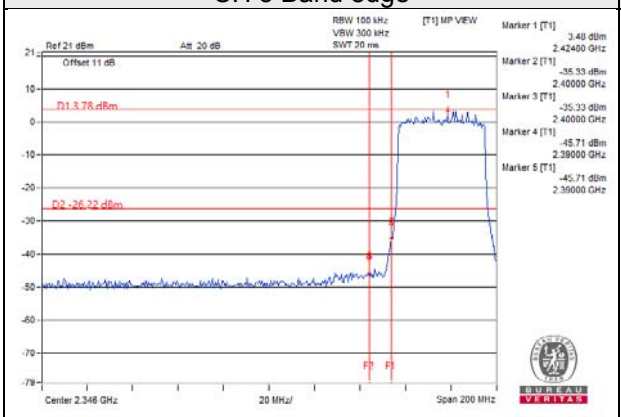


CH 9

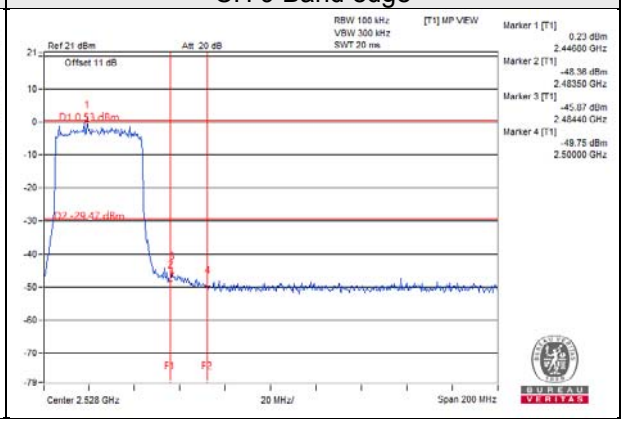




CH 3 Band edge

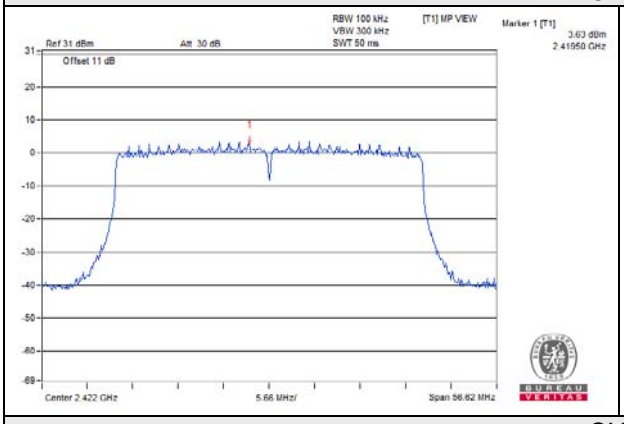


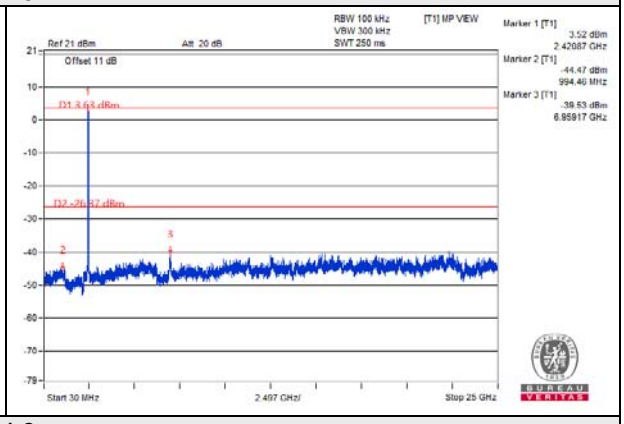
CH 9 Band edge



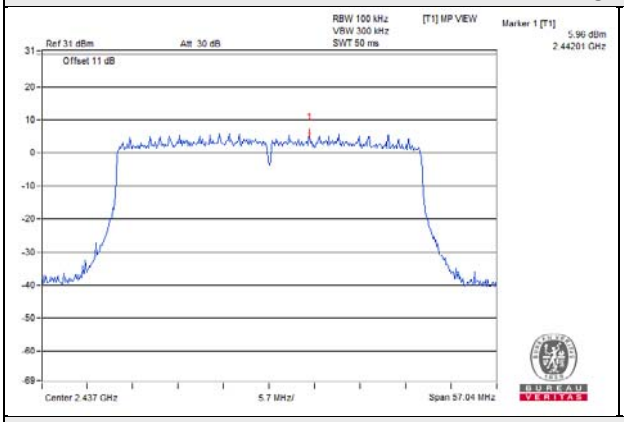
802.11ax (HE40)_Chain 1

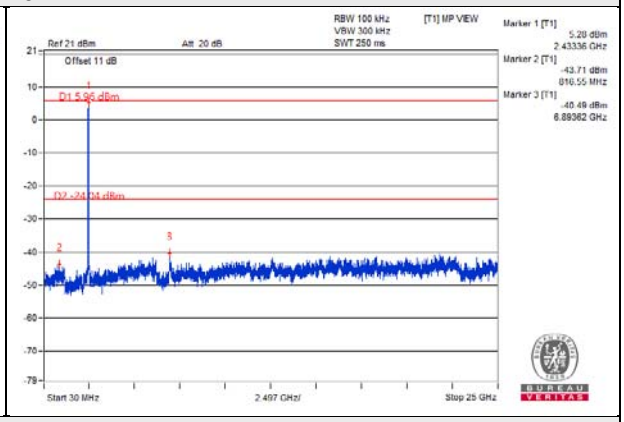
CH 3



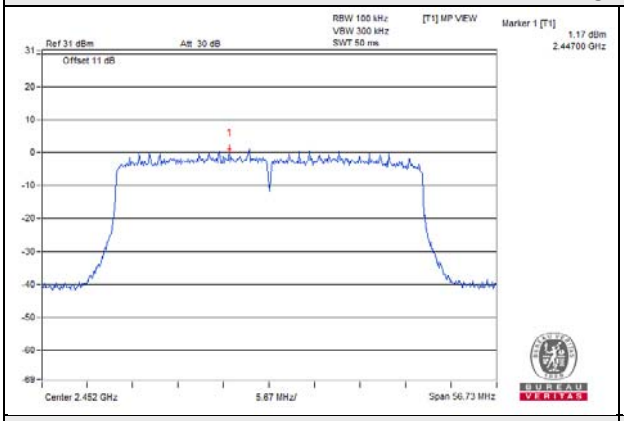


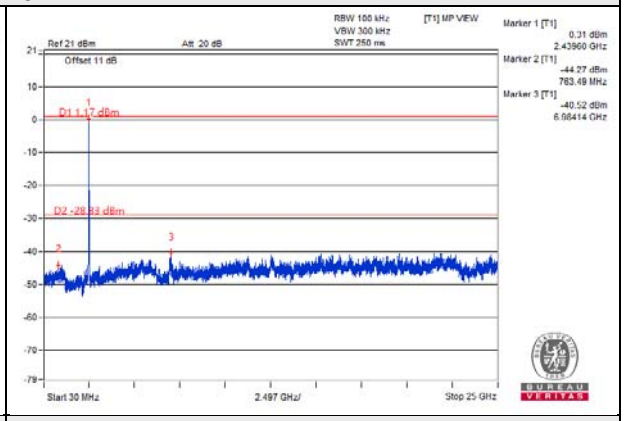
CH 6



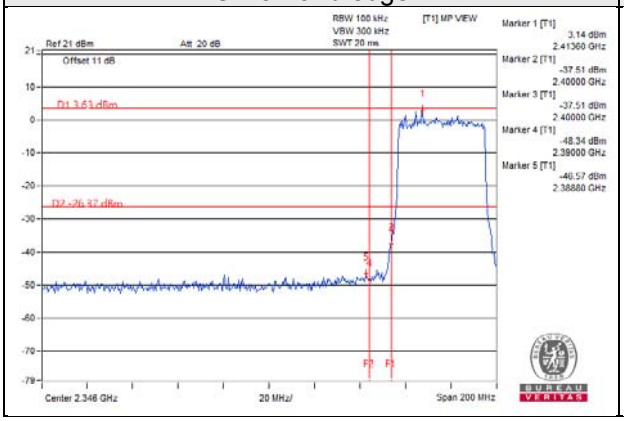


CH 9

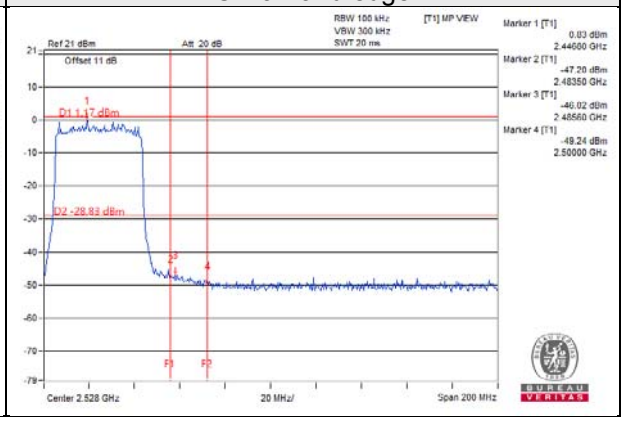




CH 3 Band edge

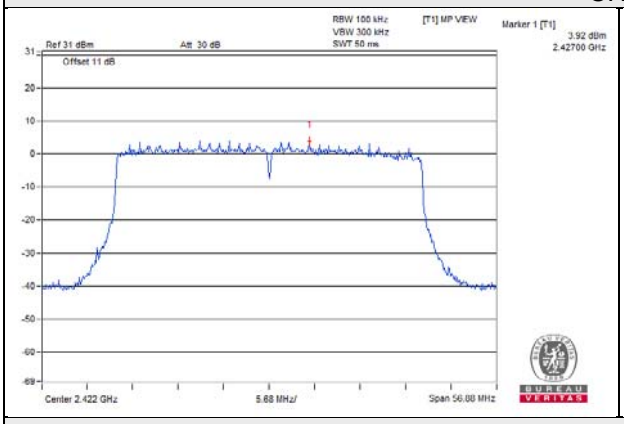


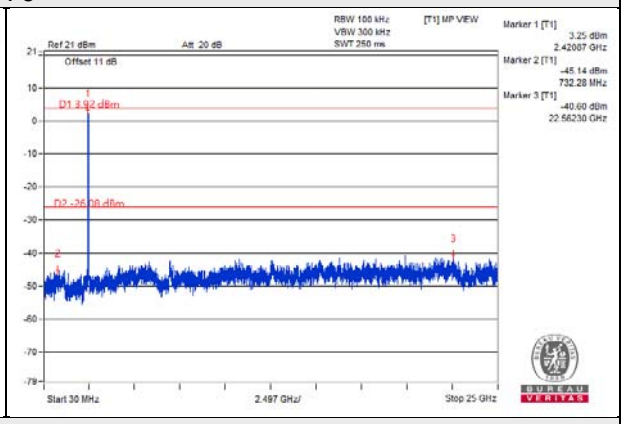
CH 9 Band edge



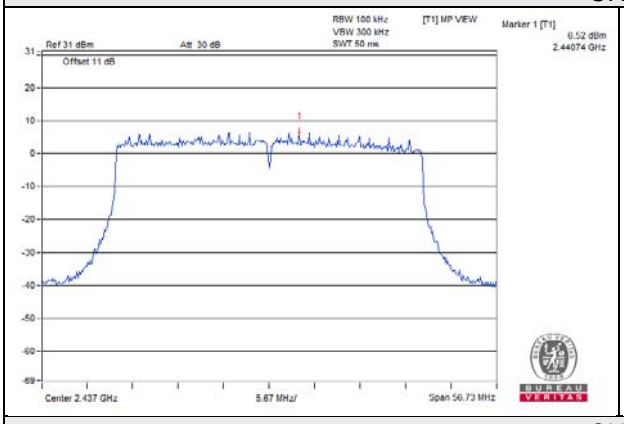
802.11ax (HE40)_Chain 2

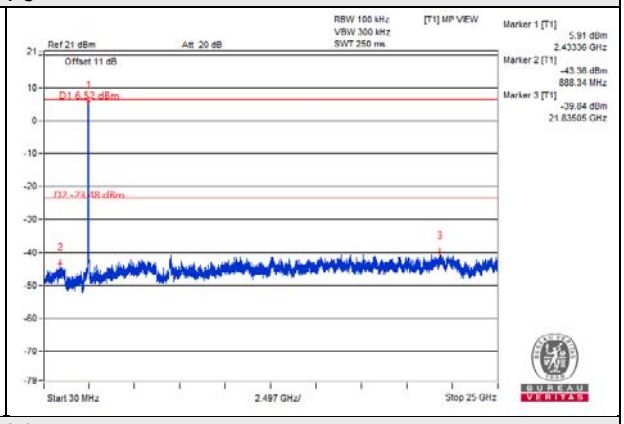
CH 3



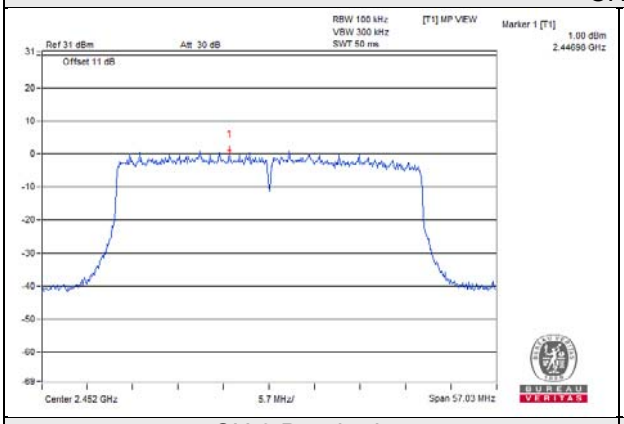


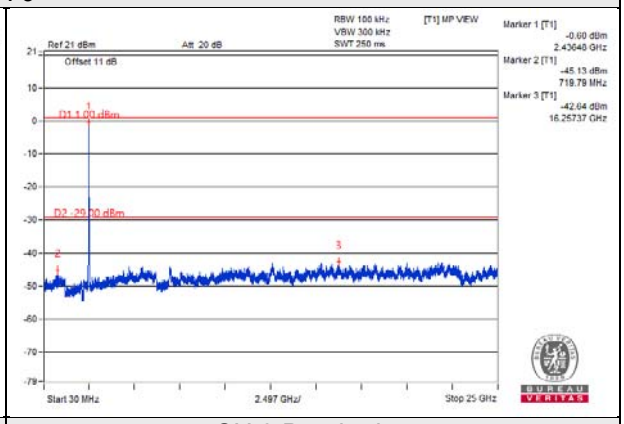
CH 6



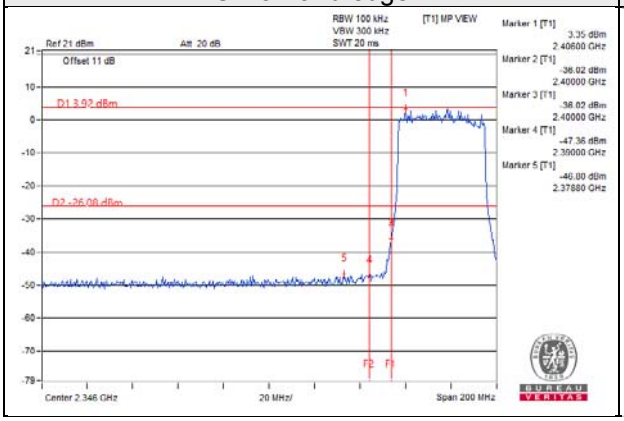


CH 9

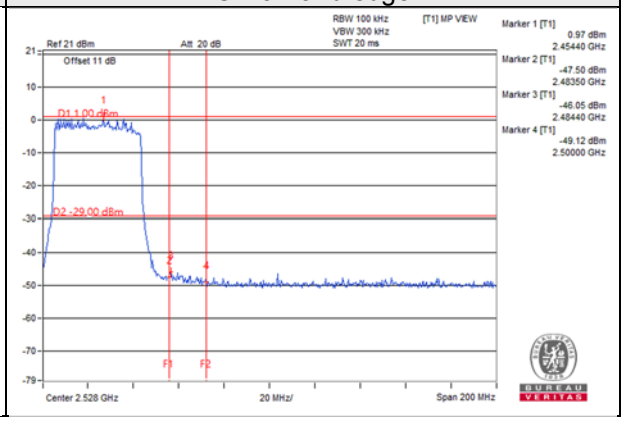




CH 3 Band edge

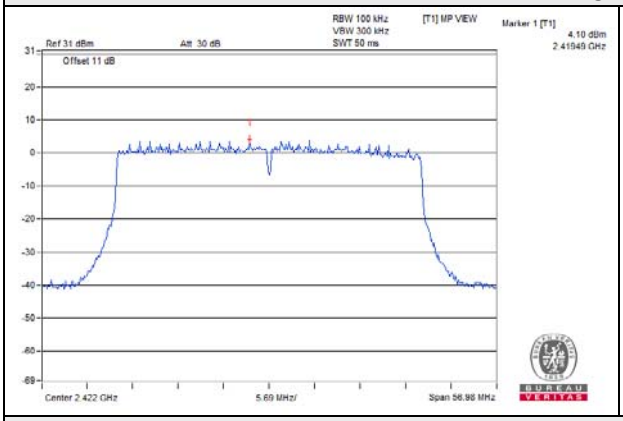


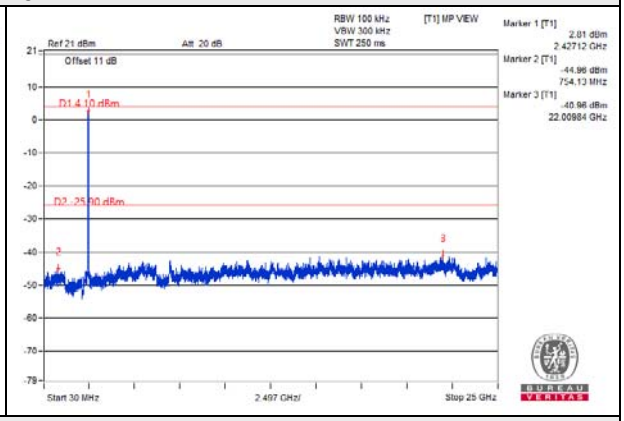
CH 9 Band edge



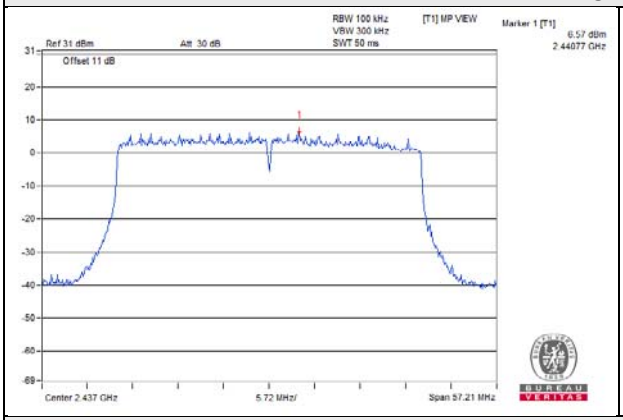
802.11ax (HE40)_Chain 3

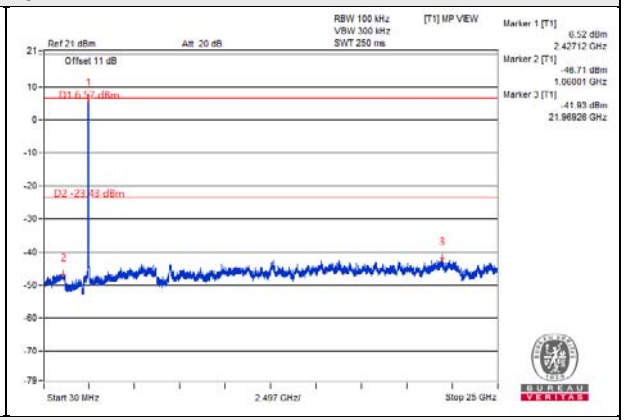
CH 3



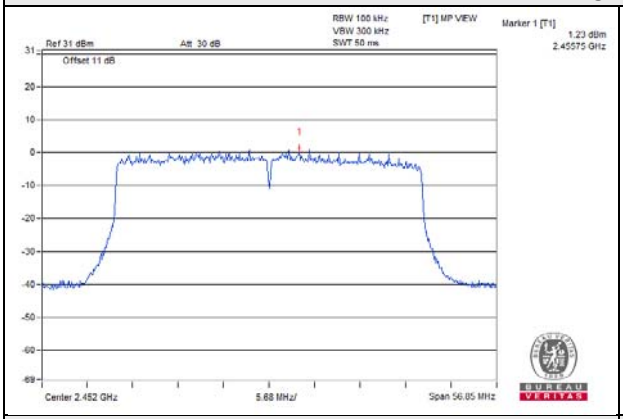


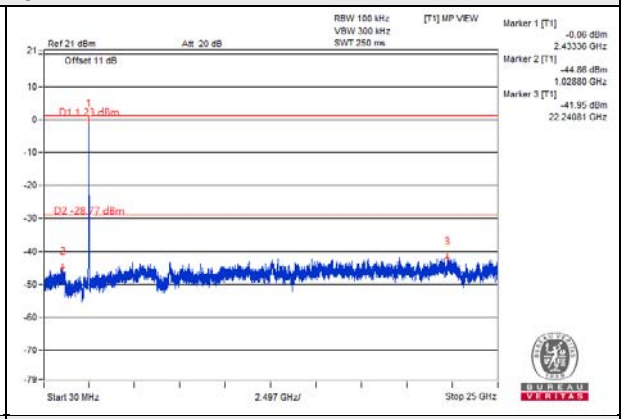
CH 6



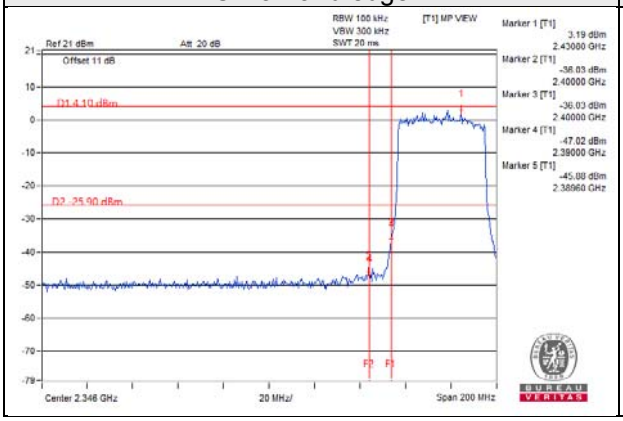


CH 9

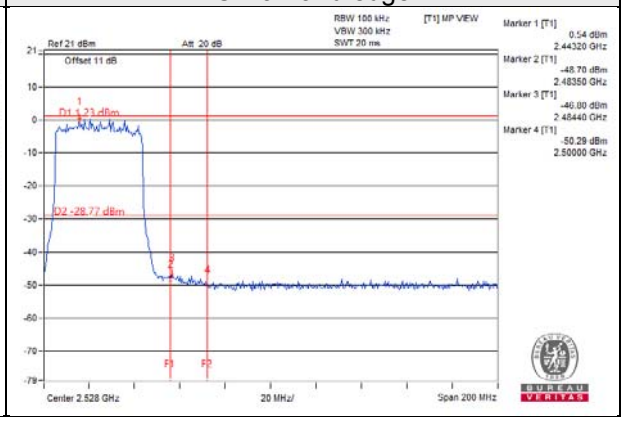




CH 3 Band edge



CH 9 Band edge

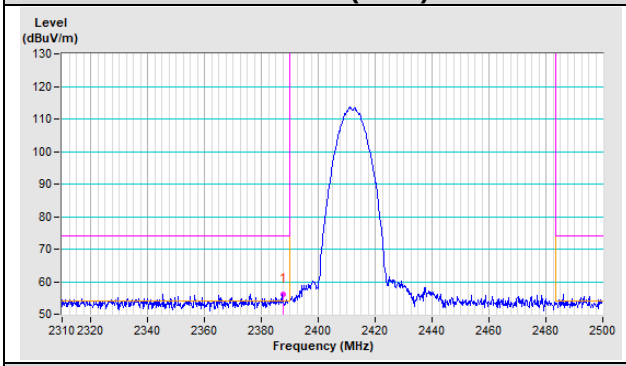
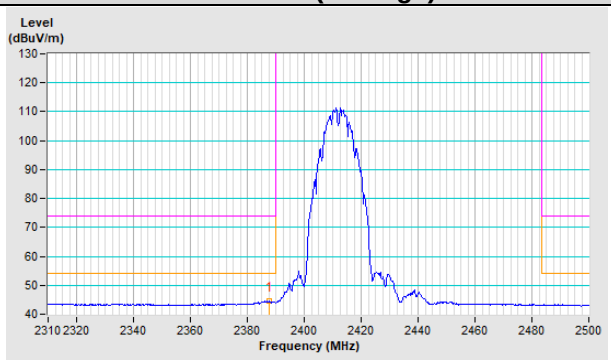
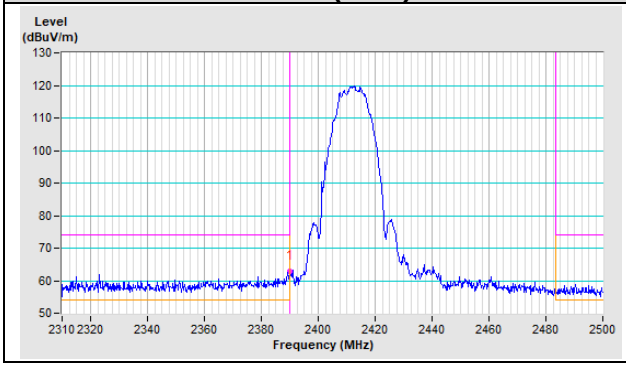
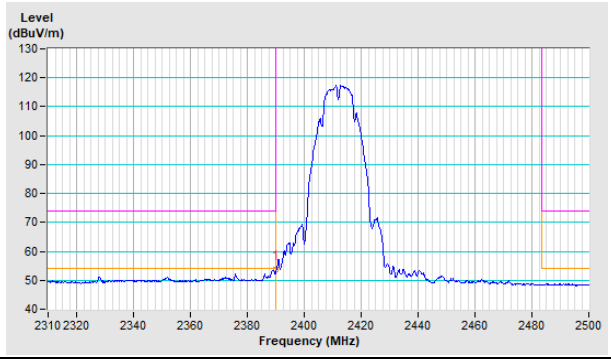


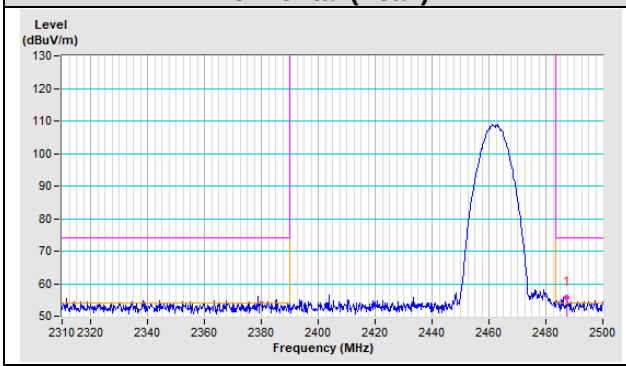
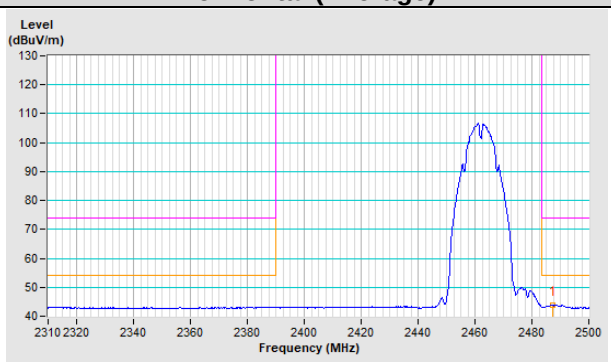
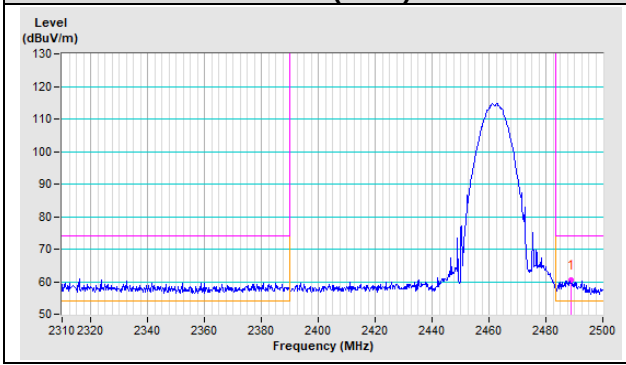
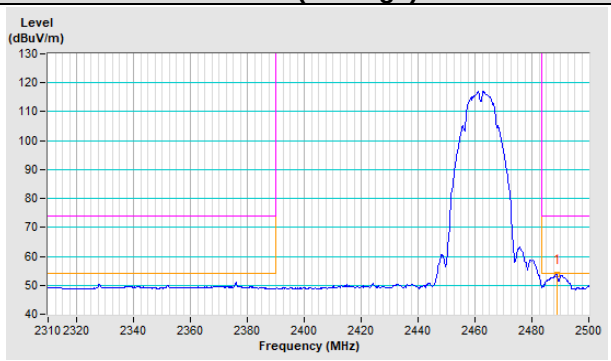
5 Pictures of Test Arrangements

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

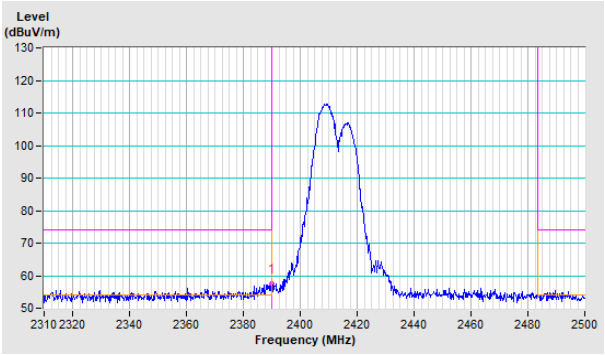
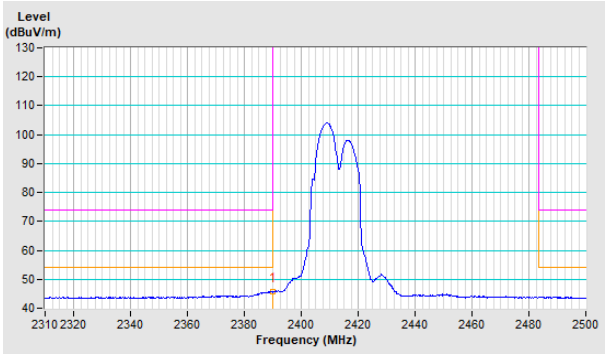
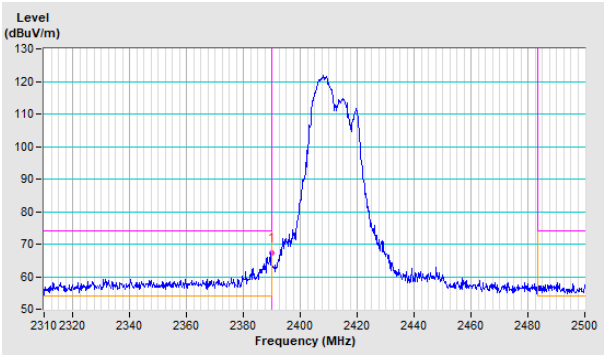
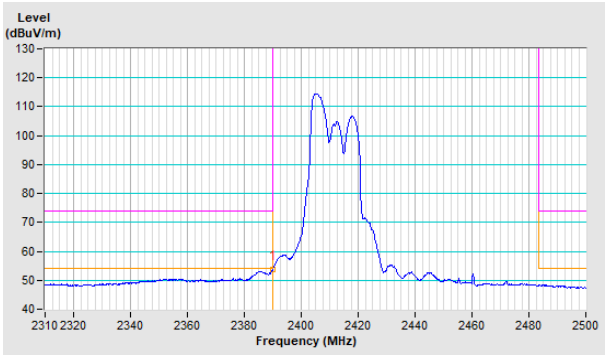
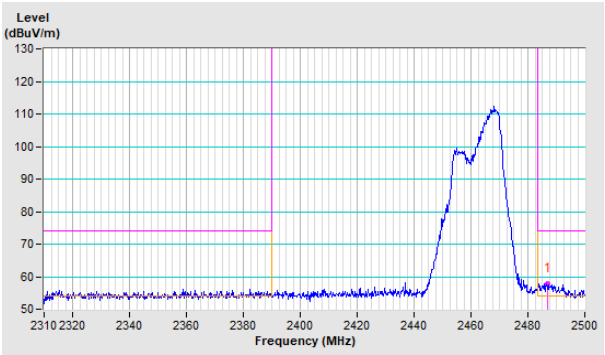
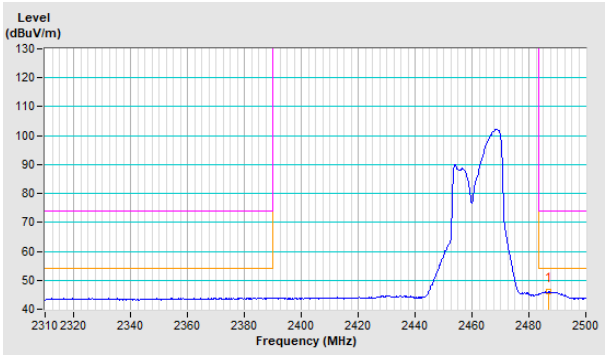
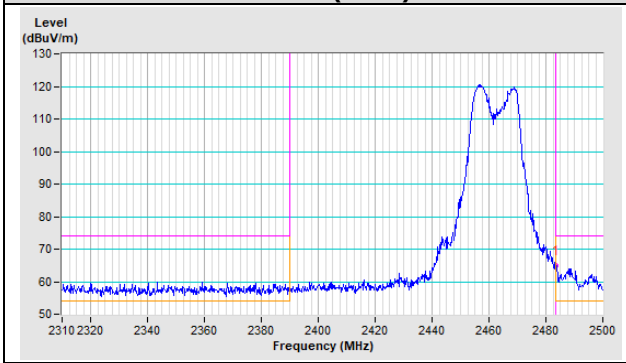
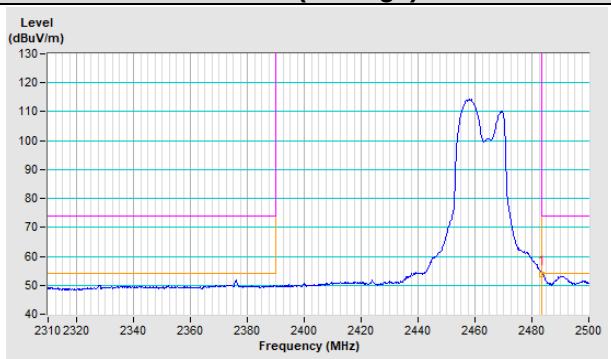
Annex A- Band Edge Measurement

802.11b

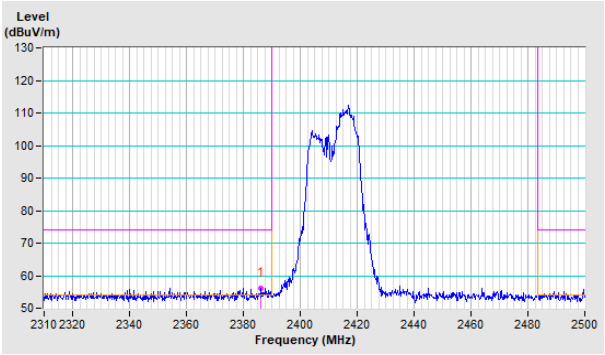
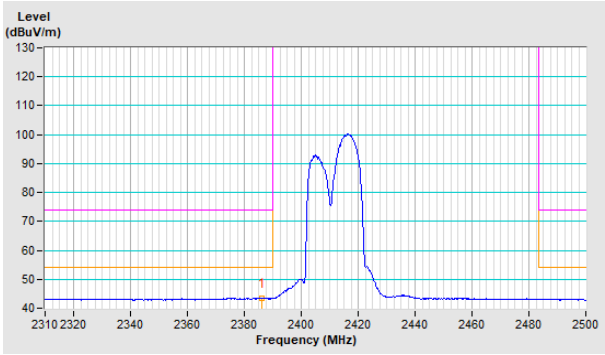
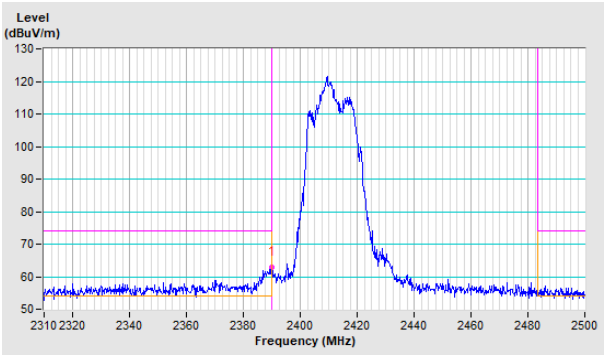
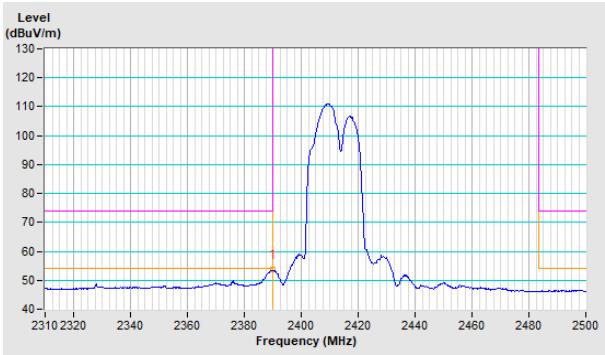
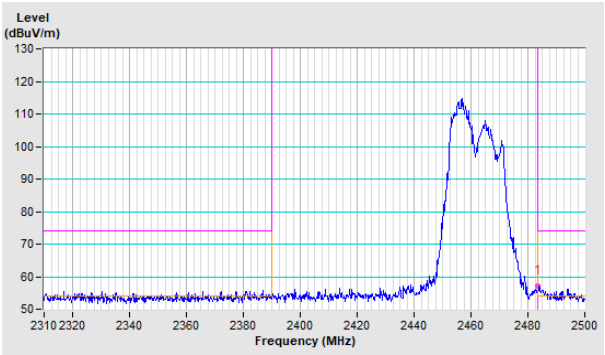
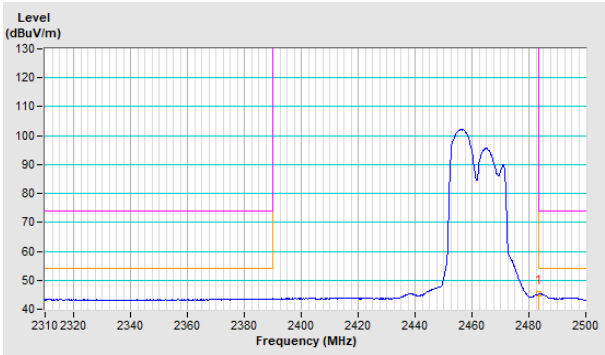
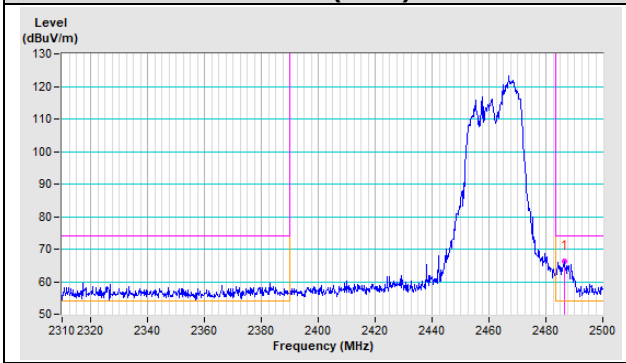
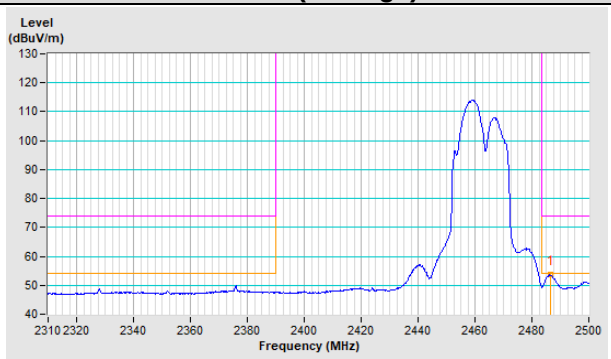
Channel 1	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

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

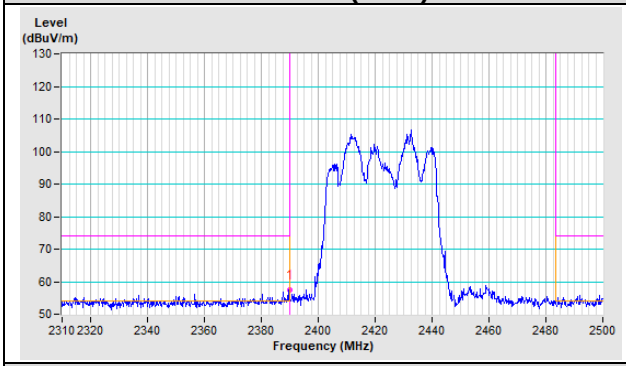
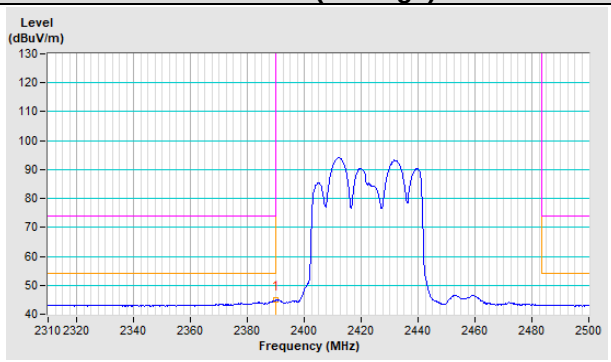
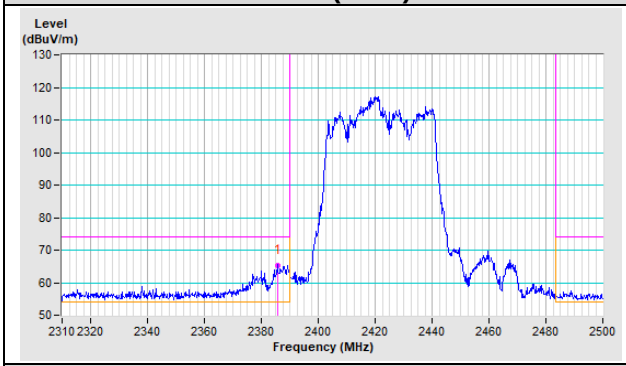
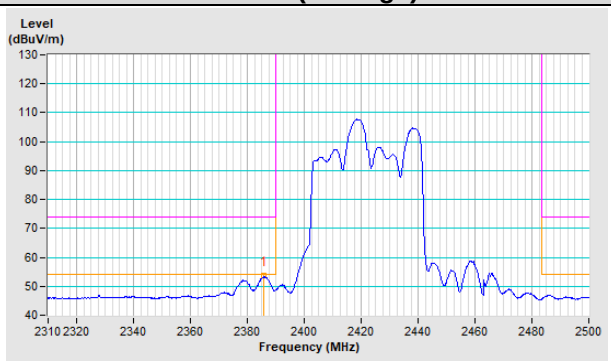
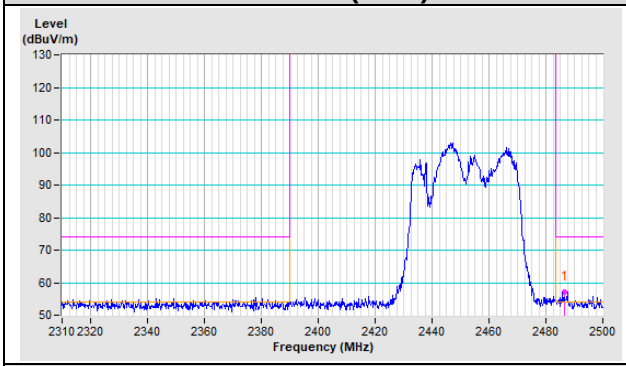
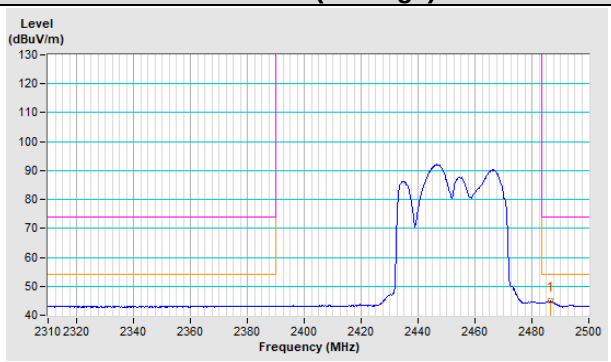
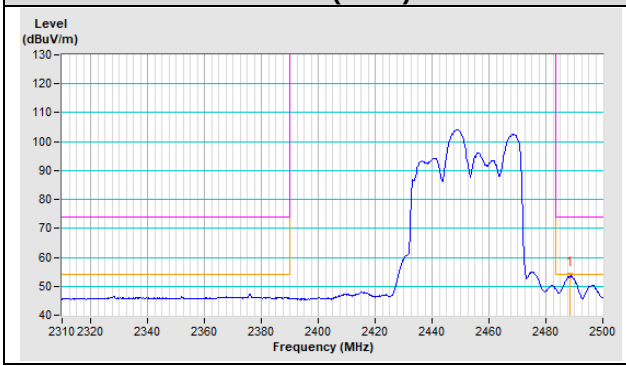
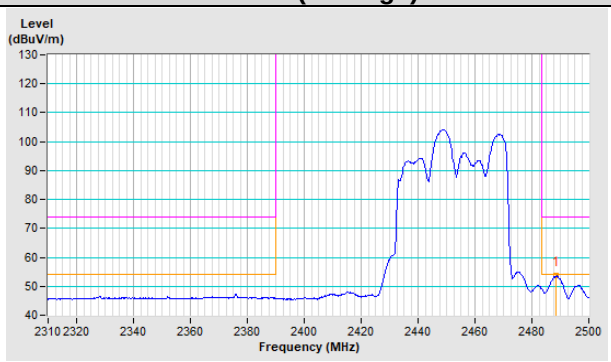
802.11g

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 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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