

FCC Test Report

Report No.: RF200610D09

FCC ID: P27IP5446A

Test Model: SAX1V1R

Received Date: Jun. 10, 2020

Test Date: Jun. 11 to Jul. 6, 2020

Issued Date: Jul. 8, 2020

Applicant: Sercomm Corp.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Release Control Record

Issue No.	Description	Date Issued
RF200610D09	Original release.	Jul. 8, 2020

1 Certificate of Conformity

Product: 11AX ROUTER_NON IOT

Brand: Charter Spectrum

Test Model: SAX1V1R

Sample Status: Engineering sample

Applicant: Sercomm Corp.

Test Date: Jun. 11 to Jul. 6, 2020

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

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

Prepared by :

Annie Chang

Date:

Jul. 8, 2020

Annie Chang / Senior Specialist

Approved by :

Rex Lai

Date:

Jul. 8, 2020

Rex Lai / Associate Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -11.62dB at 0.39739MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.70dB at 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

Note:

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Conducted Emissions	9kHz ~ 40GHz	2.63 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.61 dB
	30MHz ~ 1GHz	5.43 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.14 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	11AX ROUTER_NON IOT
Brand	Charter Spectrum
Test Model	SAX1V1R
Test software Version	QSPR-1166 Test
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from 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 (20MHz/40MHz): up to MCS31 802.11ac (20MHz/40MHz): up to MCS9 802.11ax (20MHz/40MHz): up to MCS11
Operating Frequency	2412MHz ~ 2462MHz
Number of Channel	802.11b/ 802.11g/ 802.11n (20MHz)/802.11ac (20MHz)/802.11ax (20MHz): 11 802.11n (40MHz)/802.11ac (40MHz)/802.11ax (40MHz): 7
Output Power	CDD Mode: 998.499mW Beamforming Mode: 422.416mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter
Data Cable Supplied	Non-shielded LAN cable (1.2m)

Note:

1. 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 (20MHz)	Support	Not Support	4TX
802.11n (40MHz)	Support	Not Support	4TX
802.11ac (20MHz)	Support	Support	4TX
802.11ac (40MHz)	Support	Support	4TX
802.11ax (20MHz)	Support	Support	4TX
802.11ax (40MHz)	Support	Support	4TX

* The bandwidth and modulation are similar for 20MHz/40MHz on 802.11n mode and 20MHz/40MHz on 802.11n mode and 20MHz/40MHz 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/ac/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.

2. The following antennas were provided to the EUT.

Antenna Type	Printed		
Antenna Connector	IPEX		
Antenna No.	Gain (dBi)		
	2412MHz ~ 2462MHz	5150MHz ~ 5250MHz	5745MHz ~ 5825MHz
Ant1	4.9	5.0	5.7
Ant2	2.7	4.3	3.1
Ant3	3.4	4.7	3.8
Ant4	3.5	5.0	5.0

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

3. The EUT uses following adapter.

Adapter 1	
Brand	NetBit
Model	NBS36J120300VU
Input Power	100-120Vac, 1.0A, 50/60Hz
Output Power	12.0Vdc, 3.0A
Power Cord	AC 2-Pin, Non-shielded DC cable (1.8m)
Adapter 2	
Brand	Delta
Model	ADH-36EW B
Input Power	100-125Vac, 1.5A, 50-60Hz
Output Power	12.0Vdc, 3.0A
Power Cord	AC 2-Pin, Non-shielded DC cable (1.8m)

The above two adapters were pre-tested, and Adapter 2 was the worst case for final test.

4. 2.4GHz & 5GHz technologies can transmit at same time.

5. Spurious emission of the simultaneous operation (2.4GHz & 5GHz technologies) has been evaluated and no non-compliance was found.

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz), 802.11ac (20MHz), 802.11ax (20MHz):

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 (40MHz), 802.11ac (40MHz), 802.11ax (40MHz):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

Radiated Emission Test (Above 1GHz):

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

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
CDD Mode						
-	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 (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
	802.11ax (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
Beamforming Mode						
-	802.11ax (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
	802.11ax (40MHz)	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)
CDD Mode						
-	802.11ax (20MHz)	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)
CDD Mode						
-	802.11ax (20MHz)	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)
CDD Mode						
-	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 (20MHz)*	1 to 11	1, 6, 11	OFDM	BPSK	6.5
	802.11n (40MHz)*	3 to 9	3, 6, 9	OFDM	BPSK	13.5
	802.11ac (20MHz)*	1 to 11	1, 6, 11	OFDM	BPSK	6.5
	802.11ac (40MHz)*	3 to 9	3, 6, 9	OFDM	BPSK	13.5
	802.11ax (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
	802.11ax (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
* 802.11n (20MHz), 802.11n (40MHz), 802.11ac (20MHz), 802.11ac (40MHz) are for Conducted Power Measurement only.						
Beamforming Mode (Conducted Power Measurement only)						
-	802.11ac (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
	802.11ac (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
	802.11ax (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0
	802.11ax (40MHz)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE $\geq$ 1G	22deg. C, 69%RH	120Vac, 60Hz	Ian Chang
RE<1G	22deg. C, 69%RH	120Vac, 60Hz	Dalen Dai
PLC	25deg. C, 75%RH	120Vac, 60Hz	Dalen Dai
APCM	25deg. C, 76%RH	120Vac, 60Hz	Dalen Dai

3.3 Duty Cycle of Test Signal

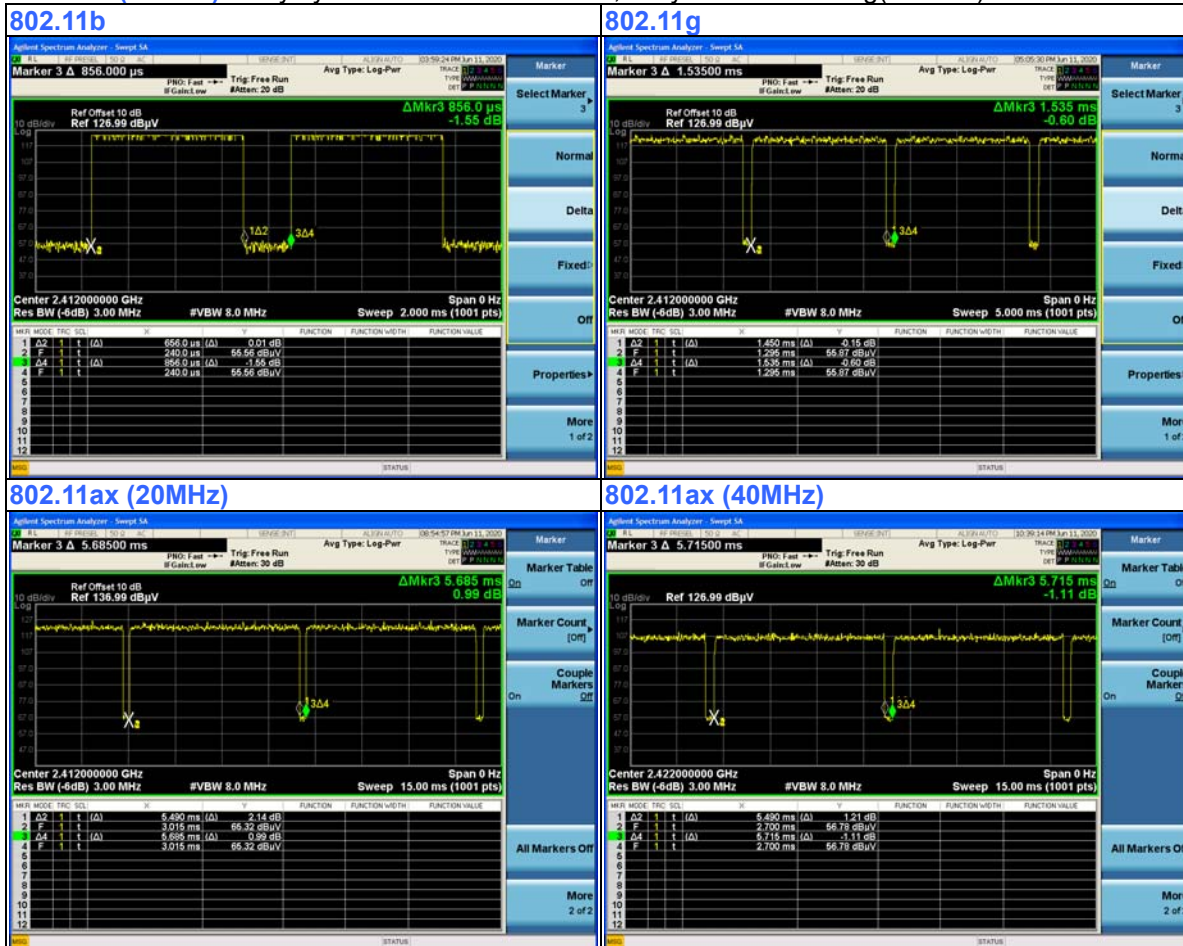
Duty cycle of test signal is < 98%, duty factor is required.

802.11b: Duty cycle = $0.656/0.856 = 0.766$, Duty factor = $10 * \log(1/0.766) = 1.16$

802.11g: Duty cycle = $1.45/1.535 = 0.945$, Duty factor = $10 * \log(1/0.945) = 0.25$

802.11ax (20MHz): Duty cycle = $5.49/5.685 = 0.966$, Duty factor = $10 * \log(1/0.966) = 0.15$

802.11ax (40MHz): Duty cycle = $5.49/5.715 = 0.961$, Duty factor = $10 * \log(1/0.961) = 0.17$



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook PC	SONY	SVS151A12P	275548477000760	N/A	Provided by Lab
B.	Load	N/A	N/A	N/A	N/A	Provided by Lab

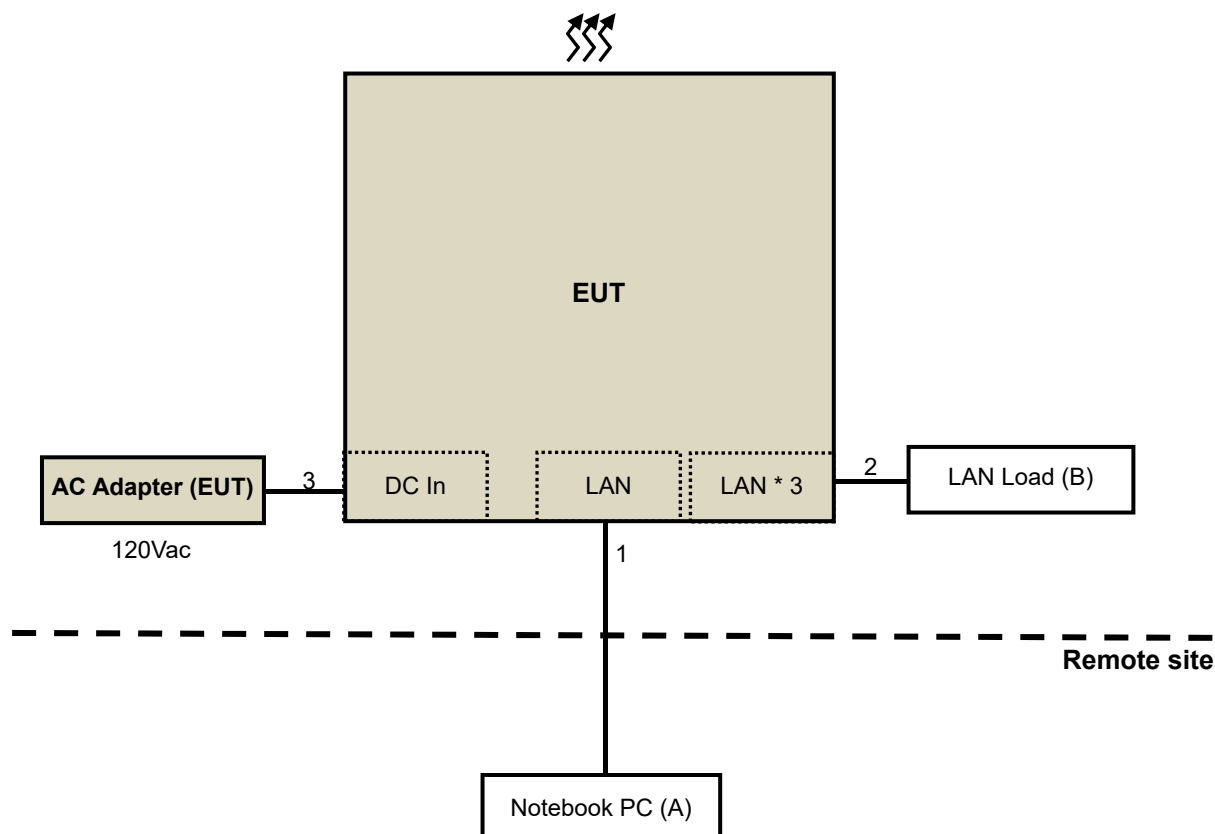
Note:

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

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	10	N	0	Provided by Lab (RJ45, Cat.5e)
2.	LAN cable	3	1.5	N	0	Supplied by client (RJ45, Cat.5e)
3.	DC cable	1	1.8	N	0	Supplied by client

Note: The core(s) is(are) originally attached to the cable(s).

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 19, 2020	Feb. 18, 2021
HP Preamplifier	8449B	3008A01201	Feb. 20, 2020	Feb. 19, 2021
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 19, 2020	Feb. 18, 2021
Agilent TEST RECEIVER	N9038A	MY51210129	Mar. 18, 2020	Mar. 17, 2021
Schwarzbeck Antenna	VULB 9168	139	Nov. 7, 2019	Nov. 6, 2020
Schwarzbeck Antenna	VHBA 9123	480	Jun. 3, 2019	Jun. 2, 2021
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 24, 2019	Nov. 23, 2020
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Nov. 24, 2019	Nov. 23, 2020
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Jul. 10, 2019	Jul. 9, 2020
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH8-3.6m	Jul. 10, 2019	Jul. 9, 2020
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 16, 2019	Jun. 15, 2020
			Jun. 16, 2020	Jun. 15, 2021
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Jul. 30, 2019	Jul. 29, 2020
Loop Antenna EMCI	LPA600	270	Aug. 23, 2019	Aug. 22, 2021
EMCO Horn Antenna	3115	00028257	Nov. 24, 2019	Nov. 23, 2020
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 23, 2019	Sep. 22, 2020
Anritsu Power Sensor	MA2411B	0738404	Apr. 13, 2020	Apr. 12, 2021
Anritsu Power Meter	ML2495A	0842014	Apr. 13, 2020	Apr. 12, 2021

- NOTE:** 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

NOTE:

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

For Radiated emission above 30MHz

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

Note:

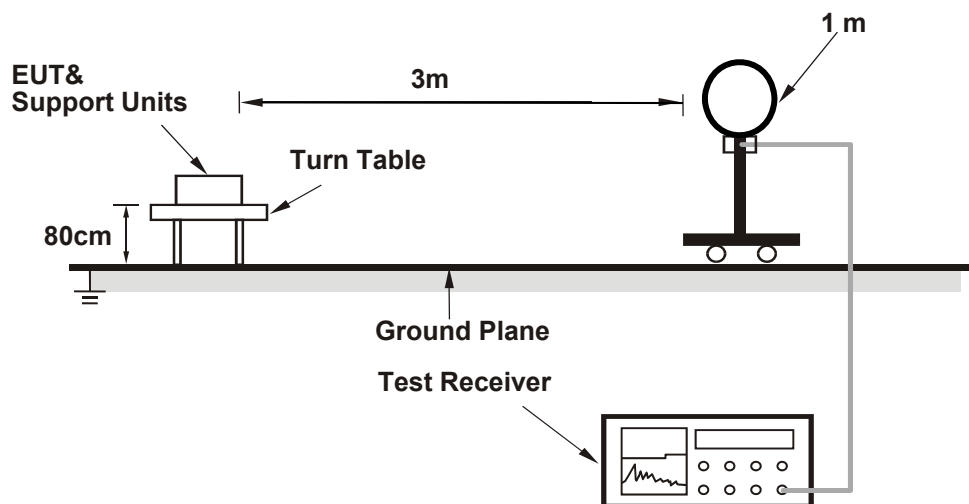
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
(802.11b: RBW = 1MHz, VBW = 1.6kHz; 802.11g: RBW = 1MHz, VBW = 750Hz;
802.11ax (20MHz): RBW = 1MHz, VBW = 200Hz; 802.11ax (40MHz): RBW = 1MHz, VBW = 200Hz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

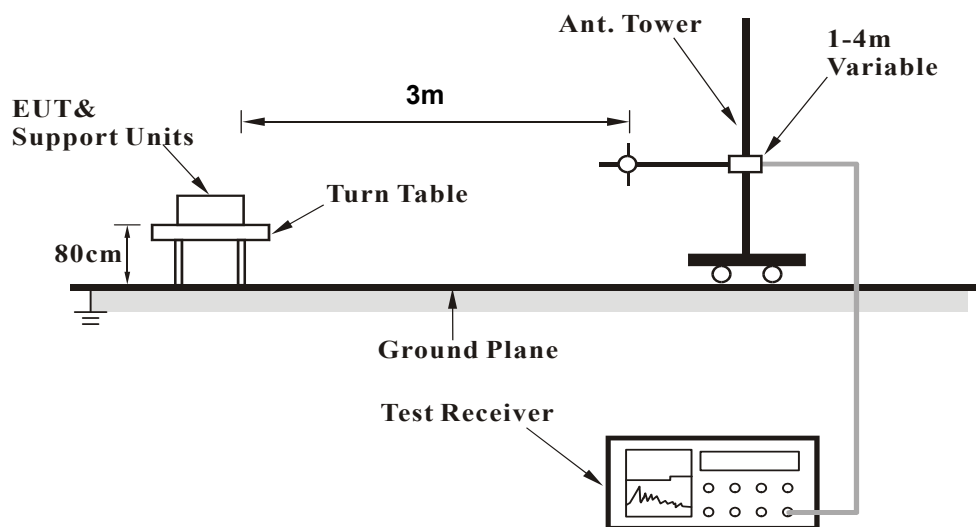
No deviation.

4.1.5 Test Setup

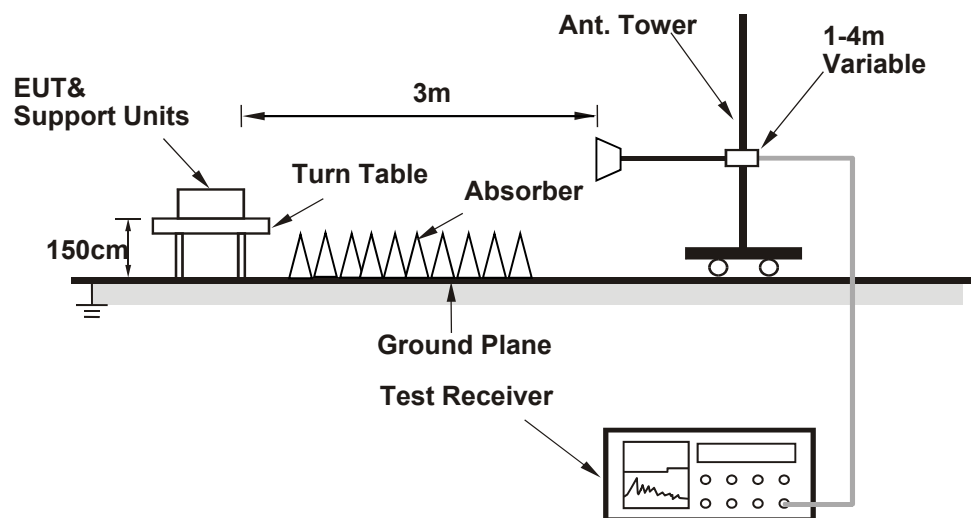
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

ABOVE 1GHz DATA

CDD Mode

802.11b

Channel	TX Channel 1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.38 PK	74.00	-17.62	3.45 H	70	55.07	1.31
2	2390.00	41.94 AV	54.00	-12.06	3.45 H	70	40.63	1.31
3	*2412.00	120.90 PK			3.45 H	70	119.54	1.36
4	*2412.00	118.51 AV			3.45 H	70	117.15	1.36
5	4824.00	49.28 PK	74.00	-24.72	1.61 H	308	40.43	8.85
6	4824.00	37.75 AV	54.00	-16.25	1.61 H	308	28.90	8.85
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.60 PK	74.00	-18.40	1.73 V	160	54.29	1.31
2	2390.00	41.84 AV	54.00	-12.16	1.73 V	160	40.53	1.31
3	*2412.00	118.52 PK			1.73 V	160	117.16	1.36
4	*2412.00	116.22 AV			1.73 V	160	114.86	1.36
5	4824.00	51.24 PK	74.00	-22.76	1.83 V	297	42.39	8.85
6	4824.00	40.93 AV	54.00	-13.07	1.83 V	297	32.08	8.85

Remarks:

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

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	121.07 PK			3.46 H	72	119.69	1.38
2	*2437.00	118.63 AV			3.46 H	72	117.25	1.38
3	4874.00	49.57 PK	74.00	-24.43	1.59 H	315	40.55	9.02
4	4874.00	37.98 AV	54.00	-16.02	1.59 H	315	28.96	9.02

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	118.72 PK			1.74 V	154	117.34	1.38
2	*2437.00	116.40 AV			1.74 V	154	115.02	1.38
3	4874.00	51.54 PK	74.00	-22.46	1.78 V	301	42.52	9.02
4	4874.00	41.25 AV	54.00	-12.75	1.78 V	301	32.23	9.02

Remarks:

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

Channel	TX Channel 11	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	120.74 PK			3.32 H	65	119.29	1.45
2	*2462.00	118.44 AV			3.32 H	65	116.99	1.45
3	2483.50	55.52 PK	74.00	-18.48	3.32 H	65	53.97	1.55
4	2483.50	42.07 AV	54.00	-11.93	3.32 H	65	40.52	1.55
5	4924.00	49.72 PK	74.00	-24.28	1.59 H	289	40.63	9.09
6	4924.00	37.76 AV	54.00	-16.24	1.59 H	289	28.67	9.09
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	118.69 PK			1.68 V	158	117.24	1.45
2	*2462.00	116.55 AV			1.68 V	158	115.10	1.45
3	2483.50	55.20 PK	74.00	-18.80	1.68 V	158	53.65	1.55
4	2483.50	40.96 AV	54.00	-13.04	1.68 V	158	39.41	1.55
5	4924.00	51.45 PK	74.00	-22.55	1.88 V	294	42.36	9.09
6	4924.00	40.73 AV	54.00	-13.27	1.88 V	294	31.64	9.09

Remarks:

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

802.11g

Channel	TX Channel 1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2350.00	59.68 PK	74.00	-14.32	3.15 H	37	58.53	1.15
2	2350.00	43.07 AV	54.00	-10.93	3.15 H	37	41.92	1.15
3	*2412.00	122.98 PK			3.15 H	37	121.62	1.36
4	*2412.00	113.49 AV			3.15 H	37	112.13	1.36
5	4824.00	50.19 PK	74.00	-23.81	2.31 H	140	41.34	8.85
6	4824.00	37.40 AV	54.00	-16.60	2.31 H	140	28.55	8.85
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.16 PK	74.00	-17.84	1.69 V	158	54.85	1.31
2	2390.00	31.41 AV	54.00	-22.59	1.69 V	158	30.10	1.31
3	*2412.00	120.94 PK			1.69 V	158	119.58	1.36
4	*2412.00	111.79 AV			1.69 V	158	110.43	1.36
5	4824.00	49.51 PK	74.00	-24.49	1.74 V	128	40.66	8.85
6	4824.00	36.30 AV	54.00	-17.70	1.74 V	128	27.45	8.85

Remarks:

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

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	122.62 PK			3.26 H	42	121.24	1.38
2	*2437.00	113.39 AV			3.26 H	42	112.01	1.38
3	4874.00	50.18 PK	74.00	-23.82	2.24 H	145	41.16	9.02
4	4874.00	37.36 AV	54.00	-16.64	2.24 H	145	28.34	9.02

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	120.76 PK			1.58 V	174	119.38	1.38
2	*2437.00	111.71 AV			1.58 V	174	110.33	1.38
3	4874.00	49.57 PK	74.00	-24.43	1.53 V	214	40.55	9.02
4	4874.00	36.65 AV	54.00	-17.35	1.53 V	214	27.63	9.02

Remarks:

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

Channel	TX Channel 11	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	124.20 PK			2.76 H	48	122.75	1.45
2	*2462.00	114.72 AV			2.76 H	48	113.27	1.45
3	2483.50	72.29 PK	74.00	-1.71	2.76 H	48	70.74	1.55
4	2483.50	52.70 AV	54.00	-1.30	2.76 H	48	51.15	1.55
5	4924.00	50.24 PK	74.00	-23.76	2.26 H	258	41.15	9.09
6	4924.00	37.40 AV	54.00	-16.60	2.26 H	258	28.31	9.09
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	121.59 PK			1.77 V	152	120.14	1.45
2	*2462.00	113.08 AV			1.77 V	152	111.63	1.45
3	2483.50	69.14 PK	74.00	-4.86	1.77 V	152	67.59	1.55
4	2483.50	50.77 AV	54.00	-3.23	1.77 V	152	49.22	1.55
5	4924.00	49.20 PK	74.00	-24.80	1.44 V	126	40.11	9.09
6	4924.00	36.48 AV	54.00	-17.52	1.44 V	126	27.39	9.09

Remarks:

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

802.11ax (20MHz)

Channel	TX Channel 1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	61.35 PK	74.00	-12.65	2.85 H	113	60.04	1.31
2	2390.00	46.92 AV	54.00	-7.08	2.85 H	113	45.61	1.31
3	*2412.00	125.83 PK			2.85 H	113	124.47	1.36
4	*2412.00	112.04 AV			2.85 H	113	110.68	1.36
5	4824.00	50.37 PK	74.00	-23.63	2.17 H	162	41.52	8.85
6	4824.00	37.56 AV	54.00	-16.44	2.17 H	162	28.71	8.85
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	66.95 PK	74.00	-7.05	1.24 V	157	65.64	1.31
2	2390.00	49.74 AV	54.00	-4.26	1.24 V	157	48.43	1.31
3	*2412.00	122.75 PK			1.24 V	157	121.39	1.36
4	*2412.00	109.08 AV			1.24 V	157	107.72	1.36
5	4824.00	49.73 PK	74.00	-24.27	1.66 V	129	40.88	8.85
6	4824.00	37.05 AV	54.00	-16.95	1.66 V	129	28.20	8.85

Remarks:

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

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	127.82 PK			2.83 H	116	126.44	1.38
2	*2437.00	115.27 AV			2.83 H	116	113.89	1.38
3	4874.00	50.61 PK	74.00	-23.39	2.12 H	160	41.59	9.02
4	4874.00	37.78 AV	54.00	-16.22	2.12 H	160	28.76	9.02

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	123.52 PK			1.22 V	159	122.14	1.38
2	*2437.00	110.27 AV			1.22 V	159	108.89	1.38
3	4874.00	49.91 PK	74.00	-24.09	1.68 V	131	40.89	9.02
4	4874.00	37.28 AV	54.00	-16.72	1.68 V	131	28.26	9.02

Remarks:

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

Channel	TX Channel 11	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	125.26 PK			1.56 H	114	123.81	1.45
2	*2462.00	111.97 AV			1.56 H	114	110.52	1.45
3	2483.50	70.94 PK	74.00	-3.06	1.56 H	114	69.39	1.55
4	2483.50	52.77 AV	54.00	-1.23	1.56 H	114	51.22	1.55
5	4924.00	50.41 PK	74.00	-23.59	2.14 H	163	41.32	9.09
6	4924.00	37.60 AV	54.00	-16.40	2.14 H	163	28.51	9.09
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	122.91 PK			1.23 V	156	121.46	1.45
2	*2462.00	109.64 AV			1.23 V	156	108.19	1.45
3	2483.50	72.47 PK	74.00	-1.53	1.23 V	156	70.92	1.55
4	2483.50	52.84 AV	54.00	-1.16	1.23 V	156	51.29	1.55
5	4924.00	49.77 PK	74.00	-24.23	1.65 V	127	40.68	9.09
6	4924.00	37.09 AV	54.00	-16.91	1.65 V	127	28.00	9.09

Remarks:

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

802.11ax (40MHz)

Channel	TX Channel 3	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	70.35 PK	74.00	-3.65	2.83 H	112	69.04	1.31
2	2390.00	51.74 AV	54.00	-2.26	2.83 H	112	50.43	1.31
3	*2422.00	123.41 PK			2.83 H	112	122.04	1.37
4	*2422.00	109.72 AV			2.83 H	112	108.35	1.37
5	4844.00	50.28 PK	74.00	-23.72	2.09 H	167	41.37	8.91
6	4844.00	37.41 AV	54.00	-16.59	2.09 H	167	28.50	8.91
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	67.95 PK	74.00	-6.05	1.33 V	158	66.64	1.31
2	2390.00	49.93 AV	54.00	-4.07	1.33 V	158	48.62	1.31
3	*2422.00	120.89 PK			1.33 V	158	119.52	1.37
4	*2422.00	107.17 AV			1.33 V	158	105.80	1.37
5	4844.00	49.69 PK	74.00	-24.31	1.71 V	134	40.78	8.91
6	4844.00	36.88 AV	54.00	-17.12	1.71 V	134	27.97	8.91

Remarks:

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

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	125.92 PK			2.84 H	115	124.54	1.38
2	*2437.00	112.46 AV			2.84 H	115	111.08	1.38
3	4874.00	50.80 PK	74.00	-23.20	2.11 H	174	41.78	9.02
4	4874.00	37.93 AV	54.00	-16.07	2.11 H	174	28.91	9.02

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	123.52 PK			1.27 V	155	122.14	1.38
2	*2437.00	110.14 AV			1.27 V	155	108.76	1.38
3	4874.00	50.31 PK	74.00	-23.69	1.65 V	130	41.29	9.02
4	4874.00	37.14 AV	54.00	-16.86	1.65 V	130	28.12	9.02

Remarks:

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

Channel	TX Channel 9	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	121.23 PK			2.57 H	113	119.83	1.40
2	*2452.00	107.99 AV			2.57 H	113	106.59	1.40
3	2483.50	72.78 PK	74.00	-1.22	2.57 H	113	71.23	1.55
4	2483.50	50.74 AV	54.00	-3.26	2.57 H	113	49.19	1.55
5	4904.00	50.20 PK	74.00	-23.80	2.15 H	168	41.09	9.11
6	4904.00	37.29 AV	54.00	-16.71	2.15 H	168	28.18	9.11
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	118.92 PK			1.24 V	157	117.52	1.40
2	*2452.00	105.43 AV			1.24 V	157	104.03	1.40
3	2483.50	72.25 PK	74.00	-1.75	1.24 V	157	70.70	1.55
4	2483.50	53.30 AV	54.00	-0.70	1.24 V	157	51.75	1.55
5	4904.00	49.55 PK	74.00	-24.45	1.66 V	128	40.44	9.11
6	4904.00	36.72 AV	54.00	-17.28	1.66 V	128	27.61	9.11

Remarks:

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

Beamforming Mode

802.11ax (20MHz)

Channel	TX Channel 1	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	72.65 PK	74.00	-1.35	2.86 H	18	71.34	1.31
2	2390.00	52.72 AV	54.00	-1.28	2.86 H	18	51.41	1.31
3	*2412.00	120.87 PK			2.86 H	18	119.51	1.36
4	*2412.00	108.19 AV			2.86 H	18	106.83	1.36
5	4824.00	50.03 PK	74.00	-23.97	1.72 H	135	41.18	8.85
6	4824.00	36.34 AV	54.00	-17.66	1.72 H	135	27.49	8.85
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	68.13 PK	74.00	-5.87	1.00 V	35	66.82	1.31
2	2390.00	45.94 AV	54.00	-8.06	1.00 V	35	44.63	1.31
3	*2412.00	123.15 PK			1.00 V	35	121.79	1.36
4	*2412.00	109.91 AV			1.00 V	35	108.55	1.36
5	4824.00	49.54 PK	74.00	-24.46	1.38 V	220	40.69	8.85
6	4824.00	36.17 AV	54.00	-17.83	1.38 V	220	27.32	8.85

Remarks:

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

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	123.84 PK			2.83 H	24	122.46	1.38
2	*2437.00	111.08 AV			2.83 H	24	109.70	1.38
3	4874.00	50.58 PK	74.00	-23.42	1.77 H	129	41.56	9.02
4	4874.00	37.08 AV	54.00	-16.92	1.77 H	129	28.06	9.02

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	126.49 PK			1.03 V	39	125.11	1.38
2	*2437.00	113.31 AV			1.03 V	39	111.93	1.38
3	4874.00	49.82 PK	74.00	-24.18	1.41 V	223	40.80	9.02
4	4874.00	36.38 AV	54.00	-17.62	1.41 V	223	27.36	9.02

Remarks:

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

Channel	TX Channel 11	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	121.53 PK			2.74 H	139	120.08	1.45
2	*2462.00	109.74 AV			2.74 H	139	108.29	1.45
3	2483.50	71.64 PK	74.00	-2.36	2.74 H	139	70.09	1.55
4	2483.50	49.42 AV	54.00	-4.58	2.74 H	139	47.87	1.55
5	4924.00	50.66 PK	74.00	-23.34	1.75 H	131	41.57	9.09
6	4924.00	37.23 AV	54.00	-16.77	1.75 H	131	28.14	9.09
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	125.03 PK			1.53 V	119	123.58	1.45
2	*2462.00	112.74 AV			1.53 V	119	111.29	1.45
3	2483.50	72.94 PK	74.00	-1.06	1.53 V	119	71.39	1.55
4	2483.50	49.31 AV	54.00	-4.69	1.53 V	119	47.76	1.55
5	4924.00	50.17 PK	74.00	-23.83	1.43 V	227	41.08	9.09
6	4924.00	36.51 AV	54.00	-17.49	1.43 V	227	27.42	9.09

Remarks:

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

802.11ax (40MHz)

Channel	TX Channel 3	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	72.56 PK	74.00	-1.44	2.84 H	19	71.25	1.31
2	2390.00	51.78 AV	54.00	-2.22	2.84 H	19	50.47	1.31
3	*2422.00	121.26 PK			2.84 H	19	119.89	1.37
4	*2422.00	108.45 AV			2.84 H	19	107.08	1.37
5	4844.00	50.22 PK	74.00	-23.78	1.79 H	145	41.31	8.91
6	4844.00	37.39 AV	54.00	-16.61	1.79 H	145	28.48	8.91
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	70.38 PK	74.00	-3.62	1.85 V	44	69.07	1.31
2	2390.00	50.49 AV	54.00	-3.51	1.85 V	44	49.18	1.31
3	*2422.00	119.69 PK			1.85 V	44	118.32	1.37
4	*2422.00	105.97 AV			1.85 V	44	104.60	1.37
5	4844.00	49.74 PK	74.00	-24.26	1.33 V	234	40.83	8.91
6	4844.00	36.69 AV	54.00	-17.31	1.33 V	234	27.78	8.91

Remarks:

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

Channel	TX Channel 6	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	123.04 PK			2.77 H	133	121.66	1.38
2	*2437.00	110.61 AV			2.77 H	133	109.23	1.38
3	4874.00	50.46 PK	74.00	-23.54	1.75 H	142	41.44	9.02
4	4874.00	37.51 AV	54.00	-16.49	1.75 H	142	28.49	9.02

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	126.42 PK			1.51 V	117	125.04	1.38
2	*2437.00	113.57 AV			1.51 V	117	112.19	1.38
3	4874.00	50.08 PK	74.00	-23.92	1.30 V	236	41.06	9.02
4	4874.00	36.87 AV	54.00	-17.13	1.30 V	236	27.85	9.02

Remarks:

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

Channel	TX Channel 9	Detector Function	Peak (PK)
Frequency Range	1GHz ~ 25GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	119.79 PK			2.58 H	64	118.39	1.40
2	*2452.00	106.35 AV			2.58 H	64	104.95	1.40
3	2483.50	72.37 PK	74.00	-1.63	2.58 H	64	70.82	1.55
4	2483.50	51.04 AV	54.00	-2.96	2.58 H	64	49.49	1.55
5	4904.00	49.55 PK	74.00	-24.45	1.37 H	228	40.44	9.11
6	4904.00	36.60 AV	54.00	-17.40	1.37 H	228	27.49	9.11
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	117.98 PK			1.55 V	119	116.58	1.40
2	*2452.00	104.65 AV			1.55 V	119	103.25	1.40
3	2483.50	66.88 PK	74.00	-7.12	1.55 V	119	65.33	1.55
4	2483.50	50.14 AV	54.00	-3.86	1.55 V	119	48.59	1.55
5	4904.00	49.13 PK	74.00	-24.87	1.31 V	224	40.02	9.11
6	4904.00	36.22 AV	54.00	-17.78	1.31 V	224	27.11	9.11

Remarks:

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

Below 1GHz Data:

CDD Mode

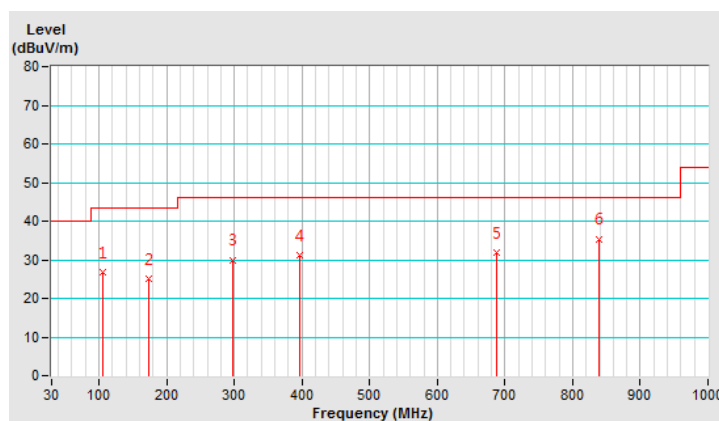
802.11ax (20MHz)

Channel	TX Channel 6	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	105.03	26.65 QP	43.50	-16.85	1.23 H	261	37.20	-10.55
2	173.22	24.97 QP	43.50	-18.53	1.49 H	73	32.12	-7.15
3	297.62	29.76 QP	46.00	-16.24	1.05 H	107	34.60	-4.84
4	396.03	31.06 QP	46.00	-14.94	2.17 H	92	33.98	-2.92
5	686.98	31.76 QP	46.00	-14.24	1.76 H	352	28.31	3.45
6	839.71	35.23 QP	46.00	-10.77	1.88 H	239	28.79	6.44

Remarks:

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

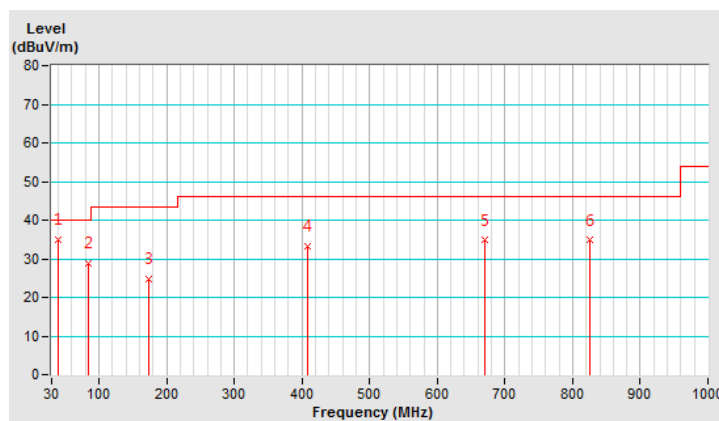


Channel	TX Channel 6	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	39.41	35.03 QP	40.00	-4.97	1.37 V	360	42.89	-7.86
2	83.40	28.80 QP	40.00	-11.20	1.86 V	272	40.91	-12.11
3	173.85	24.67 QP	43.50	-18.83	1.29 V	354	31.86	-7.19
4	408.01	33.21 QP	46.00	-12.79	2.08 V	257	35.96	-2.75
5	669.57	34.78 QP	46.00	-11.22	1.14 V	360	31.58	3.20
6	825.30	34.82 QP	46.00	-11.18	1.95 V	59	28.51	6.31

Remarks:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESR3	102413	Feb. 17, 2020	Feb. 16, 2021
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 13, 2019	Dec. 12, 2020
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 13, 2019	Dec. 12, 2020
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 31, 2019	Oct. 30, 2020
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 14, 2020	May 13, 2021
SCHWARZBECK Artificial Mains Network (for EUT)	NNLK 8121	8121-808	Apr. 10, 2020	Apr. 9, 2021
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With 10dB PAD	5D-FB	Cable-C09.01	Aug. 15, 2019	Aug. 14, 2020
SUHNTER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 13, 2020	May 12, 2021

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 Shielded Room No. 9. (Conduction 9)

3. The VCCI Site Registration No. C-11312.

4.2.3 Test Procedures

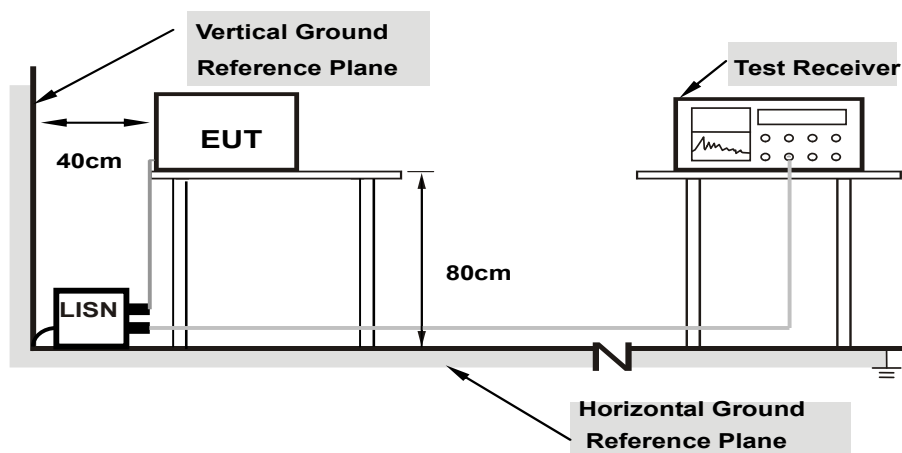
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency continuously.

4.2.7 Test Results

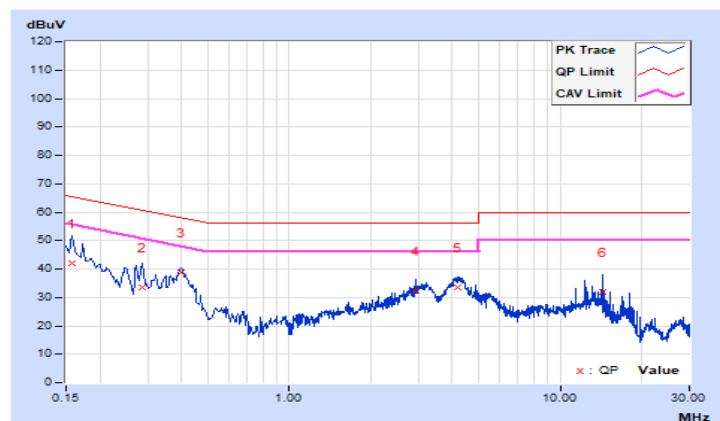
CDD Mode

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	10.53	31.41	20.32	41.94	30.85	65.58	55.58	-23.64	-24.73
2	0.28685	10.58	22.88	15.43	33.46	26.01	60.62	50.62	-27.16	-24.61
3	0.39739	10.59	28.20	25.70	38.79	36.29	57.91	47.91	-19.12	-11.62
4	2.92811	10.84	21.36	11.60	32.20	22.44	56.00	46.00	-23.80	-23.56
5	4.20113	10.94	22.42	12.88	33.36	23.82	56.00	46.00	-22.64	-22.18
6	14.26667	11.54	20.22	10.27	31.76	21.81	60.00	50.00	-28.24	-28.19

REMARKS:

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

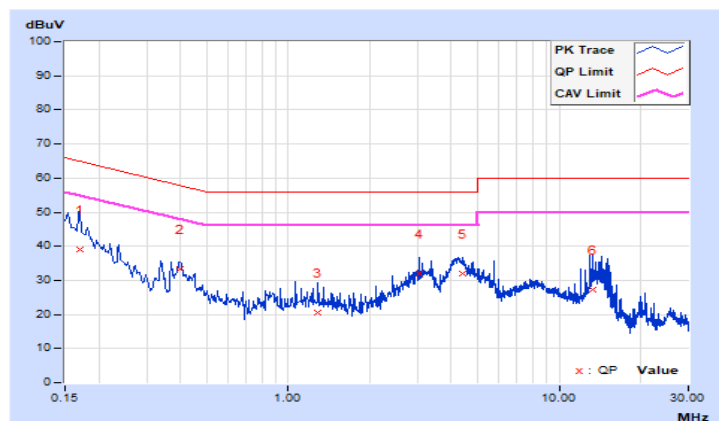


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16955	10.52	28.52	16.82	39.04	27.34	64.98	54.98	-25.94	-27.64
2	0.39739	10.57	22.89	19.57	33.46	30.14	57.91	47.91	-24.45	-17.77
3	1.28982	10.63	9.97	2.63	20.60	13.26	56.00	46.00	-35.40	-32.74
4	3.04932	10.79	21.16	10.66	31.95	21.45	56.00	46.00	-24.05	-24.55
5	4.39436	10.89	21.07	12.96	31.96	23.85	56.00	46.00	-24.04	-22.15
6	13.23837	11.32	16.05	7.94	27.37	19.26	60.00	50.00	-32.63	-30.74

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

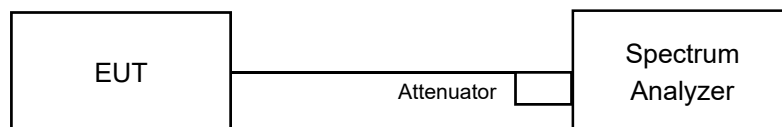


4.3 6dB Bandwidth Measurement

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

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

CDD Mode

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	8.07	7.61	8.09	8.10	0.5	Pass
6	2437	8.06	8.06	7.09	7.59	0.5	Pass
11	2462	8.09	8.06	8.05	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	15.97	15.72	16.06	15.82	0.5	Pass
6	2437	15.84	15.71	15.73	15.97	0.5	Pass
11	2462	16.07	16.11	16.08	16.07	0.5	Pass

802.11ax (20MHz)

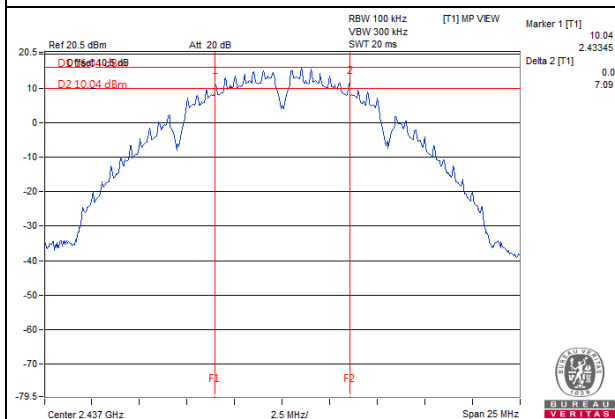
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
1	2412	18.91	18.83	18.88	18.81	0.5	Pass
6	2437	19.00	18.95	18.93	18.98	0.5	Pass
11	2462	19.03	19.04	19.03	19.04	0.5	Pass

802.11ax (40MHz)

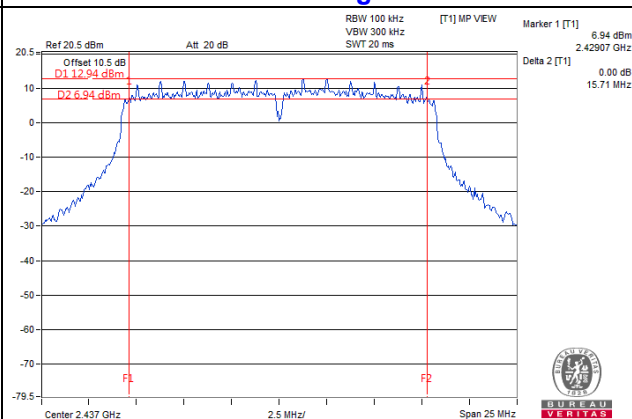
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
3	2422	37.93	38.04	38.01	38.02	0.5	Pass
6	2437	37.84	37.97	38.01	37.99	0.5	Pass
9	2452	38.10	38.12	38.02	38.07	0.5	Pass

Spectrum Plot of Worst Value

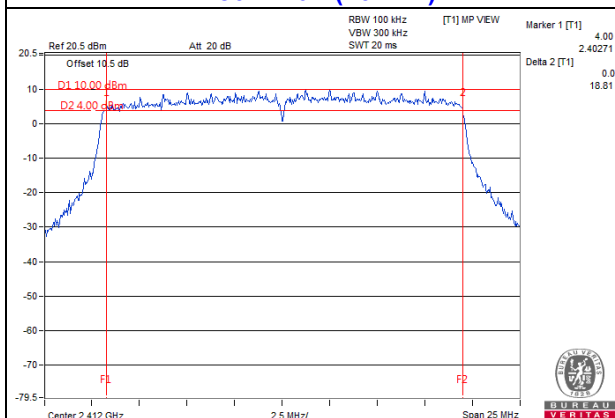
802.11b



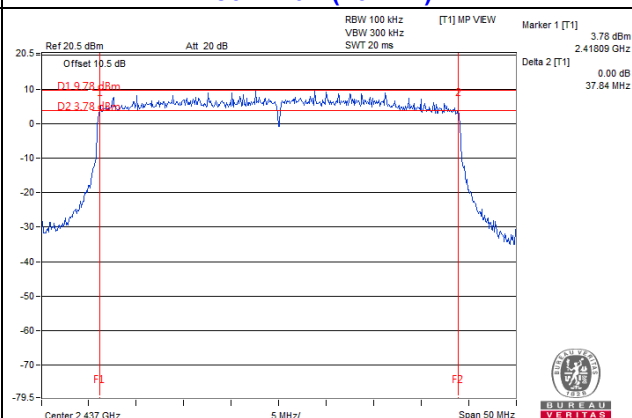
802.11g



802.11ax (20MHz)



802.11ax (40MHz)

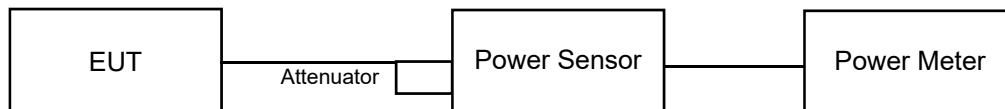


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

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	23.80	23.72	24.01	23.78	965.937	29.85	30	Pass
6	2437	24.02	23.82	24.00	24.01	996.295	29.98	30	Pass
11	2462	23.93	24.02	24.05	23.49	976.975	29.90	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	24.00	23.90	24.05	23.94	998.499	29.99	30	Pass
6	2437	23.75	23.78	24.08	24.12	990.003	29.96	30	Pass
11	2462	23.35	23.52	23.82	23.41	901.448	29.55	30	Pass

802.11n (20MHz)

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	22.86	22.70	22.88	22.98	772.104	28.88	30	Pass
6	2437	22.74	22.89	23.24	23.15	799.869	29.03	30	Pass
11	2462	21.42	21.40	21.44	21.27	549.997	27.40	30	Pass

802.11n (40MHz)

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	21.48	21.42	21.61	21.47	564.439	27.52	30	Pass
6	2437	22.88	22.77	22.93	22.96	777.356	28.91	30	Pass
9	2452	20.37	20.48	20.55	20.38	443.224	26.47	30	Pass

802.11ac (20MHz)

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	23.09	22.95	23.13	23.22	816.43	29.12	30	Pass
6	2437	22.99	23.15	23.48	23.38	846.22	29.27	30	Pass
11	2462	21.65	21.63	21.67	21.50	579.91	27.63	30	Pass

802.11ac (40MHz)

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	21.70	21.64	21.85	21.72	595.495	27.75	30	Pass
6	2437	23.12	22.99	23.18	23.22	822.047	29.15	30	Pass
9	2452	20.60	20.70	20.81	20.59	467.360	26.70	30	Pass

802.11ax (20MHz)

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	23.84	23.67	23.89	23.96	968.704	29.86	30	Pass
6	2437	23.75	23.85	24.18	24.04	995.130	29.98	30	Pass
11	2462	22.37	22.38	22.43	22.26	688.818	28.38	30	Pass

802.11ax (40MHz)

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	22.46	22.37	22.59	22.48	707.344	28.50	30	Pass
6	2437	23.82	23.64	23.96	23.84	963.186	29.84	30	Pass
9	2452	21.34	21.46	21.58	21.33	555.814	27.45	30	Pass

Beamforming Mode

802.11ac (20MHz)

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	19.09	18.90	19.45	18.68	320.616	25.06	26.32	Pass
6	2437	19.24	19.36	19.73	19.63	356.049	25.52	26.32	Pass
11	2462	19.65	19.50	19.73	19.43	363.055	25.60	26.32	Pass

Note: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 9.68\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.68 - 6) = 26.32\text{dBm}$.

802.11ac (40MHz)

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	19.51	19.31	19.72	19.60	359.598	25.56	26.32	Pass
6	2437	19.50	19.31	19.71	19.59	358.967	25.55	26.32	Pass
9	2452	18.22	18.20	18.74	18.22	273.635	24.37	26.32	Pass

Note: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 9.68\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.68 - 6) = 26.32\text{dBm}$.

802.11ax (20MHz)

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	19.77	19.52	20.09	19.35	372.572	25.71	26.32	Pass
6	2437	19.92	20.07	20.41	20.25	415.626	26.19	26.32	Pass
11	2462	20.26	20.21	20.41	20.06	422.416	26.26	26.32	Pass

Note: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 9.68\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.68 - 6) = 26.32\text{dBm}$.

802.11ax (40MHz)

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	20.16	20.02	20.41	20.28	420.775	26.24	26.32	Pass
6	2437	20.22	19.99	20.35	20.22	418.555	26.22	26.32	Pass
9	2452	18.86	18.89	19.39	18.89	318.701	25.03	26.32	Pass

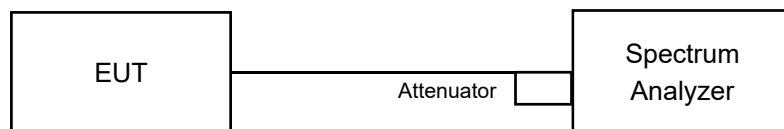
Note: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 9.68\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (9.68 - 6) = 26.32\text{dBm}$.

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

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

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

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

CDD Mode 802.11b

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	-9.39	-10.82	-11.36	-10.57	1.16	-3.29	4.32	Pass
6	2437	-13.34	-10.48	-10.43	-7.85	1.16	-2.92	4.32	Pass
11	2462	-8.86	-10.55	-10.52	-10.03	1.16	-2.75	4.32	Pass

Note:

- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 9.68\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(9.68-6) = 4.32\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11g

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	-5.99	-5.92	-5.99	-6.12	0.25	0.27	4.32	Pass
6	2437	-6.36	-6.66	-6.34	-6.71	0.25	-0.24	4.32	Pass
11	2462	-6.24	-6.70	-6.66	-6.97	0.25	-0.36	4.32	Pass

Note:

- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 9.68\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(9.68-6) = 4.32\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (20MHz)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
1	2412	-11.52	-11.40	-11.48	-11.45	0.15	-5.29	4.32	Pass
6	2437	-8.31	-8.24	-8.84	-8.65	0.15	-2.33	4.32	Pass
11	2462	-11.18	-11.02	-11.27	-11.39	0.15	-5.04	4.32	Pass

Note:

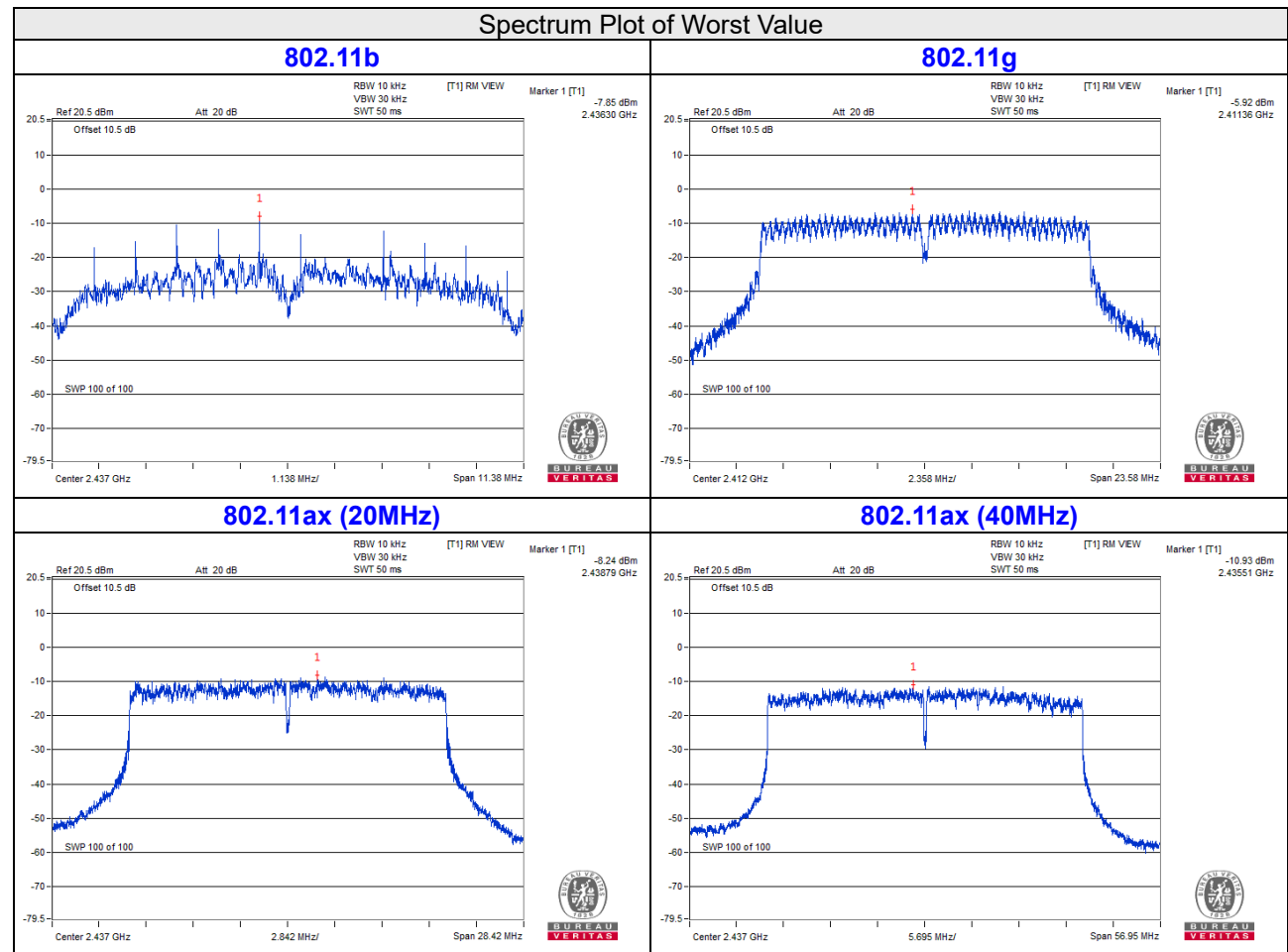
- Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
- Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 9.68\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(9.68-6) = 4.32\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (40MHz)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
3	2422	-13.77	-13.75	-13.45	-13.29	0.17	-7.37	4.32	Pass
6	2437	-11.41	-10.93	-11.14	-11.09	0.17	-4.95	4.32	Pass
9	2452	-15.46	-15.22	-15.55	-15.86	0.17	-9.33	4.32	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/4] = 9.68\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(9.68-6) = 4.32\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

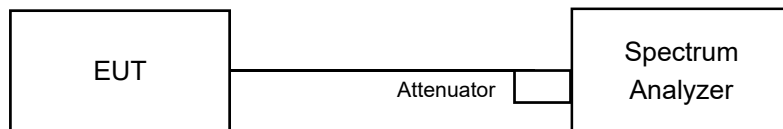


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

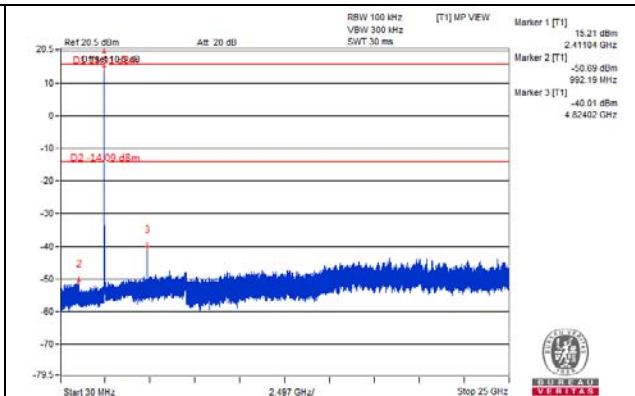
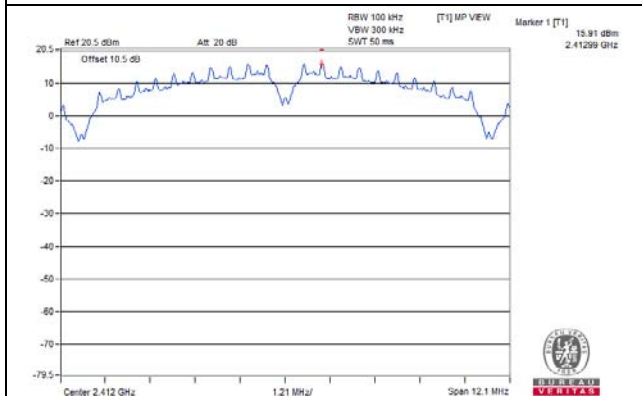
Same as Item 4.3.6

4.6.7 Test Results

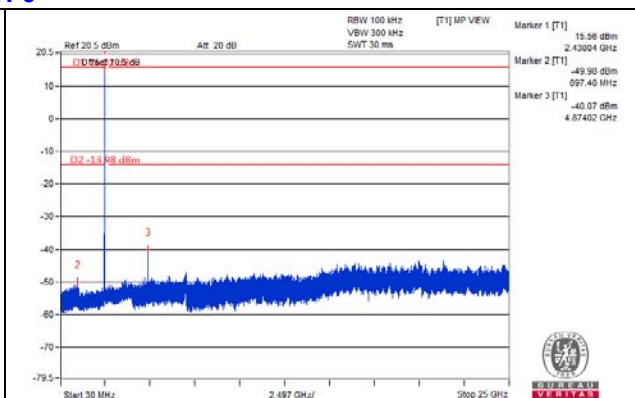
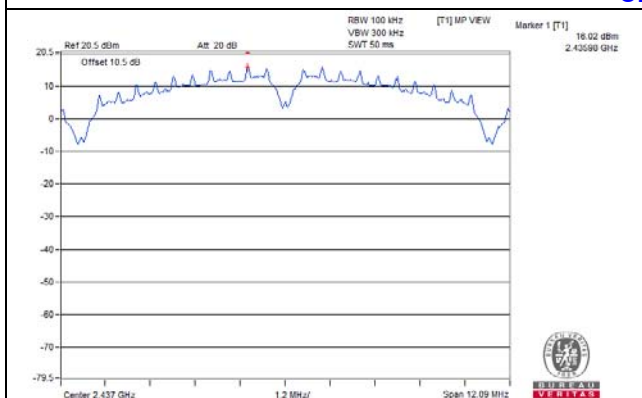
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

CDD Mode 802.11b_Chain 0

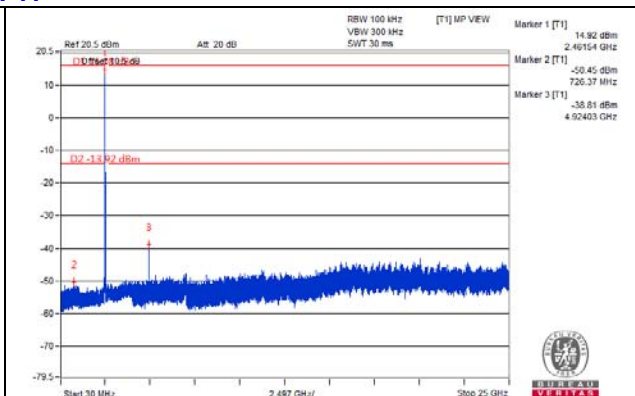
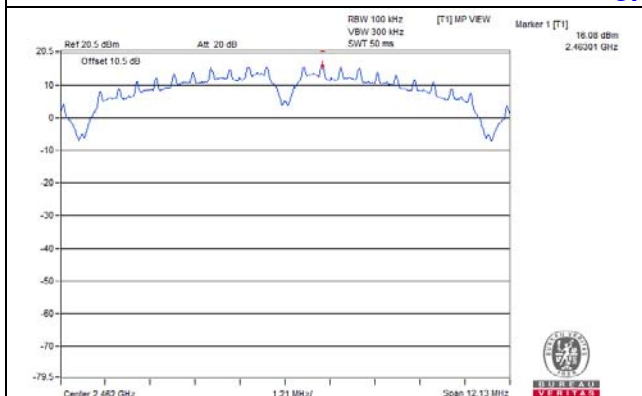
CH 1



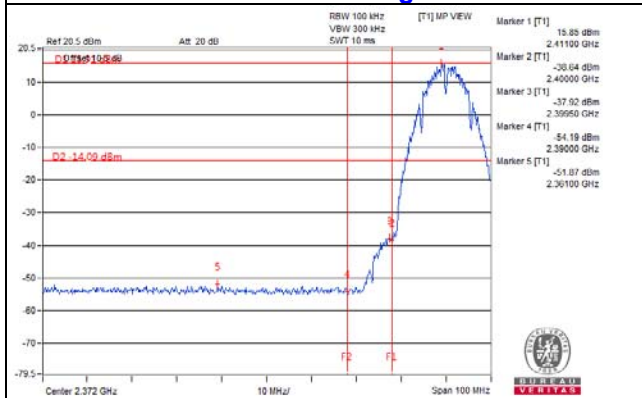
CH 6



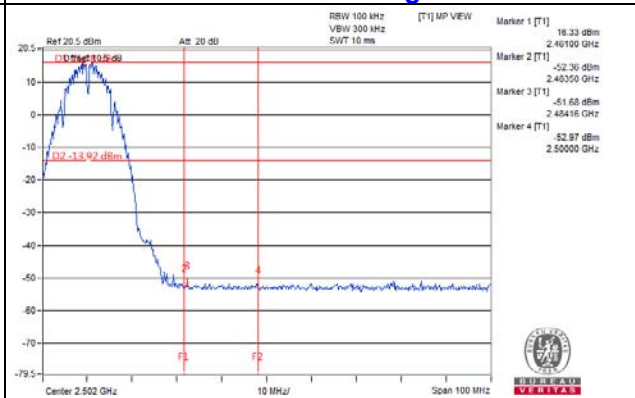
CH 11



CH 1 Band edge

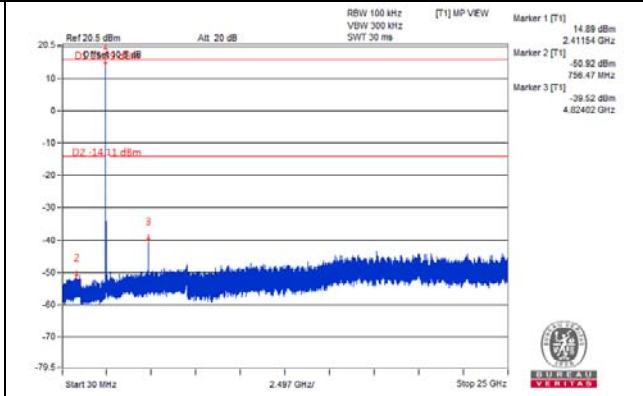
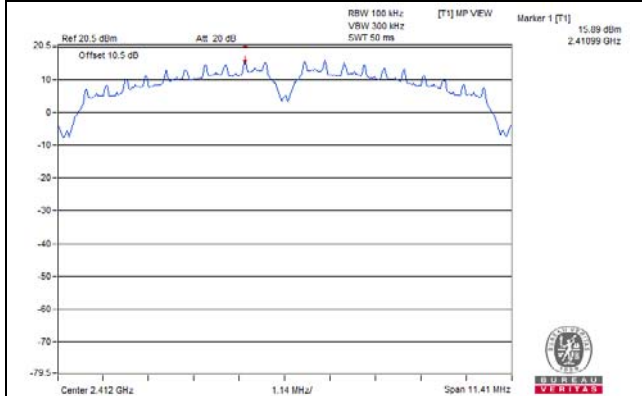


CH 11 Band edge

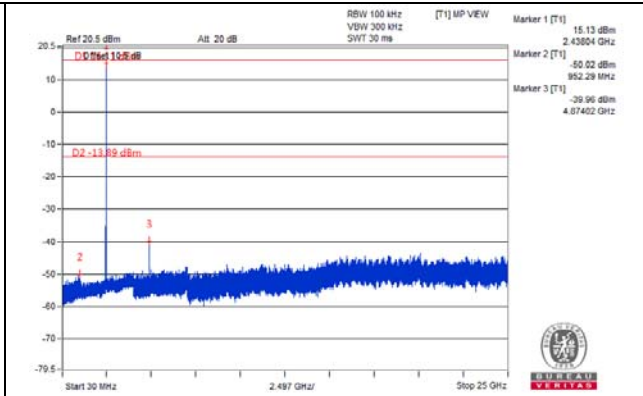
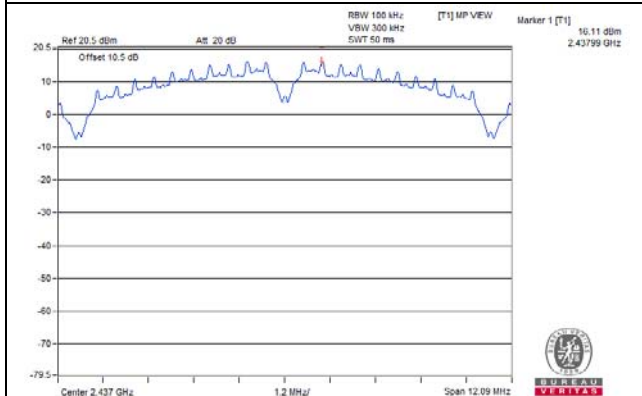


802.11b_Chain 1

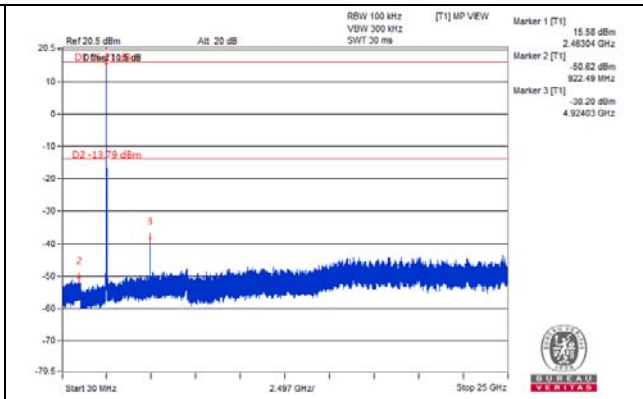
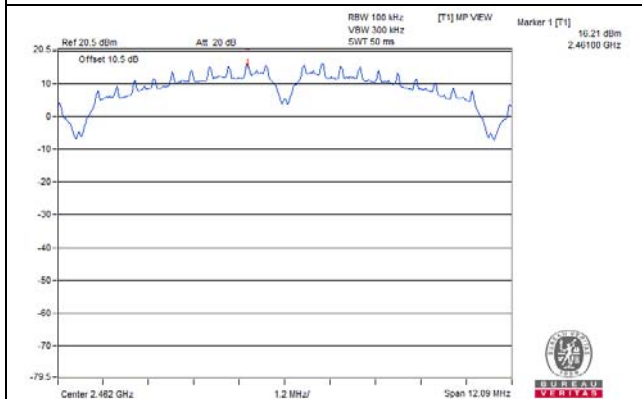
CH 1



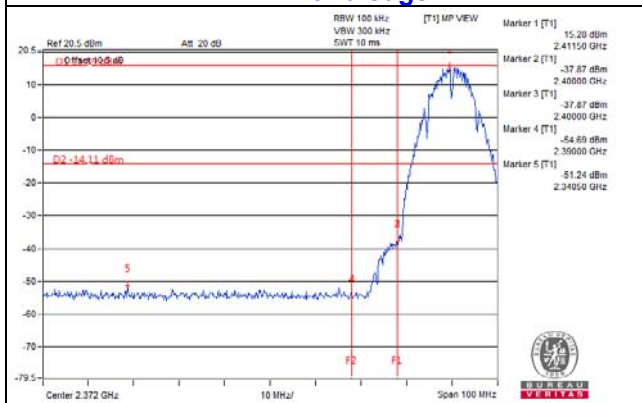
CH 6



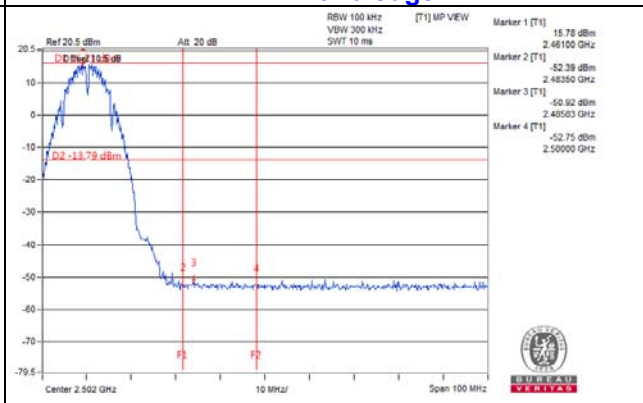
CH 11



CH 1 Band edge

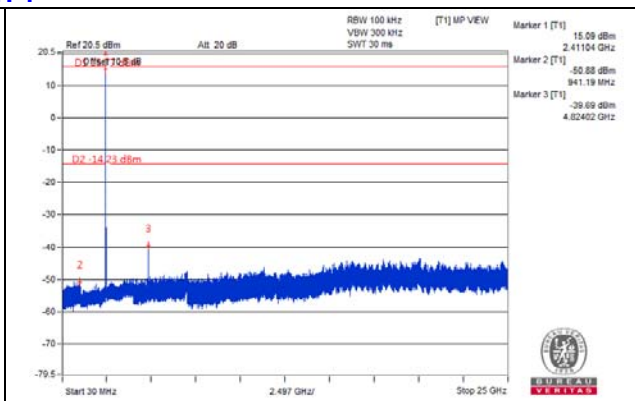
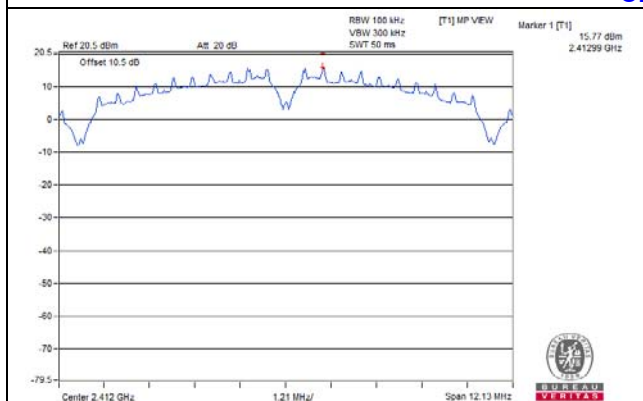


CH 11 Band edge

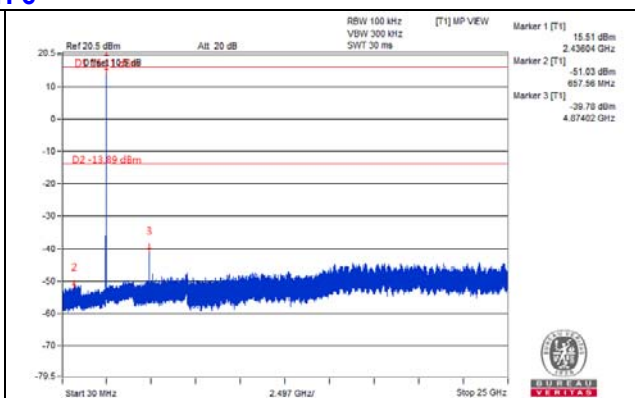
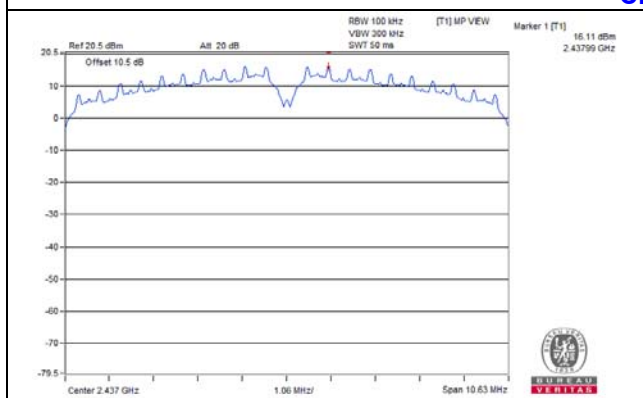


802.11b_Chain 2

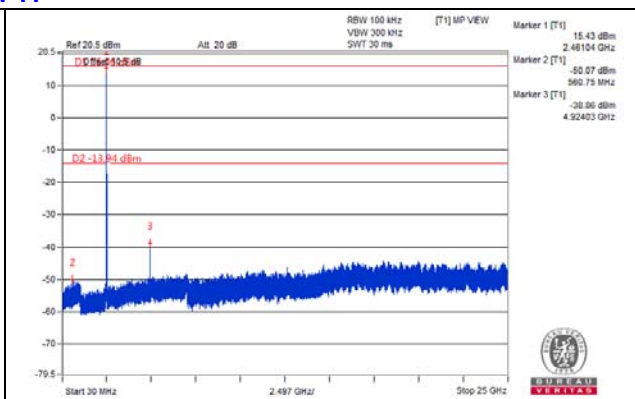
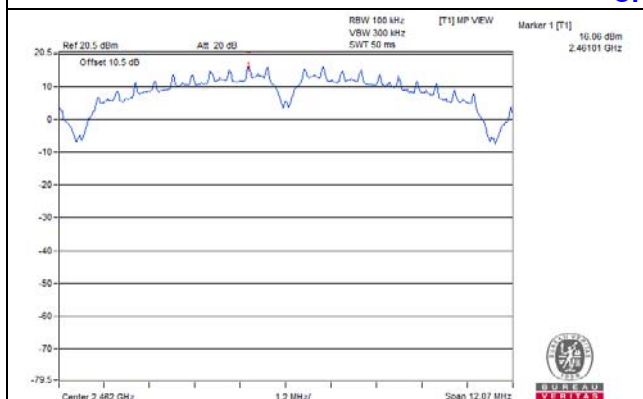
CH 1



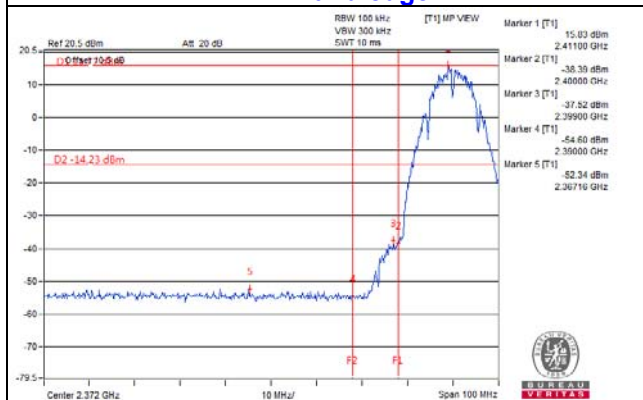
CH 6



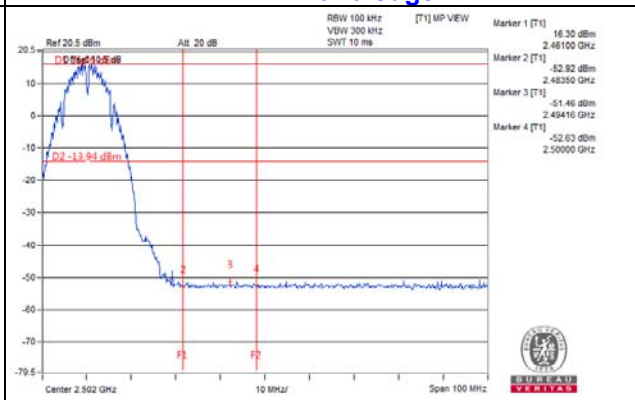
CH 11



CH 1 Band edge

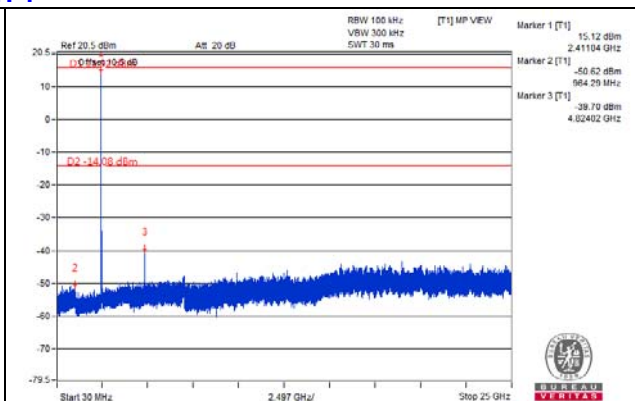
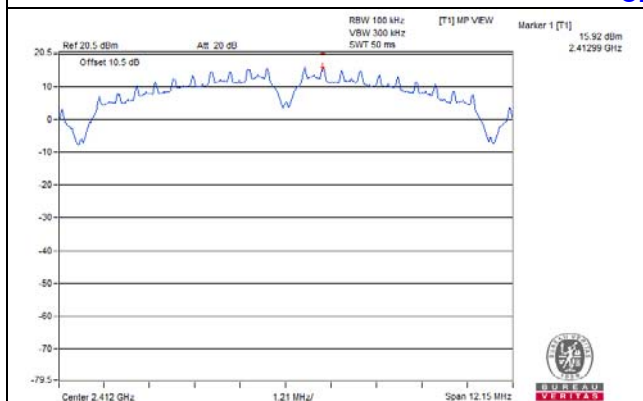


CH 11 Band edge

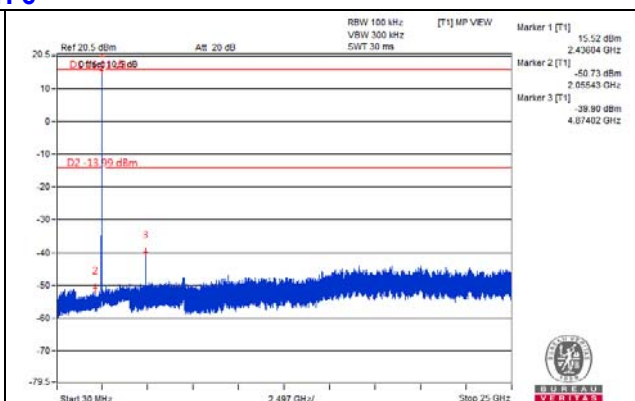
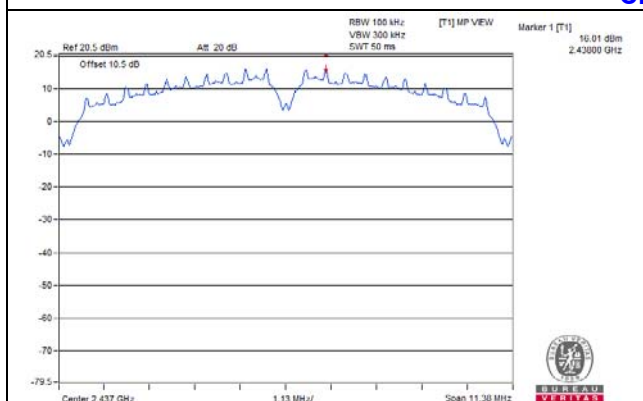


802.11b_Chain 3

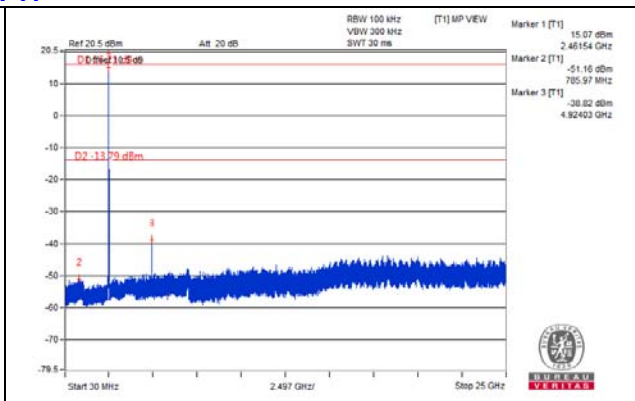
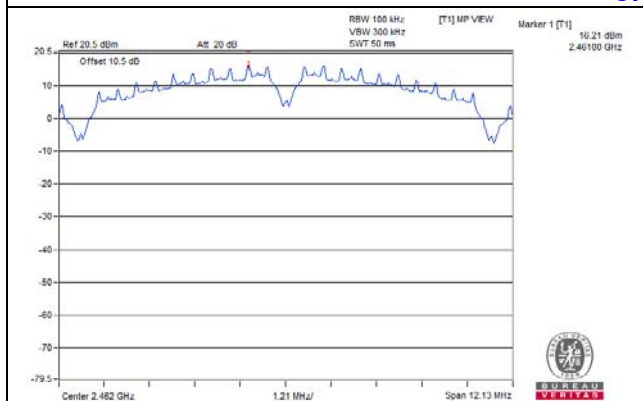
CH 1



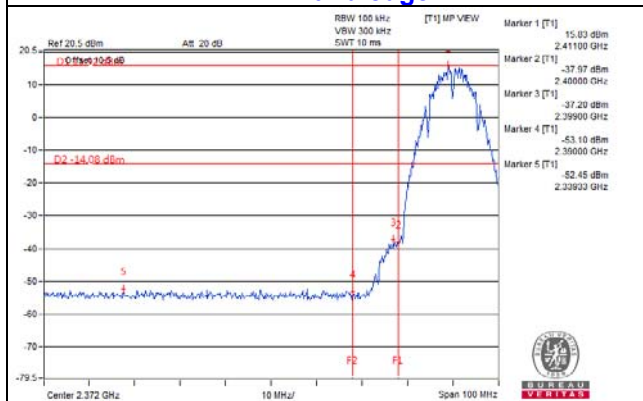
CH 6



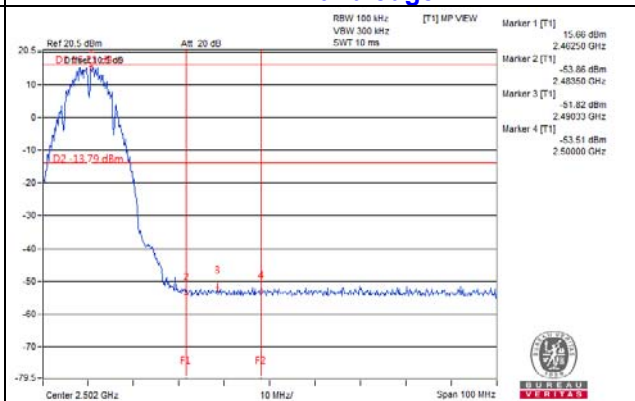
CH 11



CH 1 Band edge

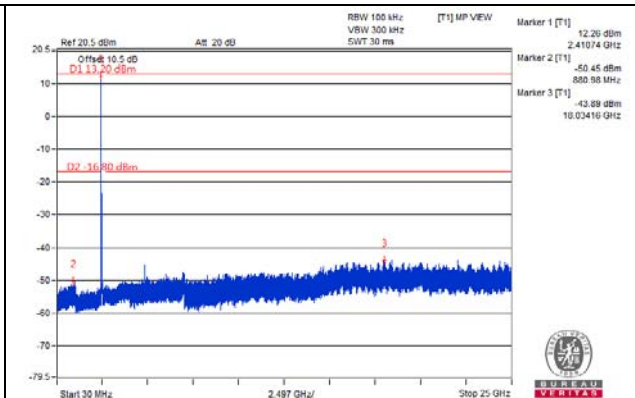
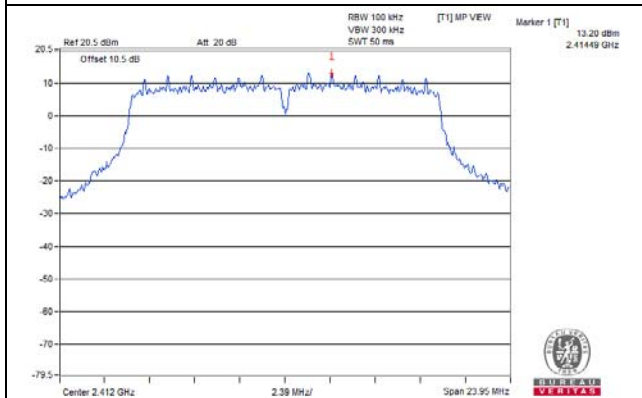


CH 11 Band edge

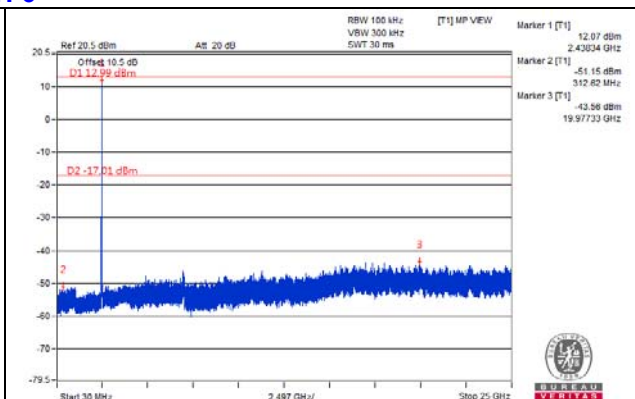
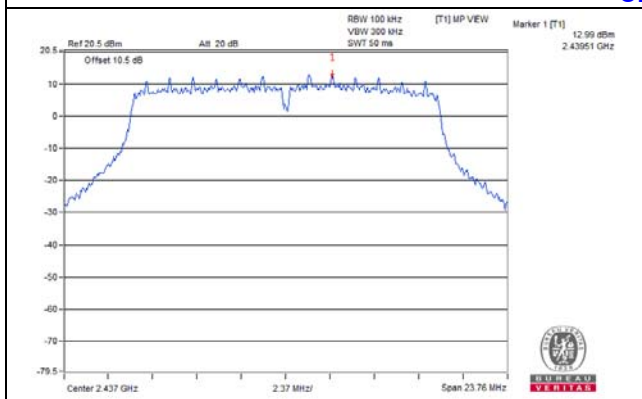


802.11g_Chain 0

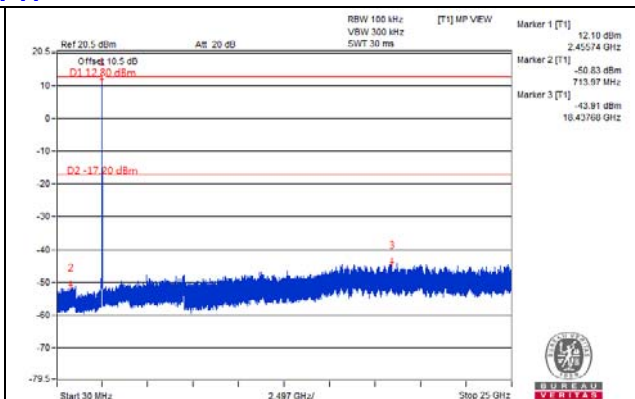
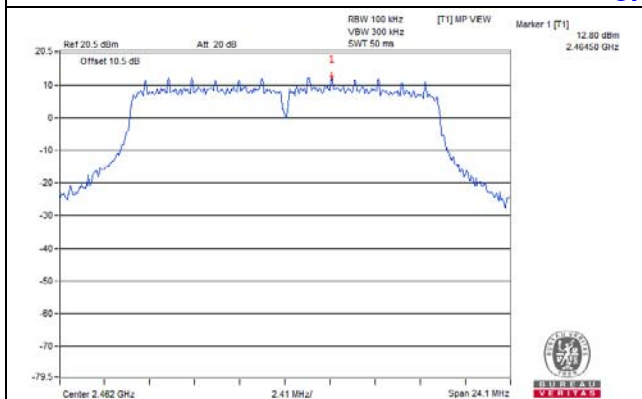
CH 1



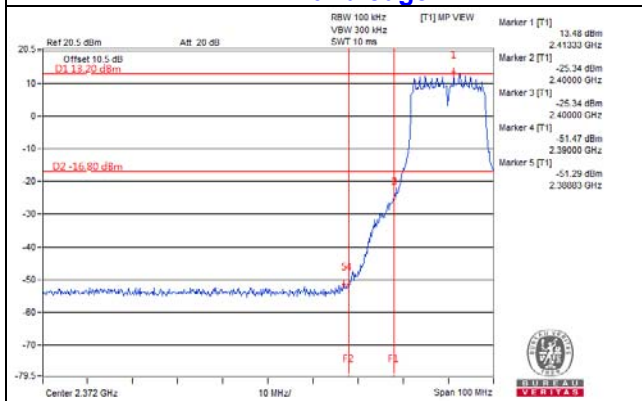
CH 6



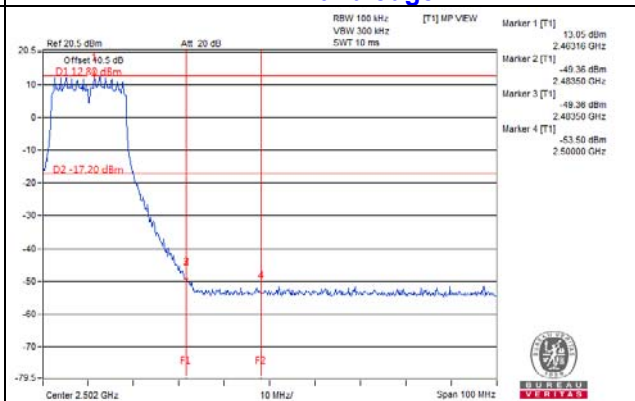
CH 11



CH 1 Band edge

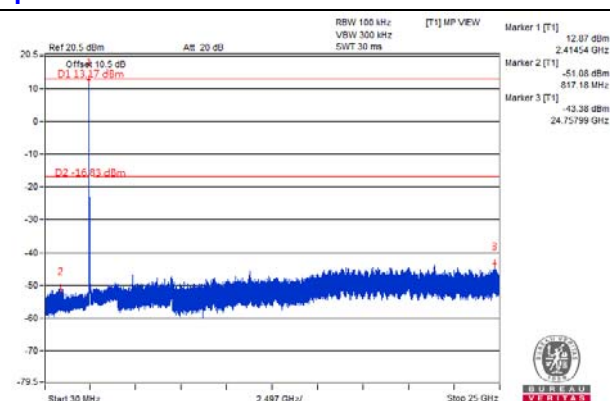
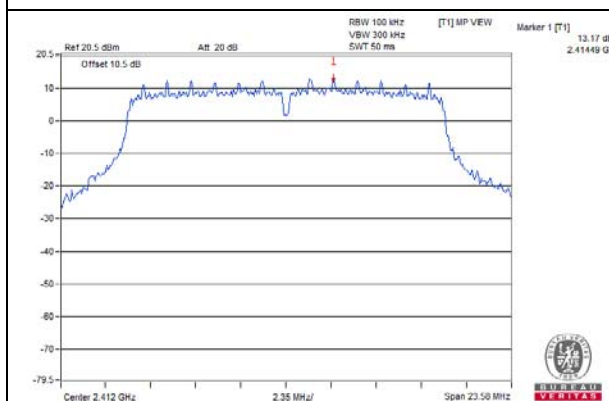


CH 11 Band edge

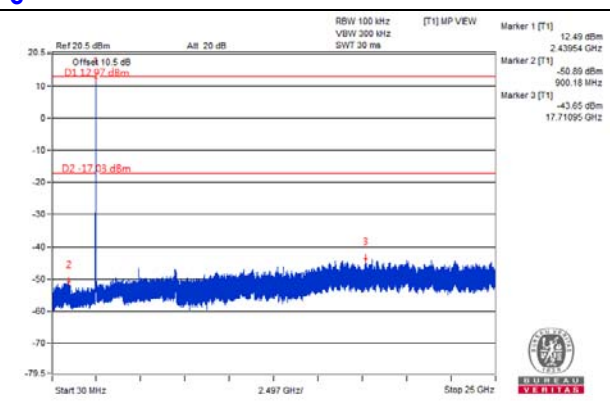
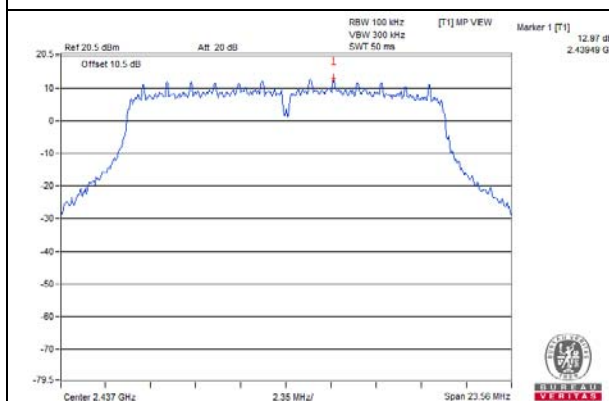


802.11g_Chain 1

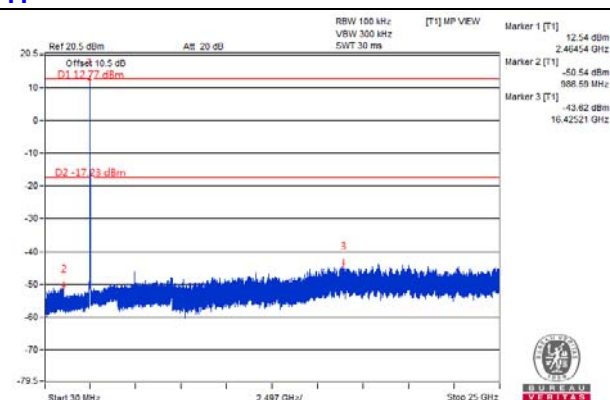
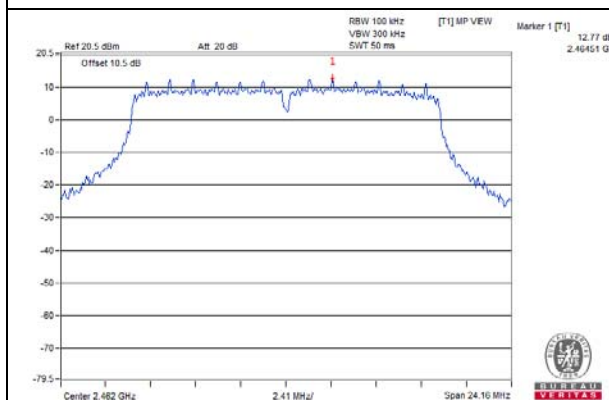
CH 1



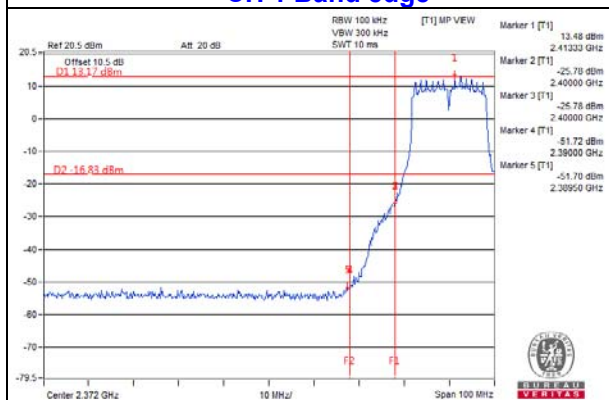
CH 6



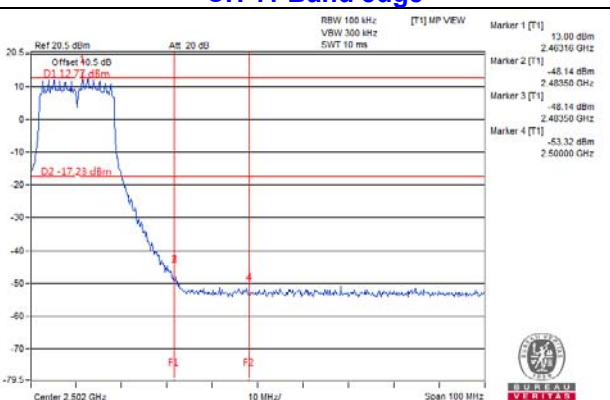
CH 11



CH 1 Band edge

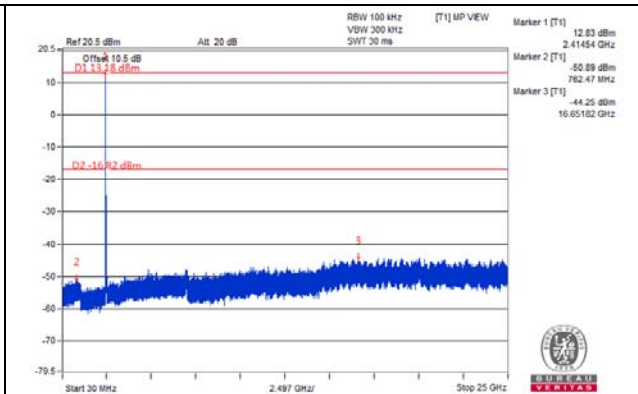
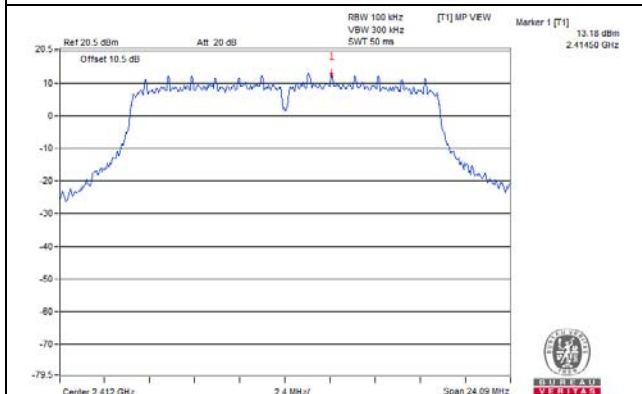


CH 11 Band edge

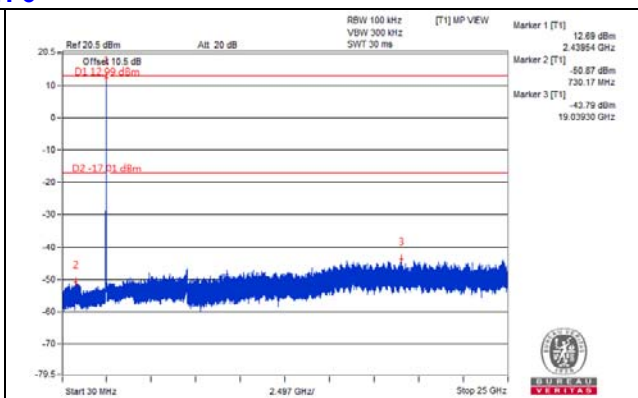
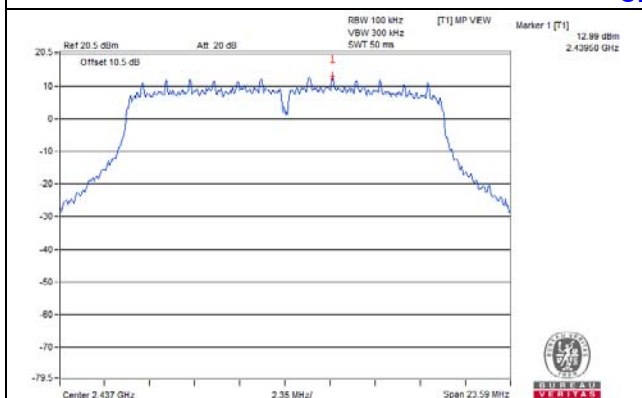


802.11g_Chain 2

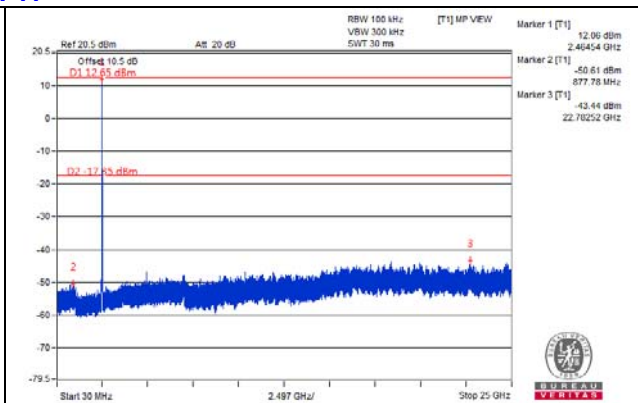
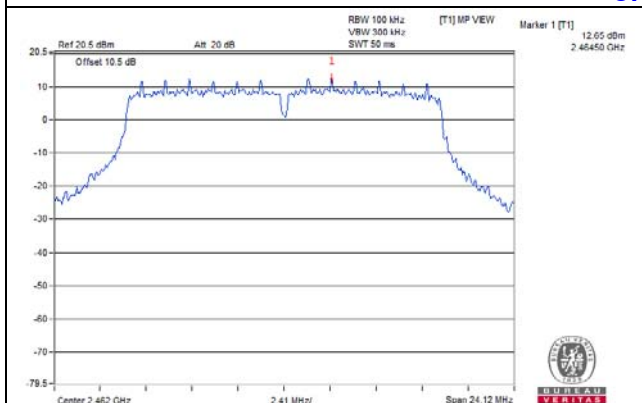
CH 1



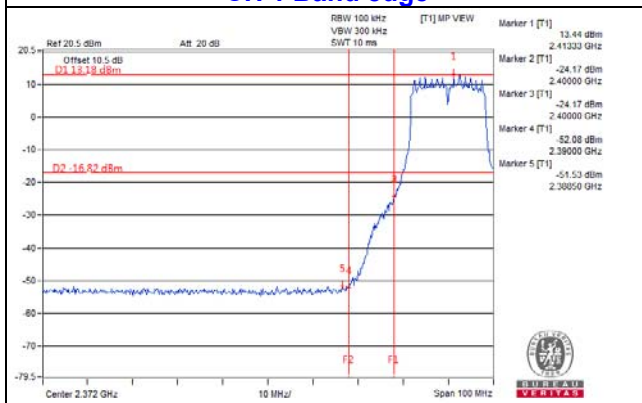
CH 6



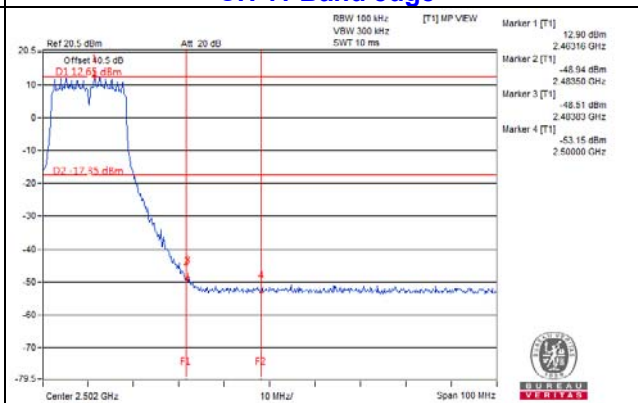
CH 11



CH 1 Band edge

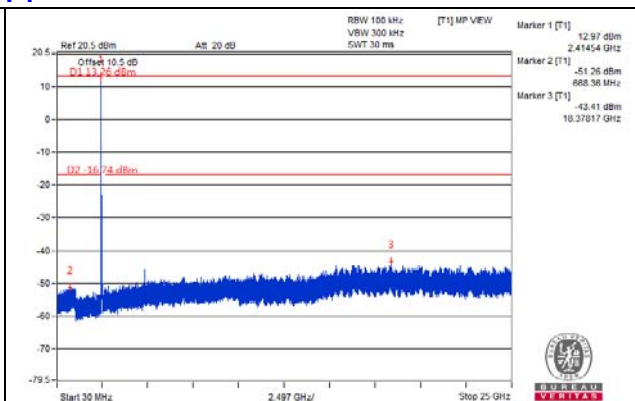
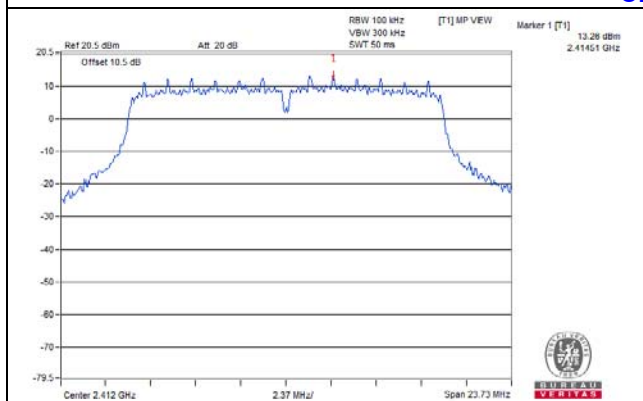


CH 11 Band edge

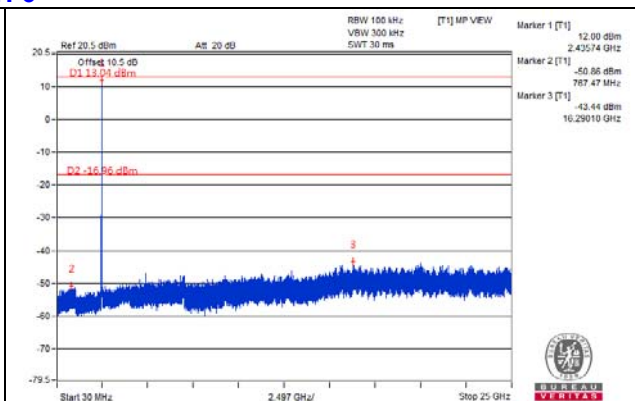
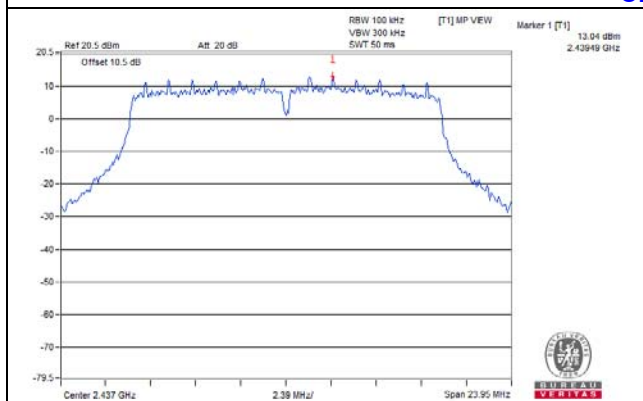


802.11g_Chain 3

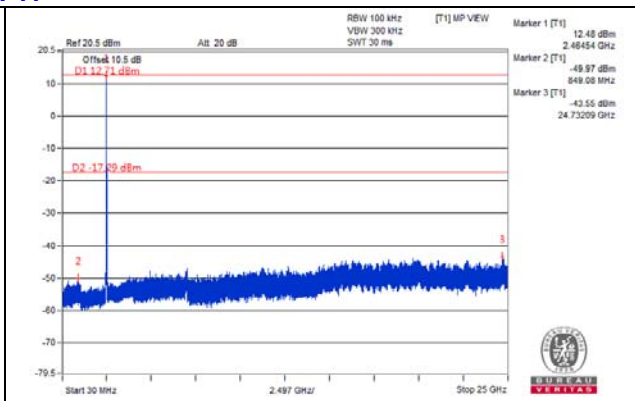
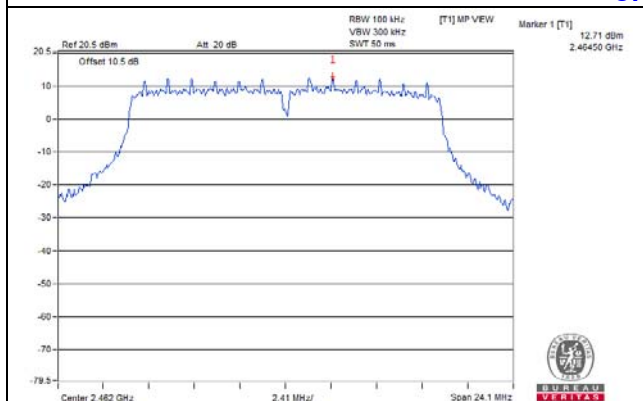
CH 1



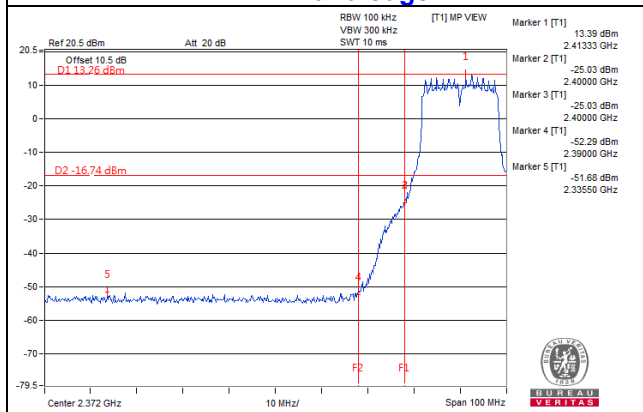
CH 6



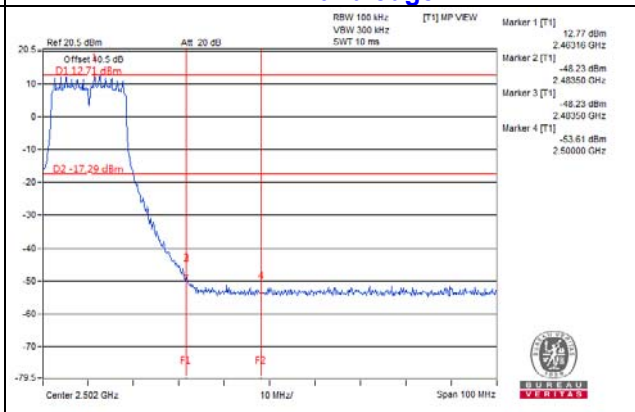
CH 11



CH 1 Band edge

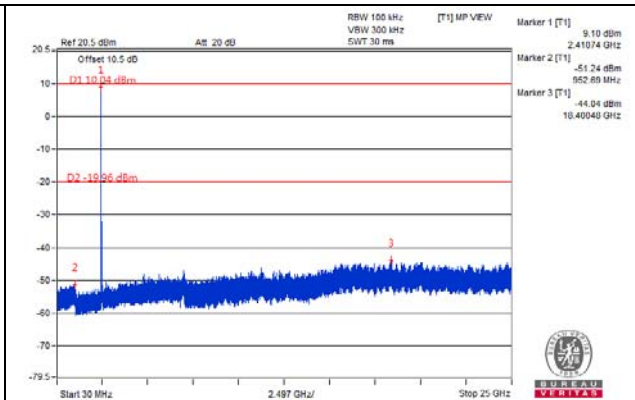
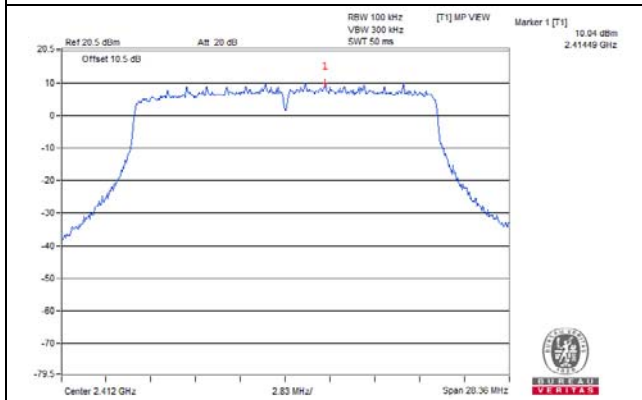


CH 11 Band edge

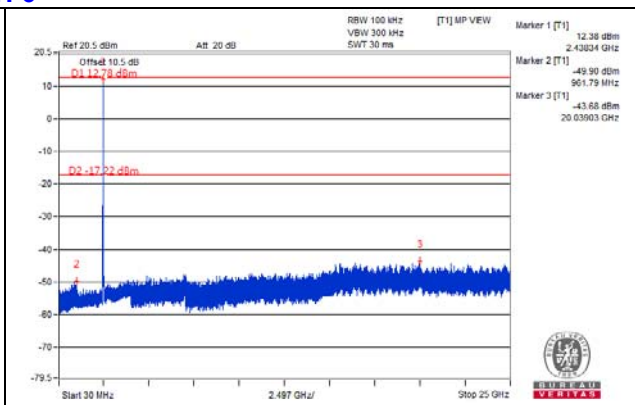
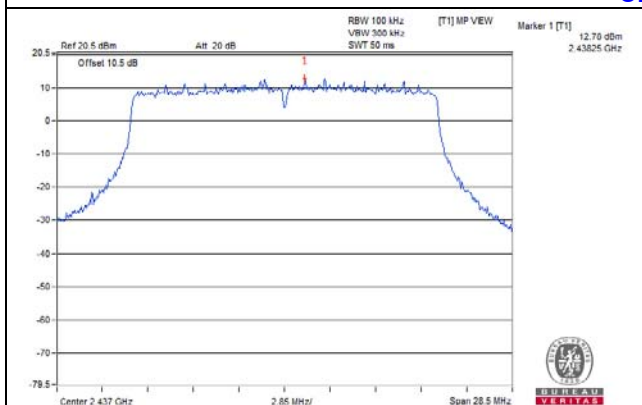


802.11ax (20MHz)_Chain 0

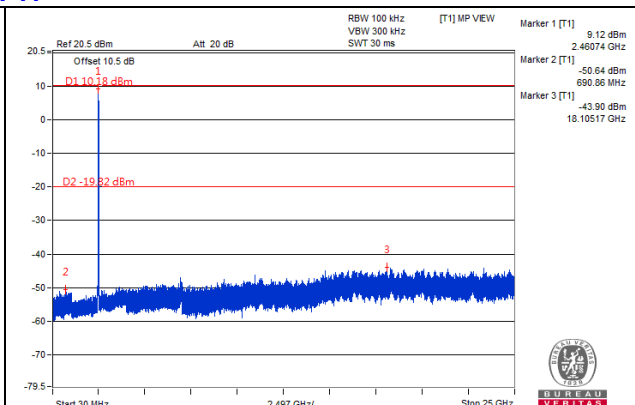
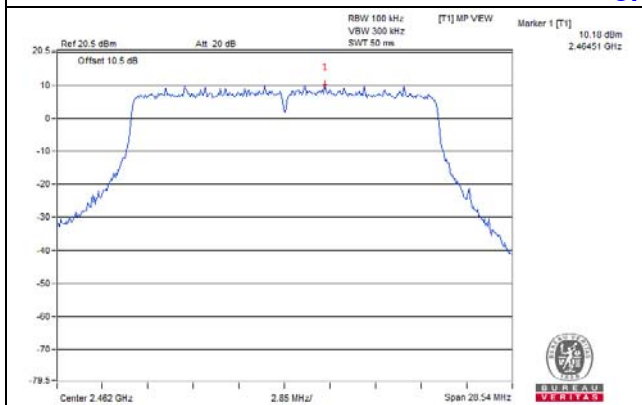
CH 1



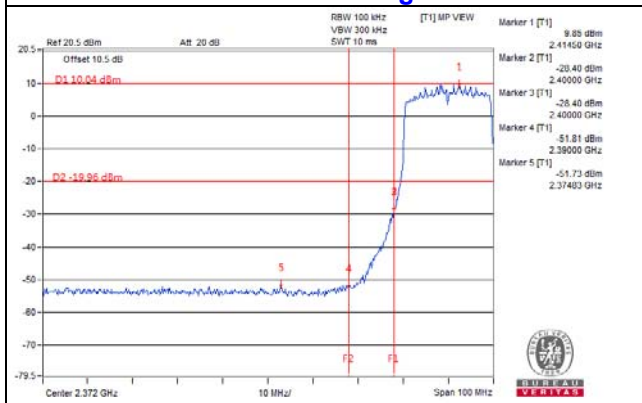
CH 6



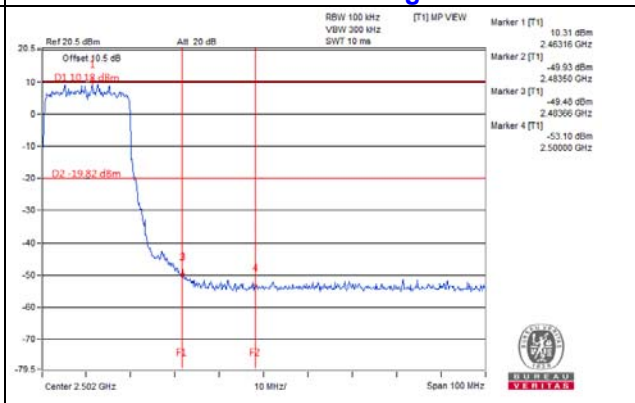
CH 11



CH 1 Band edge

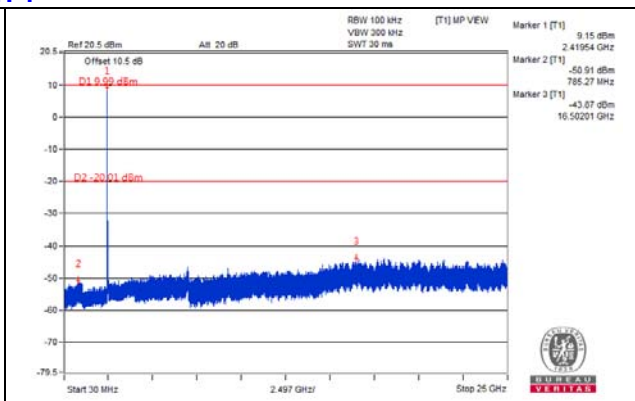
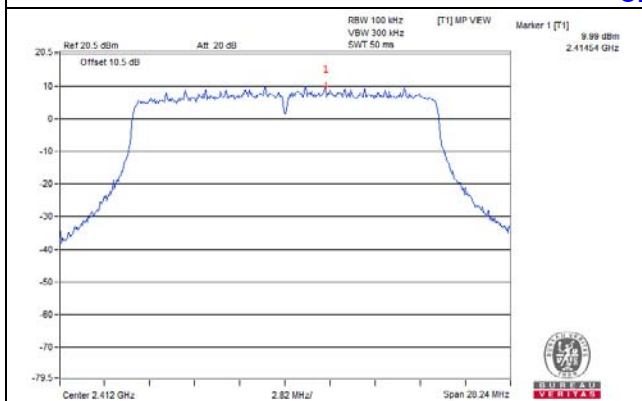


CH 11 Band edge

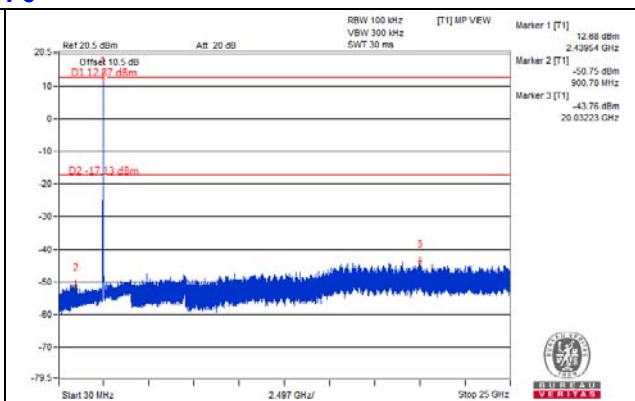
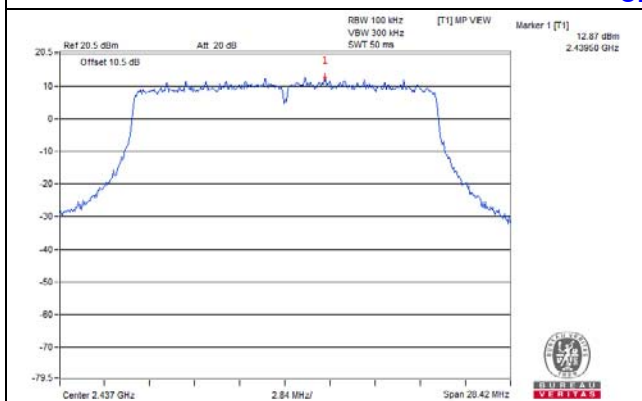


802.11ax (20MHz)_Chain 1

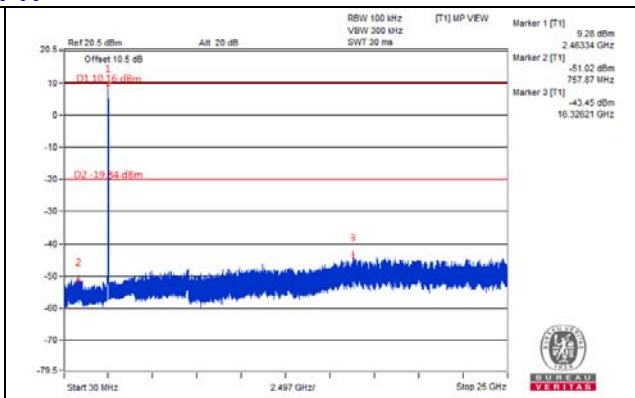
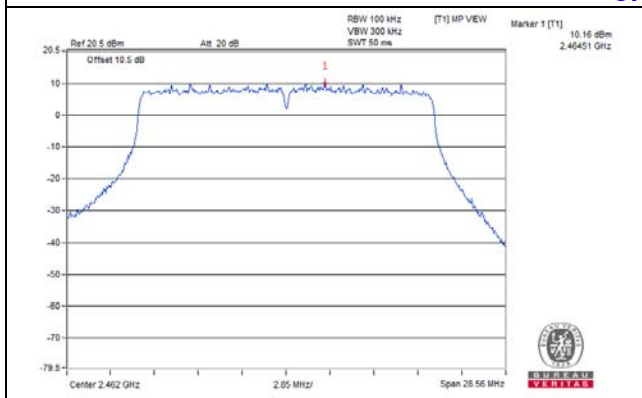
CH 1



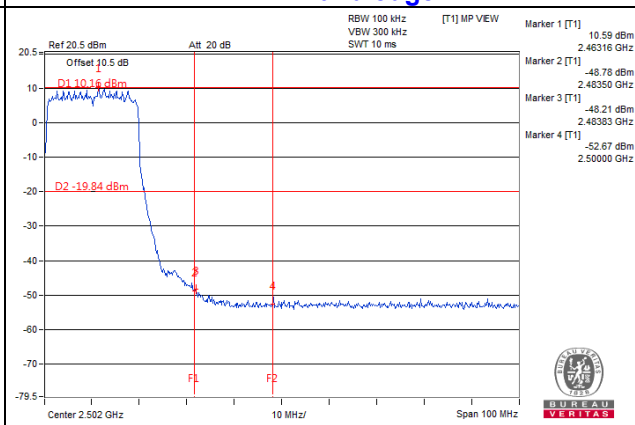
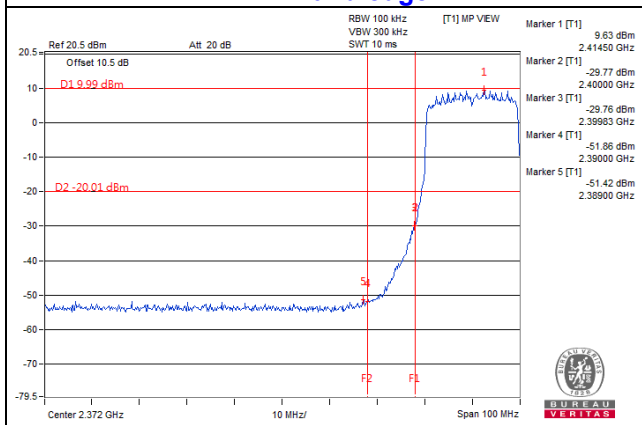
CH 6



CH 11

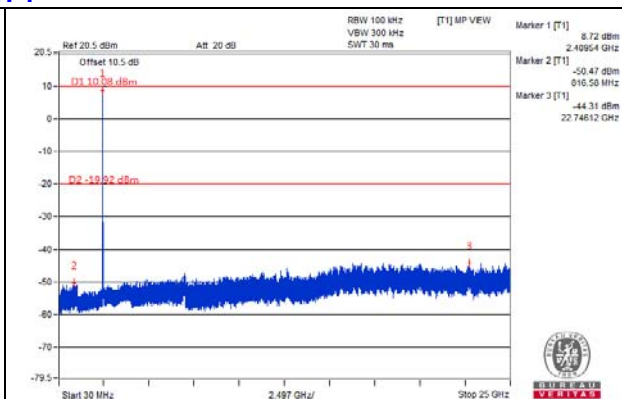
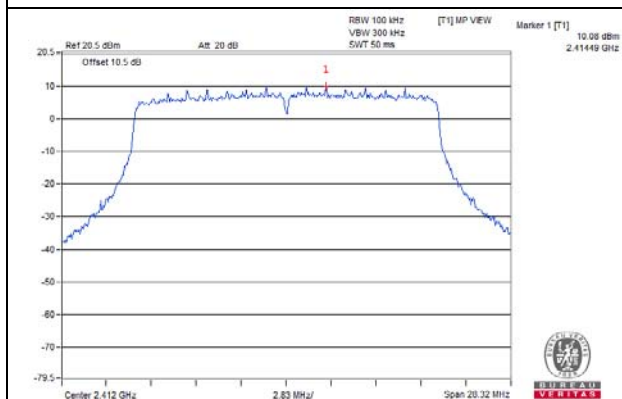


CH 1 Band edge

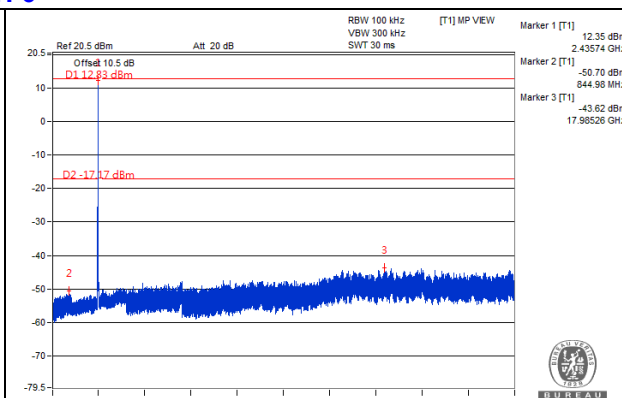
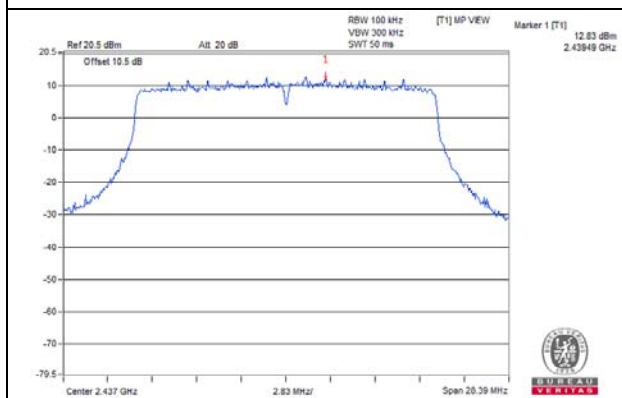


802.11ax (20MHz)_Chain 2

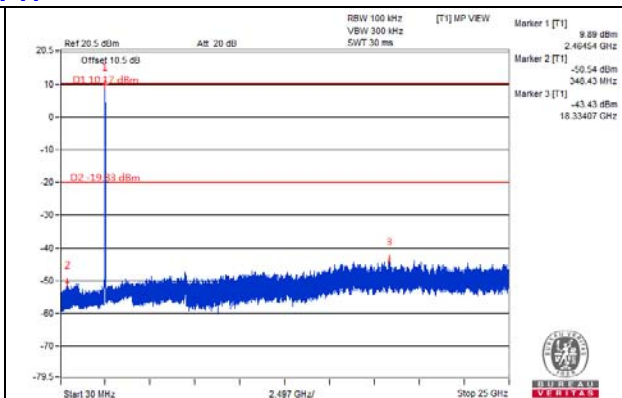
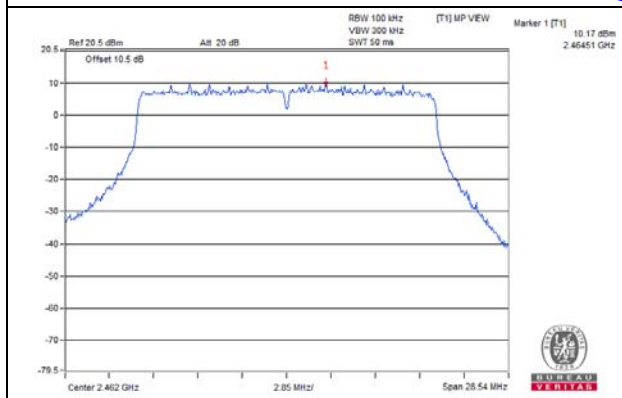
CH 1



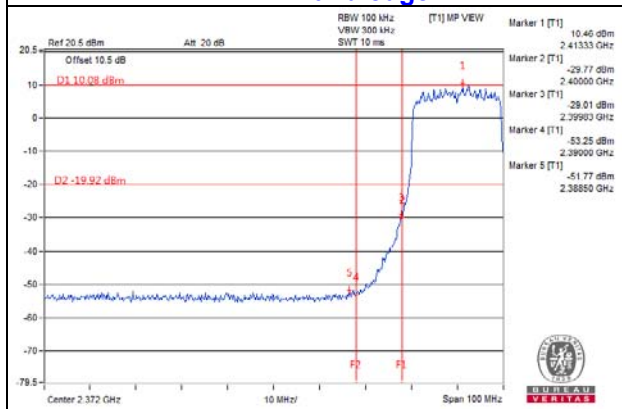
CH 6



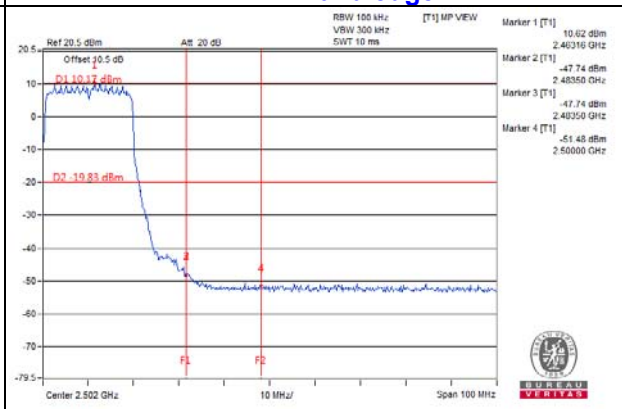
CH 11



CH 1 Band edge

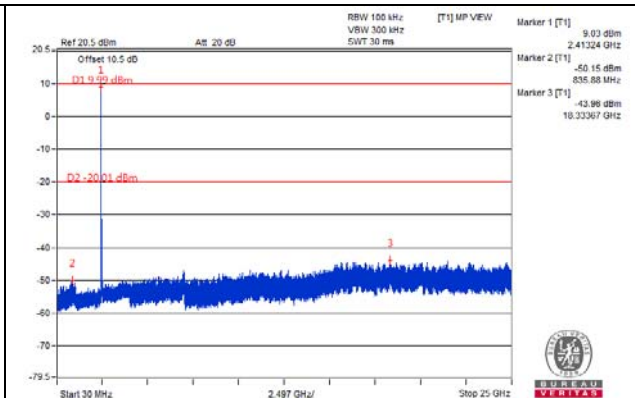
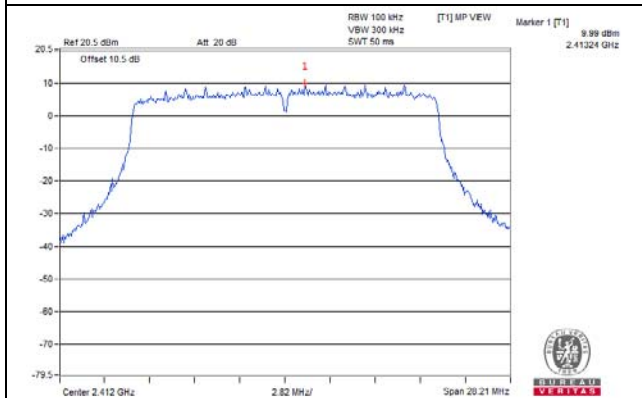


CH 11 Band edge

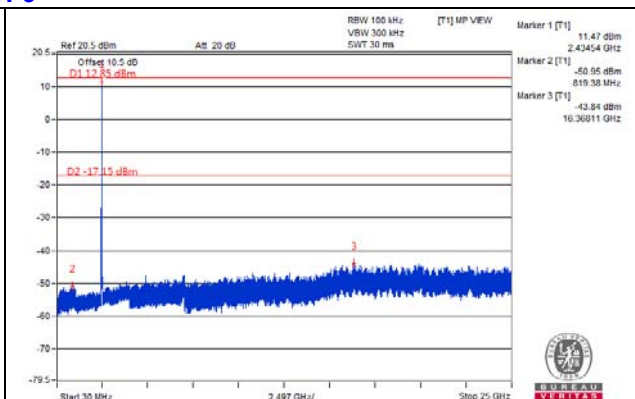
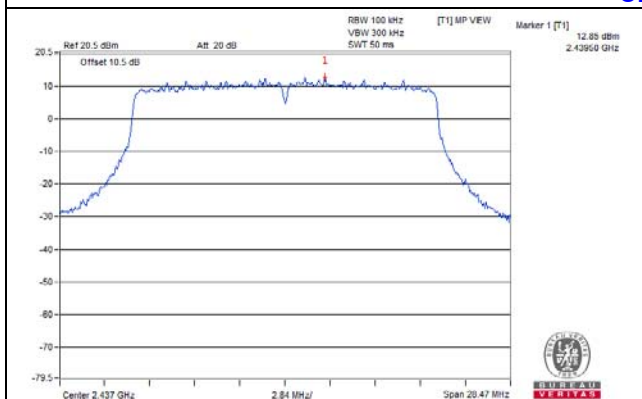


802.11ax (20MHz)_Chain 3

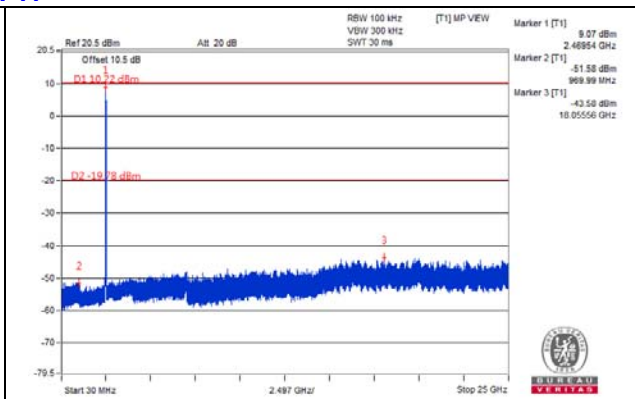
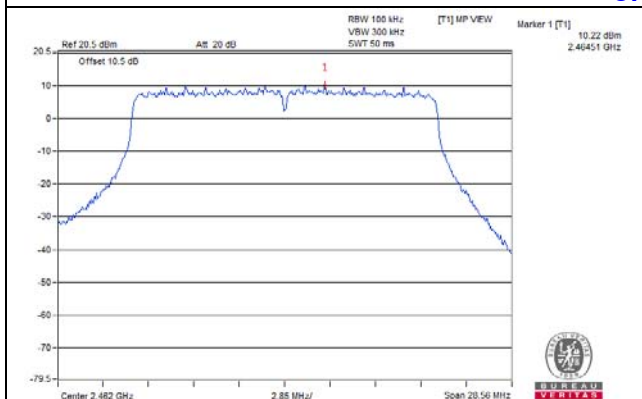
CH 1



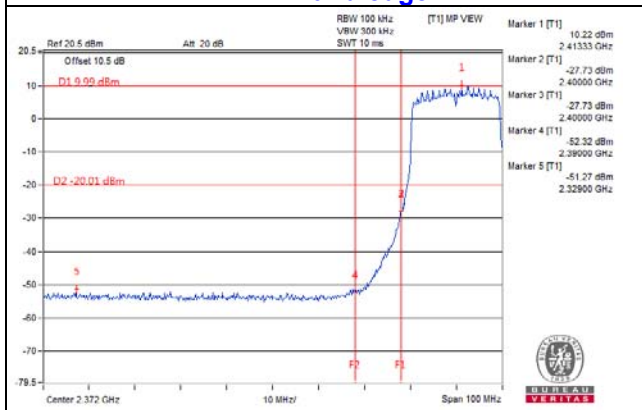
CH 6



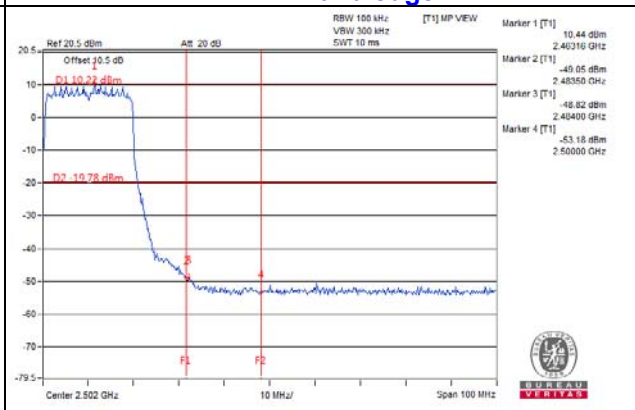
CH 11



CH 1 Band edge

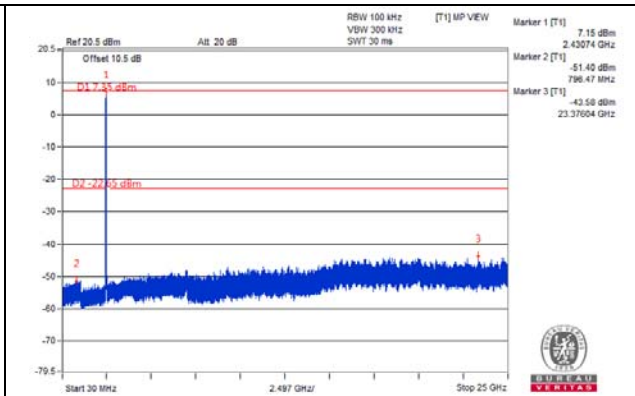
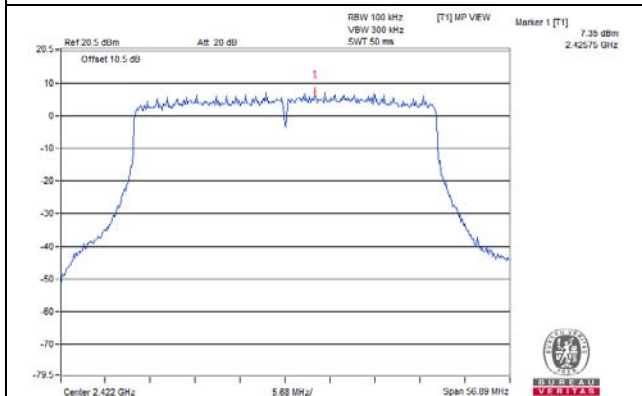


CH 11 Band edge

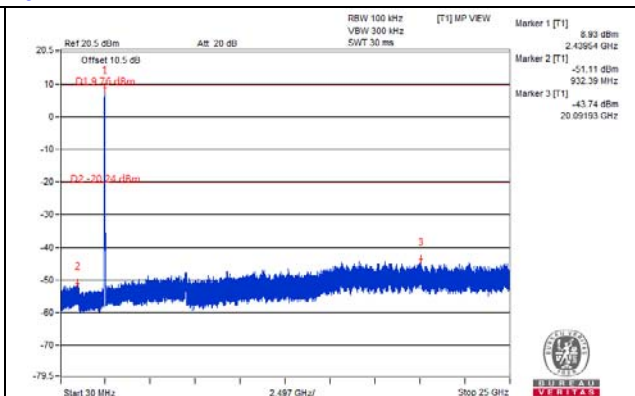
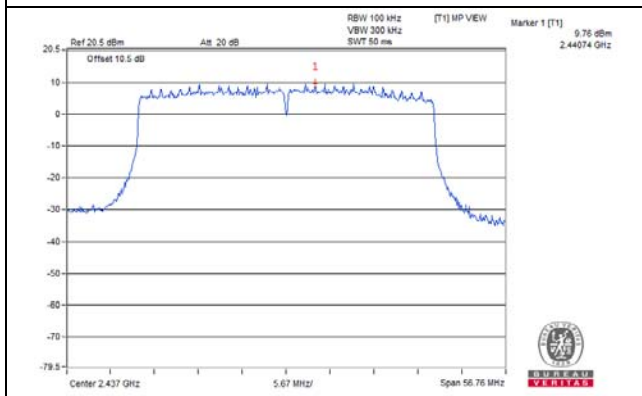


802.11ax (40MHz)_Chain 0

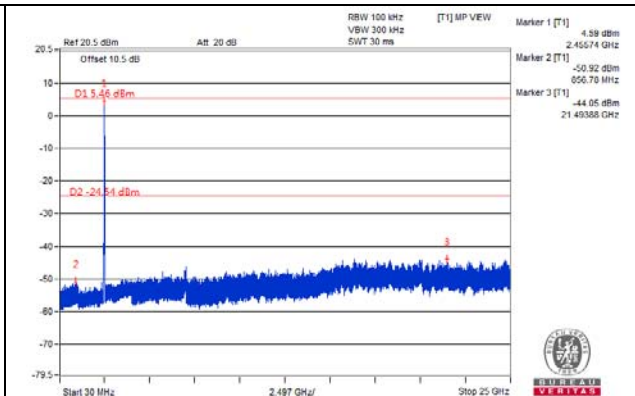
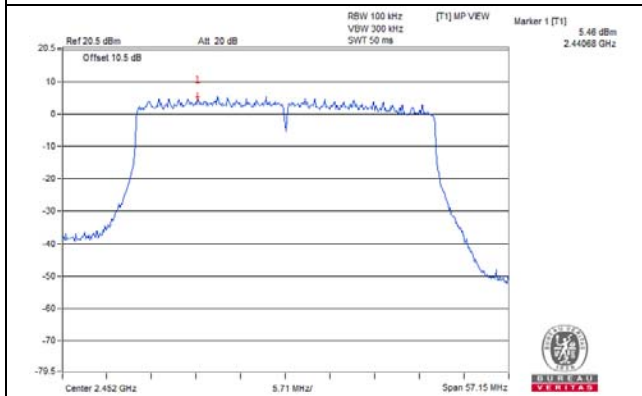
CH 3



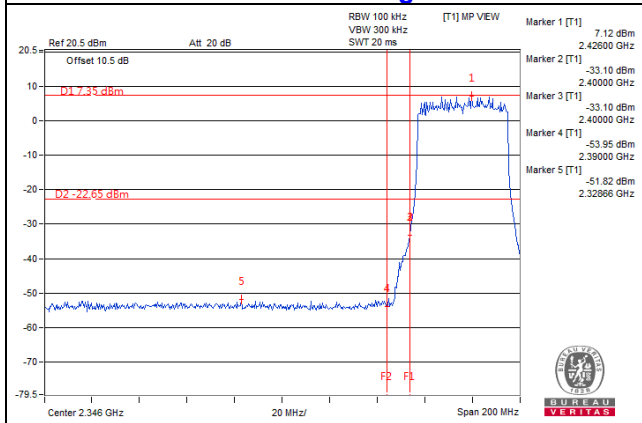
CH 6



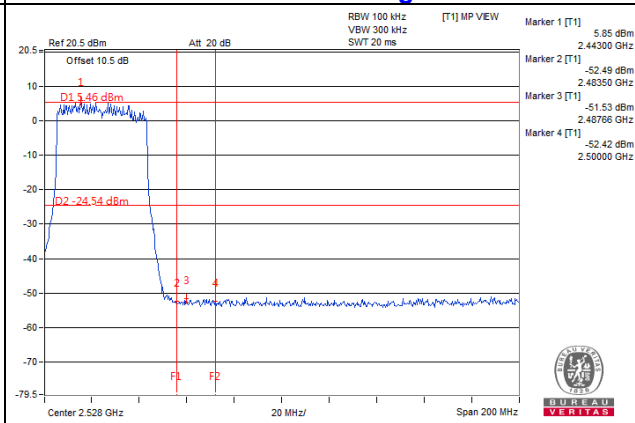
CH 9



CH 3 Band edge

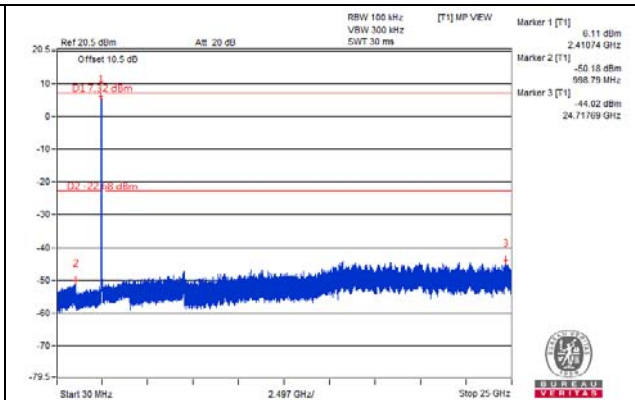
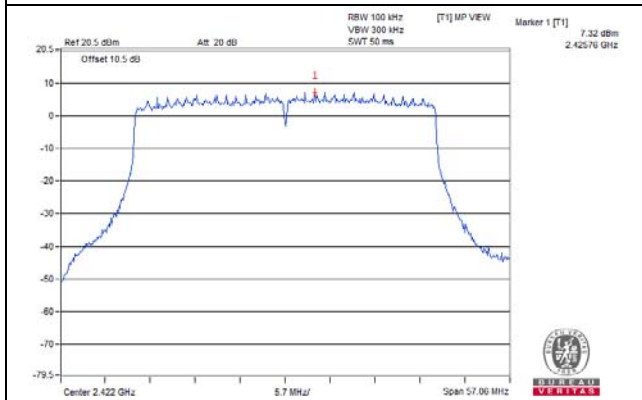


CH 9 Band edge

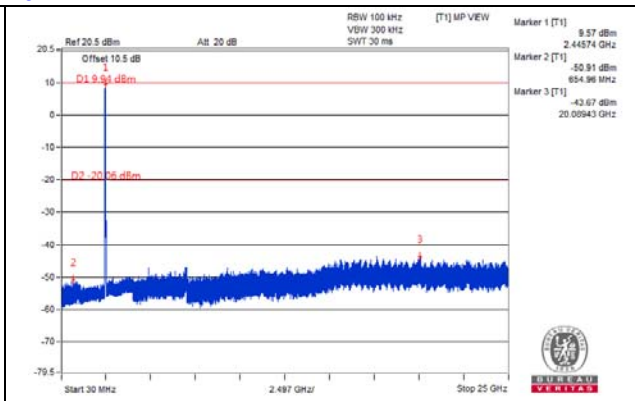
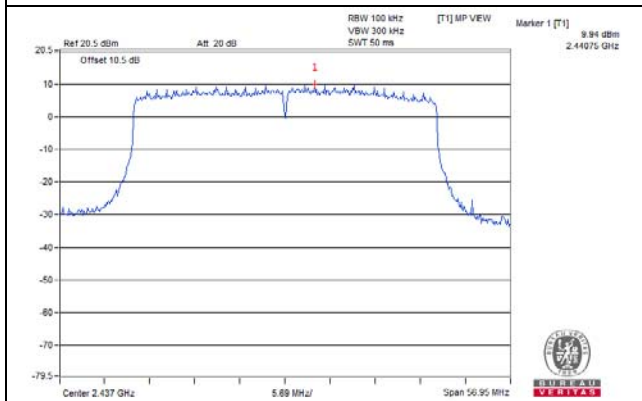


802.11ax (40MHz)_Chain 1

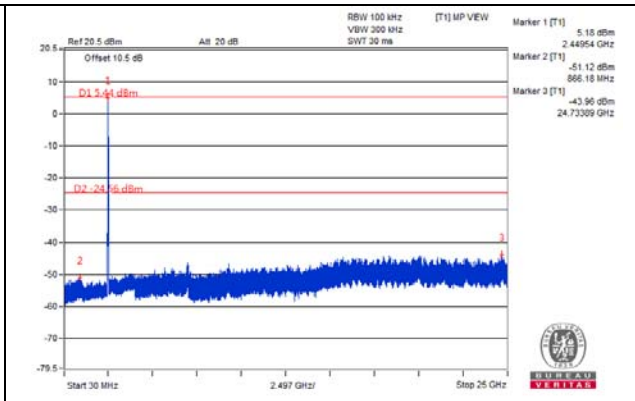
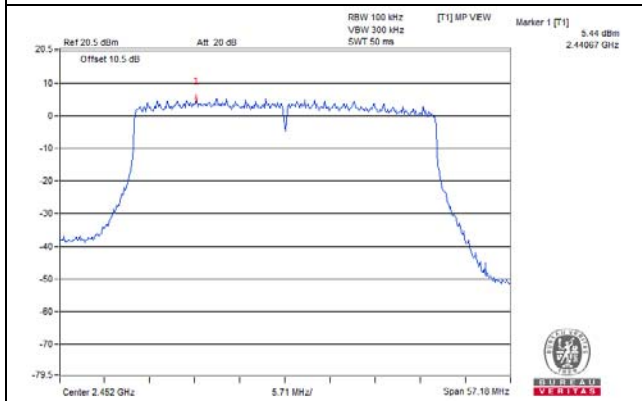
CH 3



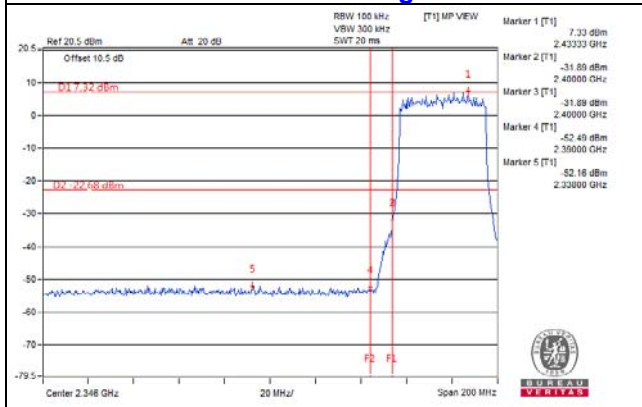
CH 6



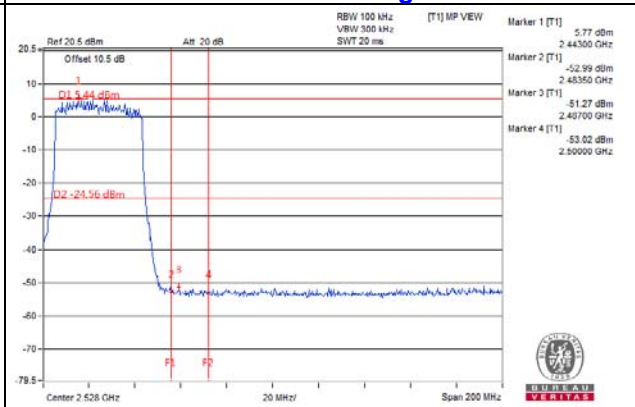
CH 9



CH 3 Band edge

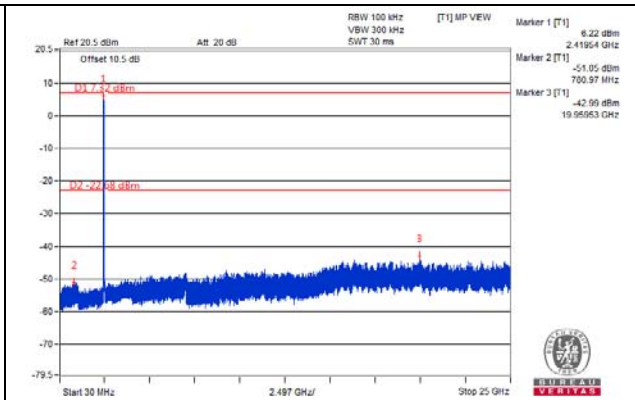
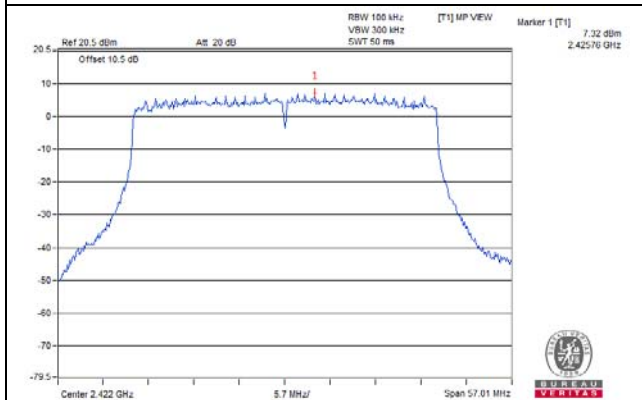


CH 9 Band edge

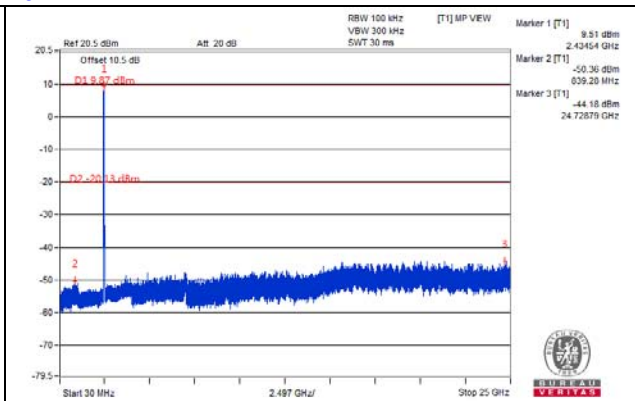
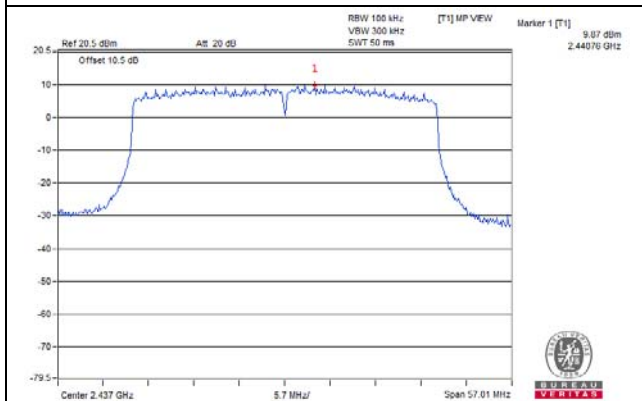


802.11ax (40MHz)_Chain 2

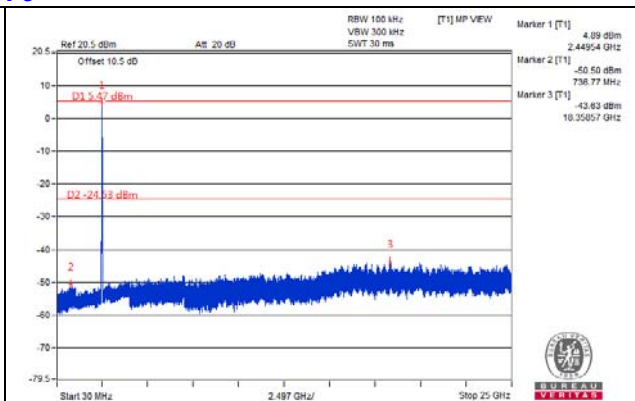
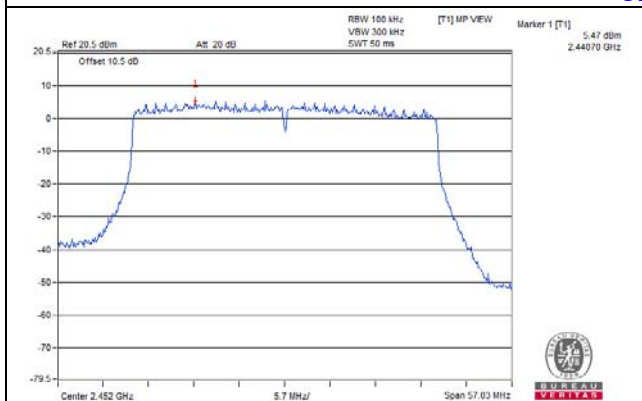
CH 3



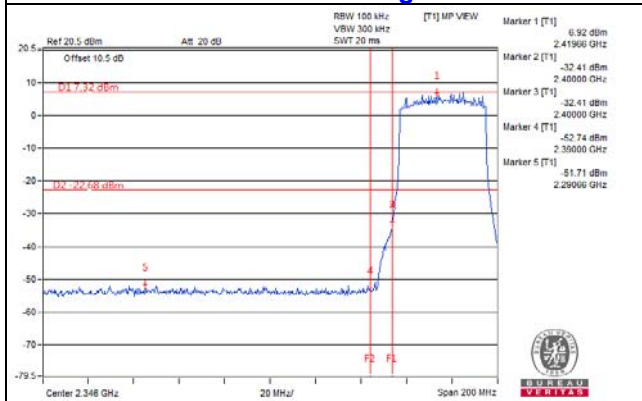
CH 6



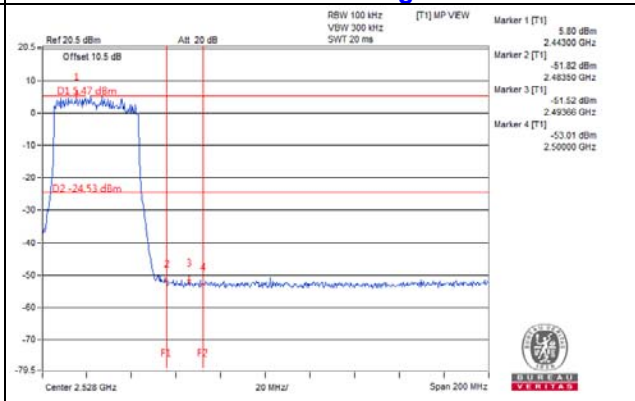
CH 9



CH 3 Band edge

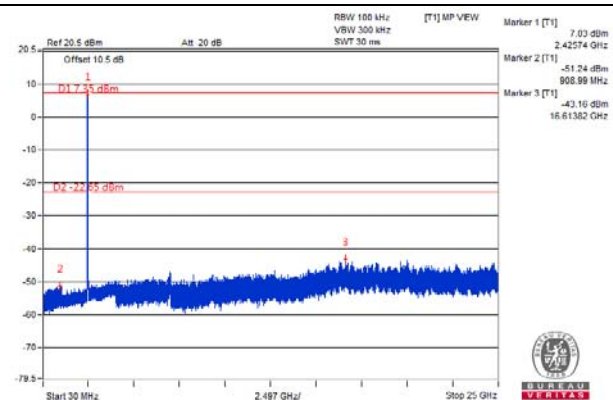
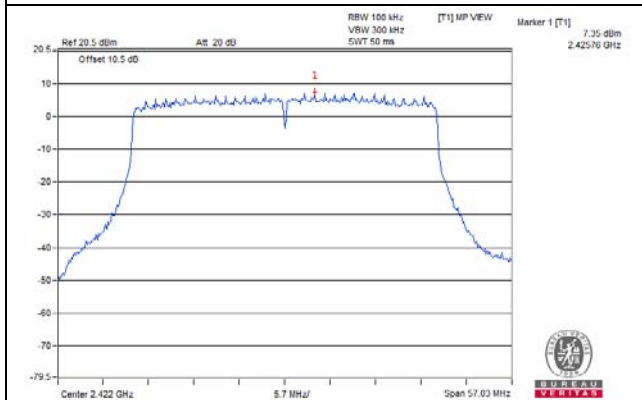


CH 9 Band edge

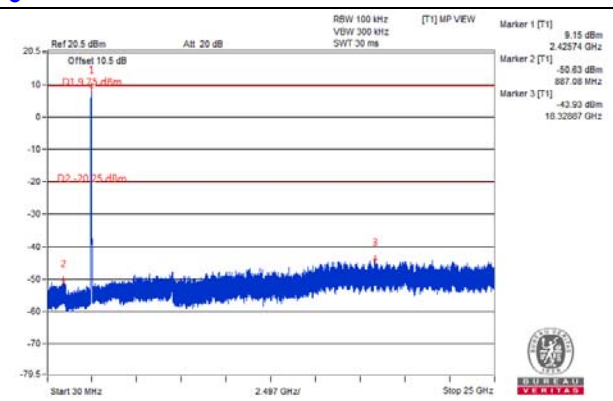
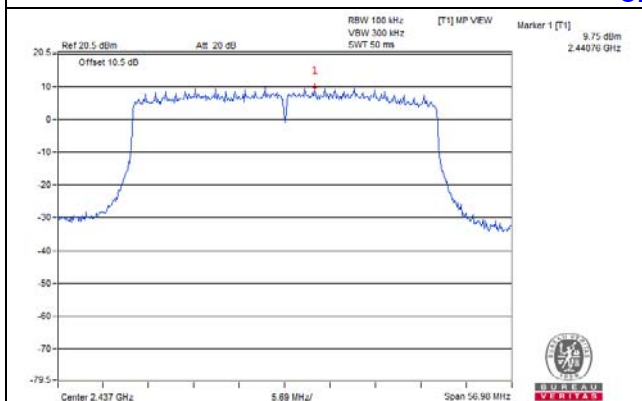


802.11ax (40MHz)_Chain 3

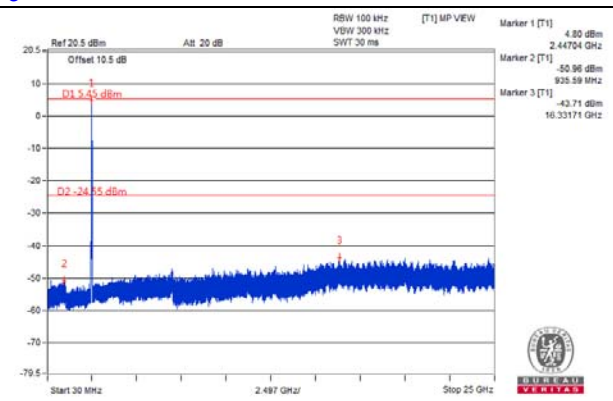
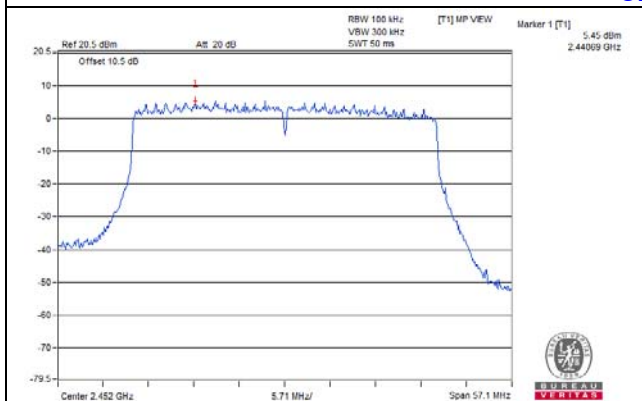
CH 3



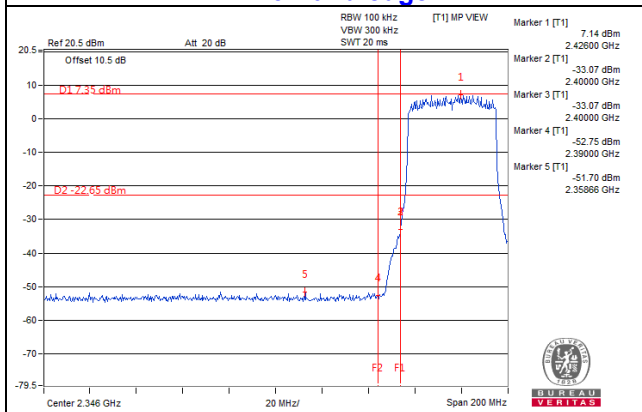
CH 6



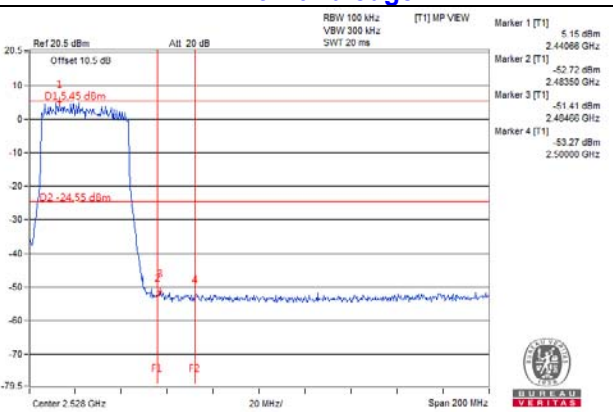
CH 9



CH 3 Band edge

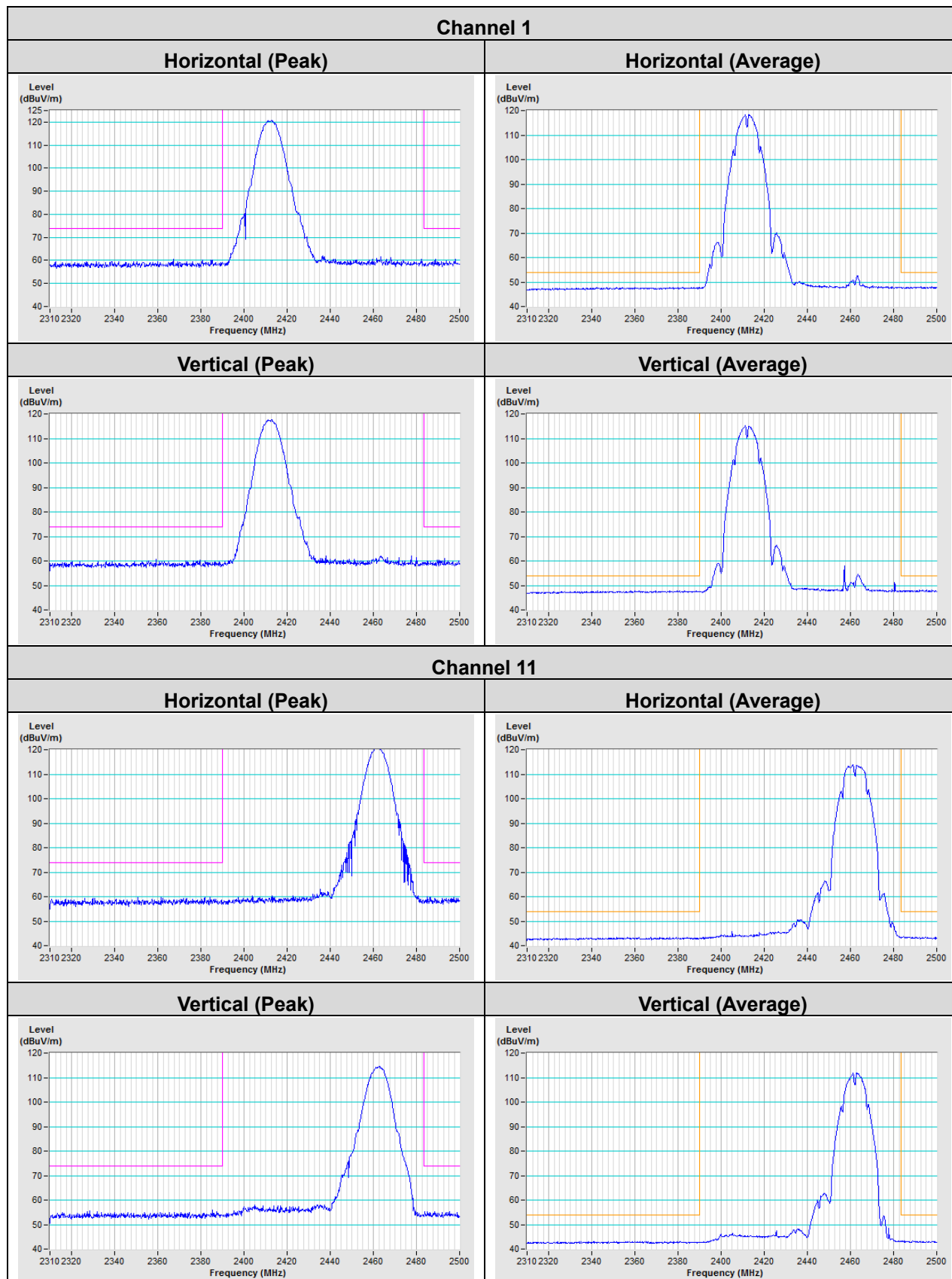


CH 9 Band edge

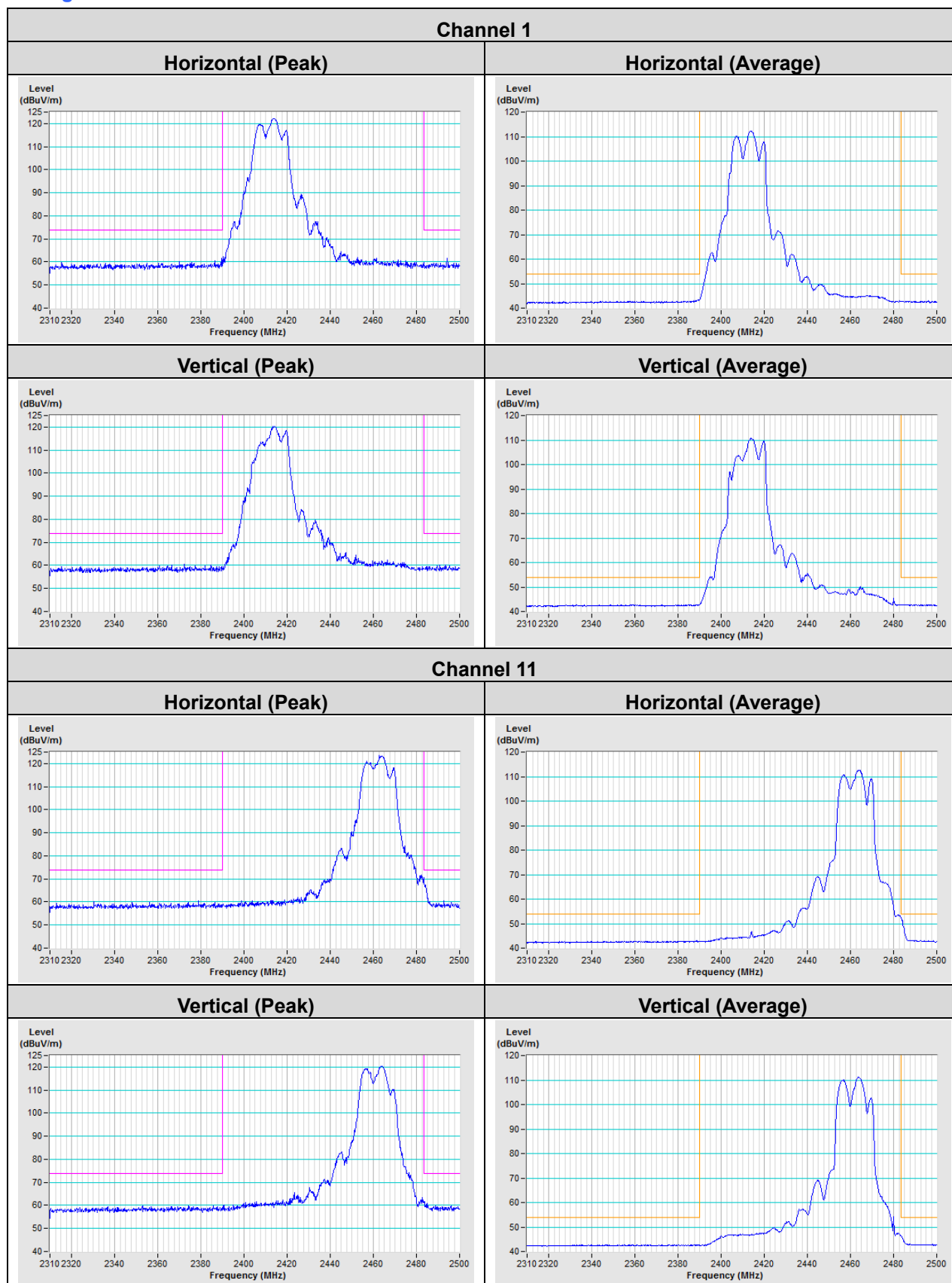


Annex A- Band Edge Measurement

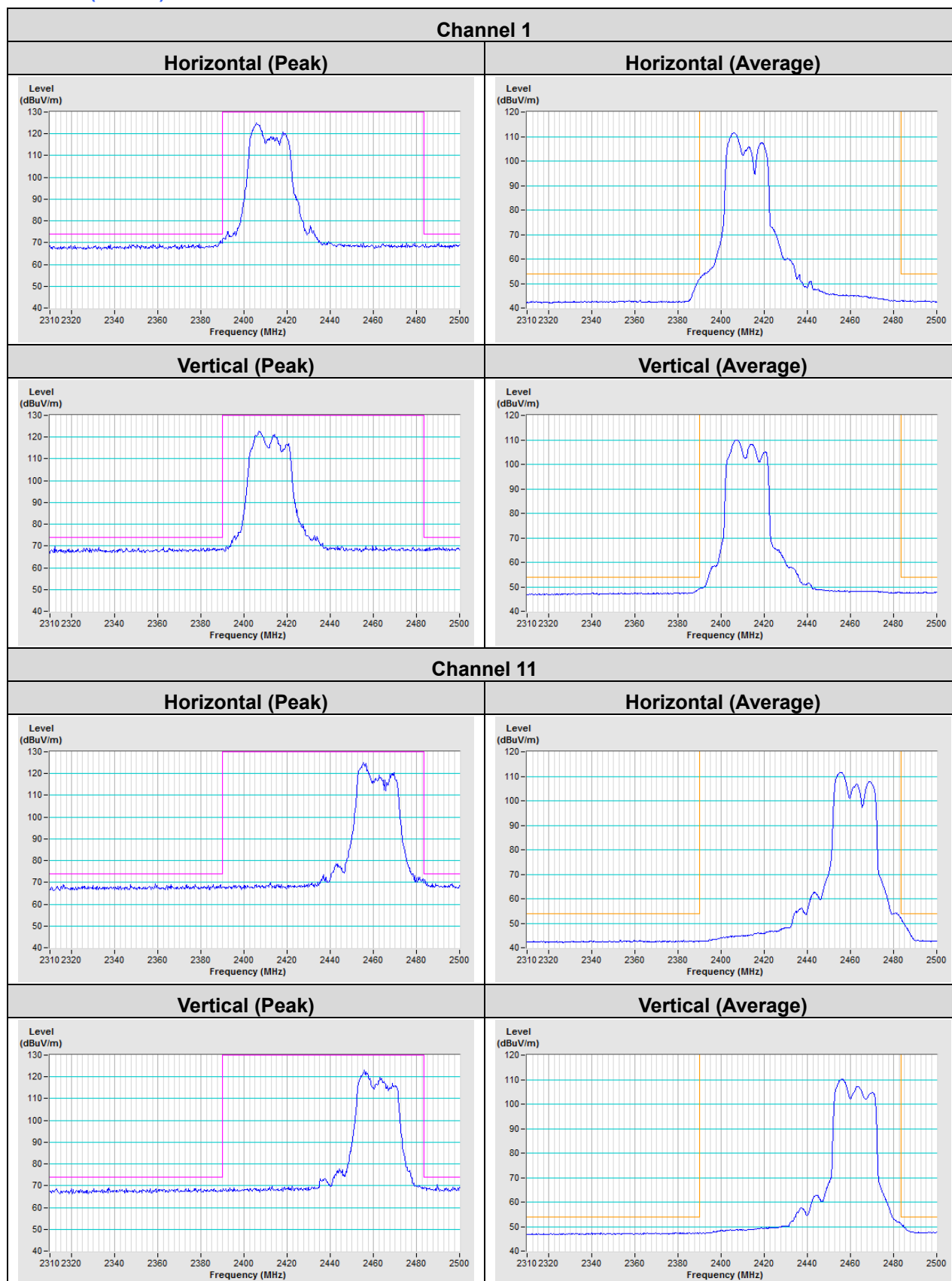
CDD Mode
802.11b



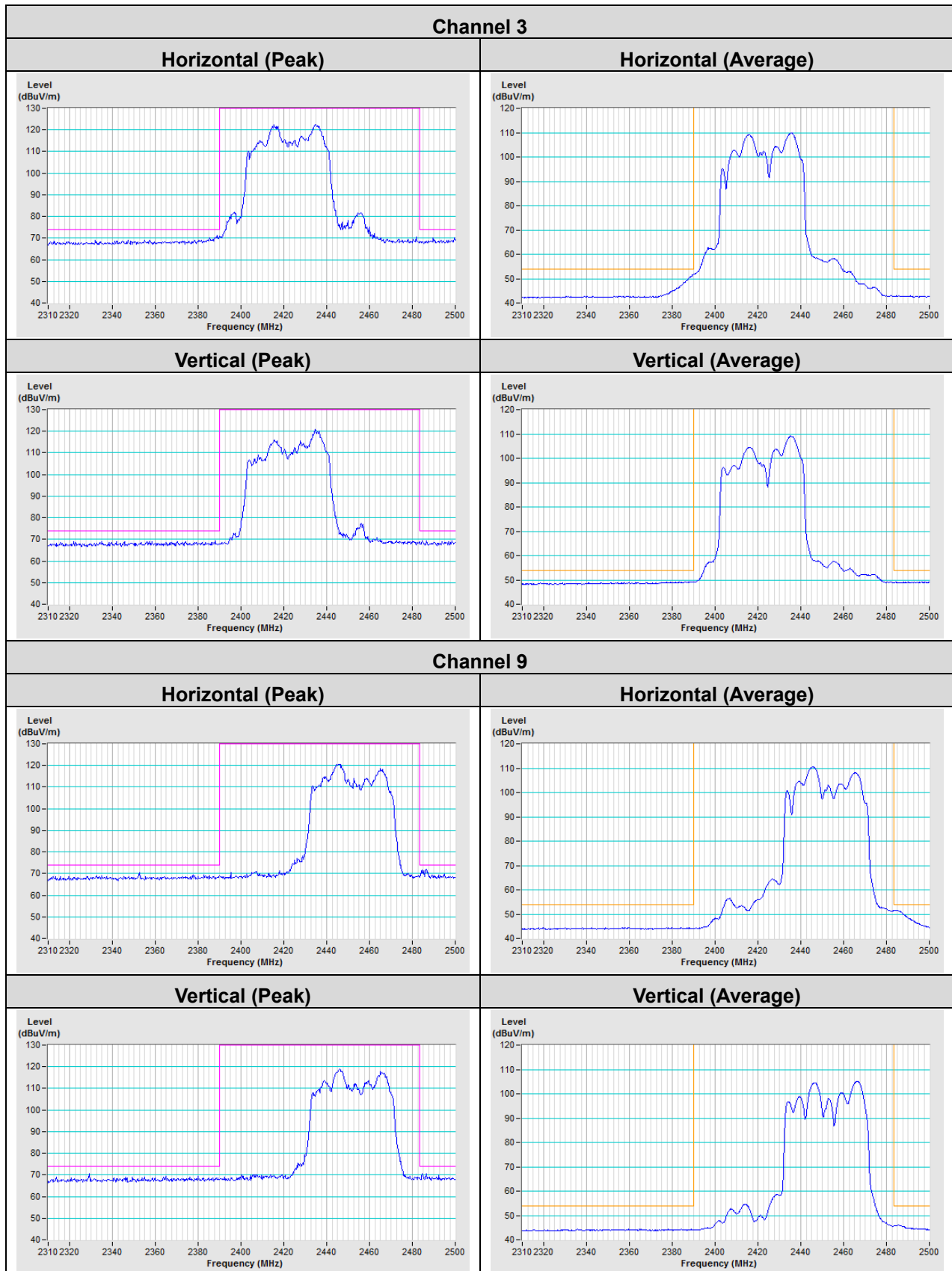
802.11g



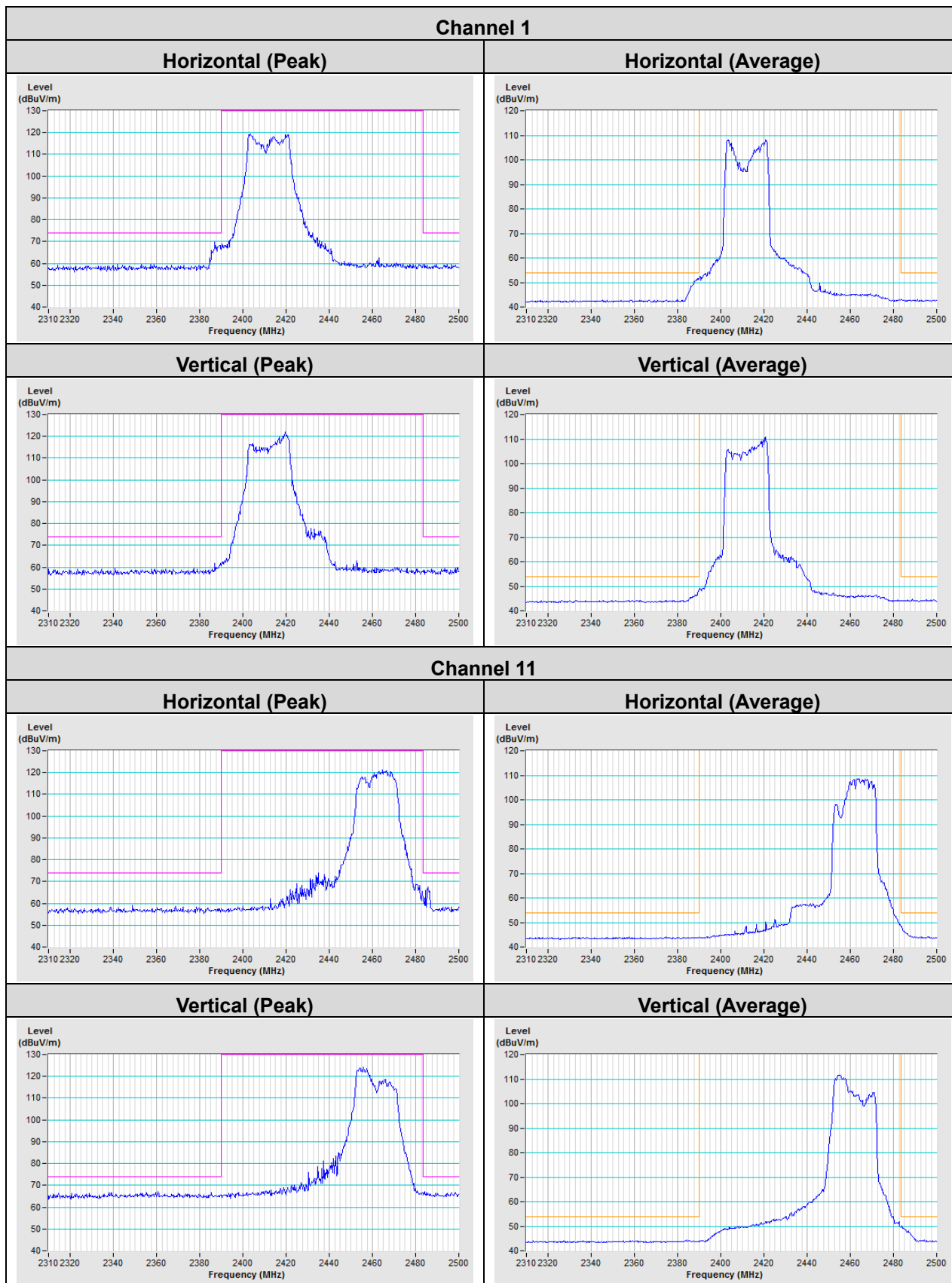
802.11ax (20MHz)



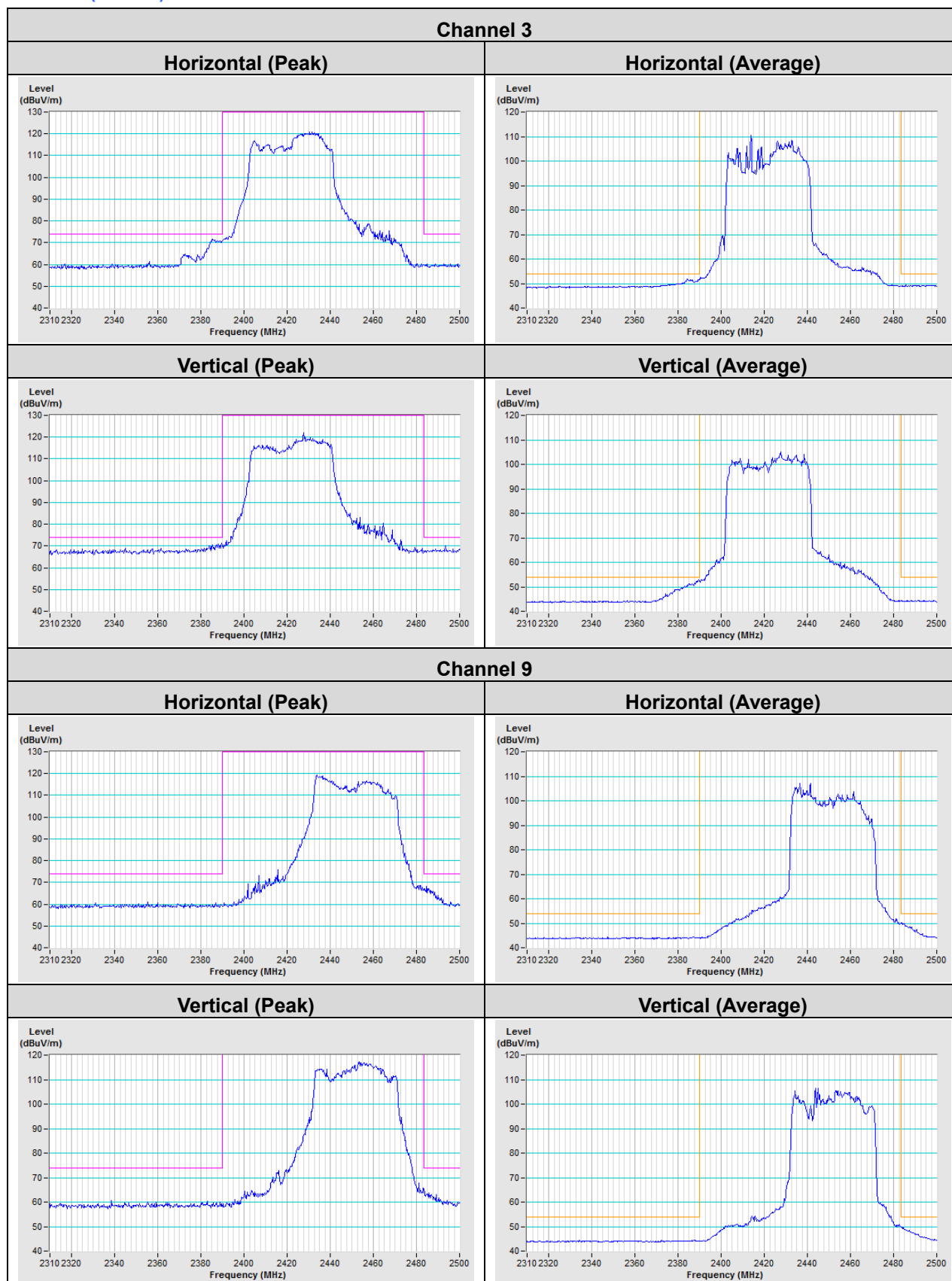
802.11ax (40MHz)



Beamforming Mode 802.11ax (20MHz)



802.11ax (40MHz)



5 Pictures of Test Arrangements

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

Appendix – Information of the Testing Laboratories

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