

FCC Test Report (WLAN)

Report No.: RFBEOE-WTW-P21090470

FCC ID: MQT-XC70W

Test Model: XC70-W

Received Date: 2021/9/11

Test Date: 2021/9/16 ~ 2021/9/30

Issued Date: 2021/10/15

Applicant: XAC AUTOMATION CORP.

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PARK,HSINCHU,TAIWAN

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RFBEOE-WTW-P21090470	Original release.	2021/10/15

1 Certificate of Conformity

Product: Cradle

Brand: XAC, WesternUnion

Test Model: XC70-W

Sample Status: Engineering sample

Applicant: XAC AUTOMATION CORP.

Test Date: 2021/9/16 ~ 2021/9/30

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

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

Prepared by : Evy Chen , **Date:** 2021/10/15
Evy Chen / Specialist

Approved by : Clark Lin , **Date:** 2021/10/15
Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -22.97dB at 0.34531MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 2390.00MHz, 2483.50MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF) 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. Test Procedures refer to report 4.1.3.
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Conducted emissions	-	2.5 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.4 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.0 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT (WLAN)

Product	Cradle
Brand	XAC, WesternUnion
Test Model	XC70-W
Status of EUT	Engineering sample
Power Supply Rating	12~24Vdc
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11g: up to 54 Mbps 802.11n: up to 150 Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7
Output Power	199.067 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Cable Supplied	NA

Note:

1. The antenna provided to the EUT, please refer to the following table:

Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
AWAN	AYP6P-100029	3.42	2.4~2.4835	PIFA	i-pex(MHF)	50

2. The EUT incorporates a SISO function:

2.4GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	1TX	1RX
802.11g	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX

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

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

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

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)

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 \geq 1G	RE $<$ 1G	PLC	APCM	
-	√	√	√	√	-

Where **RE \geq 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1	DSSS	DBPSK	1

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1	DSSS	DBPSK	1

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.

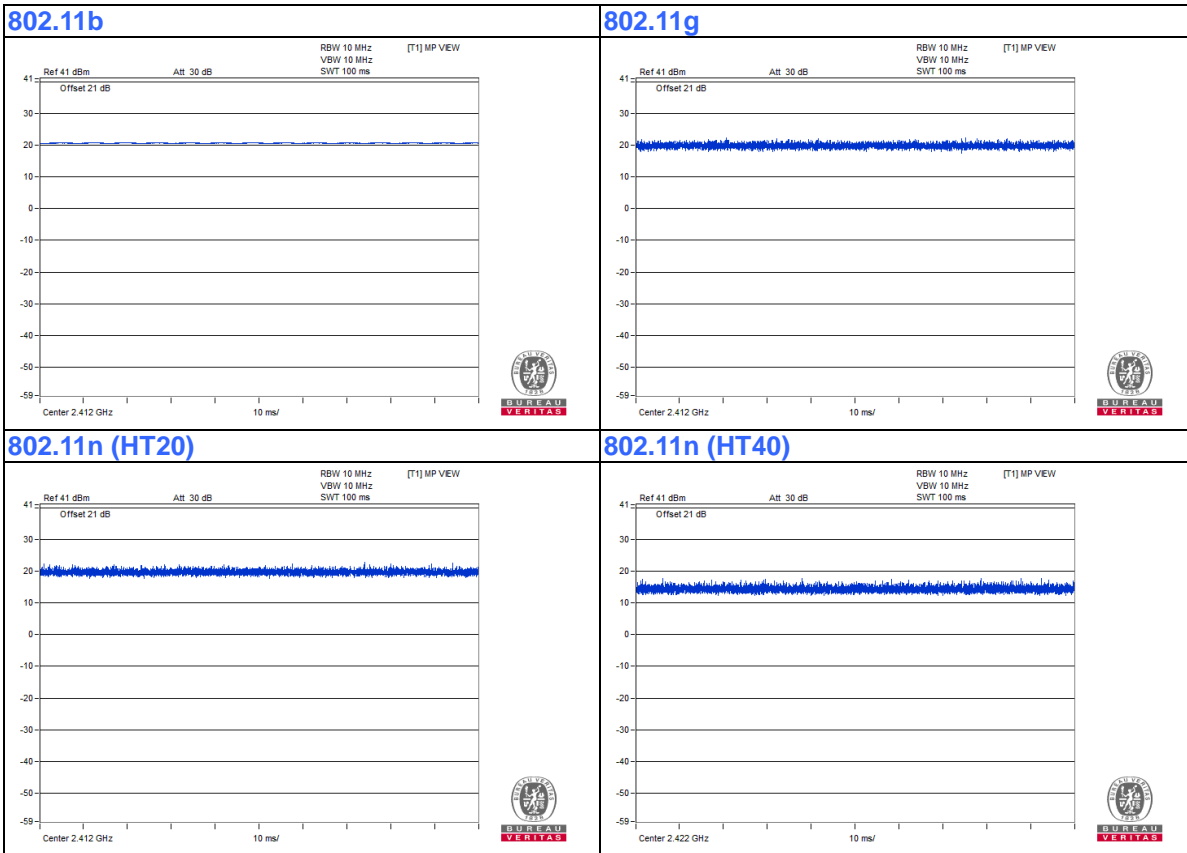
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (System)	TESTED BY
RE \geq 1G	25deg. C, 66%RH	120Vac, 60Hz	Nelson Teng
RE $<$ 1G	25deg. C, 66%RH	120Vac, 60Hz	Tom Yang
PLC	25deg. C, 66%RH	120Vac, 60Hz	Tom Yang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jim Hung

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is 100 %, duty factor is not required.



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.	Adapter	MOSO	MSA-C2000IC12.0-24P-US	NA	NA	Supplied by client
B.	iPod	Apple	MC749TA/A	CC4DM9M8DFDM	NA	Provided by Lab
C.	iPod	Apple	MC749TA/A	CC4DN25WDFDM	NA	Provided by Lab
D.	Laptop	DELL	E5430	DM1SKV1	FCC DoC	Provided by Lab
E.	Terminal	XAC	xCL_AT-170-R-18U	NA	NA	Supplied by client

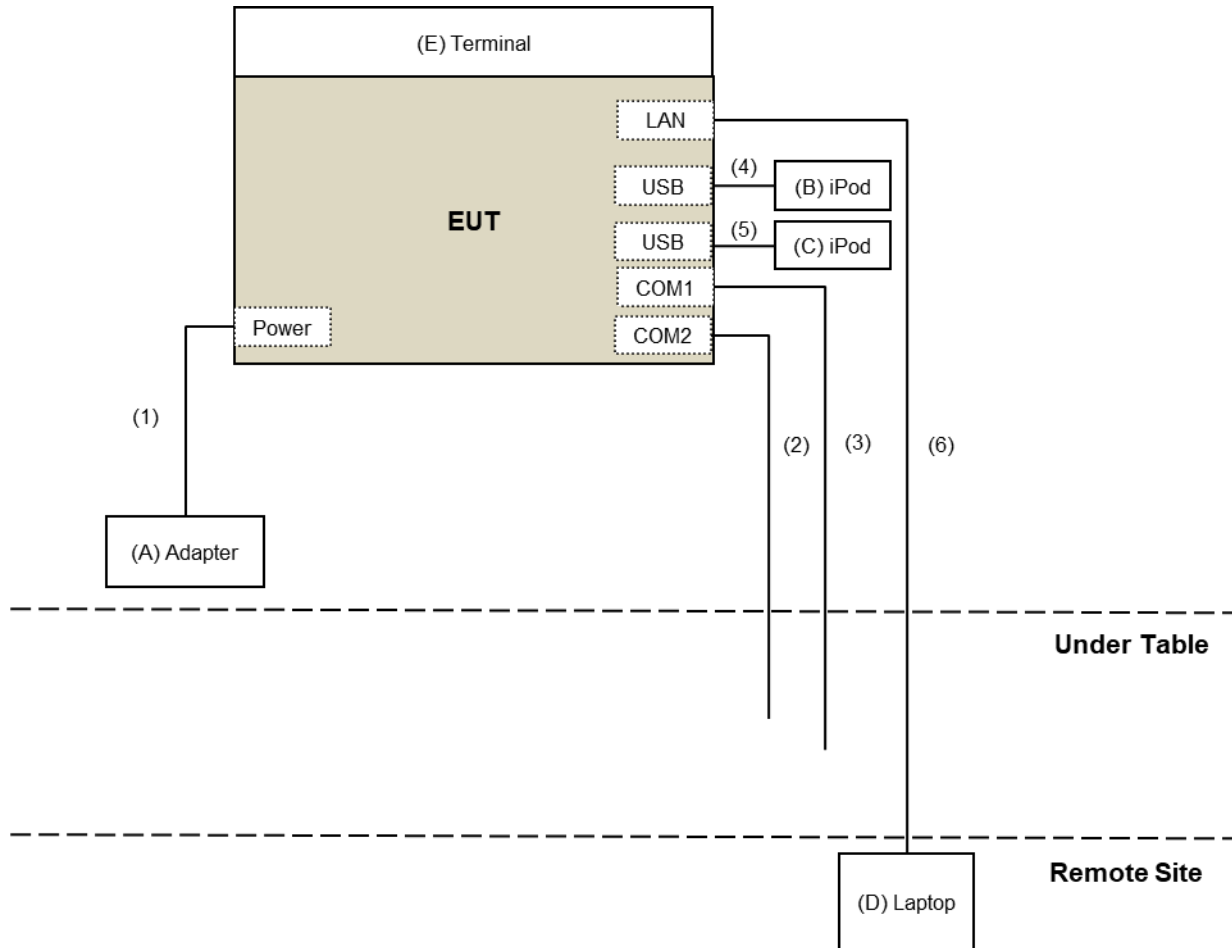
Note:

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

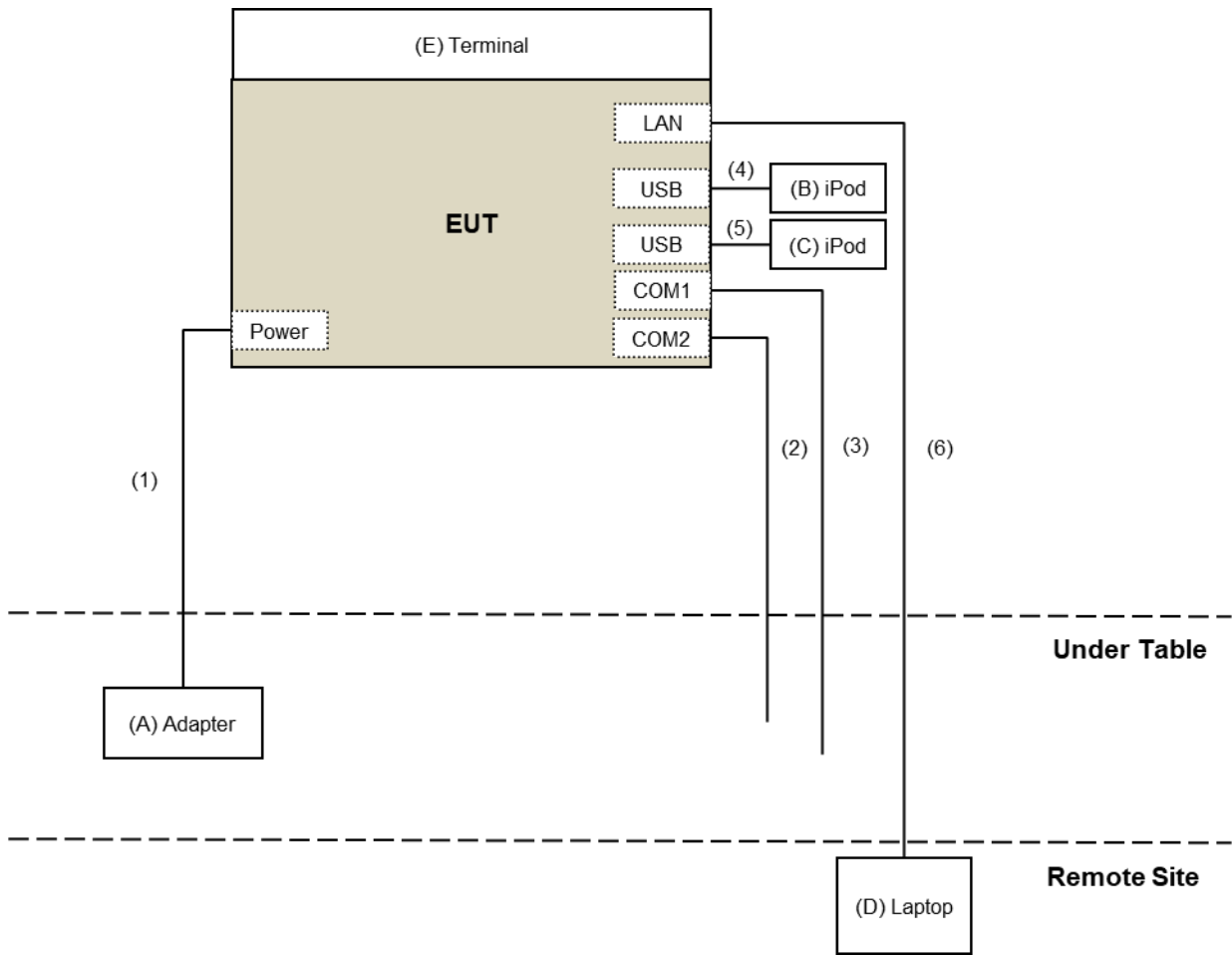
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.5	Yes	0	Supplied by client
2.	RS232 to RJ12	1	1.5	No	0	Supplied by client
3.	RS232 to RJ12	1	1.5	No	0	Supplied by client
4.	USB Cable	1	0.1	Yes	0	Provided by Lab
5.	USB Cable	1	0.1	Yes	0	Provided by Lab
6.	RJ-45 Cable	1	10	No	0	Provided by Lab

3.4.1 Configuration of System under Test

For Conduction Emission test:



For other test items:



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 20dB below the highest level of the desired power:

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

Note:

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

4.1.2 Test Instruments

For Radiated Emission (Below 1GHz) & Bandedge test:

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Test Receiver Agilent	N9038A	MY50010156	2021/7/22	2022/7/21
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Pre_Amplifier EMCI	EMC001340	980142	2021/5/24	2022/5/23
LOOP ANTENNA Electro-Metrics	EM-6879	264	2021/3/5	2022/3/4
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2021/1/7	2022/1/6
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-002	2021/1/7	2022/1/6
Pre_Amplifier Mini-Circuits	ZFL-1000VH2	QA0838008	2020/10/20	2021/10/19
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	2020/11/5	2021/11/4
RF Coaxial Cable COMMATE/PEWC	8D	966-3-1	2021/3/16	2022/3/15
RF Coaxial Cable COMMATE/PEWC	8D	966-3-2	2021/3/16	2022/3/15
RF Coaxial Cable COMMATE/PEWC	8D	966-3-3	2021/3/16	2022/3/15
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	2021/9/23	2022/9/22

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: 2021/9/30

For Radiated Emission (Above 1GHz) & Bandedge test:

Description & Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Horn Antenna Schwarzbeck	BBHA9120-D	9120D-406	2020/11/22	2021/11/21
Pre_Amplifier EMCI	EMC12630SE	980384	2021/1/11	2022/1/10
RF Coaxial Cable EMCI	EMC104-SM-SM-1500	180504	2021/4/26	2022/4/25
RF Coaxial Cable EMCI	EMC104-SM-SM-2000	180601	2021/6/8	2022/6/7
RF Coaxial Cable EMCI	EMC104-SM-SM-6000	210201	2021/5/13	2022/5/12
Fix tool for Boresight antenna tower LIOW GUU	FBA-01	FBA_SIP01	NA	NA
Spectrum Analyzer Keysight	N9030A	MY54490679	2021/7/9	2022/7/8
Pre_Amplifier EMCI	EMC184045SE	980387	2021/1/11	2022/1/10
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170519	2020/11/22	2021/11/21
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2021/1/11	2022/1/10
RF cable (40GHz) EMCI	EMC-KM-KM-4000	200214	2021/3/10	2022/3/9

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: 2021/9/16 ~ 2021/9/23

For other test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	101516	2021/3/8	2022/3/7
Power Meter Anritsu	ML2495A	1529002	2021/6/21	2022/6/20
Pulse Power Sensor Anritsu	MA2411B	1339443	2021/5/31	2022/5/30
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2021/4/13	2022/4/12
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA

- NOTE:**
1. The test was performed in Oven room 2.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 3. Tested Date: 2021/9/22

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:

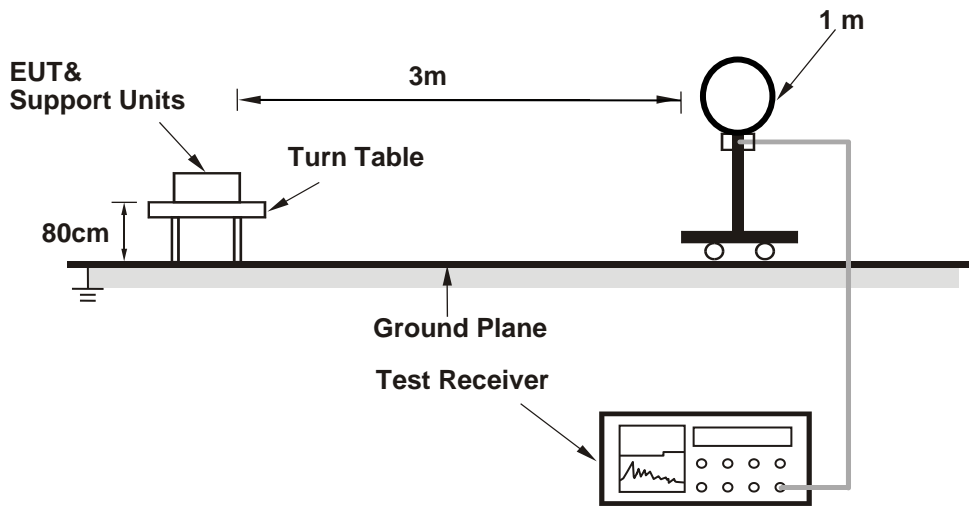
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

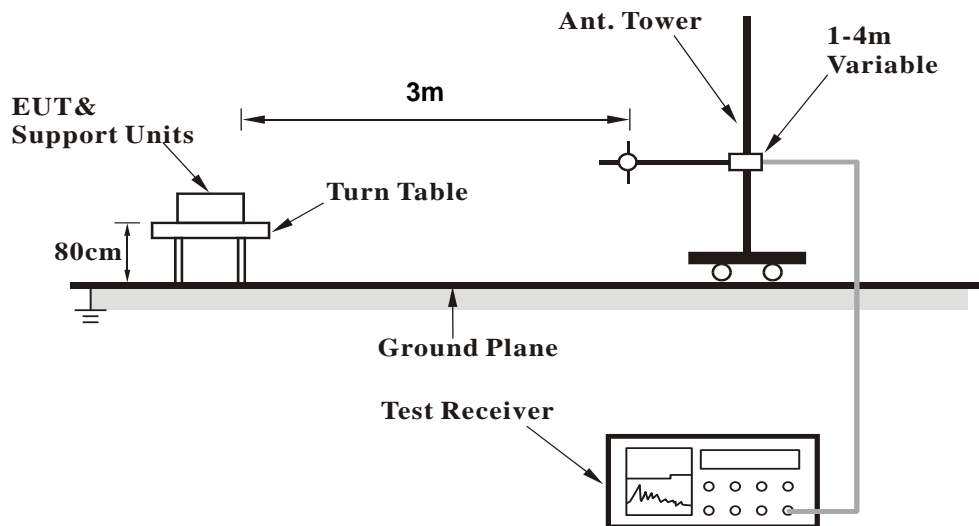
No deviation.

4.1.5 Test Setup

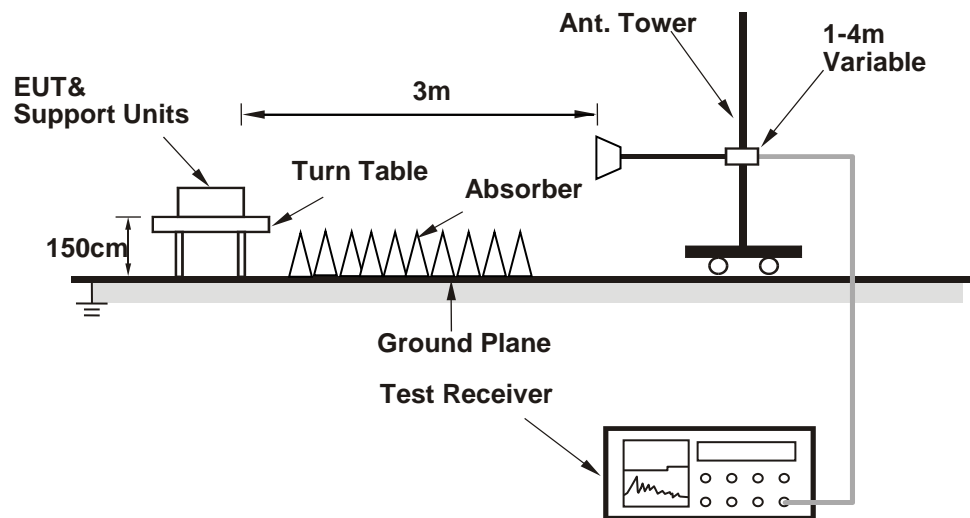
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- a. Placed the EUT on the testing table.
- b. Controlling software (HyperTerminal paste XC70_RF mode command.txt command) has been activated to set the EUT under transmission condition continuously.

4.1.7 Test Results

ABOVE 1GHz DATA

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	57.7 PK	74.0	-16.3	3.30 H	217	58.9	-1.2
2	2390.00	45.8 AV	54.0	-8.2	3.30 H	217	47.0	-1.2
3	*2412.00	100.7 PK			3.30 H	217	101.9	-1.2
4	*2412.00	98.5 AV			3.30 H	217	99.7	-1.2
5	4824.00	48.4 PK	74.0	-25.6	3.51 H	135	44.7	3.7
6	4824.00	45.6 AV	54.0	-8.4	3.51 H	135	41.9	3.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2386.50	56.4 PK	74.0	-17.6	3.53 V	273	57.6	-1.2
2	2386.50	47.2 AV	54.0	-6.8	3.53 V	273	48.4	-1.2
3	*2412.00	105.3 PK			3.53 V	273	106.5	-1.2
4	*2412.00	102.8 AV			3.53 V	273	104.0	-1.2
5	4824.00	48.8 PK	74.0	-25.2	2.02 V	224	45.1	3.7
6	4824.00	46.0 AV	54.0	-8.0	2.02 V	224	42.3	3.7

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	53.4 PK	74.0	-20.6	2.99 H	266	54.6	-1.2
2	2390.00	42.2 AV	54.0	-11.8	2.99 H	266	43.4	-1.2
3	*2437.00	102.0 PK			2.99 H	266	103.2	-1.2
4	*2437.00	99.8 AV			2.99 H	266	101.0	-1.2
5	2483.50	55.1 PK	74.0	-18.9	2.99 H	266	56.3	-1.2
6	2483.50	43.3 AV	54.0	-10.7	2.99 H	266	44.5	-1.2
7	4874.00	48.3 PK	74.0	-25.7	3.55 H	135	44.5	3.8
8	4874.00	45.6 AV	54.0	-8.4	3.55 H	135	41.8	3.8
9	7311.00	45.3 PK	74.0	-28.7	2.12 H	259	35.6	9.7
10	7311.00	33.1 AV	54.0	-20.9	2.12 H	259	23.4	9.7

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.2 PK	74.0	-19.8	3.76 V	247	55.4	-1.2
2	2390.00	42.7 AV	54.0	-11.3	3.76 V	247	43.9	-1.2
3	*2437.00	105.6 PK			3.76 V	247	106.8	-1.2
4	*2437.00	102.9 AV			3.76 V	247	104.1	-1.2
5	2483.50	55.5 PK	74.0	-18.5	3.76 V	247	56.7	-1.2
6	2483.50	43.8 AV	54.0	-10.2	3.76 V	247	45.0	-1.2
7	4874.00	48.4 PK	74.0	-25.6	2.06 V	233	44.6	3.8
8	4874.00	45.6 AV	54.0	-8.4	2.06 V	233	41.8	3.8
9	7311.00	45.7 PK	74.0	-28.3	2.74 V	76	36.0	9.7
10	7311.00	33.5 AV	54.0	-20.5	2.74 V	76	23.8	9.7

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	102.0 PK			2.56 H	121	103.2	-1.2
2	*2462.00	99.8 AV			2.56 H	121	101.0	-1.2
3	2483.50	57.4 PK	74.0	-16.6	2.56 H	121	58.6	-1.2
4	2483.50	44.0 AV	54.0	-10.0	2.56 H	121	45.2	-1.2
5	4924.00	48.7 PK	74.0	-25.3	3.53 H	126	44.8	3.9
6	4924.00	46.1 AV	54.0	-7.9	3.53 H	126	42.2	3.9
7	7386.00	45.8 PK	74.0	-28.2	2.16 H	246	36.1	9.7
8	7386.00	33.6 AV	54.0	-20.4	2.16 H	246	23.9	9.7

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	105.9 PK			3.72 V	252	107.1	-1.2
2	*2462.00	103.5 AV			3.72 V	252	104.7	-1.2
3	2486.90	56.2 PK	74.0	-17.8	3.72 V	252	57.4	-1.2
4	2486.90	46.2 AV	54.0	-7.8	3.72 V	252	47.4	-1.2
5	4924.00	48.4 PK	74.0	-25.6	2.02 V	234	44.5	3.9
6	4924.00	45.4 AV	54.0	-8.6	2.02 V	234	41.5	3.9
7	7386.00	45.8 PK	74.0	-28.2	2.73 V	70	36.1	9.7
8	7386.00	33.5 AV	54.0	-20.5	2.73 V	70	23.8	9.7

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	59.4 PK	74.0	-14.6	3.28 H	218	60.6	-1.2
2	2390.00	46.3 AV	54.0	-7.7	3.28 H	218	47.5	-1.2
3	*2412.00	102.6 PK			3.28 H	218	103.8	-1.2
4	*2412.00	91.9 AV			3.28 H	218	93.1	-1.2
5	4824.00	40.6 PK	74.0	-33.4	3.61 H	144	36.9	3.7
6	4824.00	38.0 AV	54.0	-16.0	3.61 H	144	34.3	3.7

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.8 PK	74.0	-11.2	3.90 V	275	64.0	-1.2
2	2390.00	49.1 AV	54.0	-4.9	3.90 V	275	50.3	-1.2
3	*2412.00	107.7 PK			3.90 V	275	108.9	-1.2
4	*2412.00	96.9 AV			3.90 V	275	98.1	-1.2
5	4824.00	40.5 PK	74.0	-33.5	1.97 V	248	36.8	3.7
6	4824.00	38.3 AV	54.0	-15.7	1.97 V	248	34.6	3.7

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.9 PK	74.0	-19.1	2.60 H	238	56.1	-1.2
2	2390.00	43.2 AV	54.0	-10.8	2.60 H	238	44.4	-1.2
3	*2437.00	106.7 PK			2.60 H	238	107.9	-1.2
4	*2437.00	96.8 AV			2.60 H	238	98.0	-1.2
5	2483.50	55.8 PK	74.0	-18.2	2.60 H	238	57.0	-1.2
6	2483.50	43.8 AV	54.0	-10.2	2.60 H	238	45.0	-1.2
7	4874.00	40.8 PK	74.0	-33.2	3.53 H	129	37.0	3.8
8	4874.00	38.1 AV	54.0	-15.9	3.53 H	129	34.3	3.8
9	7311.00	45.4 PK	74.0	-28.6	2.15 H	254	35.7	9.7
10	7311.00	33.5 AV	54.0	-20.5	2.15 H	254	23.8	9.7

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.2 PK	74.0	-19.8	3.72 V	271	55.4	-1.2
2	2390.00	42.7 AV	54.0	-11.3	3.72 V	271	43.9	-1.2
3	*2437.00	106.1 PK			3.72 V	271	107.3	-1.2
4	*2437.00	98.5 AV			3.72 V	271	99.7	-1.2
5	2483.50	55.8 PK	74.0	-18.2	3.72 V	271	57.0	-1.2
6	2483.50	44.1 AV	54.0	-9.9	3.72 V	271	45.3	-1.2
7	4874.00	40.6 PK	74.0	-33.4	2.06 V	240	36.8	3.8
8	4874.00	38.5 AV	54.0	-15.5	2.06 V	240	34.7	3.8
9	7311.00	45.6 PK	74.0	-28.4	2.71 V	76	35.9	9.7
10	7311.00	33.3 AV	54.0	-20.7	2.71 V	76	23.6	9.7

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	102.7 PK			2.77 H	123	103.9	-1.2
2	*2462.00	92.6 AV			2.77 H	123	93.8	-1.2
3	2483.50	64.1 PK	74.0	-9.9	2.77 H	123	65.3	-1.2
4	2483.50	48.3 AV	54.0	-5.7	2.77 H	123	49.5	-1.2
5	4924.00	40.4 PK	74.0	-33.6	3.57 H	129	36.5	3.9
6	4924.00	37.8 AV	54.0	-16.2	3.57 H	129	33.9	3.9
7	7386.00	45.2 PK	74.0	-28.8	2.15 H	257	35.5	9.7
8	7386.00	33.1 AV	54.0	-20.9	2.15 H	257	23.4	9.7

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	106.6 PK			3.72 V	268	107.8	-1.2
2	*2462.00	96.6 AV			3.72 V	268	97.8	-1.2
3	2483.50	64.6 PK	74.0	-9.4	3.72 V	268	65.8	-1.2
4	2483.50	50.7 AV	54.0	-3.3	3.72 V	268	51.9	-1.2
5	4924.00	40.8 PK	74.0	-33.2	2.02 V	238	36.9	3.9
6	4924.00	38.7 AV	54.0	-15.3	2.02 V	238	34.8	3.9
7	7386.00	45.3 PK	74.0	-28.7	2.68 V	72	35.6	9.7
8	7386.00	33.0 AV	54.0	-21.0	2.68 V	72	23.3	9.7

Remarks:

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

RF Mode	TX 802.11n (HT20)	Channel	CH 1 : 2412 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	70.9 PK	74.0	-3.1	3.28 H	217	72.1	-1.2
2	2390.00	53.1 AV	54.0	-0.9	3.28 H	217	54.3	-1.2
3	*2412.00	103.2 PK			3.28 H	217	104.4	-1.2
4	*2412.00	93.5 AV			3.28 H	217	94.7	-1.2
5	4824.00	39.9 PK	74.0	-34.1	3.58 H	137	36.2	3.7
6	4824.00	37.6 AV	54.0	-16.4	3.58 H	137	33.9	3.7

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	67.2 PK	74.0	-6.8	3.90 V	270	68.4	-1.2
2	2390.00	53.8 AV	54.0	-0.2	3.90 V	270	55.0	-1.2
3	*2412.00	107.2 PK			3.90 V	270	108.4	-1.2
4	*2412.00	98.0 AV			3.90 V	270	99.2	-1.2
5	4824.00	40.3 PK	74.0	-33.7	2.10 V	231	36.6	3.7
6	4824.00	38.2 AV	54.0	-15.8	2.10 V	231	34.5	3.7

Remarks:

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

RF Mode	TX 802.11n (HT20)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.3 PK	74.0	-18.7	2.62 H	253	56.5	-1.2
2	2390.00	43.6 AV	54.0	-10.4	2.62 H	253	44.8	-1.2
3	*2437.00	106.9 PK			2.62 H	253	108.1	-1.2
4	*2437.00	98.4 AV			2.62 H	253	99.6	-1.2
5	2483.50	56.2 PK	74.0	-17.8	2.62 H	253	57.4	-1.2
6	2483.50	44.0 AV	54.0	-10.0	2.62 H	253	45.2	-1.2
7	4874.00	40.7 PK	74.0	-33.3	3.50 H	142	36.9	3.8
8	4874.00	38.1 AV	54.0	-15.9	3.50 H	142	34.3	3.8
9	7311.00	45.7 PK	74.0	-28.3	2.19 H	270	36.0	9.7
10	7311.00	33.5 AV	54.0	-20.5	2.19 H	270	23.8	9.7

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.2 PK	74.0	-18.8	3.92 V	282	56.4	-1.2
2	2390.00	43.3 AV	54.0	-10.7	3.92 V	282	44.5	-1.2
3	*2437.00	106.8 PK			3.92 V	282	108.0	-1.2
4	*2437.00	99.1 AV			3.92 V	282	100.3	-1.2
5	2483.50	56.6 PK	74.0	-17.4	3.92 V	282	57.8	-1.2
6	2483.50	44.4 AV	54.0	-9.6	3.92 V	282	45.6	-1.2
7	4874.00	40.2 PK	74.0	-33.8	2.05 V	226	36.4	3.8
8	4874.00	38.4 AV	54.0	-15.6	2.05 V	226	34.6	3.8
9	7311.00	45.5 PK	74.0	-28.5	2.69 V	72	35.8	9.7
10	7311.00	33.5 AV	54.0	-20.5	2.69 V	72	23.8	9.7

Remarks:

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

RF Mode	TX 802.11n (HT20)	Channel	CH 11 : 2462 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	102.8 PK			2.76 H	123	104.0	-1.2
2	*2462.00	93.7 AV			2.76 H	123	94.9	-1.2
3	2483.50	70.7 PK	74.0	-3.3	2.76 H	123	71.9	-1.2
4	2483.50	53.5 AV	54.0	-0.5	2.76 H	123	54.7	-1.2
5	4924.00	40.5 PK	74.0	-33.5	3.55 H	119	36.6	3.9
6	4924.00	37.8 AV	54.0	-16.2	3.55 H	119	33.9	3.9
7	7386.00	45.1 PK	74.0	-28.9	2.14 H	256	35.4	9.7
8	7386.00	33.2 AV	54.0	-20.8	2.14 H	256	23.5	9.7

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	108.0 PK			3.78 V	265	109.2	-1.2
2	*2462.00	98.3 AV			3.78 V	265	99.5	-1.2
3	2483.50	70.8 PK	74.0	-3.2	3.78 V	265	72.0	-1.2
4	2483.50	53.3 AV	54.0	-0.7	3.78 V	265	54.5	-1.2
5	4924.00	41.1 PK	74.0	-32.9	2.00 V	240	37.2	3.9
6	4924.00	39.1 AV	54.0	-14.9	2.00 V	240	35.2	3.9
7	7386.00	44.9 PK	74.0	-29.1	2.70 V	63	35.2	9.7
8	7386.00	32.5 AV	54.0	-21.5	2.70 V	63	22.8	9.7

Remarks:

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

RF Mode	TX 802.11n (HT40)	Channel	CH 3 : 2422 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	67.5 PK	74.0	-6.5	2.65 H	263	68.7	-1.2
2	2390.00	53.5 AV	54.0	-0.5	2.65 H	263	54.7	-1.2
3	*2422.00	100.5 PK			2.65 H	263	101.7	-1.2
4	*2422.00	90.7 AV			2.65 H	263	91.9	-1.2
5	4844.00	40.3 PK	74.0	-33.7	3.55 H	104	36.5	3.8
6	4844.00	30.8 AV	54.0	-23.2	3.55 H	104	27.0	3.8
7	7266.00	44.8 PK	74.0	-29.2	2.10 H	235	35.3	9.5
8	7266.00	32.9 AV	54.0	-21.1	2.10 H	235	23.4	9.5

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.5 PK	74.0	-10.5	3.85 V	274	64.7	-1.2
2	2390.00	51.2 AV	54.0	-2.8	3.85 V	274	52.4	-1.2
3	*2422.00	101.6 PK			3.85 V	274	102.8	-1.2
4	*2422.00	91.9 AV			3.85 V	274	93.1	-1.2
5	4844.00	40.9 PK	74.0	-33.1	1.97 V	232	37.1	3.8
6	4844.00	33.2 AV	54.0	-20.8	1.97 V	232	29.4	3.8
7	7266.00	45.3 PK	74.0	-28.7	2.79 V	64	35.8	9.5
8	7266.00	33.6 AV	54.0	-20.4	2.79 V	64	24.1	9.5

Remarks:

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

RF Mode	TX 802.11n (HT40)	Channel	CH 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	66.8 PK	74.0	-7.2	2.99 H	281	68.0	-1.2
2	2390.00	52.0 AV	54.0	-2.0	2.99 H	281	53.2	-1.2
3	*2437.00	106.2 PK			2.99 H	281	107.4	-1.2
4	*2437.00	95.6 AV			2.99 H	281	96.8	-1.2
5	2483.50	69.1 PK	74.0	-4.9	2.99 H	281	70.3	-1.2
6	2483.50	53.6 AV	54.0	-0.4	2.99 H	281	54.8	-1.2
7	4874.00	40.0 PK	74.0	-34.0	3.54 H	107	36.2	3.8
8	4874.00	30.4 AV	54.0	-23.6	3.54 H	107	26.6	3.8
9	7311.00	45.3 PK	74.0	-28.7	2.10 H	244	35.6	9.7
10	7311.00	33.2 AV	54.0	-20.8	2.10 H	244	23.5	9.7

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	63.0 PK	74.0	-11.0	3.86 V	289	64.2	-1.2
2	2390.00	50.9 AV	54.0	-3.1	3.86 V	289	52.1	-1.2
3	*2437.00	104.7 PK			3.86 V	289	105.9	-1.2
4	*2437.00	93.9 AV			3.86 V	289	95.1	-1.2
5	2483.50	65.1 PK	74.0	-8.9	3.86 V	289	66.3	-1.2
6	2483.50	53.2 AV	54.0	-0.8	3.86 V	289	54.4	-1.2
7	4874.00	40.5 PK	74.0	-33.5	2.01 V	222	36.7	3.8
8	4874.00	32.9 AV	54.0	-21.1	2.01 V	222	29.1	3.8
9	7311.00	45.5 PK	74.0	-28.5	2.73 V	67	35.8	9.7
10	7311.00	33.6 AV	54.0	-20.4	2.73 V	67	23.9	9.7

Remarks:

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

RF Mode	TX 802.11n (HT40)	Channel	CH 9 : 2452 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	101.6 PK			2.93 H	262	102.8	-1.2
2	*2452.00	91.8 AV			2.93 H	262	93.0	-1.2
3	2483.50	65.9 PK	74.0	-8.1	2.93 H	262	67.1	-1.2
4	2483.50	53.8 AV	54.0	-0.2	2.93 H	262	55.0	-1.2
5	4904.00	40.4 PK	74.0	-33.6	3.58 H	102	36.5	3.9
6	4904.00	30.7 AV	54.0	-23.3	3.58 H	102	26.8	3.9
7	7356.00	44.7 PK	74.0	-29.3	2.07 H	259	34.8	9.9
8	7356.00	32.8 AV	54.0	-21.2	2.07 H	259	22.9	9.9

Antenna Polarity & Test Distance : Vertical at 3 m

No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2452.00	102.2 PK			3.79 V	273	103.4	-1.2
2	*2452.00	92.8 AV			3.79 V	273	94.0	-1.2
3	2483.50	65.2 PK	74.0	-8.8	3.79 V	273	66.4	-1.2
4	2483.50	53.0 AV	54.0	-1.0	3.79 V	273	54.2	-1.2
5	4904.00	40.9 PK	74.0	-33.1	2.02 V	236	37.0	3.9
6	4904.00	33.2 AV	54.0	-20.8	2.02 V	236	29.3	3.9
7	7356.00	45.6 PK	74.0	-28.4	2.73 V	60	35.7	9.9
8	7356.00	33.5 AV	54.0	-20.5	2.73 V	60	23.6	9.9

Remarks:

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

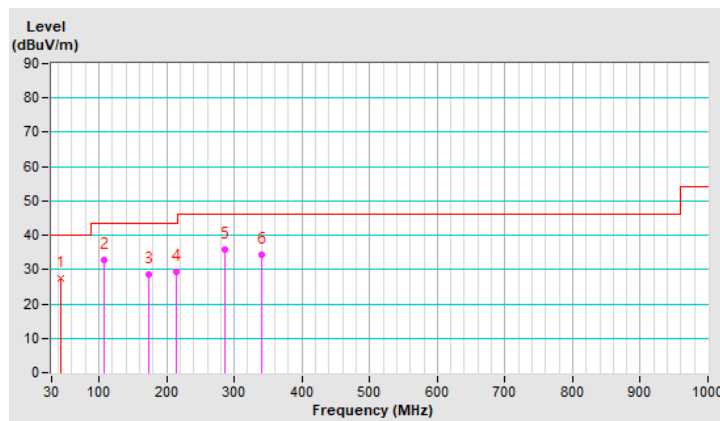
Below 1GHz Data:

RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	43.37	27.6 QP	40.0	-12.4	2.00 H	100	35.9	-8.3
2	108.27	32.7 QP	43.5	-10.8	2.00 H	115	43.6	-10.9
3	173.08	28.6 QP	43.5	-14.9	1.50 H	297	37.1	-8.5
4	214.59	29.5 QP	43.5	-14.0	1.50 H	247	40.1	-10.6
5	285.57	35.7 QP	46.0	-10.3	1.00 H	67	42.8	-7.1
6	340.05	34.4 QP	46.0	-11.6	1.50 H	79	39.7	-5.3

Remarks:

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

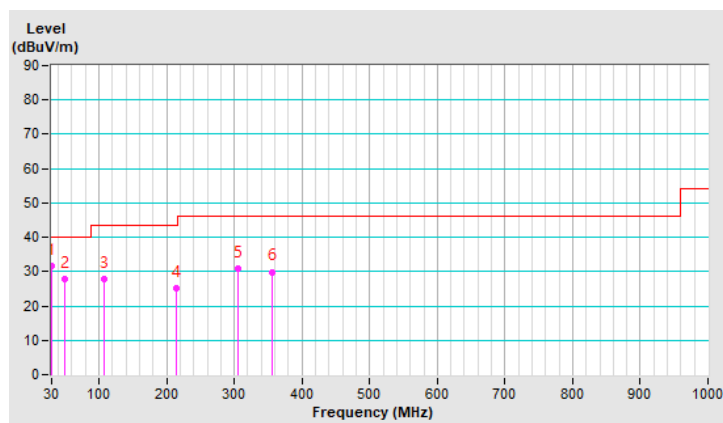


RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.57	31.8 QP	40.0	-8.2	1.00 V	19	41.2	-9.4
2	49.37	27.8 QP	40.0	-12.2	1.00 V	220	35.9	-8.1
3	107.37	27.8 QP	43.5	-15.7	1.50 V	317	38.9	-11.1
4	213.47	25.1 QP	43.5	-18.4	1.50 V	347	35.7	-10.6
5	304.57	30.8 QP	46.0	-15.2	1.00 V	270	37.1	-6.3
6	356.40	29.9 QP	46.0	-16.1	2.00 V	358	34.8	-4.9

Remarks:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	2020/10/20	2021/10/19
LISN R&S	ESH3-Z5	848773/004	2020/10/27	2021/10/26
LISN R & S	ESH3-Z5	835239/001	2021/3/26	2022/3/25
50 ohms Terminator	50	3	2020/10/26	2021/10/25
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2021/9/25	2022/9/24
Fixed attenuator STI	STI02-2200-10	005	2021/8/27	2022/8/26
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3. Tested Date: 2021/9/30

4.2.3 Test Procedures

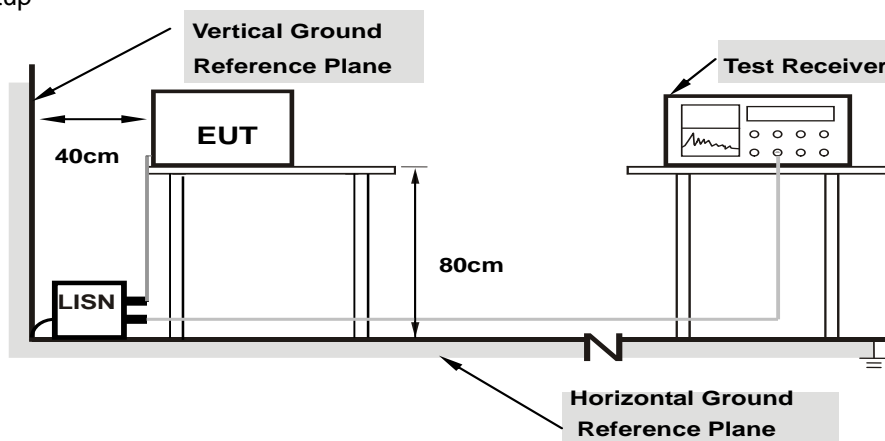
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

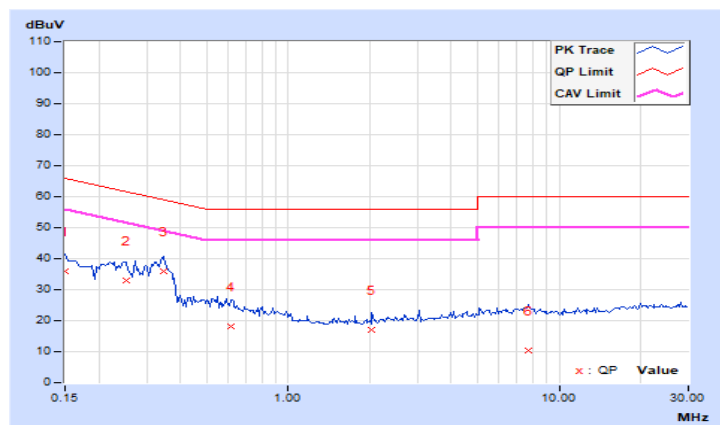
4.2.7 Test Results

RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.04	25.74	9.72	35.78	19.76	66.00	56.00	-30.22	-36.24
2	0.25156	10.07	22.87	11.81	32.94	21.88	61.71	51.71	-28.77	-29.83
3	0.34531	10.07	26.03	14.22	36.10	24.29	59.07	49.07	-22.97	-24.78
4	0.61484	10.09	8.10	-4.86	18.19	5.23	56.00	46.00	-37.81	-40.77
5	2.03844	10.17	6.78	3.67	16.95	13.84	56.00	46.00	-39.05	-32.16
6	7.72656	10.58	-0.29	-7.58	10.29	3.00	60.00	50.00	-49.71	-47.00

Remarks:

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

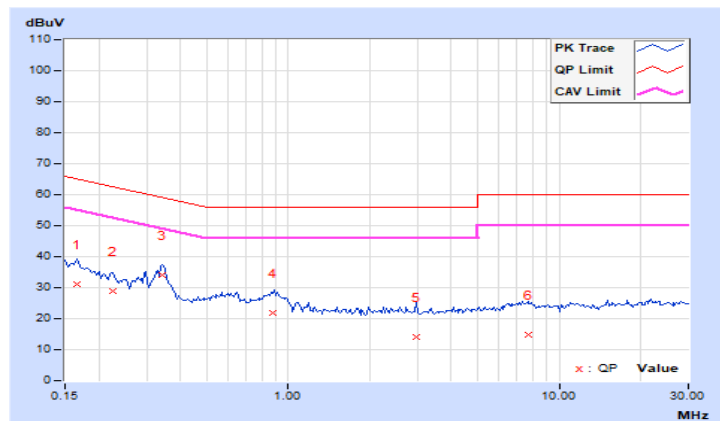


RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16562	10.03	21.12	2.75	31.15	12.78	65.18	55.18	-34.03	-42.40
2	0.22422	10.06	18.99	7.43	29.05	17.49	62.66	52.66	-33.61	-35.17
3	0.34141	10.07	23.94	15.41	34.01	25.48	59.17	49.17	-25.16	-23.69
4	0.87656	10.09	11.85	1.47	21.94	11.56	56.00	46.00	-34.06	-34.44
5	2.97266	10.23	3.67	-4.78	13.90	5.45	56.00	46.00	-42.10	-40.55
6	7.66406	10.51	4.18	-3.98	14.69	6.53	60.00	50.00	-45.31	-43.47

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

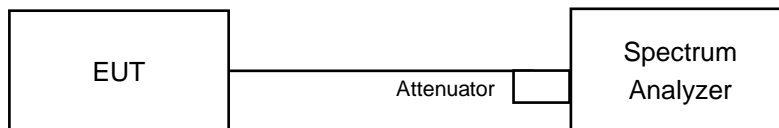


4.3 6dB Bandwidth Measurement

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.10	0.5	Pass
6	2437	10.08	0.5	Pass
11	2462	9.61	0.5	Pass

802.11g

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.40	0.5	Pass
6	2437	16.37	0.5	Pass
11	2462	16.36	0.5	Pass

802.11n (HT20)

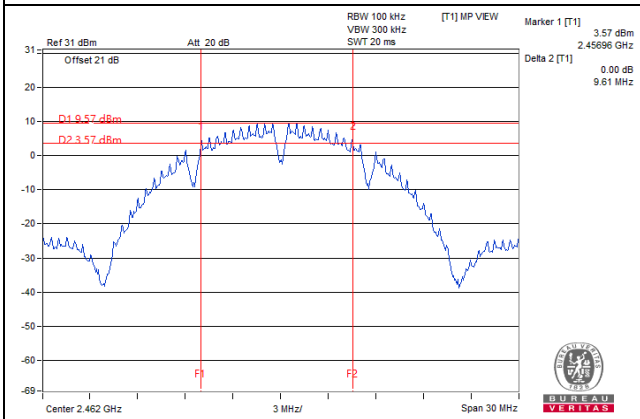
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.38	0.5	Pass
6	2437	17.35	0.5	Pass
11	2462	17.61	0.5	Pass

802.11n (HT40)

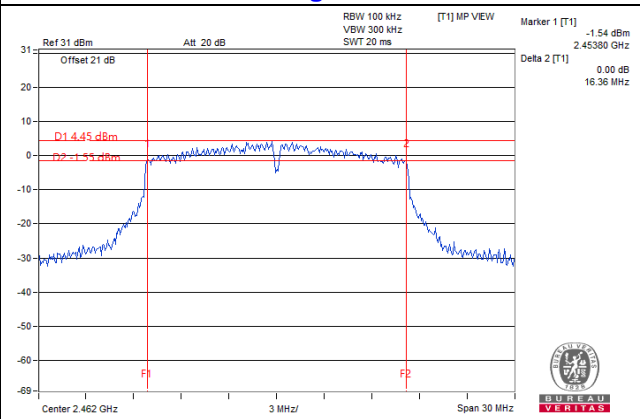
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.94	0.5	Pass
6	2437	35.34	0.5	Pass
9	2452	35.82	0.5	Pass

Spectrum Plot of Worst Value

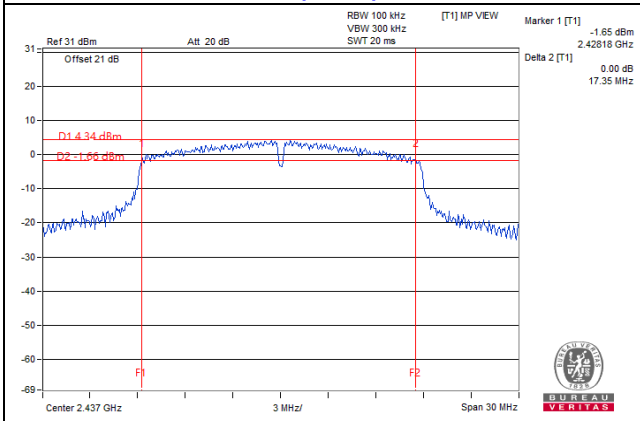
802.11b / CH11



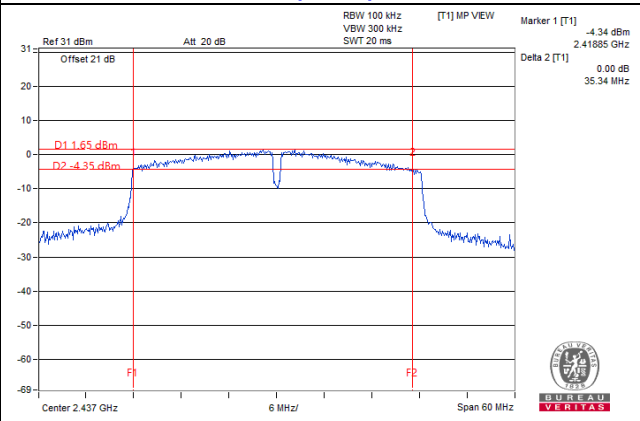
802.11g / CH11



802.11n (HT20) / CH6



802.11n (HT40) / CH6

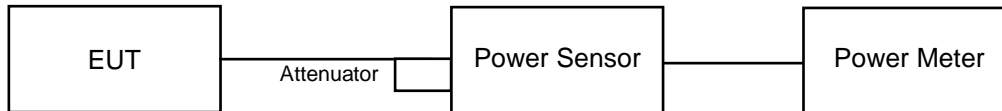


4.4 Conducted Output Power Measurement

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

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

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	103.039	20.13	30	Pass
6	2437	100.693	20.03	30	Pass
11	2462	94.842	19.77	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	170.216	22.31	30	Pass
6	2437	185.78	22.69	30	Pass
11	2462	162.555	22.11	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	176.198	22.46	30	Pass
6	2437	197.697	22.96	30	Pass
11	2462	171.791	22.35	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
3	2422	115.878	20.64	30	Pass
6	2437	199.067	22.99	30	Pass
9	2452	134.586	21.29	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	70.146	18.46
6	2437	68.549	18.36
11	2462	64.269	18.08

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	35.4	15.49
6	2437	33.266	15.22
11	2462	32.509	15.12

802.11n (HT20)

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	41.115	16.14
6	2437	51.642	17.13
11	2462	38.548	15.86

802.11n (HT40)

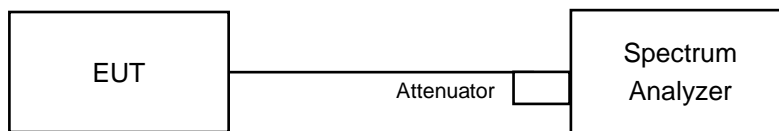
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
3	2422	18.923	12.77
6	2437	53.088	17.25
9	2452	23.714	13.75

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-4.63	8	Pass
6	2437	-4.44	8	Pass
11	2462	-4.68	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-9.15	8	Pass
6	2437	-9.71	8	Pass
11	2462	-9.55	8	Pass

802.11n (HT20)

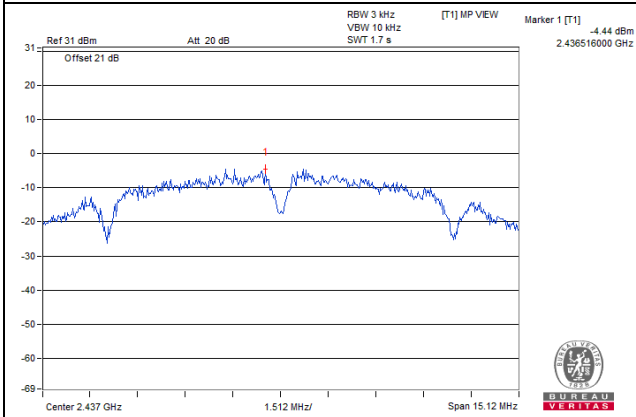
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-8.95	8	Pass
6	2437	-7.61	8	Pass
11	2462	-8.70	8	Pass

802.11n (HT40)

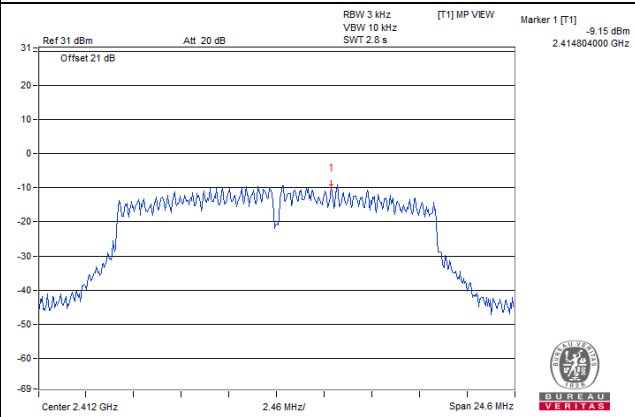
Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
3	2422	-13.91	8	Pass
6	2437	-10.16	8	Pass
9	2452	-13.67	8	Pass

Spectrum Plot of Worst Value

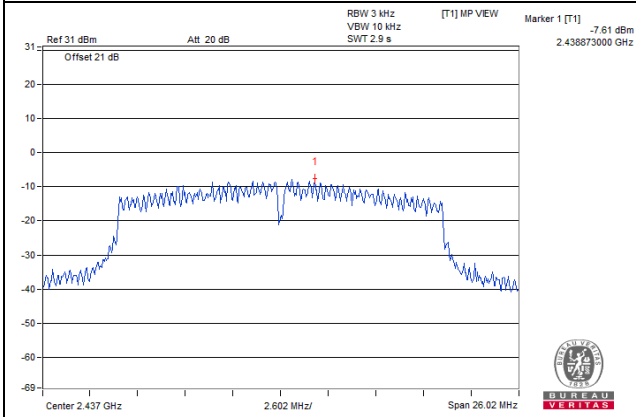
802.11b / CH6



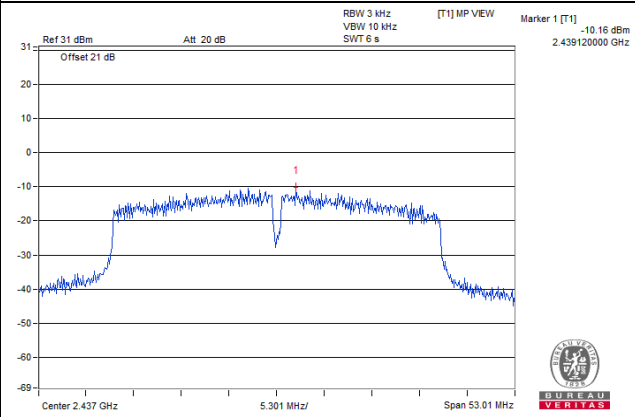
802.11g / CH1



802.11n (HT20) / CH6



802.11n (HT40) / CH6

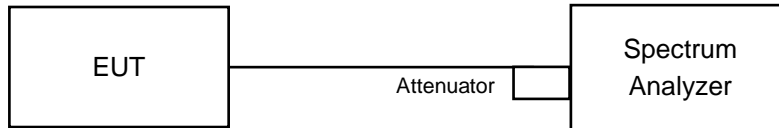


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW \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

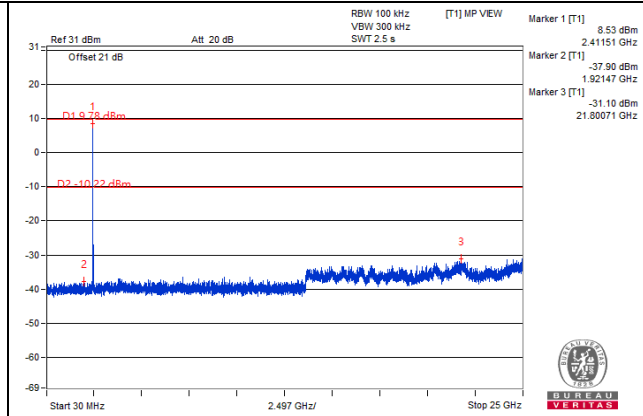
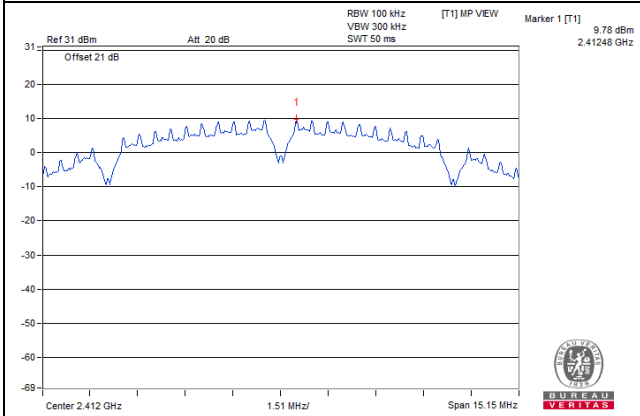
Same as Item 4.3.6

4.6.7 Test Results

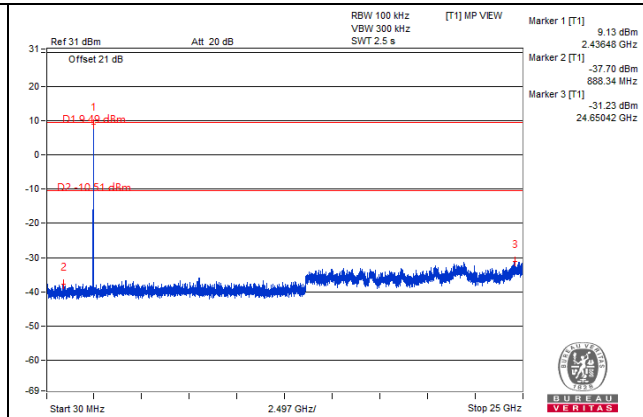
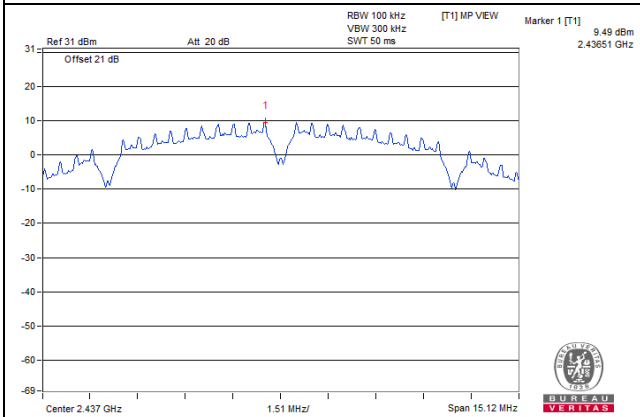
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

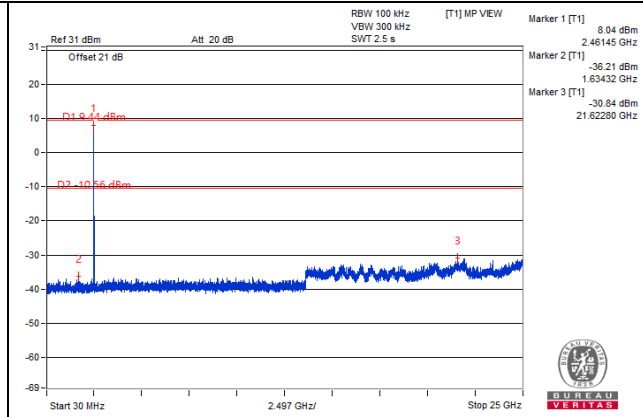
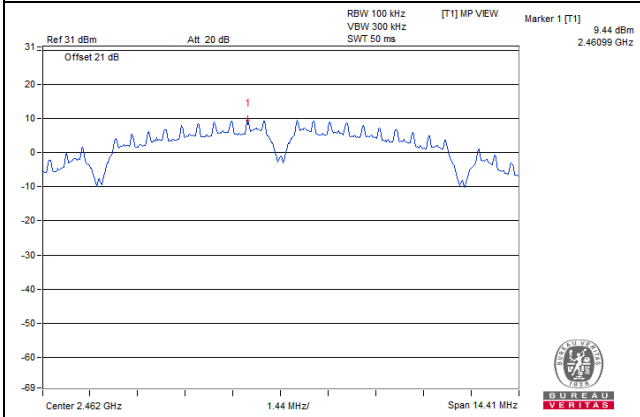
CH 1



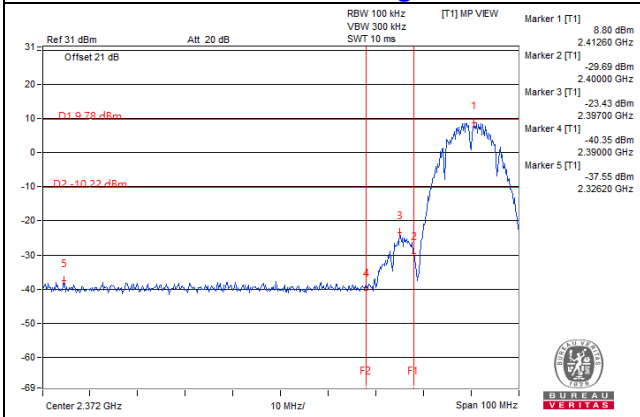
CH 6



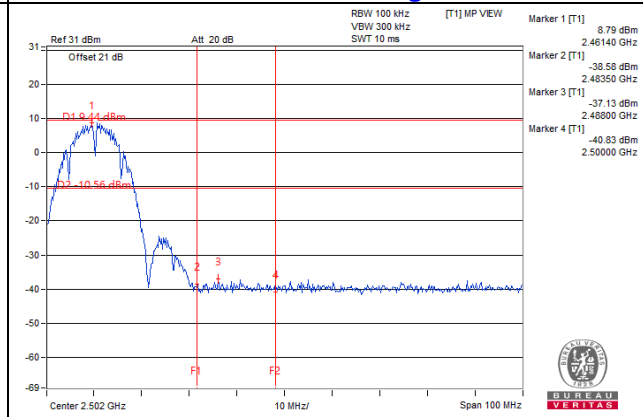
CH 11



CH 1 Band edge

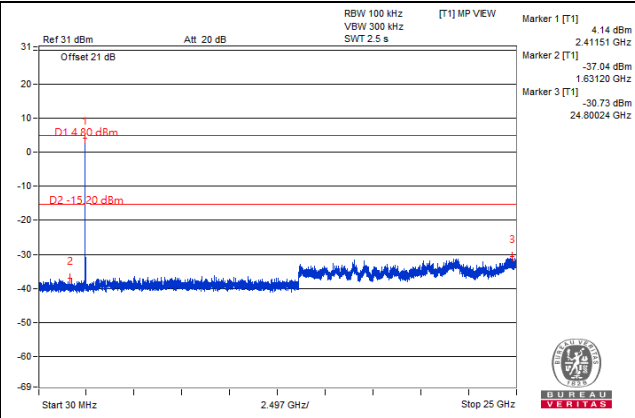
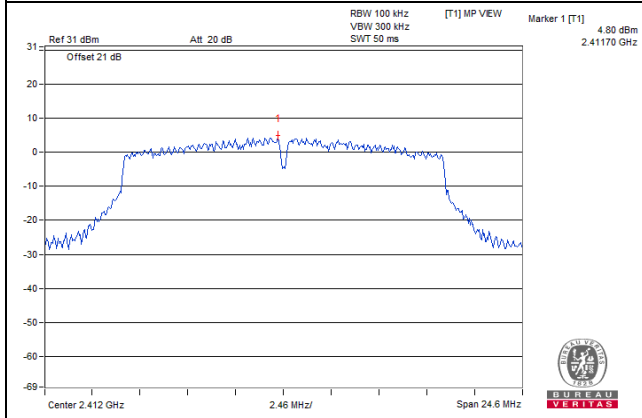


CH 11 Band edge

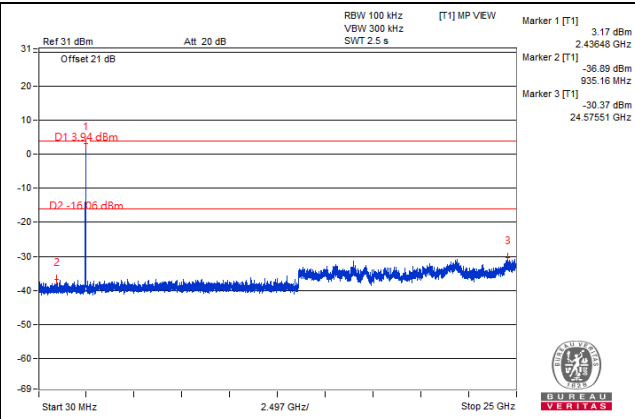
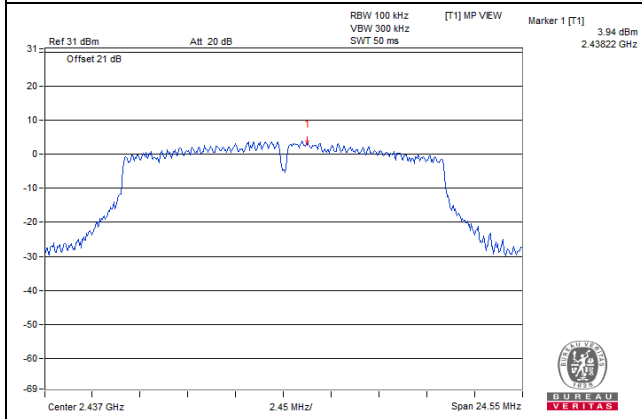


802.11g

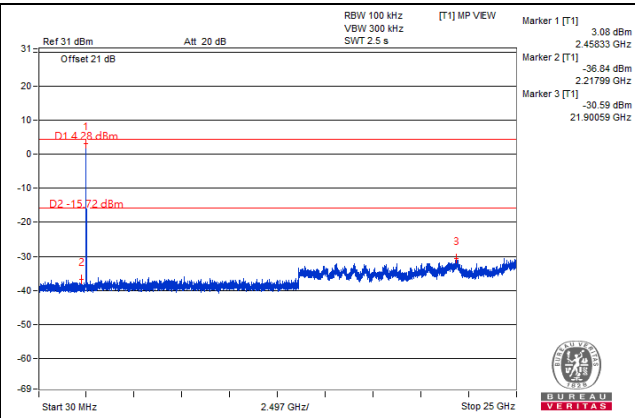
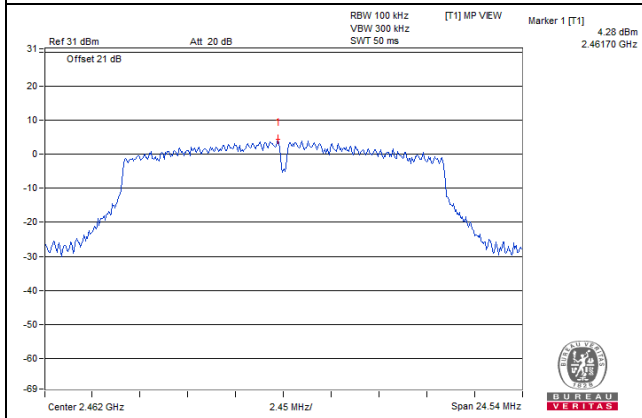
CH 1



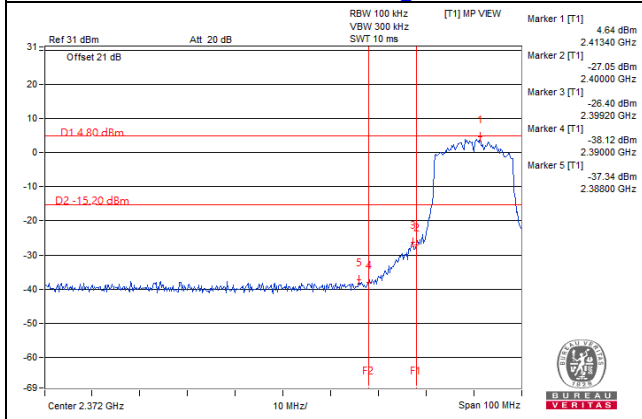
CH 6



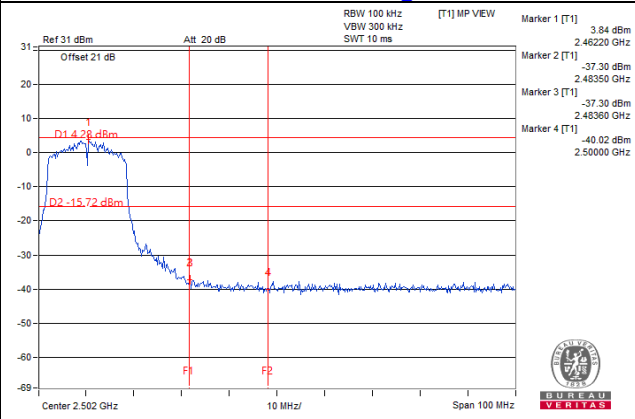
CH 11



CH 1 Band edge

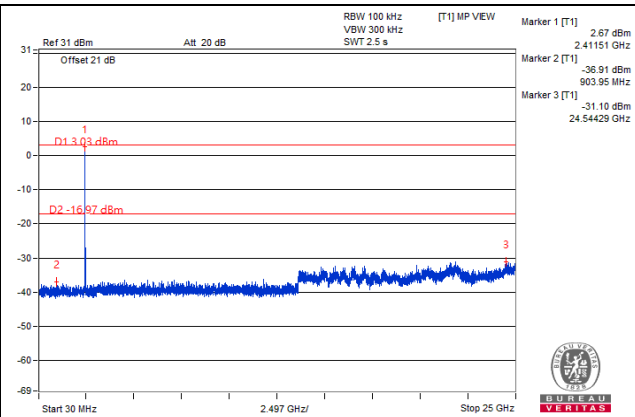
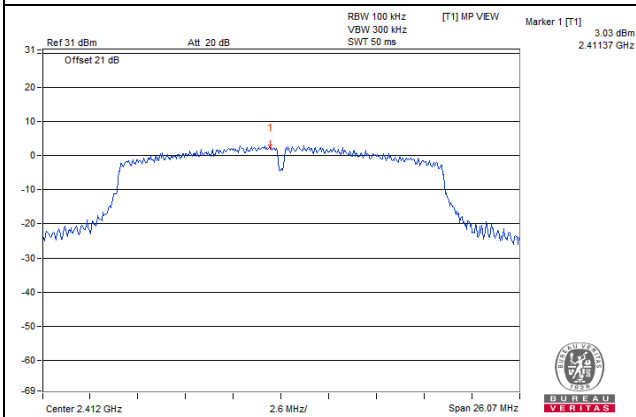


CH 11 Band edge

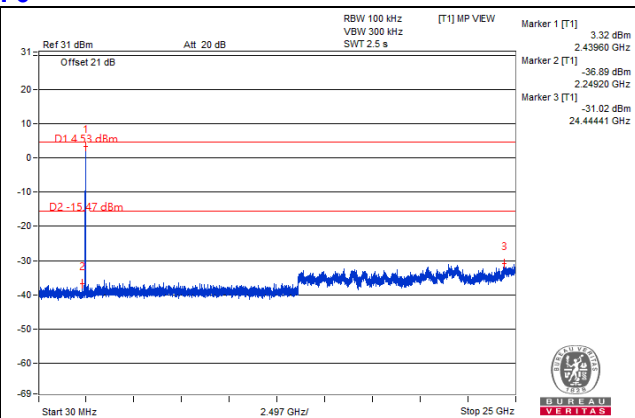
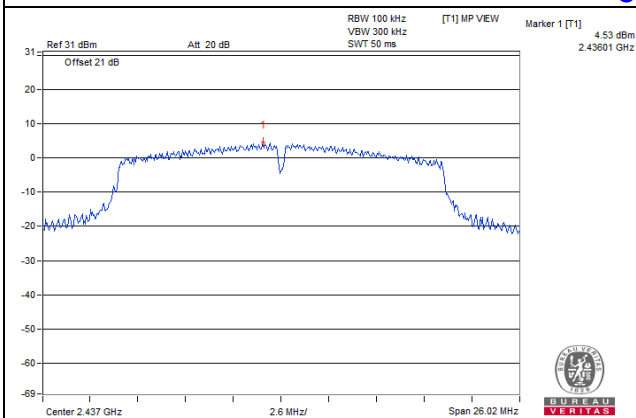


802.11n (HT20)

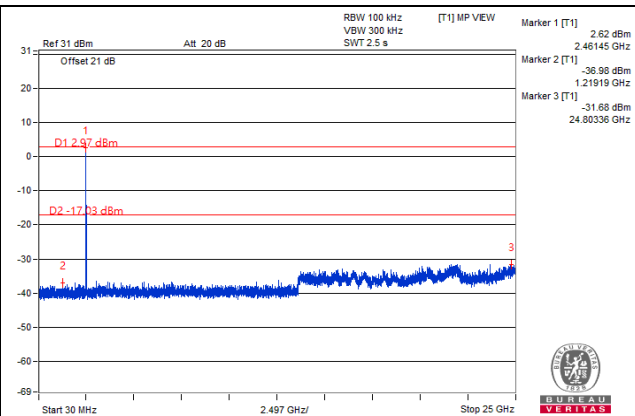
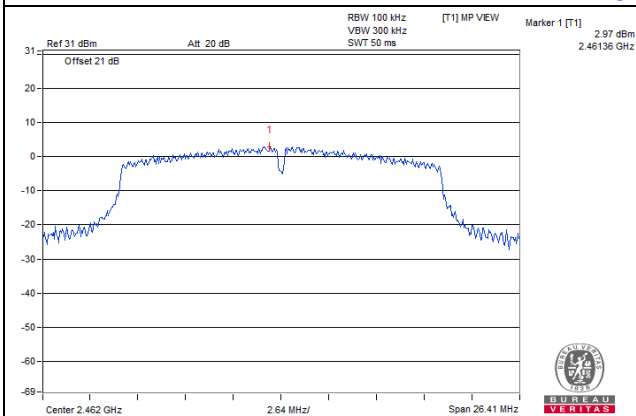
CH 1



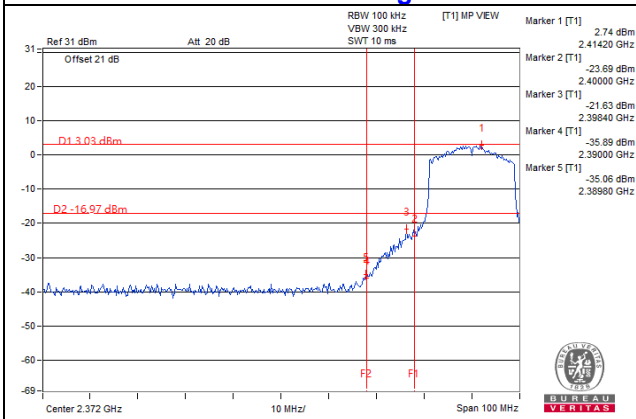
CH 6



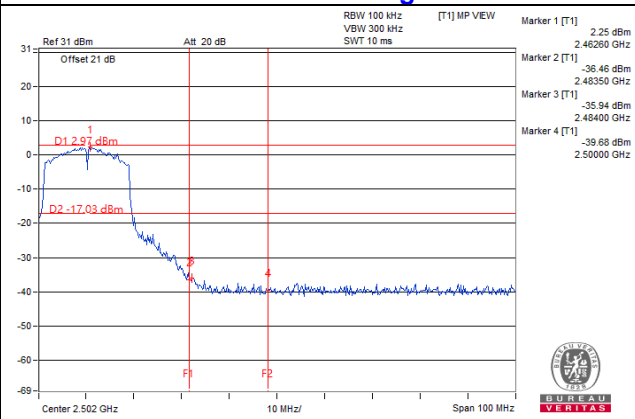
CH 11



CH 1 Band edge

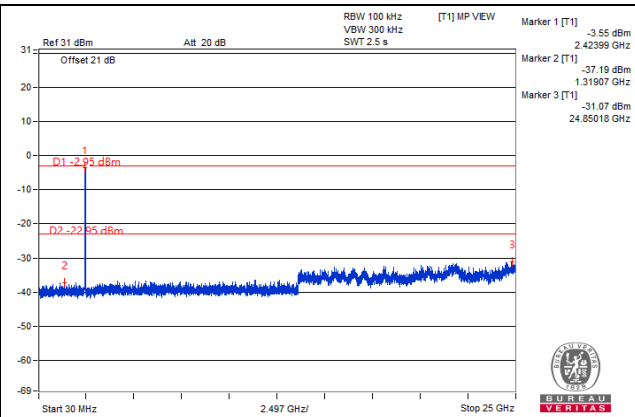
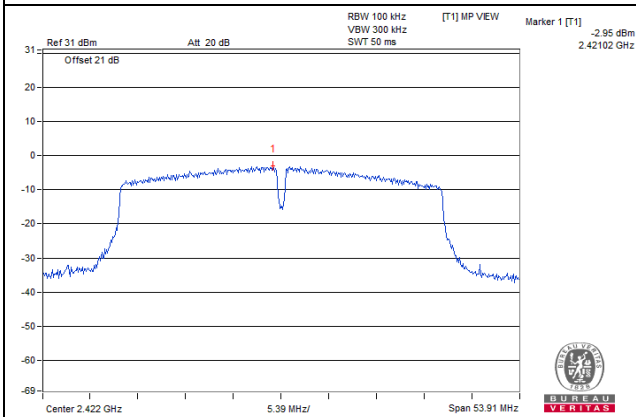


CH 11 Band edge

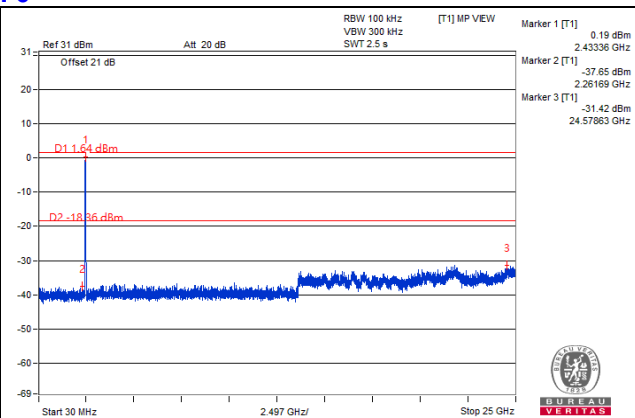
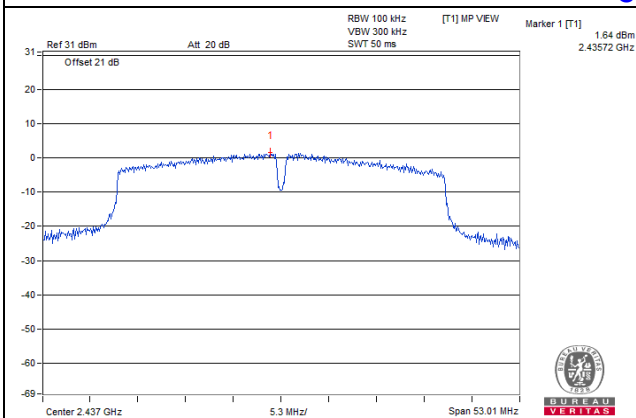


802.11n (HT40)

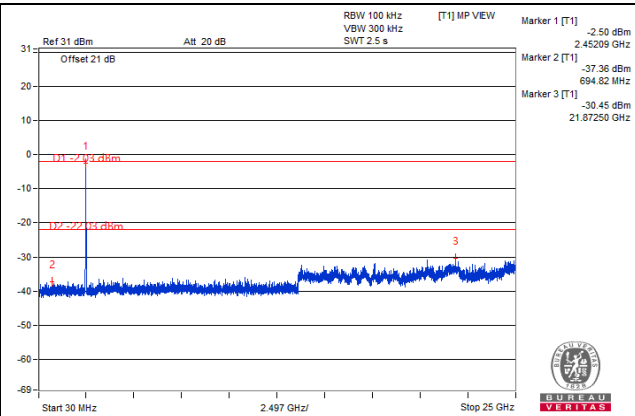
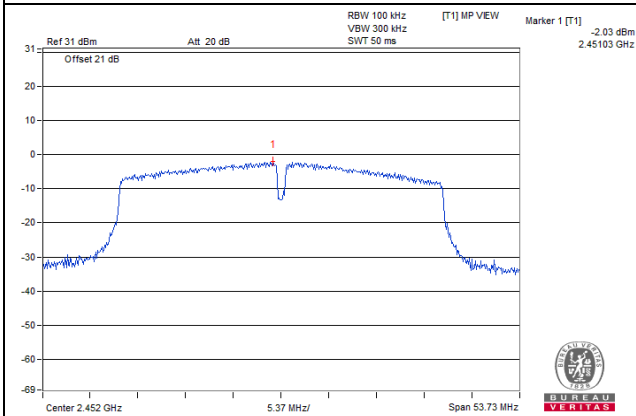
CH 3



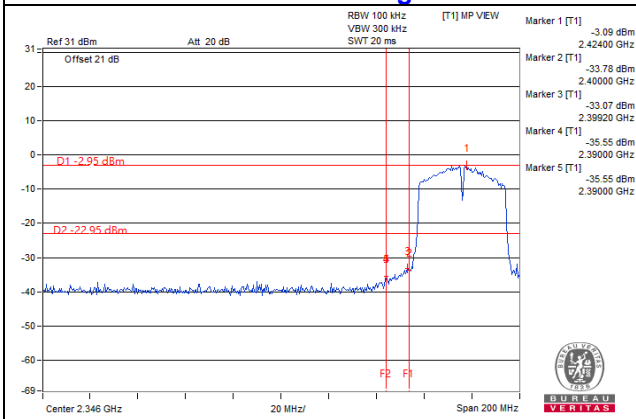
CH 6



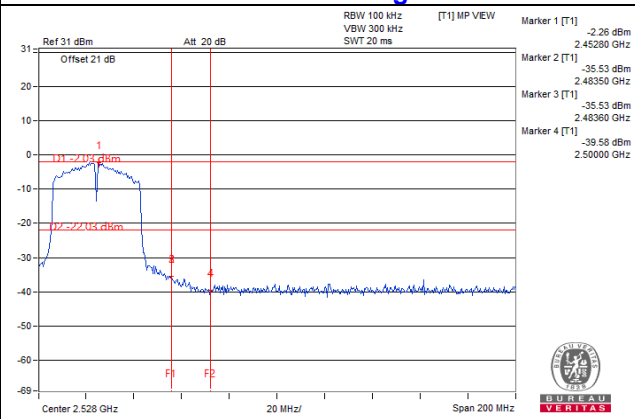
CH 9



CH 3 Band edge



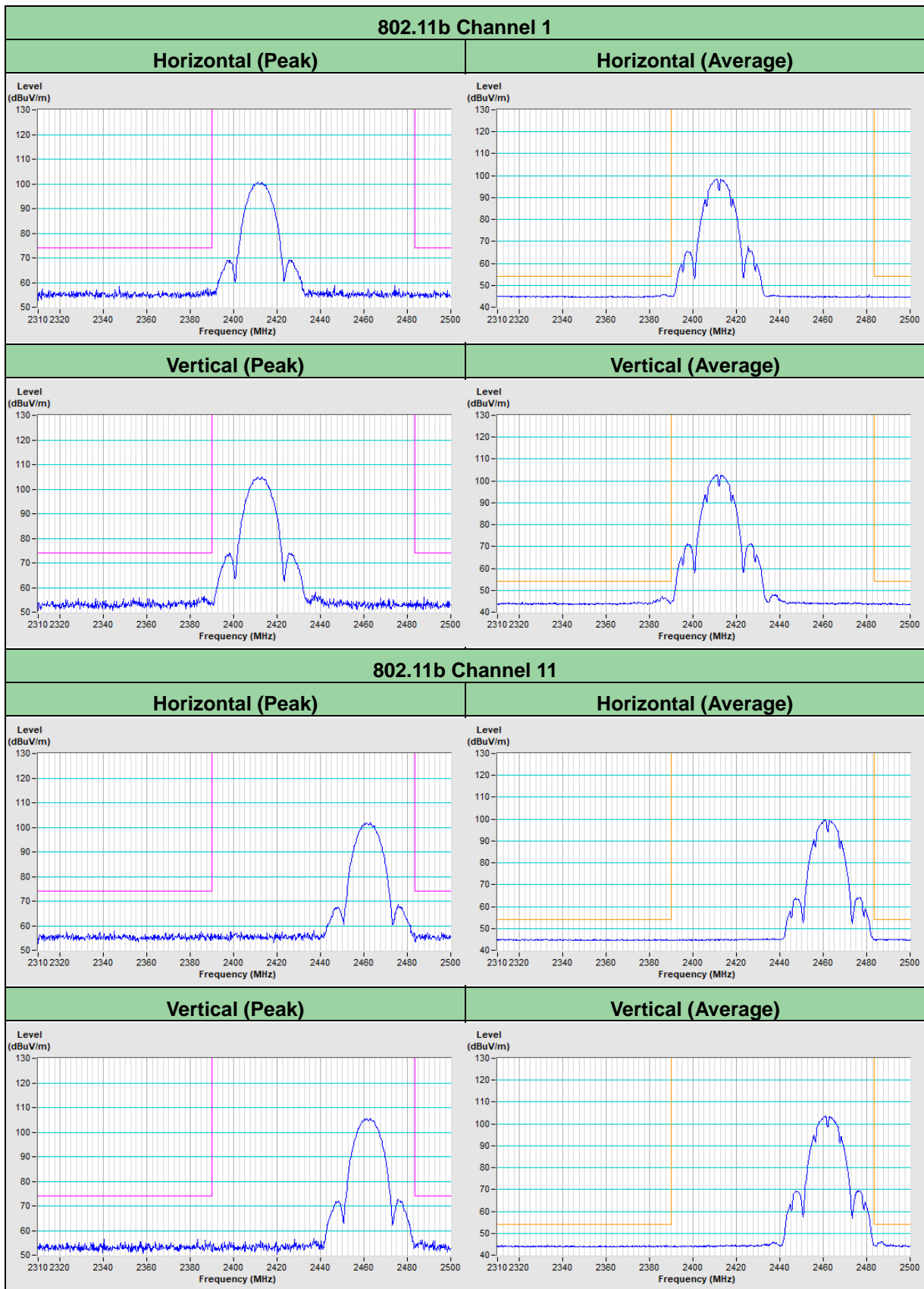
CH 9 Band edge

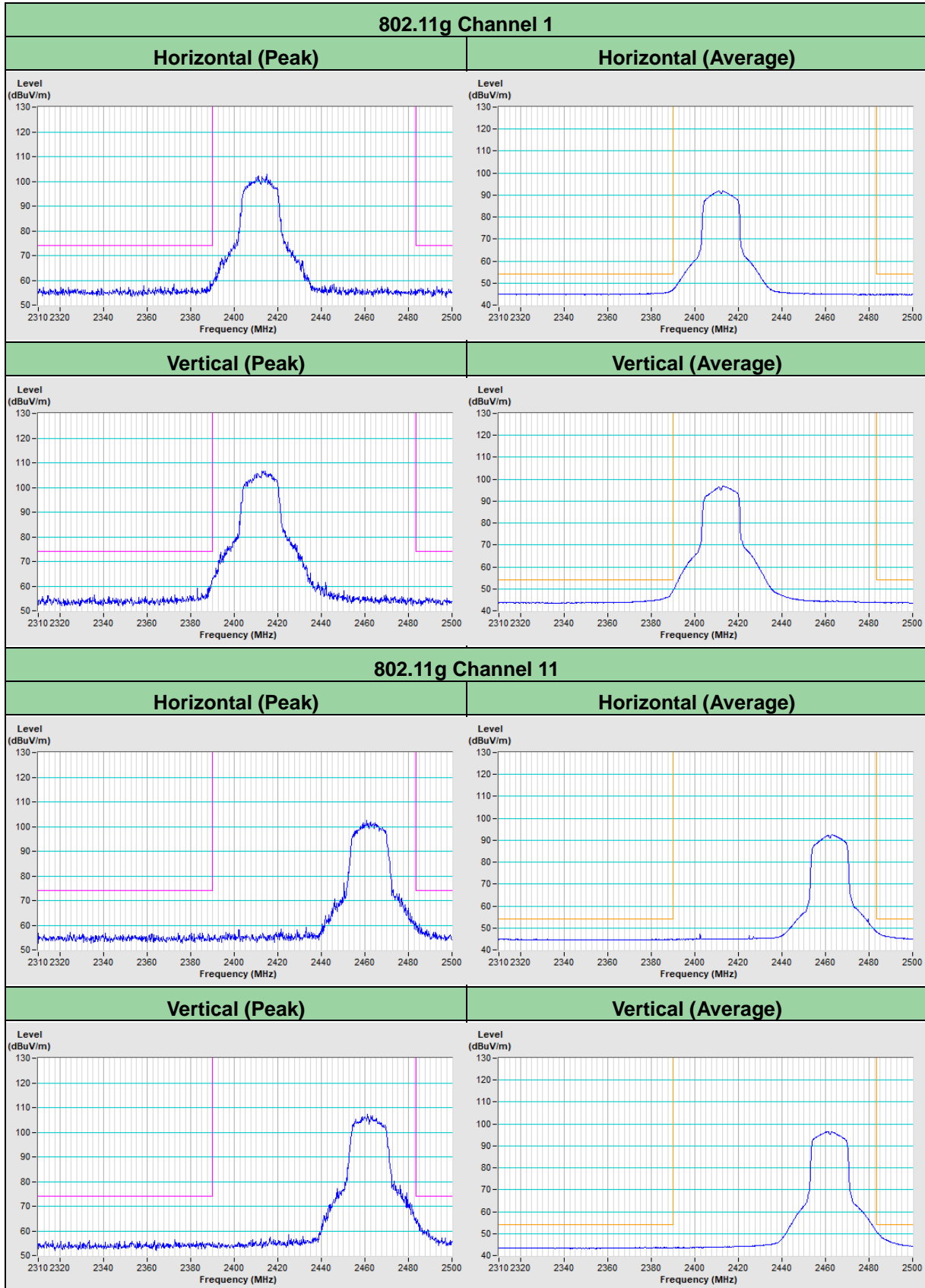


5 Pictures of Test Arrangements

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

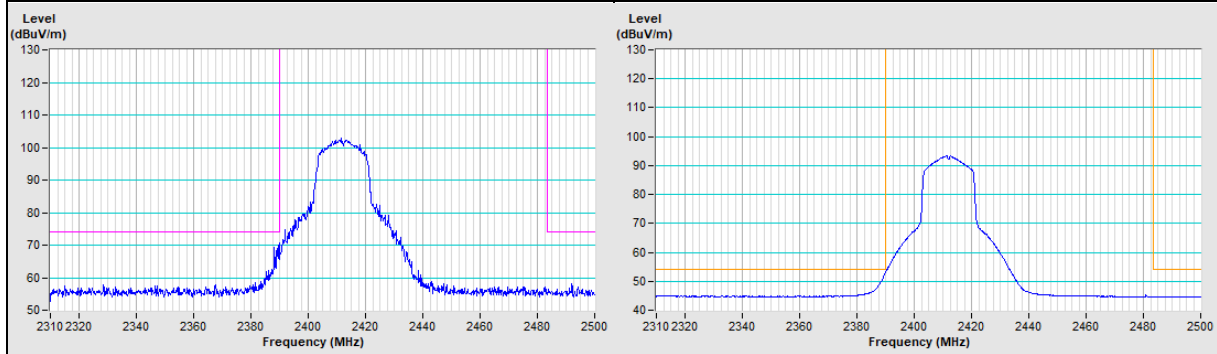
Annex A - Band-Edge Measurement



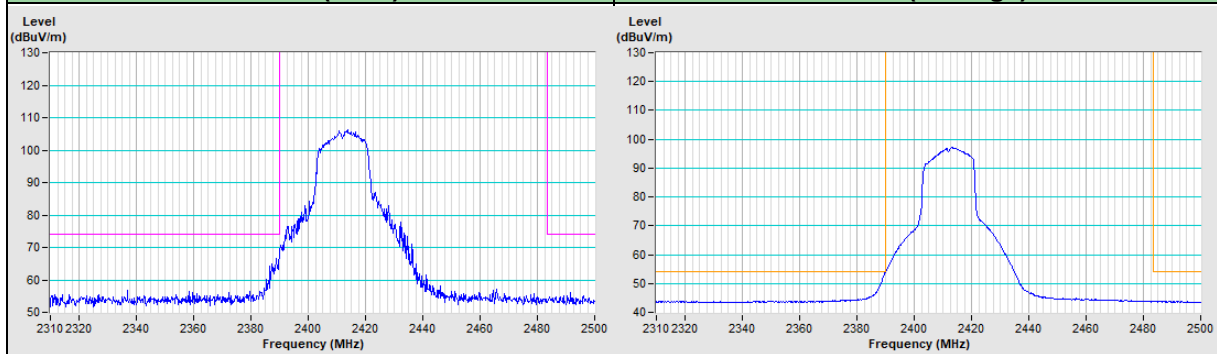


802.11n (HT20) Channel 1

Horizontal (Peak)	Horizontal (Average)
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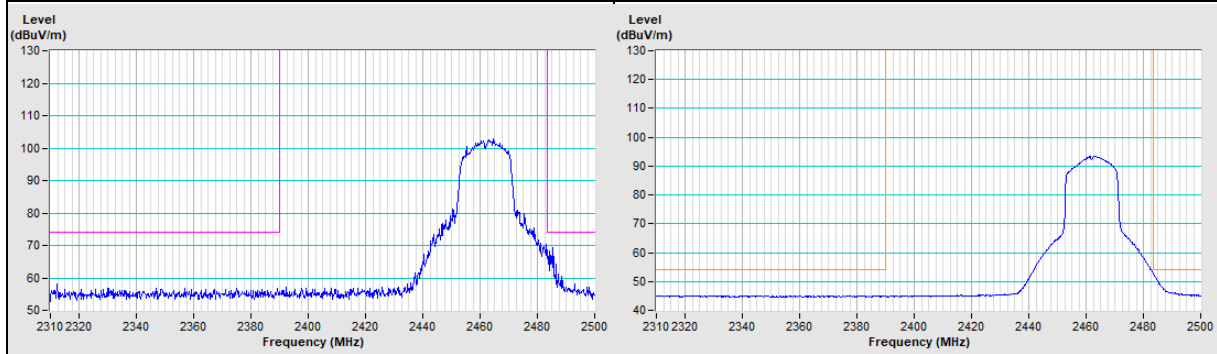


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

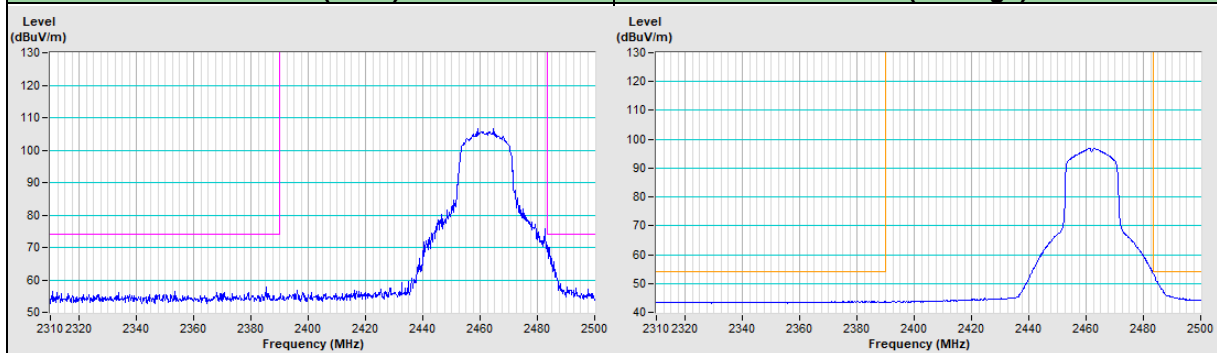


802.11n (HT20) Channel 11

Horizontal (Peak)	Horizontal (Average)
-------------------	----------------------

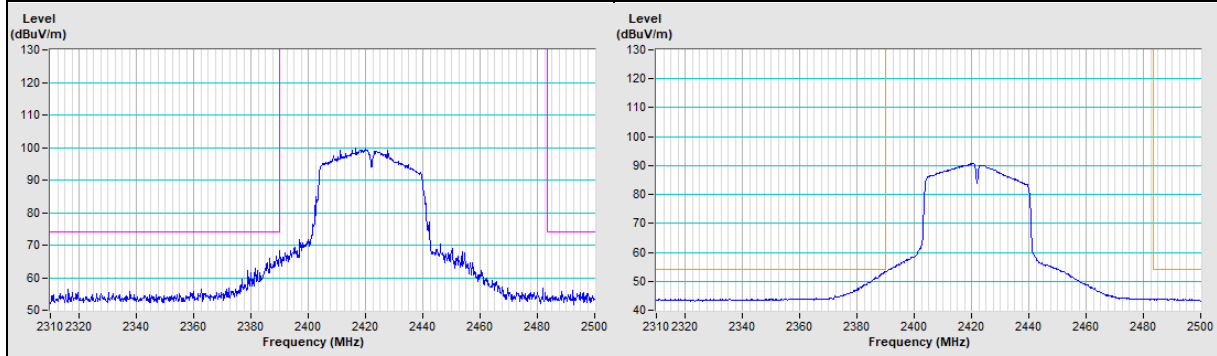


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

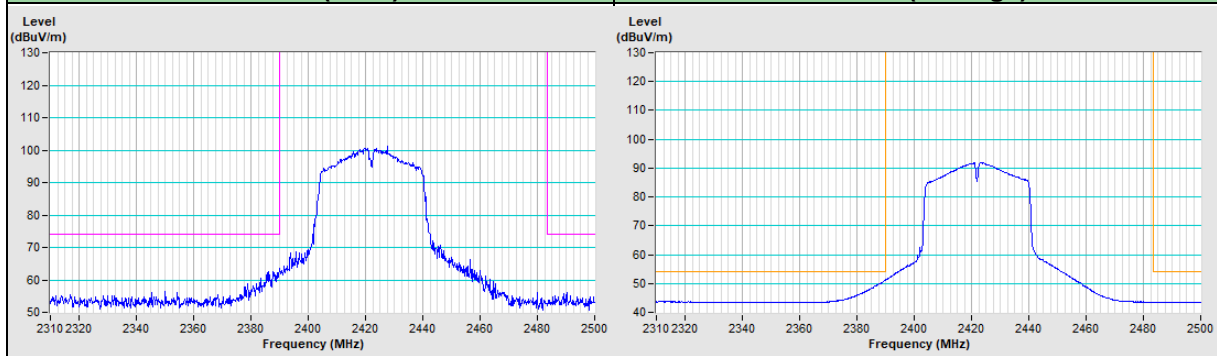


802.11n (HT40) Channel 3

Horizontal (Peak)	Horizontal (Average)
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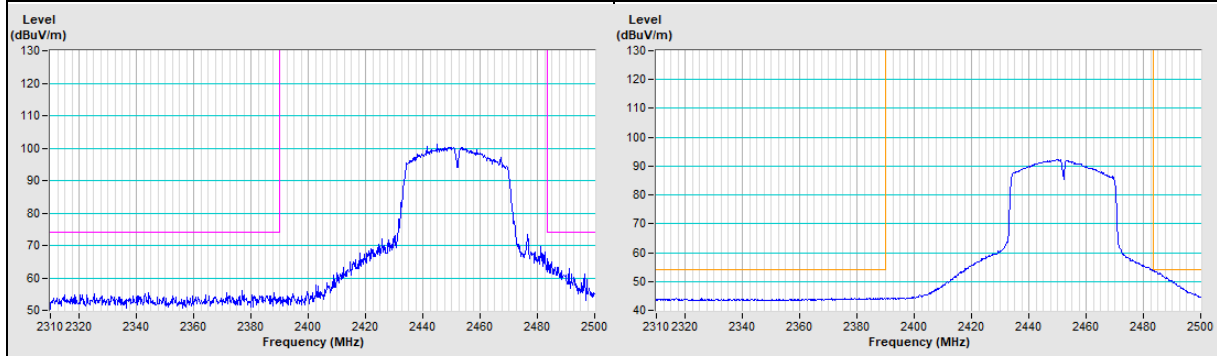


Vertical (Peak)	Vertical (Average)
-----------------	--------------------

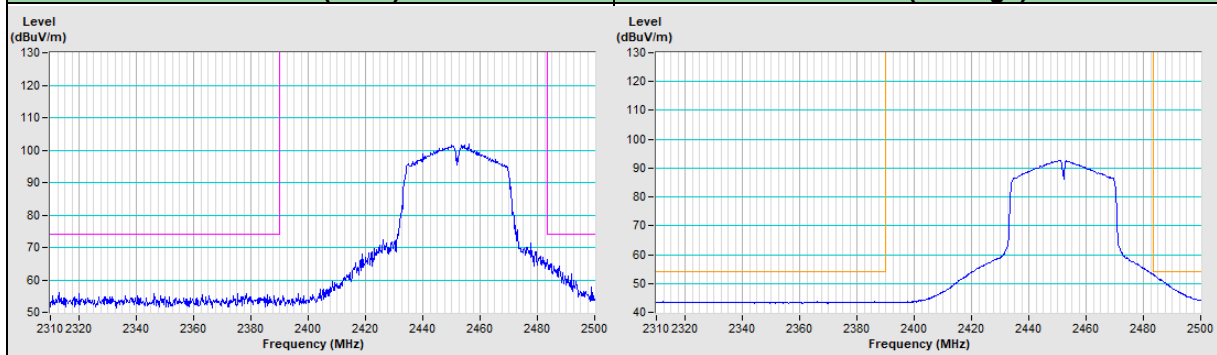


802.11n (HT40) Channel 9

Horizontal (Peak)	Horizontal (Average)
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Vertical (Peak)	Vertical (Average)
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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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The address and road map of all our labs can be found in our web site also.

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