FCC Test Report

Report No.:	RFBDMW-WTW-P20121069
FCC ID:	M4Y-SP230
Test Model:	SP230-S5, SP230
Received Date:	Dec. 31, 2020
Test Date:	Jan. 07 to Feb. 05, 2021
Issued Date:	Feb. 19, 2021
Applicant:	Z-Com, Inc.
Address:	5F, No.8, HSIN ANN RD., HSINCHU SCIENCE PARK, HSINCHU, 30078 TAIWAN
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RFBDMW-WTW-P20121069	Original release.	Feb. 19, 2021

1 Certificate of Conformity

Product:	802.11 ac Wave 2 Access Point
Brand:	ZCOM
Test Model:	SP230-S5, SP230
Sample Status:	Mass product
Applicant:	Z-Com, Inc.
Test Date:	Jan. 07 to Feb. 05, 2021
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10: 2013

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

Prepared by : Vivian Huang , **Date:** Feb. 19, 2021

Vivian Hunag / Specialist

Approved by : , **Date:** Feb. 19, 2021

Clark Lin / Technical Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -7.50dB at 0.20859MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 4924.00MHz, 2390.00MHz.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF)not a standard connector.

Note:
1. For 2.4GHz 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.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

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

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	802.11 ac Wave 2 Access Point
Brand	ZCOM
Test Model	SP230-S5, SP230
Status of EUT	Mass product
Power Supply Rating	48 Vdc from PoE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11 Mbps 802.11a/g: up to 54 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 866.7 Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18~5.24GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 11 802.11n (HT40): 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.412 ~ 2.462 GHz:** 292.715 mW **5.18 ~ 5.24 GHz:** 274.892 mW **5.745 ~ 5.825 GHz:** 176.835 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Cable Supplied	Ground Cable x 1

Note:

1. The EUT has two model names which are identical to each other in all aspects except for the following table:

Model No.	Description
SP230-S5	Use 5GHz antenna of model name 98P1DUIPF000
SP230	Use 5GHz antenna of model name 1001A0016 5GHz & 2.4GHz antenna position is different compared and 5GHz antenna gain with Model: SP230-S5
Note: From the above models, the worse radiated emission (Below 1GHz) test was found in Model No.: SP230-S5 and the worse radiated emission (Above 1GHz) test was found in Model No.: SP230.Therefore only the test data of the mode was recorded in this report.	

2. The EUT has two radios as following table:

Radio 1	Radio 2
WLAN 2.4GHz	WLAN 5GHz

3. Simultaneously transmission condition.

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

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

Model: SP230-S5

Antenna NO.	Chain No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
2G0	Chain 0 (J26)	BDTRON	1001A0018	5.5	2.4~2.4835GHz	PCB	i-pex(MHF)	230
2G1	Chain 1 (J24)	BDTRON	1001A0018	5.5	2.4~2.4835GHz	PCB	i-pex(MHF)	230
5G0	Chain 0 (J23)	BDTRON	98P1DUIPF000	9.52 10.39 10.39 10.14	5.15~5.25GHz 5.25~5.35GHz 5.47~5.725GHz 5.725~5.85GHz	PCB	i-pex(MHF) i-pex(MHF)	230
5G1	Chain 1 (J25)	BDTRON	98P1DUIPF000	8.6 9.87 9.87 10.43	5.15~5.25GHz 5.25~5.35GHz 5.47~5.725GHz 5.725~5.85GHz	PCB	i-pex(MHF)	230

Model: SP230

Antenna NO.	Chain No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length (mm)
2G0	Chain 0 (J26)	BDTRON	1001A0018	5.5	2.4~2.4835GHz	PCB	i-pex(MHF)	230
2G1	Chain 1 (J24)	BDTRON	1001A0018	5.5	2.4~2.4835GHz	PCB	i-pex(MHF)	230
5G0	Chain 0 (J23)	BDTRON	1001A0016	6.5	5.15~5.85GHz	PCB	i-pex(MHF)	230
5G1	Chain 1 (J25)	BDTRON	1001A0016	6.5	5.15~5.85GHz	PCB	i-pex(MHF)	230

5. The EUT incorporates a MIMO function:

2.4GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11b	2TX	2RX
802.11g	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
5GHz Band		
MODULATION MODE	**TX & RX CONFIGURATION**	
802.11a	2TX	2RX
802.11n (HT20)	2TX	2RX
802.11n (HT40)	2TX	2RX
802.11ac (VHT20)	2TX	2RX
802.11ac (VHT40)	2TX	2RX
802.11ac (VHT80)	2TX	2RX

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

3.2 Description of Test Modes

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

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≥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

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Y-plane.

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)
802.11n (HT40)	3 to 9	6	OFDM	BPSK	13.5

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)
802.11n (HT40)	3 to 9	6	OFDM	BPSK	13.5

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

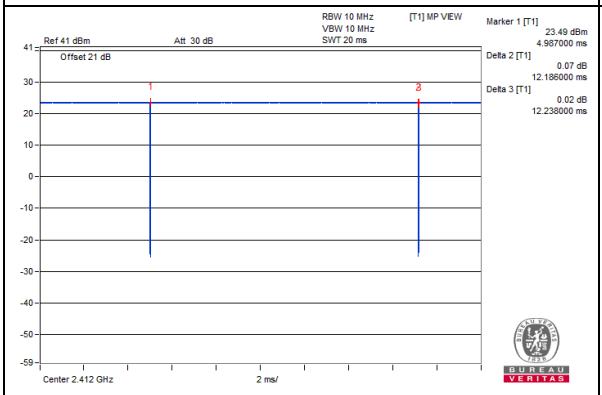
Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE≥1G	25deg. C, 75%RH	120Vac, 60Hz	Tom Yang
RE<1G	25deg. C, 66%RH	120Vac, 60Hz	Sampson Chen
PLC	25deg. C, 75%RH	120Vac, 60Hz	Sampson Chen
APCM	25deg. C, 60%RH	120Vac, 60Hz	Jyunchun Lin

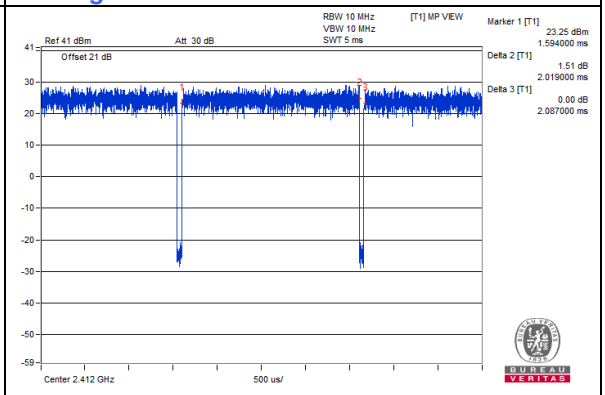
3.3 Duty Cycle of Test Signal

If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98%, duty factor shall be considered.
802.11b: Duty cycle = 12.186 ms /12.238 ms=0.996
802.11g: Duty cycle = 2.019 ms /2.087 ms=0.967, Duty factor = 10 * log (1/Duty cycle) = 0.14 dB
802.11n (HT20): Duty cycle = 1.884 ms /1.942 ms=0.97, Duty factor = 10 * log (1/Duty cycle) = 0.13 dB
802.11n (HT40): Duty cycle = 0.928 ms /0.966 ms=0.961, Duty factor = 10 * log (1/Duty cycle) = 0.17 dB

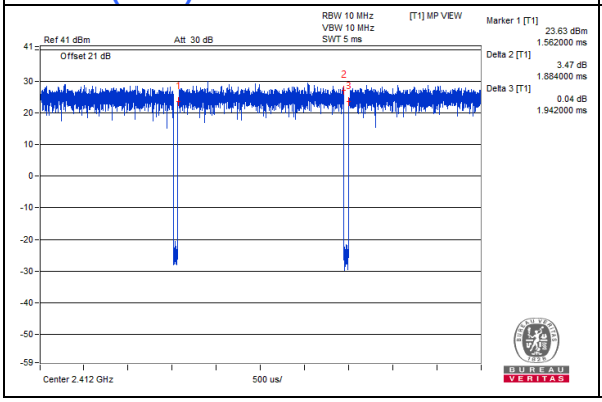
802.11b



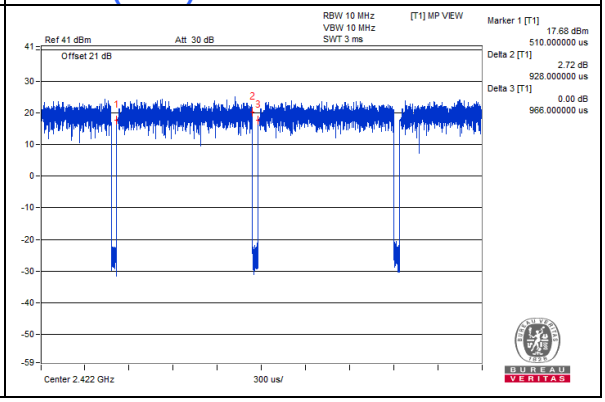
802.11g



802.11n (HT20)



802.11n (HT40)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Lenovo	20U5S01X00 L14	PF-1ANPYA	NA	Provided by Lab
B.	PoE Adapter	Gigabit	PSE301G	NA	NA	Supplied by client
C.	Laptop	Lenovo	20U5S01X00 L14	PF-28LKK7	NA	Provided by Lab

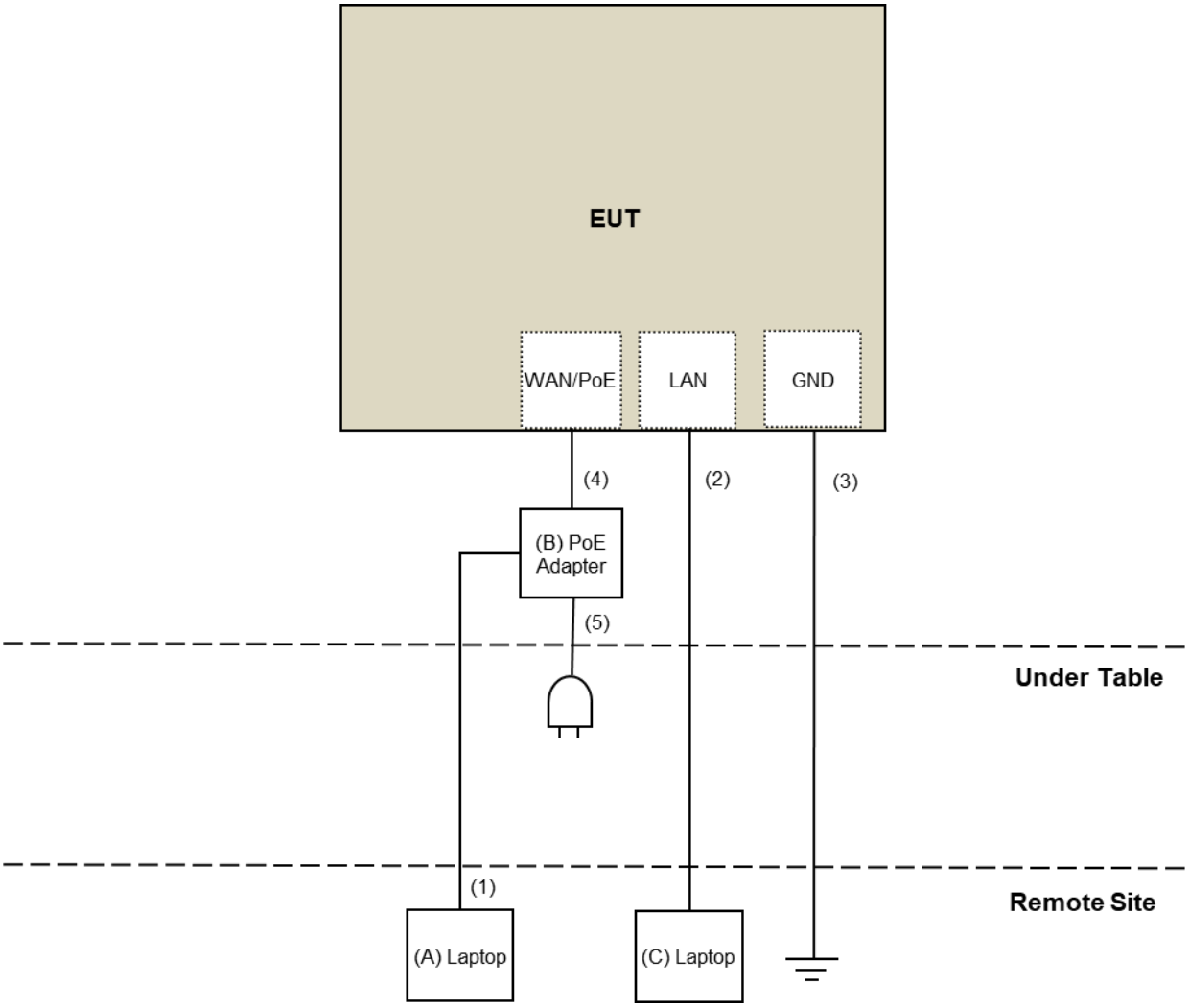
Note:

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

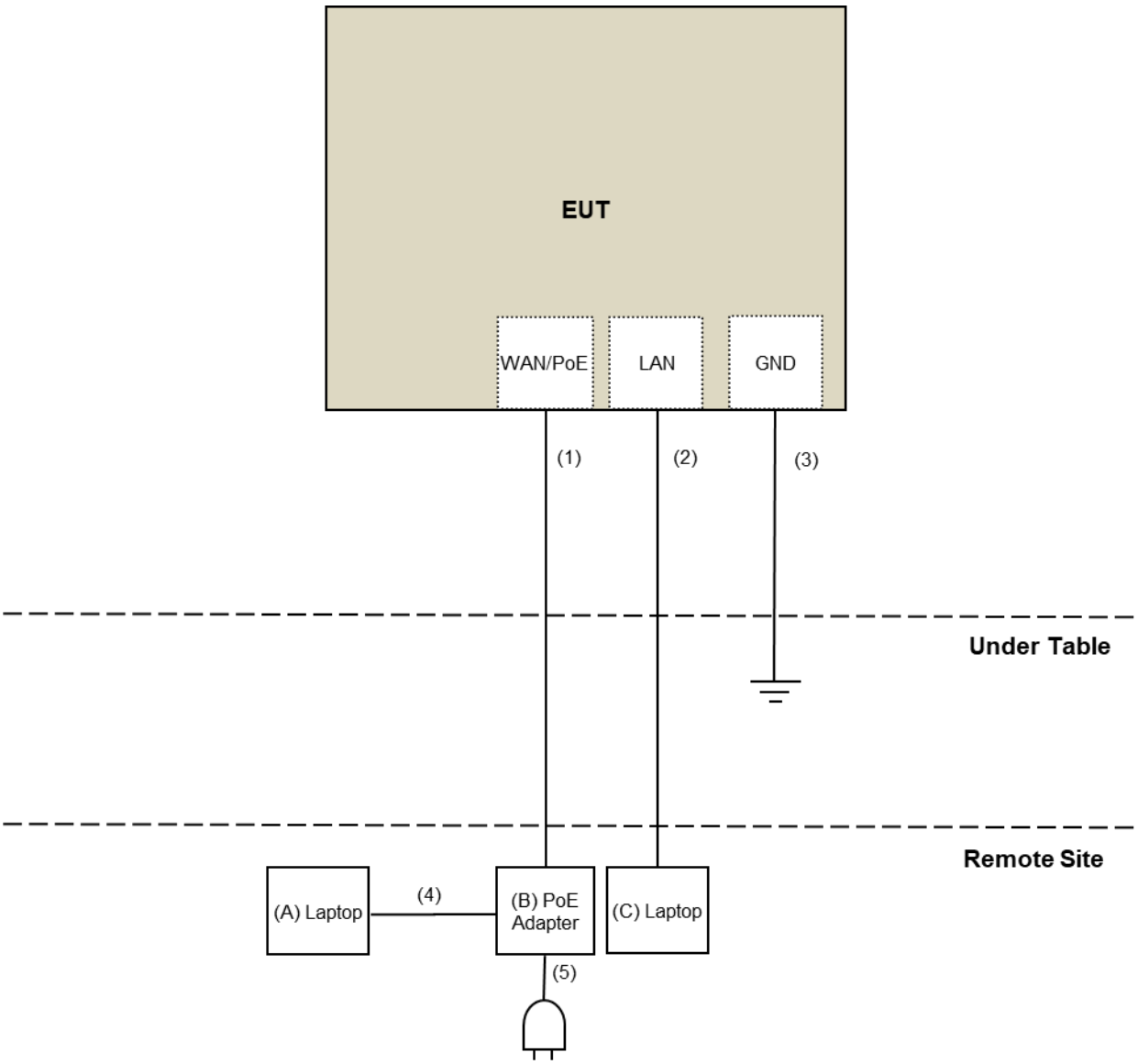
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	Ground Cable	1	3	Yes	0	Supplied by client
4.	RJ-45 Cable	1	3	No	0	Provided by Lab
5.	AC Cable	1	1.8	No	0	Provided by Lab

3.4.1 Configuration of System under Test

For Conducted Emissions:



For Radiated Emissions:



3.5 General Description of Applied Standards and References

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

Test Standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

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

References Test Guidance:

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

For Radiated emission test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 06, 2020	July 05, 2021
Pre-Amplifier EMCI	EMC001340	980142	May 25, 2020	May 24, 2021
Loop Antenna Electro-Metrics	EM-6879	264	Feb. 18, 2020	Feb. 17, 2021
RF Cable	5D-FB	LOOPCAB-001	Jan. 07, 2021	Jan. 06, 2022
RF Cable	5D-FB	LOOPCAB-002	Jan. 07, 2021	Jan. 06, 2022
Pre-Amplifier Mini-Circuits	ZFL-1000VH2	QA0838008	Oct. 20, 2020	Oct. 19, 2021
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Nov. 05, 2020	Nov. 04, 2021
RF Cable	8D	966-3-1	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-2	Mar. 17, 2020	Mar. 16, 2021
RF Cable	8D	966-3-3	Mar. 17, 2020	Mar. 16, 2021
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 24, 2020	Sep. 23, 2021
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 11, 2021	Jan. 10, 2022
RF Cable	EMC104-SM-SM-1500	180504	Apr. 29, 2020	Apr. 28, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 09, 2020	June 08, 2021
RF Cable	EMC104-SM-SM-6000	180602	June 09, 2020	June 08, 2021
Spectrum Analyzer Keysight	N9030A	MY54490679	July 13, 2020	July 12, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 11, 2021	Jan. 10, 2022
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 22, 2020	Nov. 21, 2021
RF Cable	EMC102-KM-KM-1200	160924	Jan. 11, 2021	Jan. 10, 2022
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Jan. 18 to 30, 2021

For Bandedge test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 06, 2020	July 05, 2021
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier EMCI	EMC12630SE	980384	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC104-SM-SM-1500	180504	Apr. 29, 2020	Apr. 28, 2021
RF Cable	EMC104-SM-SM-2000	180601	June 09, 2020	June 08, 2021
RF Cable	EMC104-SM-SM-6000	180602	June 09, 2020	June 08, 2021
Spectrum Analyzer Keysight	N9030A	MY54490679	July 13, 2020	July 12, 2021
Pre-Amplifier EMCI	EMC184045SE	980387	Jan. 15, 2020	Jan. 14, 2021
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170519	Nov. 22, 2020	Nov. 21, 2021
RF Cable	EMC102-KM-KM-1200	160924	Jan. 15, 2020	Jan. 14, 2021
RF Cable	EMC-KM-KM-4000	200214	Mar. 11, 2020	Mar. 10, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 3.
3. Tested Date: Jan. 07, 2021

For other test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	May 29, 2020	May 28, 2021
Power meter Anritsu	ML2495A	1529002	July 22, 2020	July 21, 2021
Power sensor Anritsu	MA2411B	1339443	July 22, 2020	July 21, 2021
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 14, 2020	Apr. 13, 2021
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: Feb. 04, 2021

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

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

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

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

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

NOTE:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

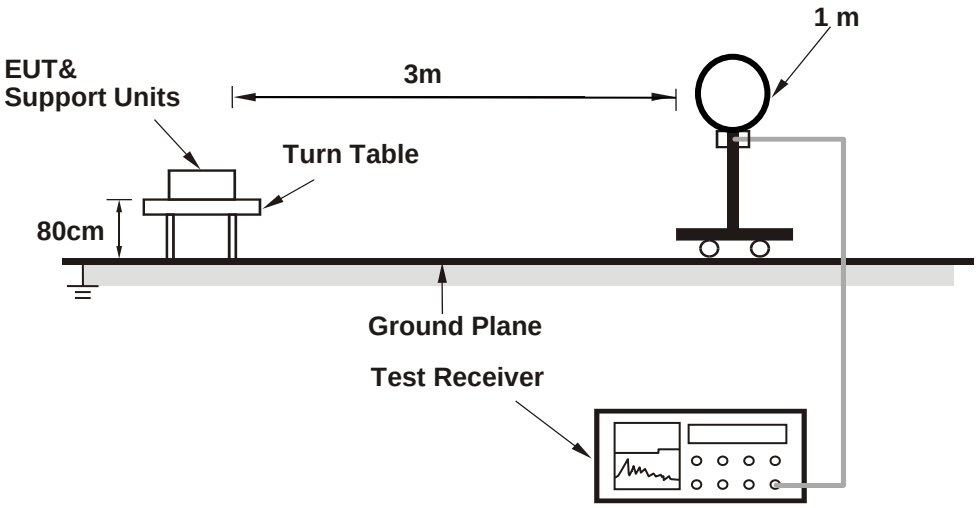
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

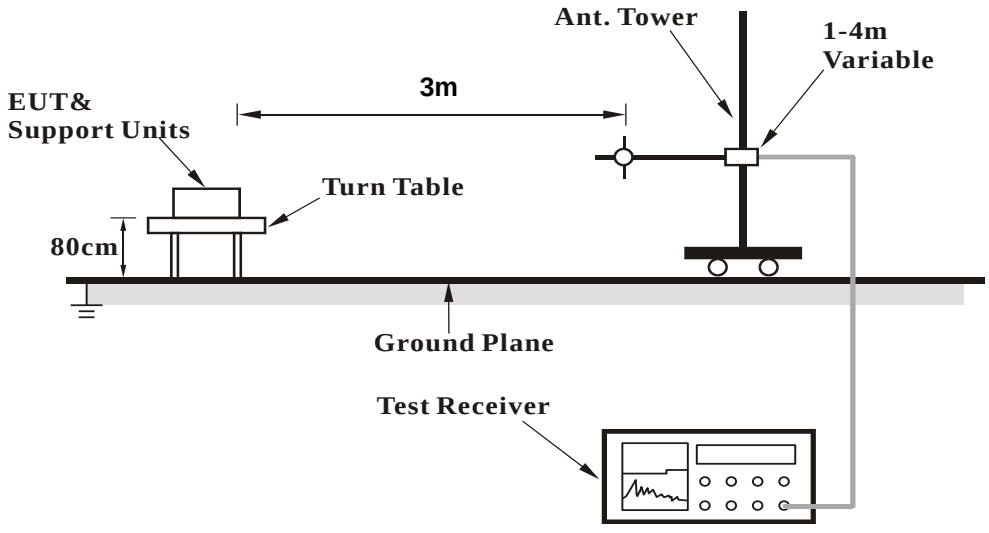
No deviation.

4.1.5 Test Setup

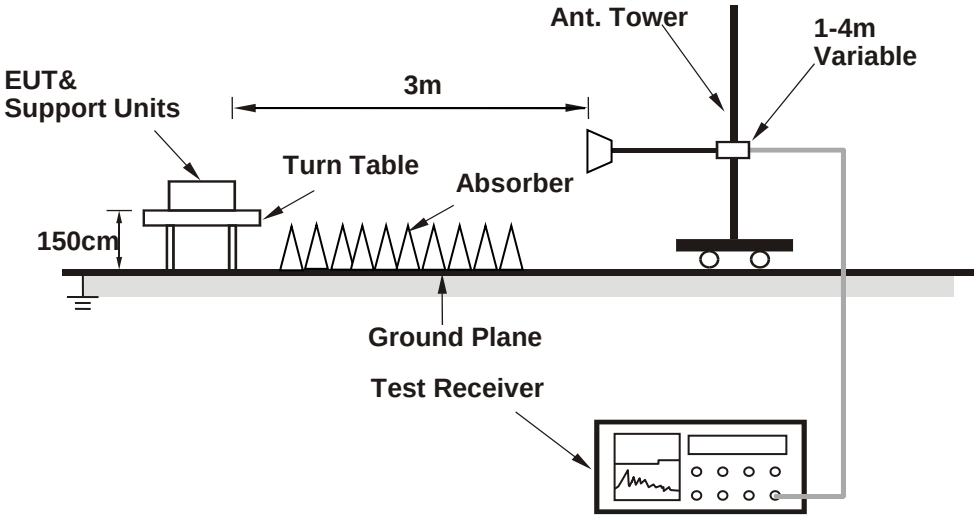
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Connected the EUT with the Laptop which is placed on remote site.
b. Controlling software (QDART_CONN.WIN.1.0 Installer-00036.2) has been activated to set the EUT under transmission condition continuously at specific channel frenquency.

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	2372.70	57.3 PK	74.0	-16.7	1.96 H	356	58.2	-0.9
2	2372.70	45.0 AV	54.0	-9.0	1.96 H	356	45.9	-0.9
3	*2412.00	106.7 PK			1.96 H	356	107.6	-0.9
4	*2412.00	104.1 AV			1.96 H	356	105.0	-0.9
5	4824.00	55.3 PK	74.0	-18.7	1.48 H	129	51.3	4.0
6	4824.00	53.4 AV	54.0	-0.6	1.48 H	129	49.4	4.0
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	2373.00	64.2 PK	74.0	-9.8	1.93 V	352	65.1	-0.9
2	2373.00	52.4 AV	54.0	-1.6	1.93 V	352	53.3	-0.9
3	*2412.00	114.3 PK			1.93 V	352	115.2	-0.9
4	*2412.00	111.7 AV			1.93 V	352	112.6	-0.9
5	4824.00	54.7 PK	74.0	-19.3	1.42 V	177	50.7	4.0
6	4824.00	53.6 AV	54.0	-0.4	1.42 V	177	49.6	4.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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	59.3 PK	74.0	-14.7	1.99 H	357	60.2	-0.9
2	2390.00	41.9 AV	54.0	-12.1	1.99 H	357	42.8	-0.9
3	*2437.00	106.1 PK			1.99 H	357	107.0	-0.9
4	*2437.00	103.7 AV			1.99 H	357	104.6	-0.9
5	2483.50	59.4 PK	74.0	-14.6	1.99 H	357	60.2	-0.8
6	2483.50	43.1 AV	54.0	-10.9	1.99 H	357	43.9	-0.8
7	4874.00	54.9 PK	74.0	-19.1	1.53 H	128	50.7	4.2
8	4874.00	53.2 AV	54.0	-0.8	1.53 H	128	49.0	4.2
9	7311.00	48.4 PK	74.0	-25.6	1.50 H	214	38.2	10.2
10	7311.00	37.7 AV	54.0	-16.3	1.50 H	214	27.5	10.2
11	7333.30	52.1 PK	74.0	-21.9	1.52 H	64	41.7	10.4
12	7333.30	49.9 AV	54.0	-4.1	1.52 H	64	39.5	10.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	61.1 PK	74.0	-12.9	1.66 V	353	62.0	-0.9
2	2390.00	50.7 AV	54.0	-3.3	1.66 V	353	51.6	-0.9
3	*2437.00	113.0 PK			1.66 V	353	113.9	-0.9
4	*2437.00	111.2 AV			1.66 V	353	112.1	-0.9
5	2483.50	61.9 PK	74.0	-12.1	1.66 V	353	62.7	-0.8
6	2483.50	48.7 AV	54.0	-5.3	1.66 V	353	49.5	-0.8
7	4874.00	54.7 PK	74.0	-19.3	1.39 V	175	50.5	4.2
8	4874.00	53.8 AV	54.0	-0.2	1.39 V	175	49.6	4.2
9	7311.00	48.3 PK	74.0	-25.7	3.78 V	153	38.1	10.2
10	7311.00	43.1 AV	54.0	-10.9	3.78 V	153	32.9	10.2
11	7333.30	52.2 PK	74.0	-21.8	2.15 V	14	41.8	10.4
12	7333.30	49.9 AV	54.0	-4.1	2.15 V	14	39.5	10.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	101.2 PK			1.93 H	353	102.0	-0.8
2	*2462.00	99.1 AV			1.93 H	353	99.9	-0.8
3	2484.90	55.0 PK	74.0	-19.0	1.93 H	353	55.8	-0.8
4	2484.90	41.8 AV	54.0	-12.2	1.93 H	353	42.6	-0.8
5	2499.00	53.4 PK	74.0	-20.6	1.93 H	353	54.2	-0.8
6	2499.00	42.6 AV	54.0	-11.4	1.93 H	353	43.4	-0.8
7	4924.00	55.6 PK	74.0	-18.4	1.58 H	128	51.4	4.2
8	4924.00	53.6 AV	54.0	-0.4	1.58 H	128	49.4	4.2
9	7386.00	48.6 PK	74.0	-25.4	1.53 H	226	38.3	10.3
10	7386.00	37.9 AV	54.0	-16.1	1.53 H	226	27.6	10.3
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	113.6 PK			1.63 V	352	114.4	-0.8
2	*2462.00	111.4 AV			1.63 V	352	112.2	-0.8
3	2500.00	61.7 PK	74.0	-12.3	1.63 V	352	62.6	-0.9
4	2500.00	51.2 AV	54.0	-2.8	1.63 V	352	52.1	-0.9
5	4924.00	55.4 PK	74.0	-18.6	1.44 V	177	51.2	4.2
6	**4924.00**	**53.9 AV**	**54.0**	**-0.1**	**1.44 V**	**177**	**49.7**	**4.2**
7	7386.00	47.5 PK	74.0	-26.5	3.74 V	167	37.2	10.3
8	7386.00	42.6 AV	54.0	-11.4	3.74 V	167	32.3	10.3

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.
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	59.3 PK	74.0	-14.7	1.92 H	356	60.2	-0.9
2	2390.00	46.0 AV	54.0	-8.0	1.92 H	356	46.9	-0.9
3	*2412.00	108.7 PK			1.92 H	356	109.6	-0.9
4	*2412.00	98.5 AV			1.92 H	356	99.4	-0.9
5	4824.00	57.2 PK	74.0	-16.8	1.59 H	137	53.2	4.0
6	4824.00	43.5 AV	54.0	-10.5	1.59 H	137	39.5	4.0
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	66.4 PK	74.0	-7.6	1.60 V	158	67.3	-0.9
2	2390.00	53.7 AV	54.0	-0.3	1.60 V	158	54.6	-0.9
3	*2412.00	118.5 PK			1.60 V	158	119.4	-0.9
4	*2412.00	107.8 AV			1.60 V	158	108.7	-0.9
5	4824.00	60.5 PK	74.0	-13.5	1.31 V	159	56.5	4.0
6	4824.00	45.7 AV	54.0	-8.3	1.31 V	159	41.7	4.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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	59.6 PK	74.0	-14.4	1.93 H	346	60.5	-0.9
2	2390.00	42.4 AV	54.0	-11.6	1.93 H	346	43.3	-0.9
3	*2437.00	109.5 PK			1.93 H	346	110.4	-0.9
4	*2437.00	99.4 AV			1.93 H	346	100.3	-0.9
5	2483.50	58.9 PK	74.0	-15.1	1.93 H	346	59.7	-0.8
6	2483.50	42.5 AV	54.0	-11.5	1.93 H	346	43.3	-0.8
7	4874.00	56.9 PK	74.0	-17.1	1.57 H	139	52.7	4.2
8	4874.00	43.4 AV	54.0	-10.6	1.57 H	139	39.2	4.2
9	7311.00	54.6 PK	74.0	-19.4	1.49 H	215	44.4	10.2
10	7311.00	38.1 AV	54.0	-15.9	1.49 H	215	27.9	10.2
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	65.5 PK	74.0	-8.5	1.57 V	359	66.4	-0.9
2	**2390.00**	**53.9 AV**	**54.0**	**-0.1**	**1.57 V**	**359**	**54.8**	**-0.9**
3	*2437.00	116.3 PK			1.57 V	359	117.2	-0.9
4	*2437.00	106.9 AV			1.57 V	359	107.8	-0.9
5	2483.50	63.8 PK	74.0	-10.2	1.57 V	359	64.6	-0.8
6	2483.50	52.6 AV	54.0	-1.4	1.57 V	359	53.4	-0.8
7	4874.00	60.5 PK	74.0	-13.5	1.36 V	164	56.3	4.2
8	4874.00	45.7 AV	54.0	-8.3	1.36 V	164	41.5	4.2
9	7311.00	57.5 PK	74.0	-16.5	3.79 V	154	47.3	10.2
10	7311.00	41.2 AV	54.0	-12.8	3.79 V	154	31.0	10.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	103.5 PK			2.12 H	354	104.3	-0.8
2	*2462.00	93.8 AV			2.12 H	354	94.6	-0.8
3	2485.00	56.6 PK	74.0	-17.4	2.12 H	354	57.4	-0.8
4	2485.00	42.7 AV	54.0	-11.3	2.12 H	354	43.5	-0.8
5	4924.00	57.3 PK	74.0	-16.7	1.55 H	133	53.1	4.2
6	4924.00	43.5 AV	54.0	-10.5	1.55 H	133	39.3	4.2
7	7386.00	54.3 PK	74.0	-19.7	1.49 H	225	44.0	10.3
8	7386.00	37.6 AV	54.0	-16.4	1.49 H	225	27.3	10.3
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	116.8 PK			1.76 V	161	117.6	-0.8
2	*2462.00	107.2 AV			1.76 V	161	108.0	-0.8
3	2483.50	65.1 PK	74.0	-8.9	1.76 V	161	65.9	-0.8
4	2483.50	53.6 AV	54.0	-0.4	1.76 V	161	54.4	-0.8
5	4924.00	60.3 PK	74.0	-13.7	1.32 V	157	56.1	4.2
6	4924.00	45.3 AV	54.0	-8.7	1.32 V	157	41.1	4.2
7	7386.00	57.7 PK	74.0	-16.3	3.81 V	155	47.4	10.3
8	7386.00	41.3 AV	54.0	-12.7	3.81 V	155	31.0	10.3

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.
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	2365.80	57.0 PK	74.0	-17.0	1.91 H	0	57.8	-0.8
2	2365.80	45.1 AV	54.0	-8.9	1.91 H	0	45.9	-0.8
3	*2412.00	108.5 PK			1.91 H	0	109.4	-0.9
4	*2412.00	98.6 AV			1.91 H	0	99.5	-0.9
5	4824.00	58.0 PK	74.0	-16.0	1.58 H	139	54.0	4.0
6	4824.00	44.2 AV	54.0	-9.8	1.58 H	139	40.2	4.0
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	69.6 PK	74.0	-4.4	1.79 V	171	70.5	-0.9
2	2390.00	53.6 AV	54.0	-0.4	1.79 V	171	54.5	-0.9
3	*2412.00	117.6 PK			1.79 V	171	118.5	-0.9
4	*2412.00	106.8 AV			1.79 V	171	107.7	-0.9
5	4824.00	60.8 PK	74.0	-13.2	1.35 V	148	56.8	4.0
6	4824.00	46.1 AV	54.0	-7.9	1.35 V	148	42.1	4.0

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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	59.0 PK	74.0	-15.0	1.95 H	3	59.9	-0.9
2	2390.00	41.7 AV	54.0	-12.3	1.95 H	3	42.6	-0.9
3	*2437.00	109.3 PK			1.95 H	3	110.2	-0.9
4	*2437.00	99.1 AV			1.95 H	3	100.0	-0.9
5	2483.50	59.8 PK	74.0	-14.2	1.95 H	3	60.6	-0.8
6	2483.50	43.0 AV	54.0	-11.0	1.95 H	3	43.8	-0.8
7	4874.00	57.0 PK	74.0	-17.0	1.52 H	145	52.8	4.2
8	4874.00	43.5 AV	54.0	-10.5	1.52 H	145	39.3	4.2
9	7311.00	54.4 PK	74.0	-19.6	1.44 H	222	44.2	10.2
10	7311.00	37.7 AV	54.0	-16.3	1.44 H	222	27.5	10.2
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	64.0 PK	74.0	-10.0	1.70 V	353	64.9	-0.9
2	2390.00	53.5 AV	54.0	-0.5	1.70 V	353	54.4	-0.9
3	*2437.00	115.8 PK			1.70 V	353	116.7	-0.9
4	*2437.00	106.0 AV			1.70 V	353	106.9	-0.9
5	2483.50	64.8 PK	74.0	-9.2	1.70 V	353	65.6	-0.8
6	2483.50	51.9 AV	54.0	-2.1	1.70 V	353	52.7	-0.8
7	4874.00	60.5 PK	74.0	-13.5	1.32 V	148	56.3	4.2
8	4874.00	45.7 AV	54.0	-8.3	1.32 V	148	41.5	4.2
9	7311.00	58.1 PK	74.0	-15.9	3.76 V	168	47.9	10.2
10	7311.00	41.5 AV	54.0	-12.5	3.76 V	168	31.3	10.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	104.6 PK			2.18 H	354	105.4	-0.8
2	*2462.00	94.0 AV			2.18 H	354	94.8	-0.8
3	2486.50	57.0 PK	74.0	-17.0	2.18 H	354	57.8	-0.8
4	2486.50	42.2 AV	54.0	-11.8	2.18 H	354	43.0	-0.8
5	2500.00	53.8 PK	74.0	-20.2	2.18 H	354	54.7	-0.9
6	2500.00	43.0 AV	54.0	-11.0	2.18 H	354	43.9	-0.9
7	4924.00	56.8 PK	74.0	-17.2	1.54 H	127	52.6	4.2
8	4924.00	43.3 AV	54.0	-10.7	1.54 H	127	39.1	4.2
9	7386.00	54.5 PK	74.0	-19.5	1.52 H	201	44.2	10.3
10	7386.00	37.9 AV	54.0	-16.1	1.52 H	201	27.6	10.3
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	115.2 PK			1.59 V	172	116.0	-0.8
2	*2462.00	106.5 AV			1.59 V	172	107.3	-0.8
3	2483.50	65.2 PK	74.0	-8.8	1.59 V	172	66.0	-0.8
4	2483.50	53.5 AV	54.0	-0.5	1.59 V	172	54.3	-0.8
5	4924.00	60.2 PK	74.0	-13.8	1.38 V	143	56.0	4.2
6	4924.00	45.5 AV	54.0	-8.5	1.38 V	143	41.3	4.2
7	7386.00	57.6 PK	74.0	-16.4	3.85 V	161	47.3	10.3
8	7386.00	41.1 AV	54.0	-12.9	3.85 V	161	30.8	10.3

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.
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	2383.40	58.0 PK	74.0	-16.0	1.96 H	357	58.9	-0.9
2	2383.40	44.4 AV	54.0	-9.6	1.96 H	357	45.3	-0.9
3	*2422.00	103.3 PK			1.96 H	357	104.2	-0.9
4	*2422.00	93.6 AV			1.96 H	357	94.5	-0.9
5	4844.00	56.3 PK	74.0	-17.7	1.56 H	131	52.2	4.1
6	4844.00	43.1 AV	54.0	-10.9	1.56 H	131	39.0	4.1
7	7266.00	55.1 PK	74.0	-18.9	1.47 H	206	45.0	10.1
8	7266.00	38.5 AV	54.0	-15.5	1.47 H	206	28.4	10.1
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	65.0 PK	74.0	-9.0	1.67 V	172	65.9	-0.9
2	2390.00	53.7 AV	54.0	-0.3	1.67 V	172	54.6	-0.9
3	*2422.00	111.6 PK			1.67 V	172	112.5	-0.9
4	*2422.00	101.4 AV			1.67 V	172	102.3	-0.9
5	4844.00	60.0 PK	74.0	-14.0	1.31 V	167	55.9	4.1
6	4844.00	44.8 AV	54.0	-9.2	1.31 V	167	40.7	4.1
7	7266.00	57.8 PK	74.0	-16.2	3.85 V	170	47.7	10.1
8	7266.00	41.2 AV	54.0	-12.8	3.85 V	170	31.1	10.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The 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	59.2 PK	74.0	-14.8	1.94 H	360	60.1	-0.9
2	2390.00	42.0 AV	54.0	-12.0	1.94 H	360	42.9	-0.9
3	*2437.00	106.6 PK			1.94 H	360	107.5	-0.9
4	*2437.00	96.8 AV			1.94 H	360	97.7	-0.9
5	2483.50	59.4 PK	74.0	-14.6	1.94 H	360	60.2	-0.8
6	2483.50	42.6 AV	54.0	-11.4	1.94 H	360	43.4	-0.8
7	4874.00	57.6 PK	74.0	-16.4	1.55 H	148	53.4	4.2
8	4874.00	43.8 AV	54.0	-10.2	1.55 H	148	39.6	4.2
9	7311.00	54.6 PK	74.0	-19.4	1.52 H	220	44.4	10.2
10	7311.00	37.9 AV	54.0	-16.1	1.52 H	220	27.7	10.2
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	65.6 PK	74.0	-8.4	1.58 V	4	66.5	-0.9
2	2390.00	53.5 AV	54.0	-0.5	1.58 V	4	54.4	-0.9
3	*2437.00	114.9 PK			1.58 V	4	115.8	-0.9
4	*2437.00	104.2 AV			1.58 V	4	105.1	-0.9
5	2483.50	64.6 PK	74.0	-9.4	1.58 V	4	65.4	-0.8
6	2483.50	51.7 AV	54.0	-2.3	1.58 V	4	52.5	-0.8
7	4874.00	60.5 PK	74.0	-13.5	1.29 V	144	56.3	4.2
8	4874.00	45.6 AV	54.0	-8.4	1.29 V	144	41.4	4.2
9	7311.00	57.7 PK	74.0	-16.3	3.84 V	157	47.5	10.2
10	7311.00	41.2 AV	54.0	-12.8	3.84 V	157	31.0	10.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	99.6 PK			1.94 H	355	100.4	-0.8
2	*2452.00	89.5 AV			1.94 H	355	90.3	-0.8
3	2484.60	59.5 PK	74.0	-14.5	1.94 H	355	60.3	-0.8
4	2484.60	42.2 AV	54.0	-11.8	1.94 H	355	43.0	-0.8
5	2486.10	59.2 PK	74.0	-14.8	1.94 H	355	60.0	-0.8
6	2486.10	42.6 AV	54.0	-11.4	1.94 H	355	43.4	-0.8
7	4904.00	56.8 PK	74.0	-17.2	1.58 H	149	52.6	4.2
8	4904.00	43.1 AV	54.0	-10.9	1.58 H	149	38.9	4.2
9	7356.00	54.8 PK	74.0	-19.2	1.48 H	220	44.4	10.4
10	7356.00	38.2 AV	54.0	-15.8	1.48 H	220	27.8	10.4
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	111.3 PK			1.57 V	166	112.1	-0.8
2	*2452.00	101.1 AV			1.57 V	166	101.9	-0.8
3	2483.50	65.1 PK	74.0	-8.9	1.57 V	166	65.9	-0.8
4	2483.50	53.8 AV	54.0	-0.2	1.57 V	166	54.6	-0.8
5	4904.00	60.4 PK	74.0	-13.6	1.32 V	170	56.2	4.2
6	4904.00	45.2 AV	54.0	-8.8	1.32 V	170	41.0	4.2
7	7356.00	57.3 PK	74.0	-16.7	3.85 V	148	46.9	10.4
8	7356.00	40.9 AV	54.0	-13.1	3.85 V	148	30.5	10.4

Remarks:

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

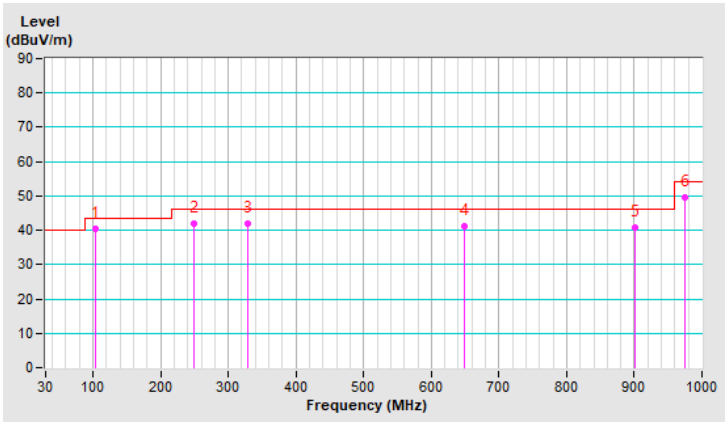
Below 1GHz Data:

RF Mode	TX 802.11n (HT40)	Channel	CH 6：2437 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	103.41	40.5 QP	43.5	-3.0	1.50 H	200	52.1	-11.6
2	248.70	42.0 QP	46.0	-4.0	1.50 H	100	50.6	-8.6
3	328.41	42.0 QP	46.0	-4.0	1.00 H	343	47.4	-5.4
4	648.41	41.2 QP	46.0	-4.8	1.50 H	350	38.9	2.3
5	900.10	40.7 QP	46.0	-5.3	1.00 H	333	34.1	6.6
6	974.88	49.5 QP	54.0	-4.5	2.00 H	20	41.7	7.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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.

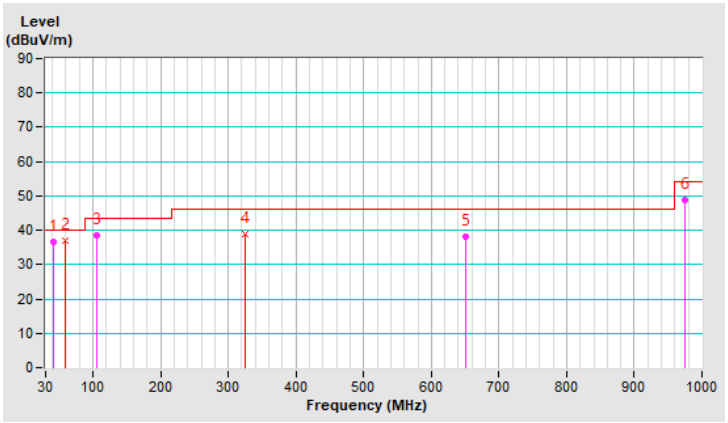


RF Mode	TX 802.11n (HT40)	Channel	CH 6：2437 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	41.45	36.4 QP	40.0	-3.6	1.00 V	41	44.8	-8.4
2	58.93	37.0 QP	40.0	-3.0	1.00 V	181	45.6	-8.6
3	105.68	38.6 QP	43.5	-4.9	1.00 V	54	49.9	-11.3
4	324.98	38.8 QP	46.0	-7.2	1.00 V	125	44.4	-5.6
5	650.00	38.1 QP	46.0	-7.9	1.50 V	360	35.8	2.3
6	975.02	48.8 QP	54.0	-5.2	1.00 V	172	41.0	7.8

Remarks:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 20, 2020	Oct. 19, 2021
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 27, 2020	Oct. 26, 2021
Line-Impedance Stabilization Network (for Peripheral) R&S	ESH3-Z5	835239/001	Mar. 19, 2020	Mar. 18, 2021
50 ohms Terminator	50	3	Oct. 26, 2020	Oct. 25, 2021
RF Cable	5D-FB	COCCAB-001	Sep. 26, 2020	Sep. 25, 2021
Fixed attenuator EMCI	STI02-2200-10	005	Aug. 29, 2020	Aug. 28, 2021
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: Jan. 19, 2021

4.2.3 Test Procedures

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

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

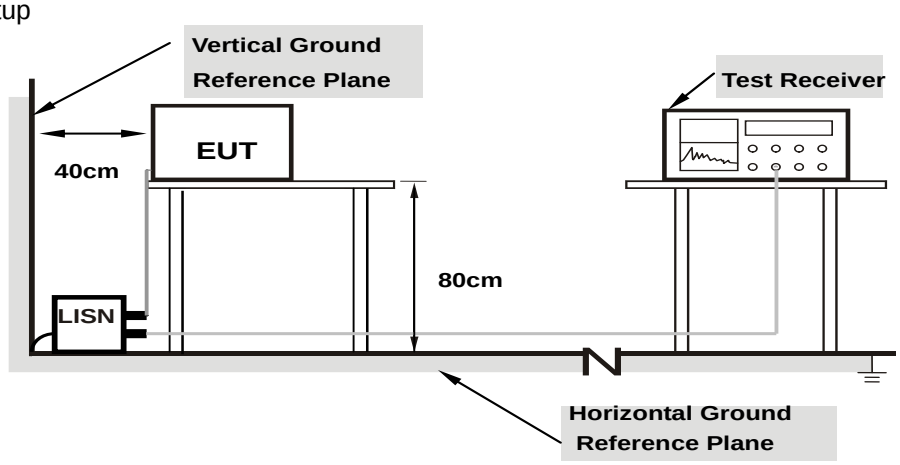
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

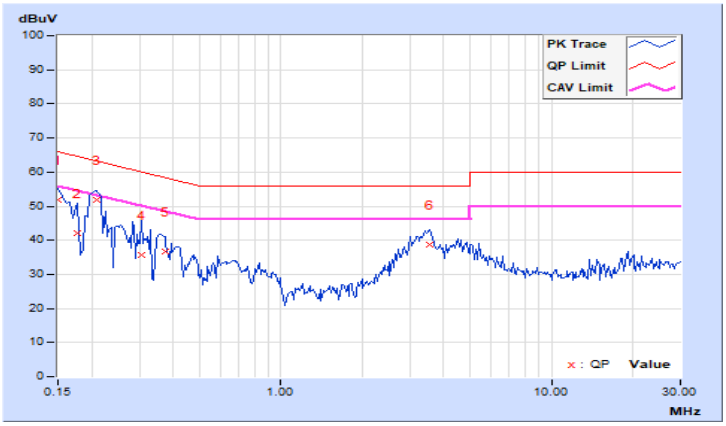
4.2.7 Test Results

RF Mode	TX 802.11n (HT40)	Channel	CH 6：2437 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	41.86	30.88	51.81	40.83	66.00	56.00	-14.19	-15.17
2	0.17734	9.96	32.26	5.38	42.22	15.34	64.61	54.61	-22.39	-39.27
3	**0.20859**	**9.97**	**41.91**	**35.79**	**51.88**	**45.76**	**63.26**	**53.26**	**-11.38**	**-7.50**
4	0.30625	9.98	25.58	16.41	35.56	26.39	60.07	50.07	-24.51	-23.68
5	0.37266	9.99	26.60	14.27	36.59	24.26	58.44	48.44	-21.85	-24.18
6	3.53516	10.15	28.70	18.31	38.85	28.46	56.00	46.00	-17.15	-17.54

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

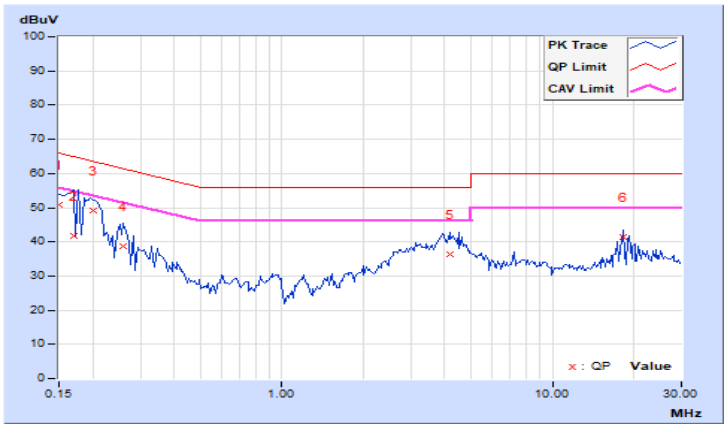


RF Mode	TX 802.11n (HT40)	Channel	CH 6：2437 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.92	40.99	29.30	50.91	39.22	66.00	56.00	-15.09	-16.78
2	0.16953	9.93	31.82	7.18	41.75	17.11	64.98	54.98	-23.23	-37.87
3	0.20078	9.95	39.08	29.20	49.03	39.15	63.58	53.58	-14.55	-14.43
4	0.25938	9.95	28.93	18.87	38.88	28.82	61.45	51.45	-22.57	-22.63
5	4.16797	10.13	26.39	20.14	36.52	30.27	56.00	46.00	-19.48	-15.73
6	18.31641	10.78	30.68	28.89	41.46	39.67	60.00	50.00	-18.54	-10.33

Remarks:

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

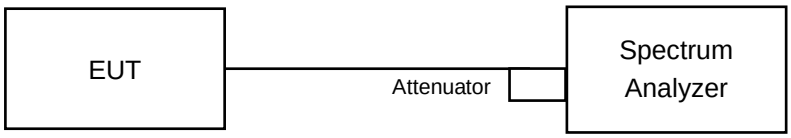


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	7.09	7.08	0.5	PASS
6	2437	7.07	7.08	0.5	PASS
11	2462	7.07	7.09	0.5	PASS

802.11g

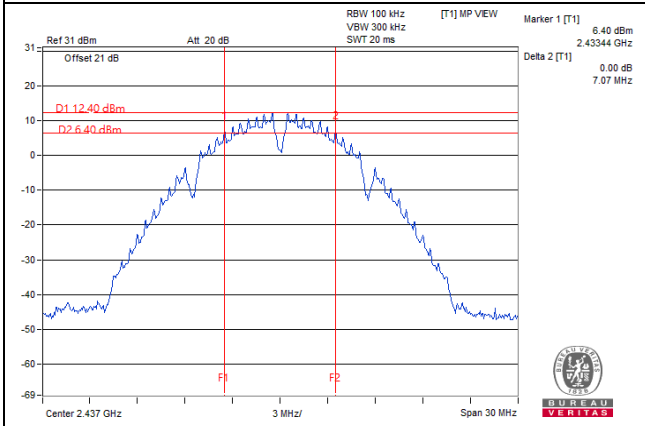
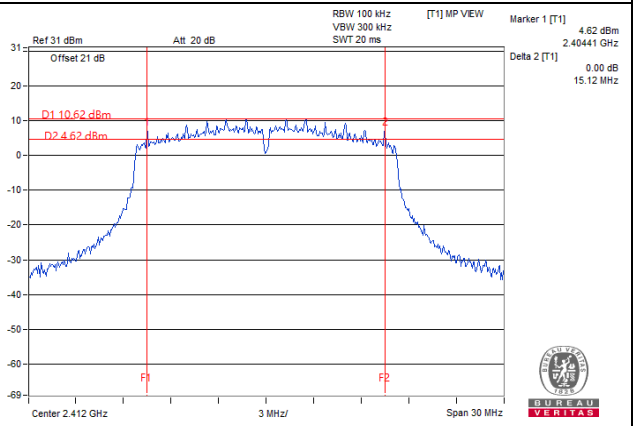
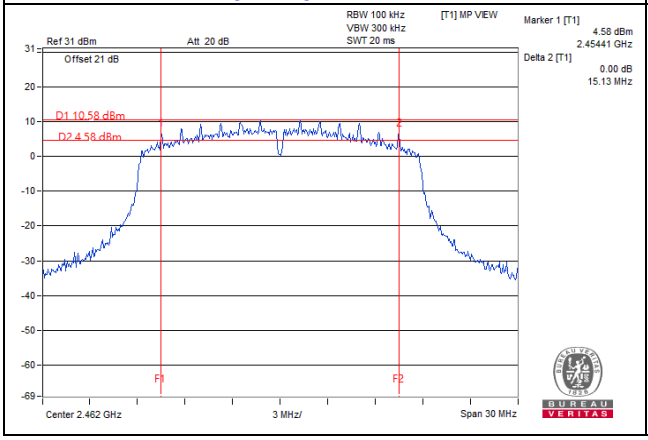
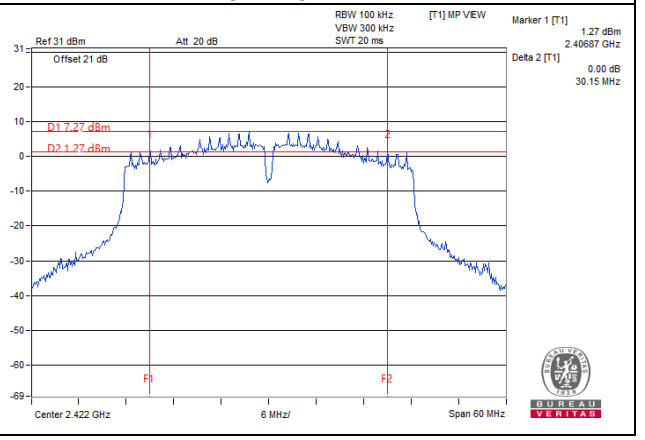
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.13	15.12	0.5	PASS
6	2437	15.16	15.17	0.5	PASS
11	2462	15.17	15.14	0.5	PASS

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	15.16	15.09	0.5	PASS
6	2437	15.15	15.14	0.5	PASS
11	2462	15.12	15.13	0.5	PASS

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	31.35	30.15	0.5	PASS
6	2437	32.55	31.39	0.5	PASS
9	2452	32.57	32.55	0.5	PASS

Spectrum Plot of Worst Value	
802.11b / Chain 0 : CH6	**802.11g / Chain 1 : CH1**
	
802.11n (HT20) / Chain 1 : CH11	**802.11n (HT40) / Chain 1 : CH3**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

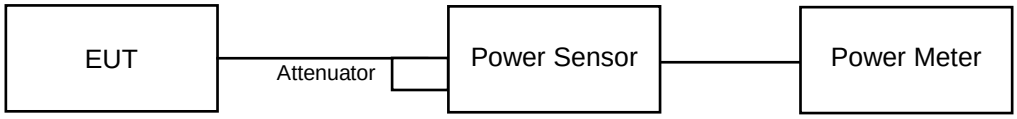
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

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

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

802.11b

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	20.40	20.68	226.598	23.55	30	Pass
6	2437	20.19	20.65	220.617	23.44	30	Pass
11	2462	20.18	20.86	226.131	23.54	30	Pass

802.11g

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.48	21.62	285.816	24.56	30	Pass
6	2437	21.26	21.93	289.615	24.62	30	Pass
11	2462	21.37	21.62	282.299	24.51	30	Pass

802.11n (HT20)

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.38	21.72	285.998	24.56	30	Pass
6	2437	21.47	21.64	286.163	24.57	30	Pass
11	2462	21.04	21.45	266.694	24.26	30	Pass

802.11n (HT40)

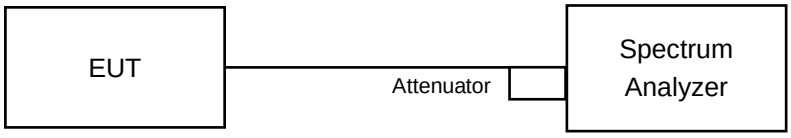
Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	18.55	19.46	159.922	22.04	30	Pass
6	2437	21.46	21.84	292.715	24.66	30	Pass
9	2452	17.72	18.56	130.936	21.17	30	Pass

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 802.11b
a) Set instrument center frequency to DTS channel center frequency.
b) Set span to at least 1.5 times the OBW.
c) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz. .
d) Set VBW ≥3 x RBW.
e) Detector = power averaging (RMS) or sample detector (when RMS not available).
f) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
g) Sweep time = auto couple.
h) Employ trace averaging (RMS) mode over a minimum of 100 traces.
i) Use the peak marker function to determine the maximum amplitude level.

For 802.11g, 802.11n (HT20), 802.11n (HT40)
a) Measure the duty cycle (x).
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz..
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to “free run”.
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (mW/3kHz)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1				
1	2412	-10.93	-10.72	0.16545	-7.81	5.49	PASS
6	2437	-11.46	-10.81	0.15443	-8.11	5.49	PASS
11	2462	-11.39	-10.27	0.16658	-7.78	5.49	PASS

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

2. Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi , so the power density limit shall be reduced to 8-(8.51-6) = 5.49dBm.

802.11g

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (mW/3kHz)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1					
1	2412	-12.94	-12.58	0.14	0.10959	-9.60	5.49	PASS
6	2437	-12.67	-12.89	0.14	0.10903	-9.62	5.49	PASS
11	2462	-13.18	-12.76	0.14	0.10445	-9.81	5.49	PASS

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

2. Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi , so the power density limit shall be reduced to 8-(8.51-6) = 5.49dBm.

3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (mW/3kHz)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1					
1	2412	-12.99	-12.26	0.13	0.11304	-9.47	5.49	PASS
6	2437	-12.84	-12.73	0.13	0.10858	-9.64	5.49	PASS
11	2462	-13.37	-13.17	0.13	0.09712	-10.13	5.49	PASS

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

2. Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi , so the power density limit shall be reduced to 8-(8.51-6) = 5.49dBm.

3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Duty Factor (dB)	Total PSD (mW/3kHz)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1					
3	2422	-16.67	-16.24	0.17	0.04715	-13.27	5.49	PASS
6	2437	-14.19	-13.63	0.17	0.08479	-10.72	5.49	PASS
9	2452	-18.24	-17.16	0.17	0.03563	-14.48	5.49	PASS

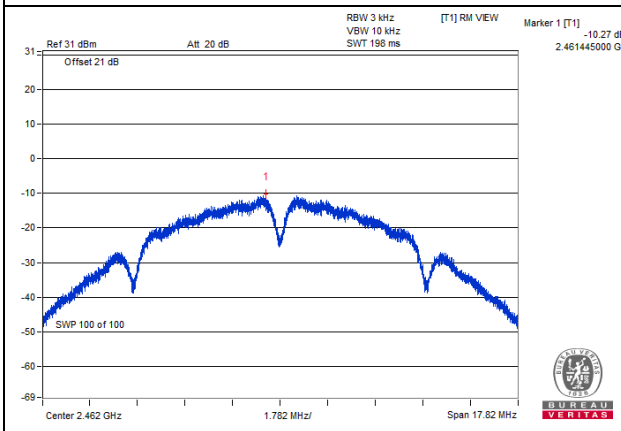
Note: 1. Method b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.

2. Directional gain = 5.5dBi + 10log(2) = 8.51dBi > 6dBi , so the power density limit shall be reduced to 8-(8.51-6) = 5.49dBm.

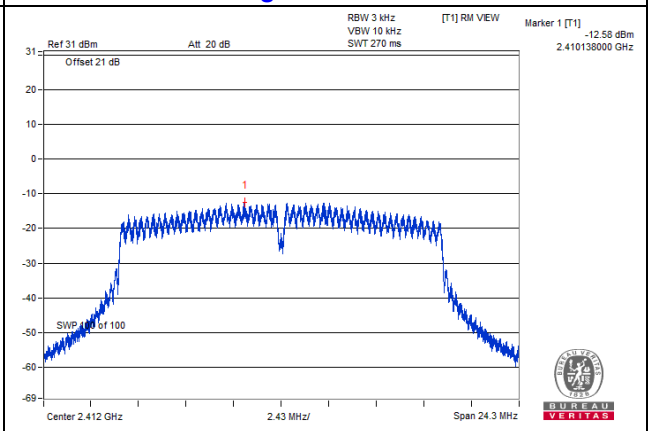
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

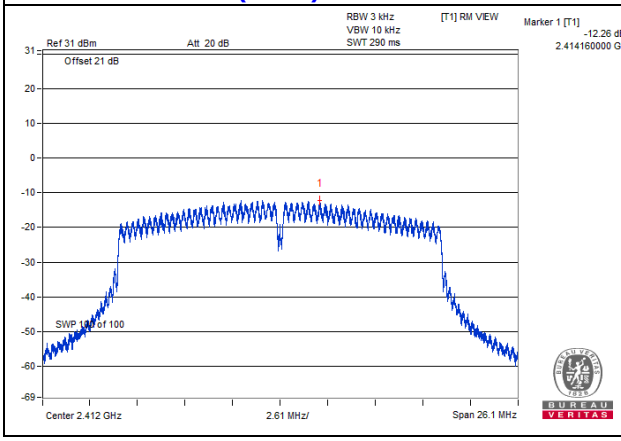
802.11b / Chain 1 : CH11



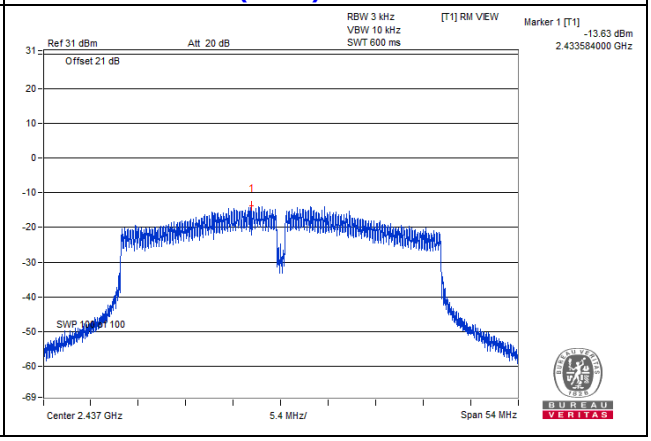
802.11g / Chain 1 : CH1



802.11n (HT20) / Chain 1 : CH1



802.11n (HT40) / Chain 1 : CH6

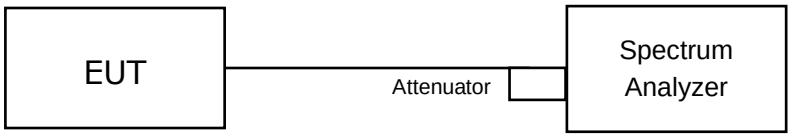


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOBE

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

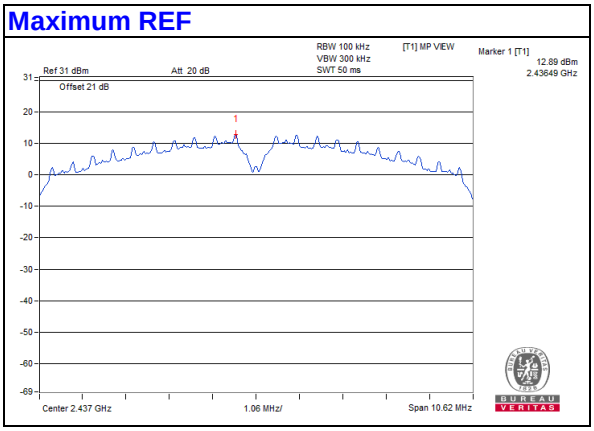
Same as Item 4.3.6

4.6.7 Test Results

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

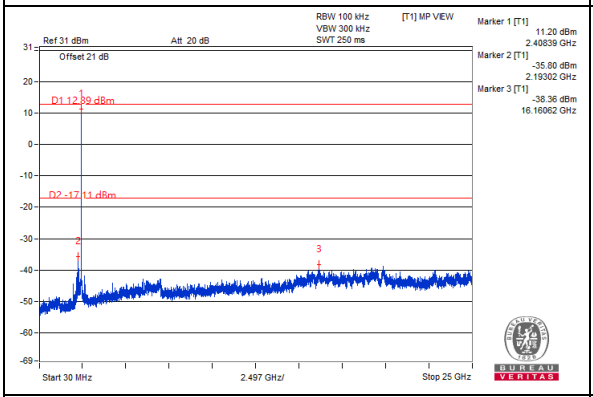
802.11b

Maximum REF

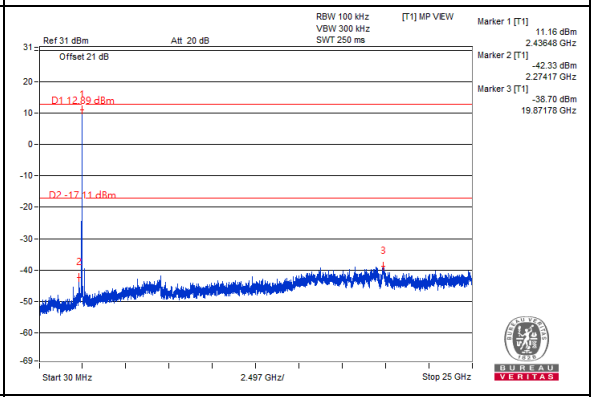


Chain 0

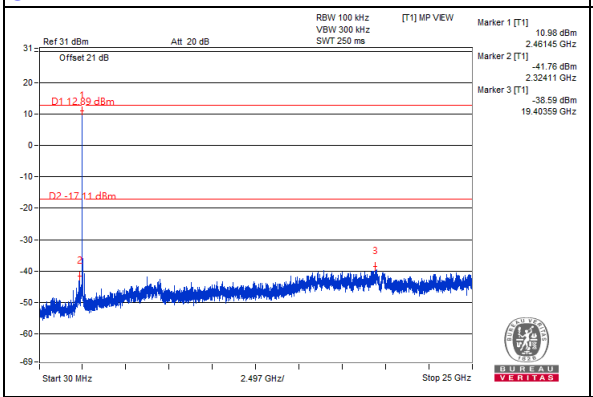
CH 1



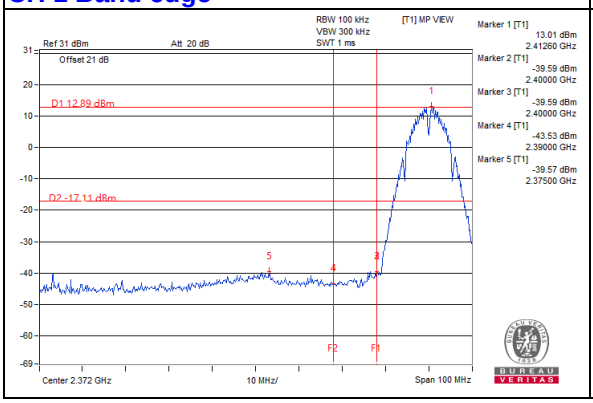
CH 6



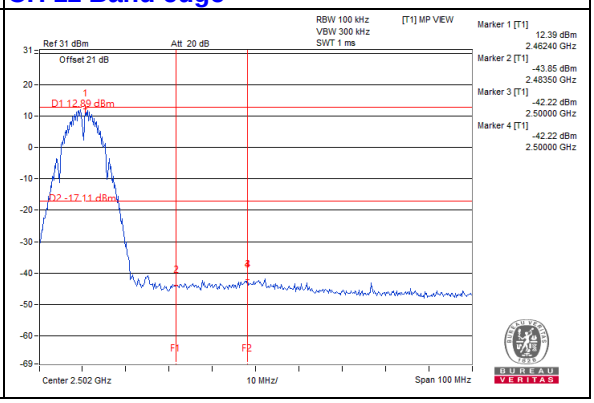
CH 11



CH 1 Band edge

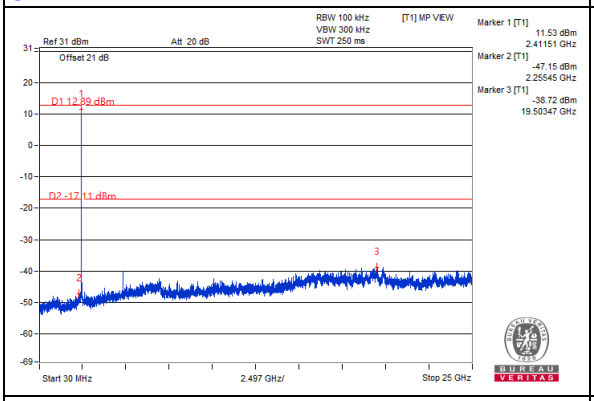


CH 11 Band edge

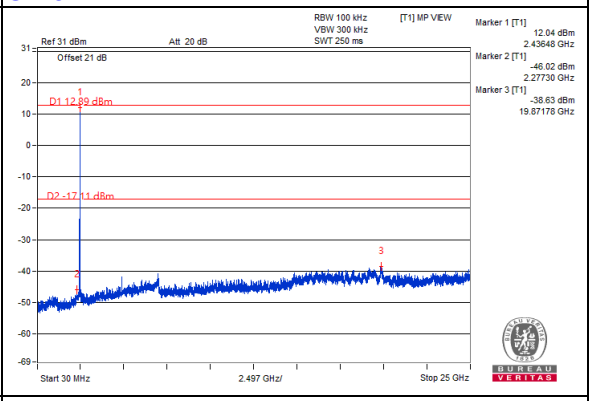


Chain 1

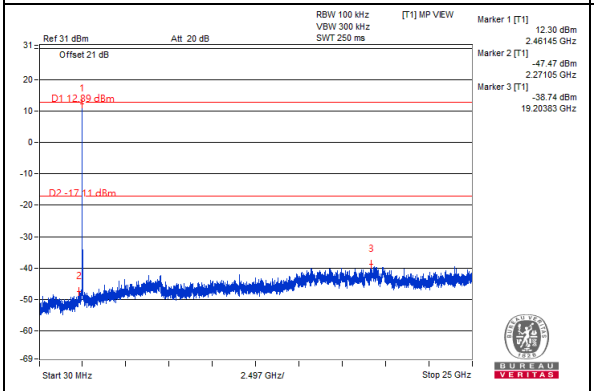
CH 1



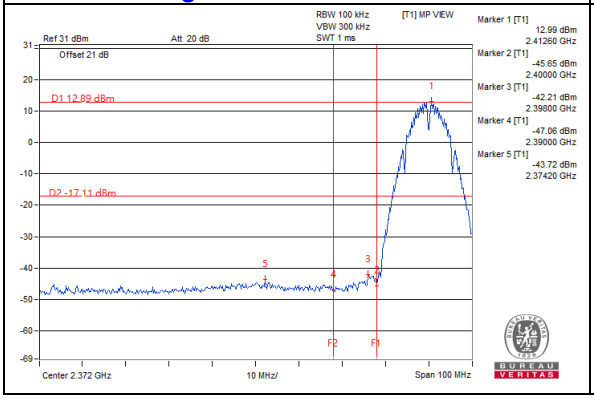
CH 6



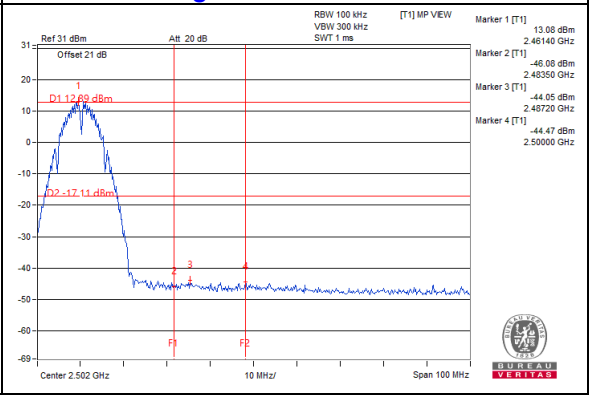
CH 11



CH 1 Band edge

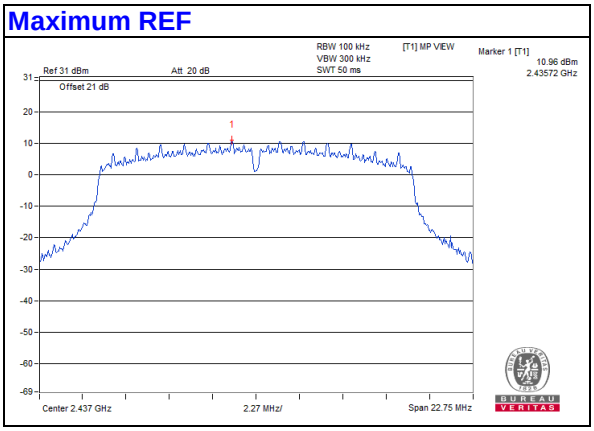


CH 11 Band edge



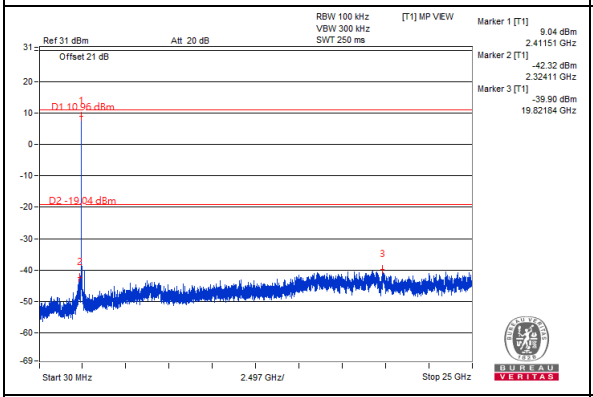
802.11g

Maximum REF

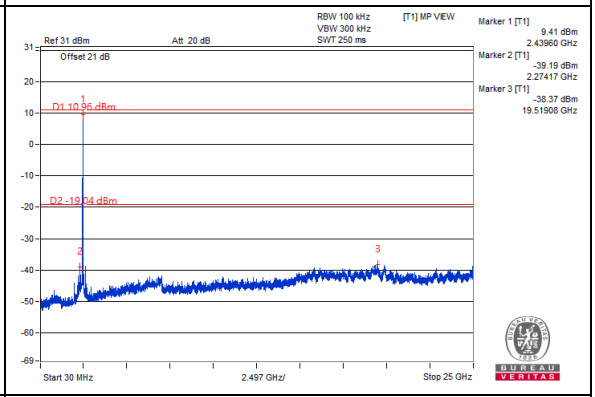


Chain 0

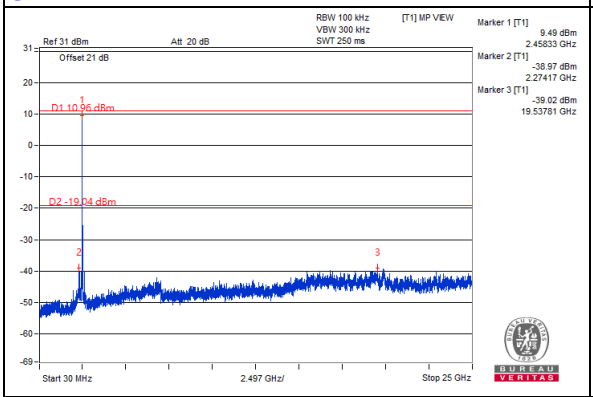
CH 1



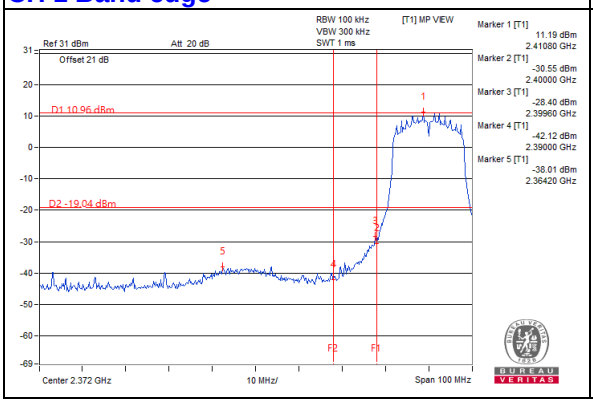
CH 6



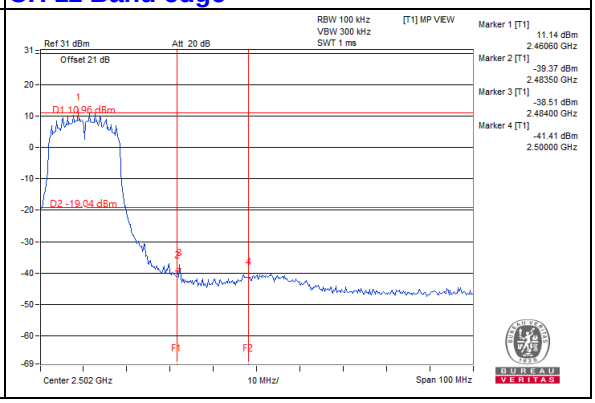
CH 11



CH 1 Band edge

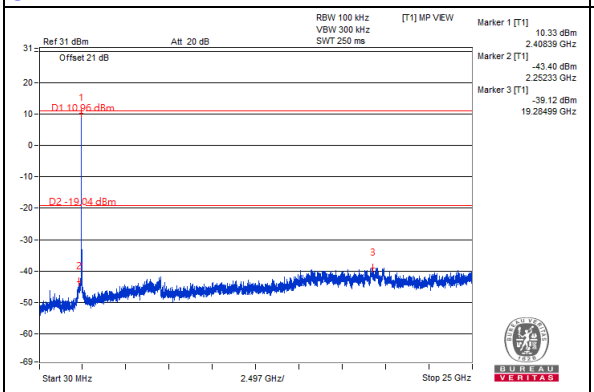


CH 11 Band edge

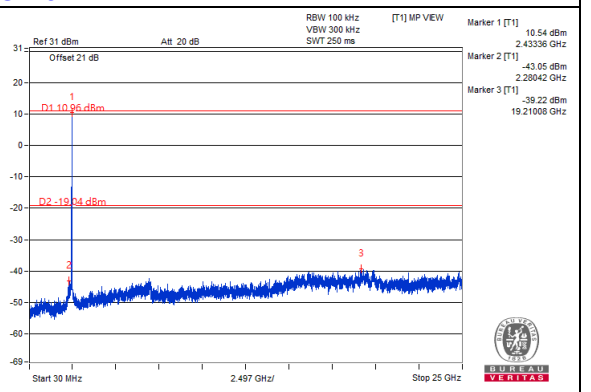


Chain 1

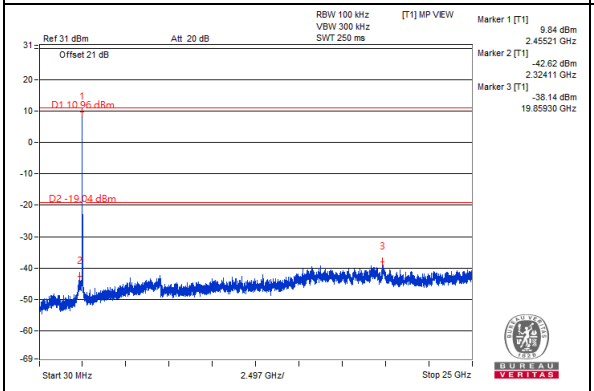
CH 1



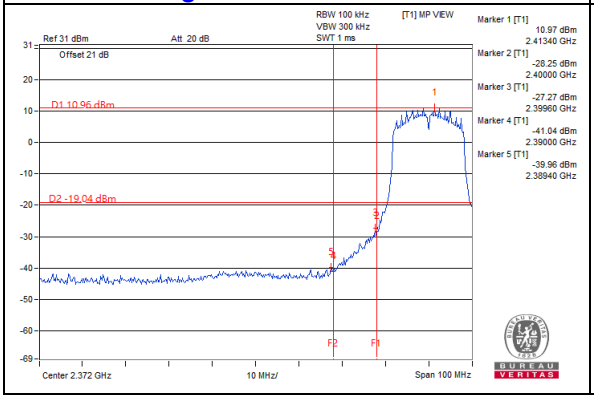
CH 6



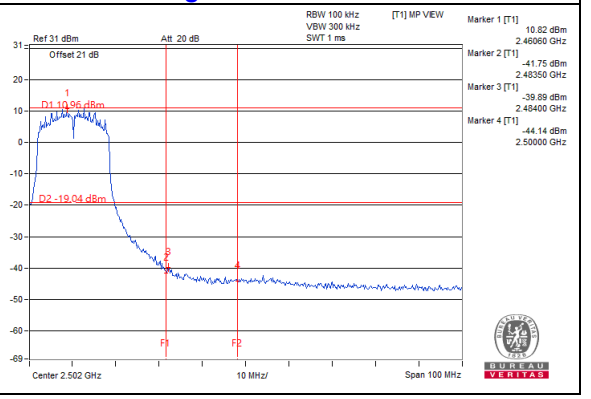
CH 11



CH 1 Band edge

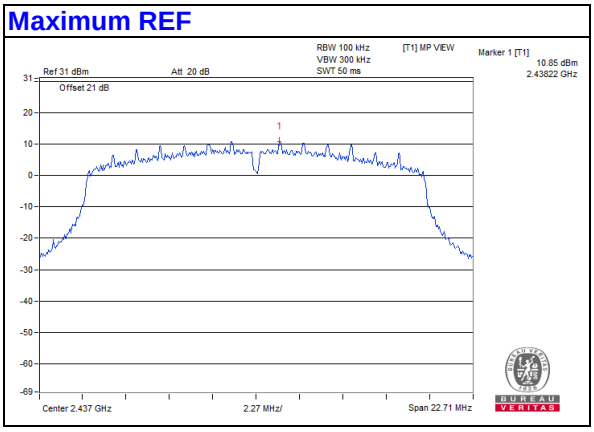


CH 11 Band edge



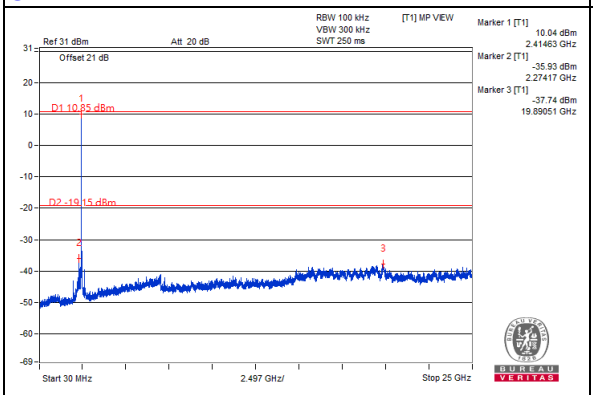
802.11n (HT20)

Maximum REF

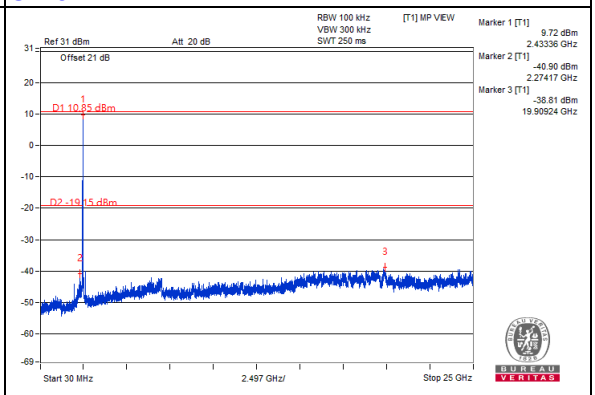


Chain 0

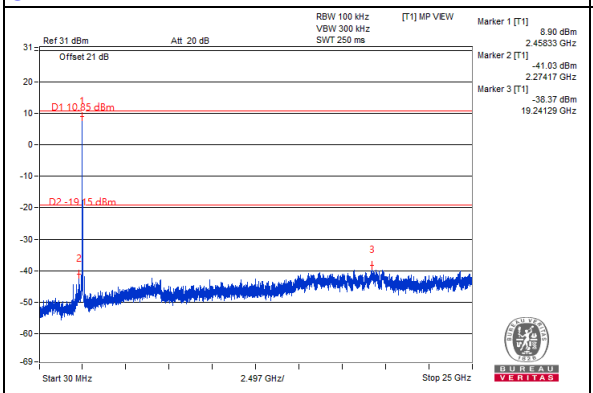
CH 1



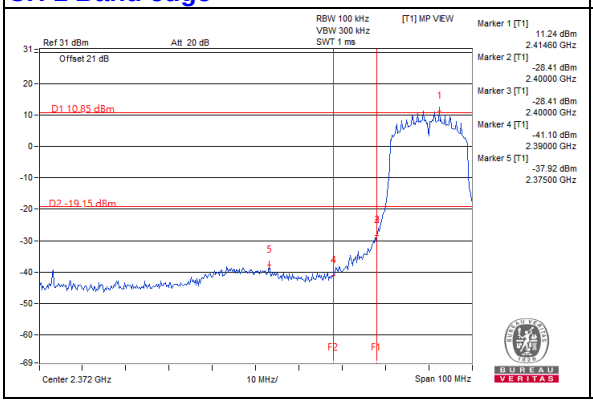
CH 6



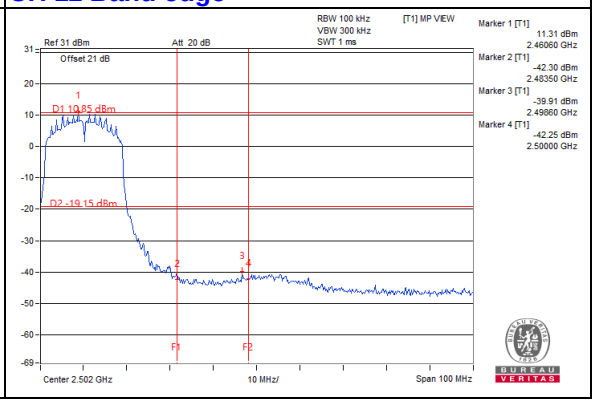
CH 11



CH 1 Band edge

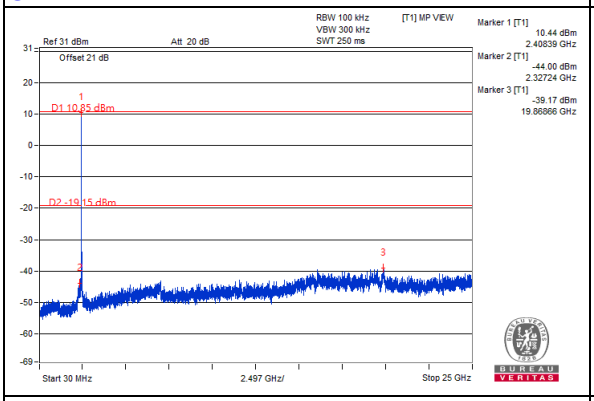


CH 11 Band edge

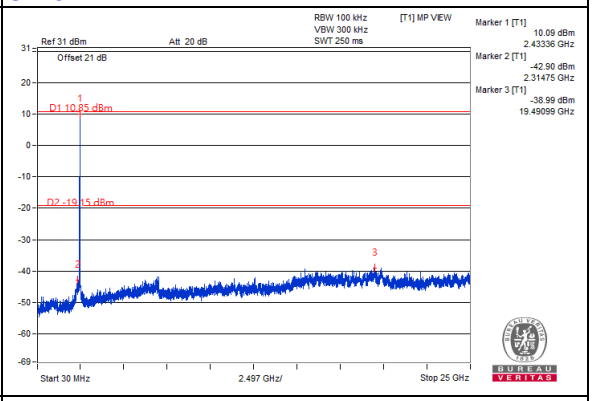


Chain 1

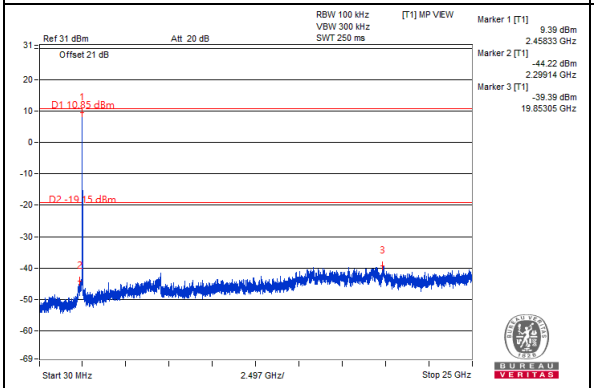
CH 1



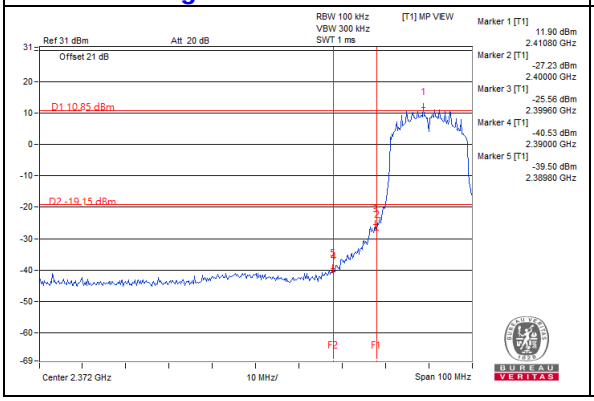
CH 6



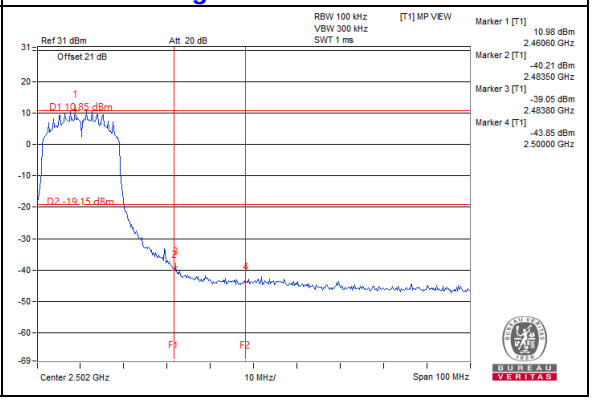
CH 11



CH 1 Band edge

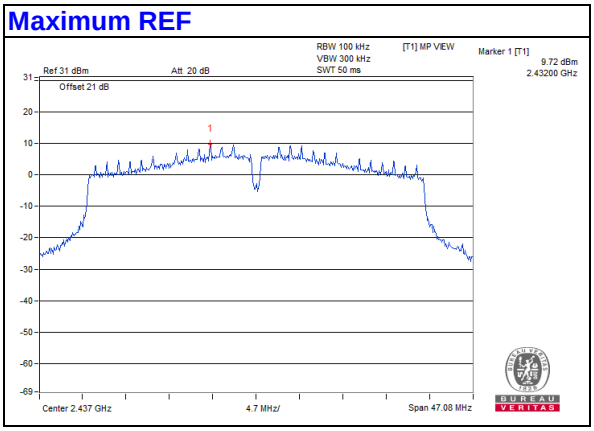


CH 11 Band edge



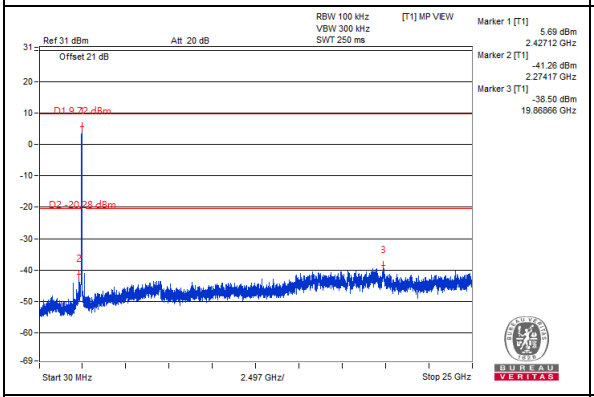
802.11n (HT40)

Maximum REF

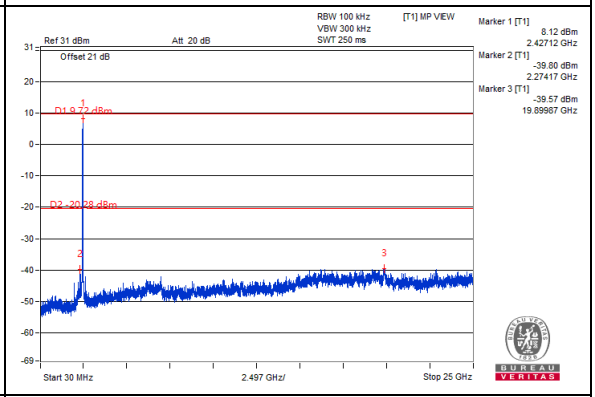


Chain 0

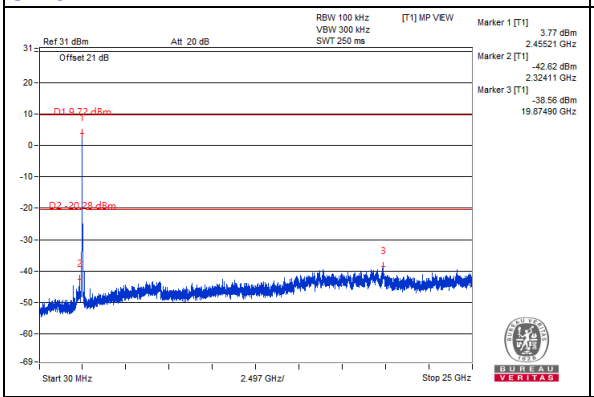
CH 3



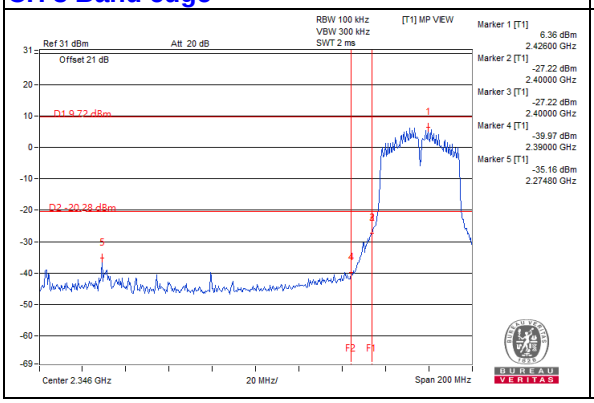
CH 6



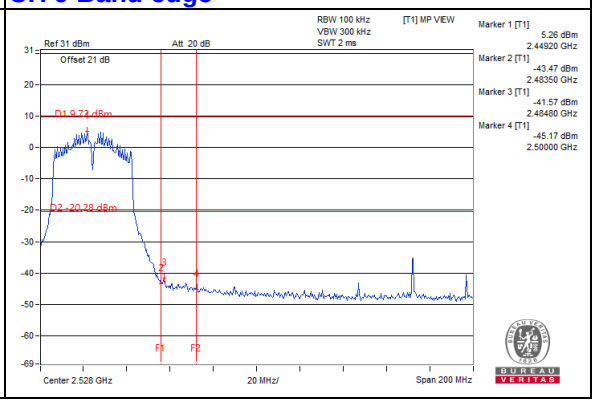
CH 9



CH 3 Band edge

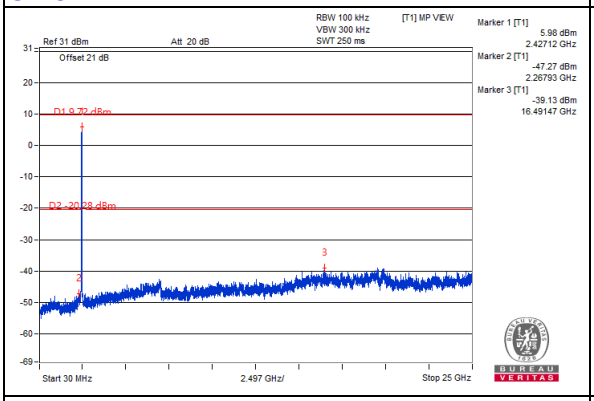


CH 9 Band edge

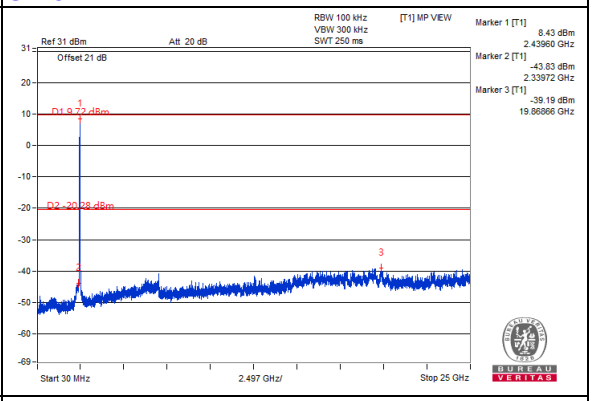


Chain 1

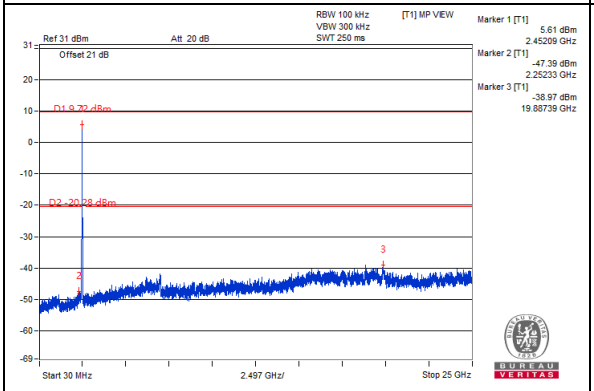
CH 3



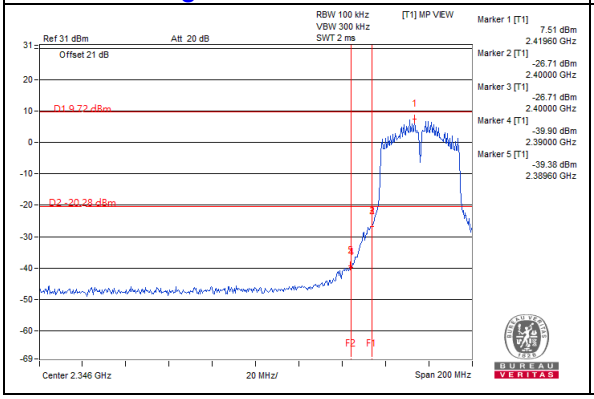
CH 6



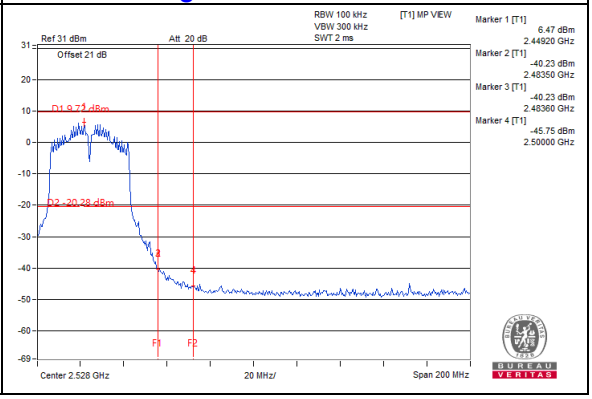
CH 9



CH 3 Band edge



CH 9 Band edge



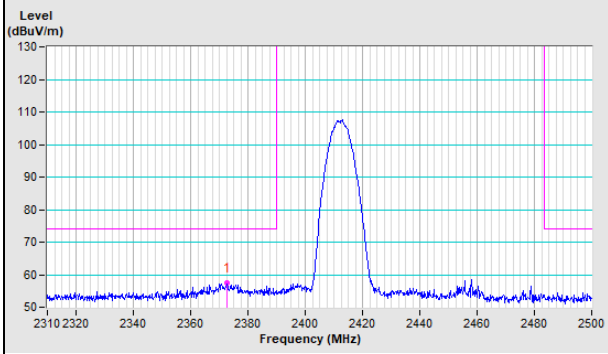
5 Pictures of Test Arrangements

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

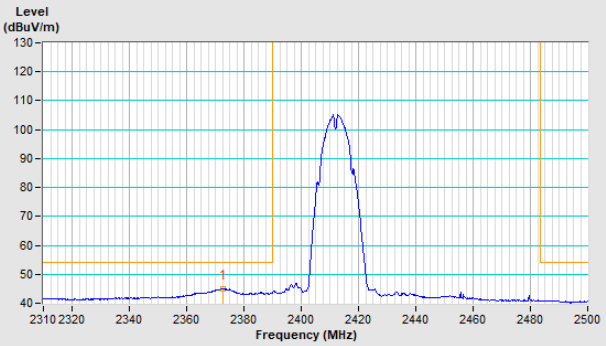
Annex A - Band-Edge Measurement

802.11b Channel 1

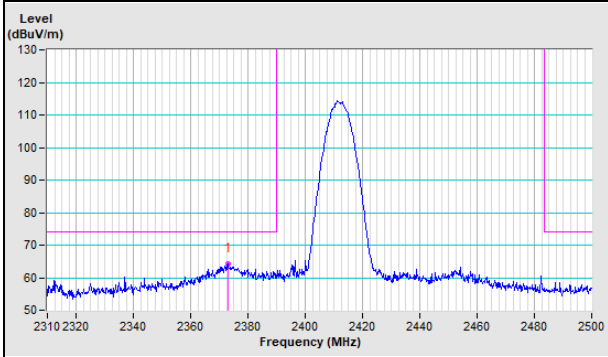
Horizontal (Peak)



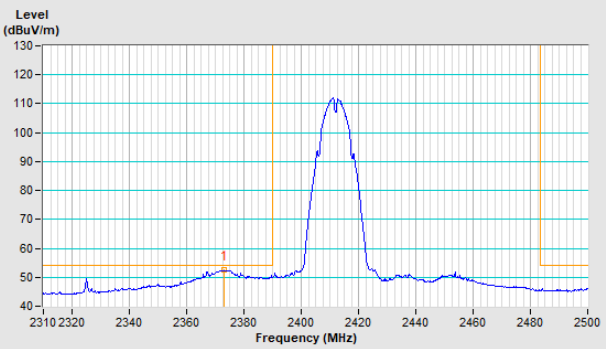
Horizontal (Average)



Vertical (Peak)

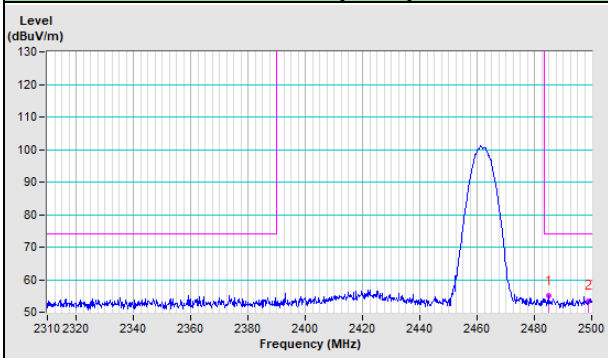


Vertical (Average)

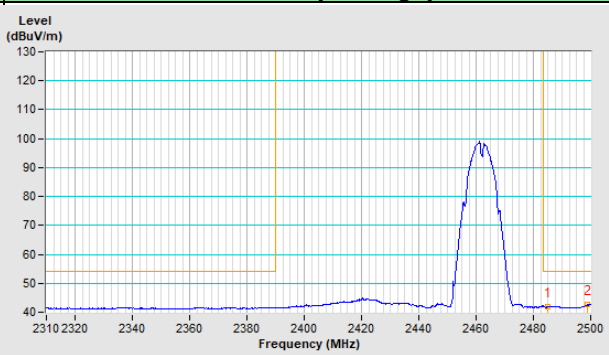


802.11b Channel 11

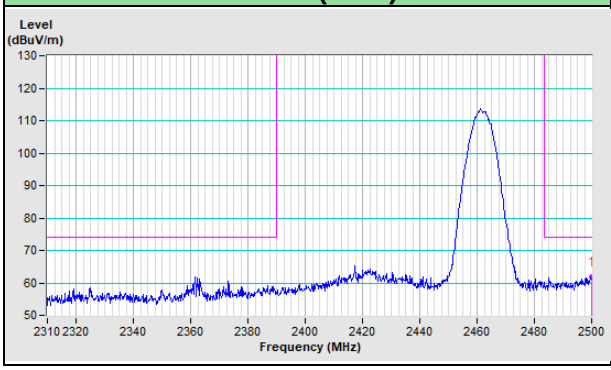
Horizontal (Peak)



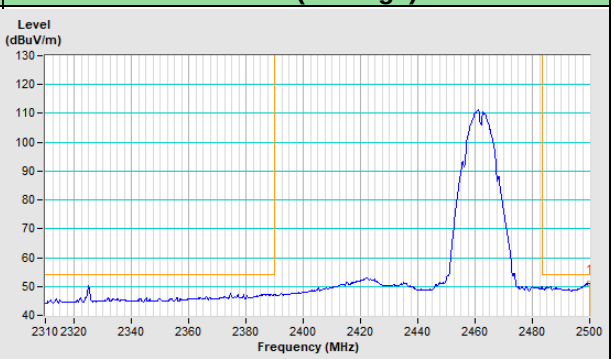
Horizontal (Average)



Vertical (Peak)

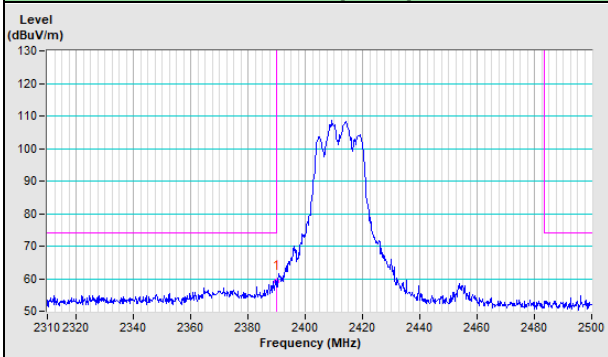


Vertical (Average)

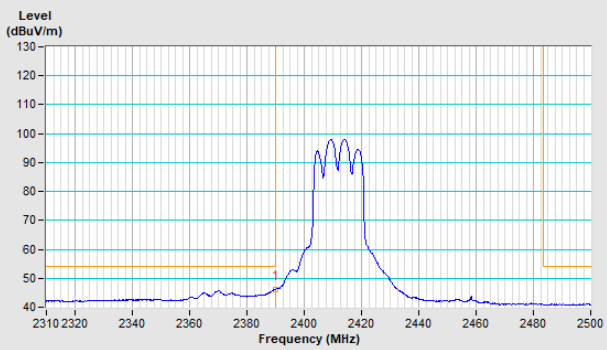


802.11g Channel 1

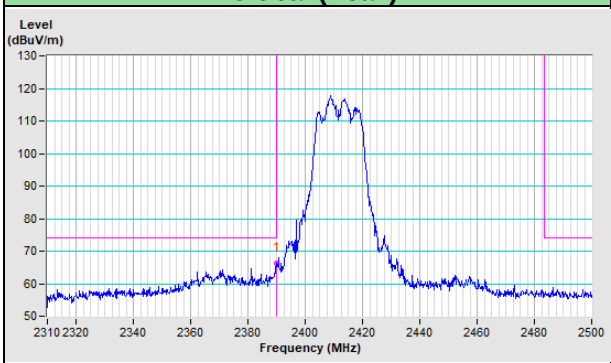
Horizontal (Peak)



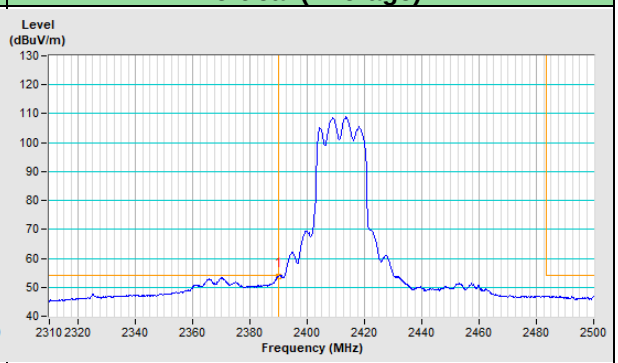
Horizontal (Average)



Vertical (Peak)

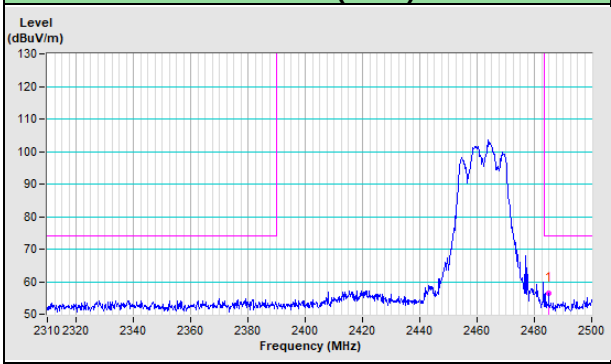


Vertical (Average)

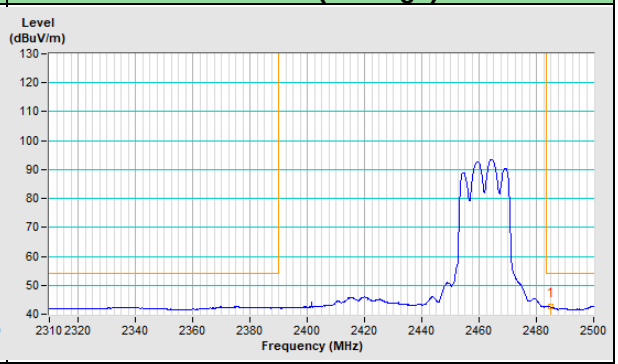


802.11g Channel 11

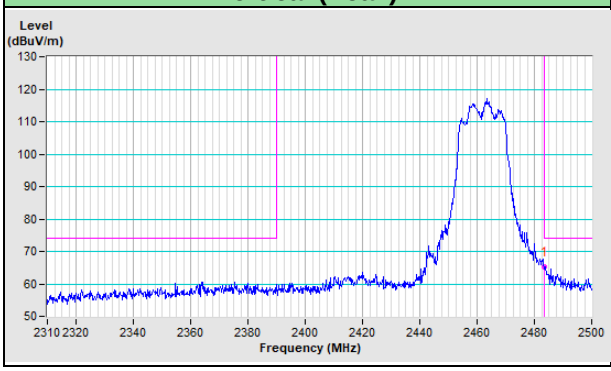
Horizontal (Peak)



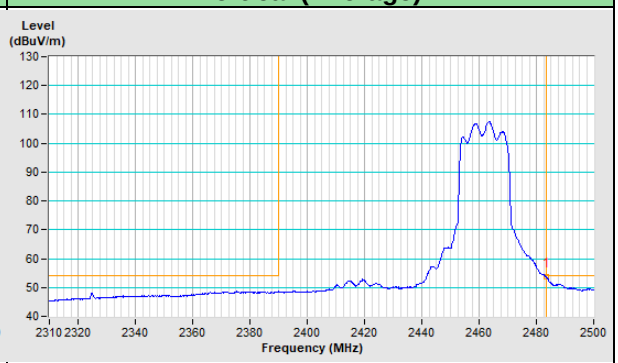
Horizontal (Average)



Vertical (Peak)

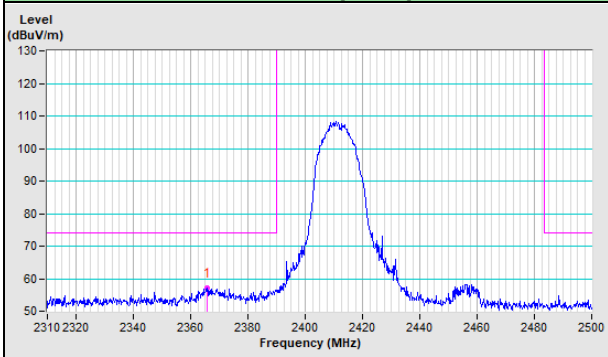


Vertical (Average)

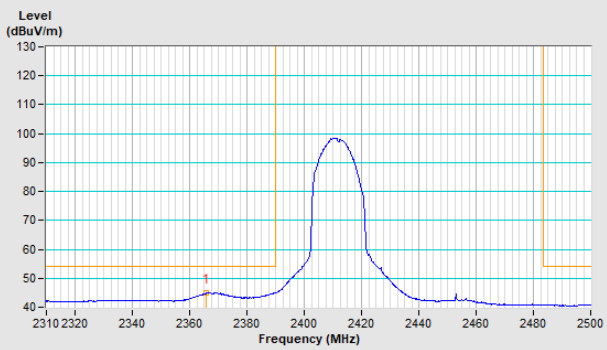


802.11n (HT20) Channel 1

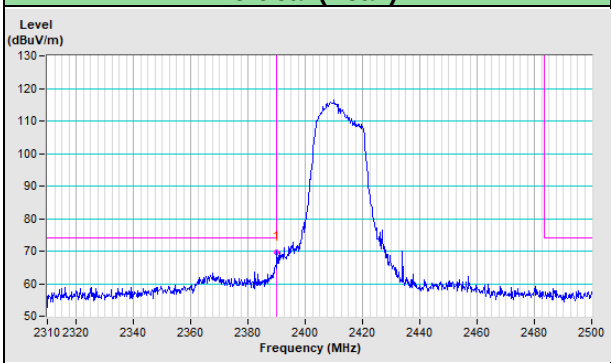
Horizontal (Peak)



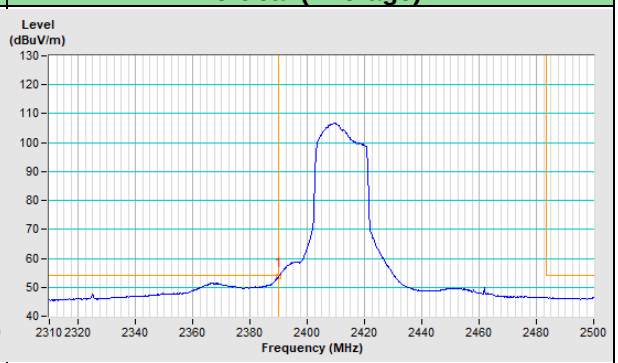
Horizontal (Average)



Vertical (Peak)

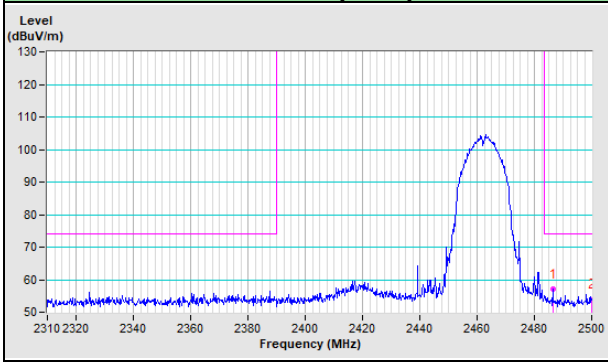


Vertical (Average)

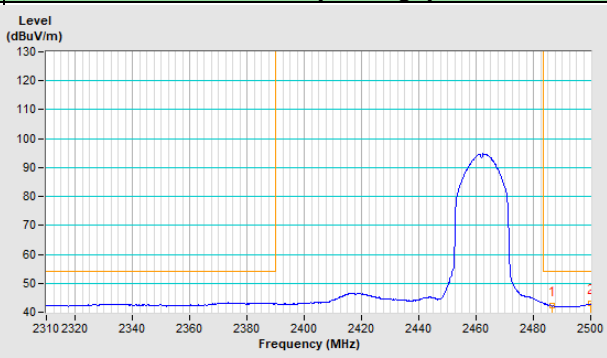


802.11n (HT20) Channel 11

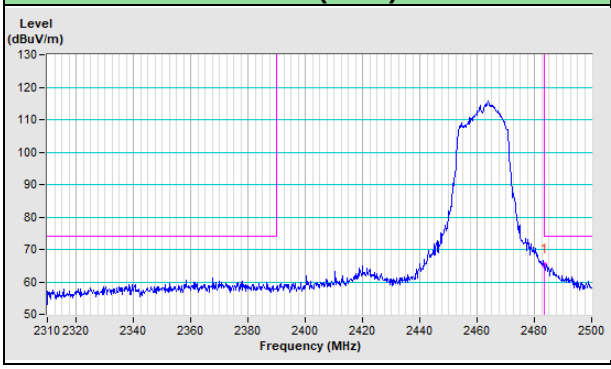
Horizontal (Peak)



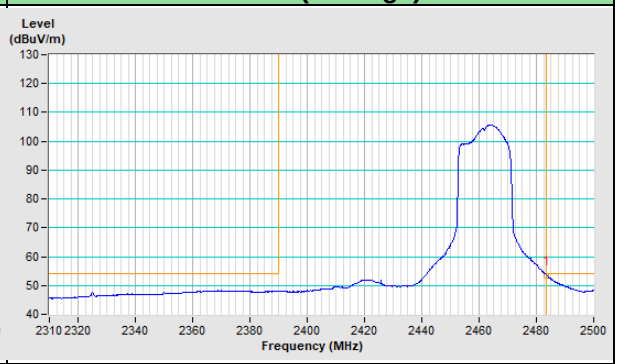
Horizontal (Average)



Vertical (Peak)

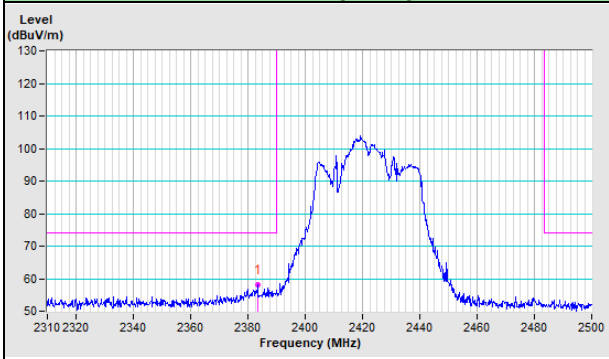


Vertical (Average)

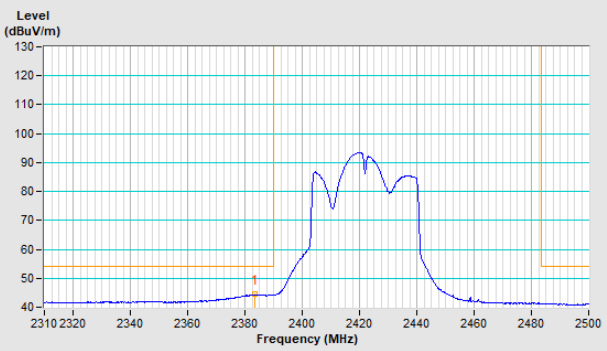


802.11n (HT40) Channel 3

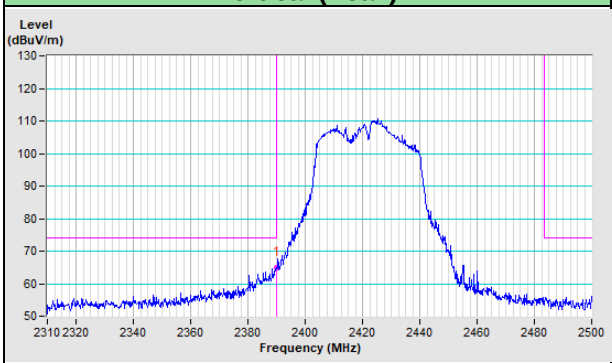
Horizontal (Peak)



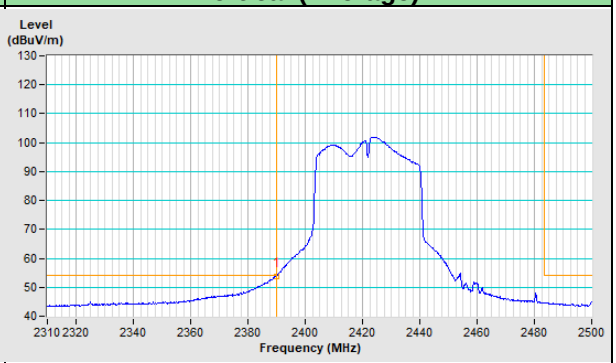
Horizontal (Average)



Vertical (Peak)

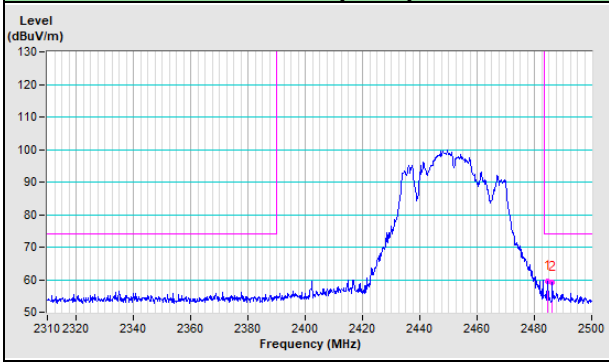


Vertical (Average)

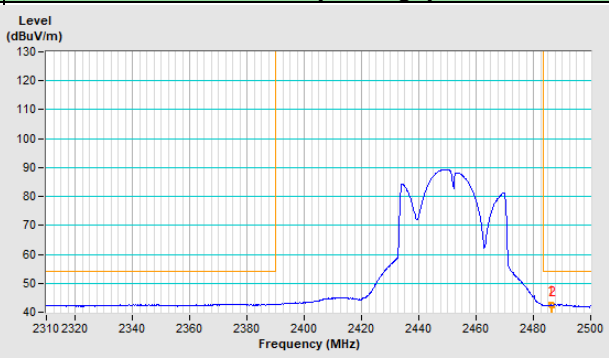


802.11n (HT40) Channel 9

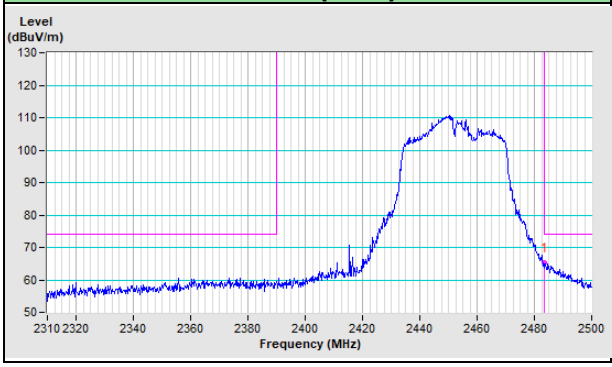
Horizontal (Peak)



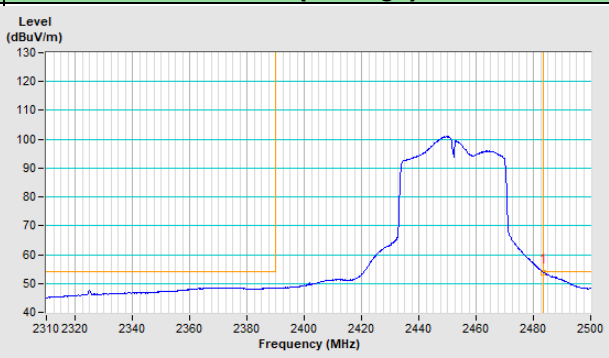
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



Appendix – Information of the Testing Laboratories

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

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

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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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