FCC Test Report

Report No.:	RFBDUM-WTW-P21060284
FCC ID:	UXX-S5A135A
Test Model:	S5A135A
Received Date:	June 24, 2021
Test Date:	July 24 to Aug. 03, 2021
Issued Date:	Sep. 01, 2021
Applicant:	Cradlepoint, Inc
Address:	1111 W. Jefferson Street Suite 400 Boise, ID 83702 USA
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

Table of Contents

Release Control Record 4

1 Certificate of Conformity 5

2 Summary of Test Results 6

2.1 Measurement Uncertainty 6
2.2 Modification Record 6

3 General Information 7

3.1 General Description of EUT 7
3.2 Description of Test Modes 10
3.2.1 Test Mode Applicability and Tested Channel Detail 11
3.3 Duty Cycle of Test Signal 13
3.4 Description of Support Units 14
3.4.1 Configuration of System under Test 15
3.5 General Description of Applied Standards and References 16

4 Test Types and Results 17

4.1 Radiated Emission and Bandedge Measurement 17
4.1.1 Limits of Radiated Emission and Bandedge Measurement 17
4.1.2 Test Instruments 18
4.1.3 Test Procedures 20
4.1.4 Deviation from Test Standard 21
4.1.5 Test Setup 21
4.1.6 EUT Operating Conditions 22
4.1.7 Test Results 23
4.2 Conducted Emission Measurement 37
4.2.1 Limits of Conducted Emission Measurement 37
4.2.2 Test Instruments 37
4.2.3 Test Procedures 38
4.2.4 Deviation from Test Standard 38
4.2.5 Test Setup 38
4.2.6 EUT Operating Conditions 38
4.2.7 Test Results 39
4.3 6dB Bandwidth Measurement 41
4.3.1 Limits of 6dB Bandwidth Measurement 41
4.3.2 Test Setup 41
4.3.3 Test Instruments 41
4.3.4 Test Procedure 41
4.3.5 Deviation from Test Standard 41
4.3.6 EUT Operating Conditions 41
4.3.7 Test Result 42
4.4 Conducted Output Power Measurement 44
4.4.1 Limits of Conducted Output Power Measurement 44
4.4.2 Test Setup 44
4.4.3 Test Instruments 44
4.4.4 Test Procedures 44
4.4.5 Deviation from Test Standard 44
4.4.6 EUT Operating Conditions 44
4.4.7 Test Results 45
4.5 Power Spectral Density Measurement 47
4.5.1 Limits of Power Spectral Density Measurement 47
4.5.2 Test Setup 47
4.5.3 Test Instruments 47
4.5.4 Test Procedure 47
4.5.5 Deviation from Test Standard 47
4.5.6 EUT Operating Condition 47

4.5.7 Test Results 48
4.6 Conducted Out of Band Emission Measurement 51
4.6.1 Limits of Conducted Out of Band Emission Measurement 51
4.6.2 Test Setup 51
4.6.3 Test Instruments 51
4.6.4 Test Procedure 51
4.6.5 Deviation from Test Standard 51
4.6.6 EUT Operating Condition 51
4.6.7 Test Results 51
5 Pictures of Test Arrangements 60
Annex A - Band-Edge Measurement 61
Appendix – Information of the Testing Laboratories 65

Release Control Record

Issue No.	Description	Date Issued
RFBDUM-WTW-P21060284	Original release.	Sep. 01, 2021

1 Certificate of Conformity

Product:	SOHO Branch Router
Brand:	cradlepoint
Test Model:	S5A135A
Sample Status:	ENGINEERING SAMPLE
Applicant:	Cradlepoint, Inc
Test Date:	July 24 to Aug. 03, 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:** Sep. 01, 2021

Vivian Hunag / Specialist

Approved by : , **Date:** Sep. 01, 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 -9.56dB at 0.34922MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.3dB at 7311.00MHz and 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:
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	5.5 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.1 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	SOHO Branch Router
Brand	cradlepoint
Test Model	S5A135A
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	12Vdc from power adapter
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 in 2.4GHz
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 ~ 2.462 GHz **5GHz:** 5.18~ 5.24 GHz, 5.50~5.72GHz, 5.745 ~ 5.825 GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 25 802.11n (HT40), 802.11ac (VHT40): 12 802.11ac (VHT80): 6
Output Power	**CDD Mode:** **2.412 ~ 2.462 GHz:** 271.049 mW **5.18 ~ 5.24 GHz:** 105.674 mW **5.26 ~ 5.32GHz:** 123.345 mW **5.5 ~ 5.72GHz:** 190.402 mW **5.745 ~ 5.825 GHz:** 106.396 mW **Beamforming Mode:** **2.412 ~ 2.462 GHz:** 127.487 mW **5.18 ~ 5.24 GHz:** 105.674 mW **5.26 ~ 5.32GHz:** 123.345 mW **5.5 ~ 5.72GHz:** 160.95 mW **5.745 ~ 5.825 GHz:** 106.396 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter × 1
Data Cable Supplied	Ethernet cable × 1 (Unshielded, 1.5 m)

Note:

1. Simultaneously transmission condition.

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

2. The EUT has two radios as following table:

Radio 1	Radio 2
WLAN (2.4GHz + 5GHz)	WWAN (LTE + WCDMA)

3. The EUT information are as below table:

Brand	Product Marketing Name (PMN)	Model	Wi-Fi Function	Embedded Radio (WWAN Module)
cradlepoint	E102-C7C	S5A135A	Yes	Brand: Sierra Wireless Model: MC7411 Contains FCC ID: N7NMC74B Contains IC: 2417C-MC74B

4. The EUT could be supplied with a power adapter as the following table:

No	Brand Name	Model Name	Spec.
1	KUANTECH	KSA-36W-120300D5	Input: 100-240 Vac, 1 A, 50-60 Hz Output: 12 Vdc, 3 A DC output cable (Unshielded, 1.5 m)
2	Asian Power Devices	WA-36N12R	Input: 100-240 Vac, 1 A, 50-60 Hz Output: 12 Vdc, 3 A DC output cable (Unshielded, 1.5 m)
Note: From the above modes, the worst radiated emission test was found in **Adapter 2**. Therefore only the test data of the modes were recorded in this report.			

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

For WLAN

Ant. No.	RF Chain No.	Brand	Model	Ant. Net Gain (dBi)	Frequency Range (GHz)	Ant. Type	Connector Type	Cable Length (mm)
1	WiFi Chain0	Cradlepoint	ANT1_N03UEADA-T10-PK1-B130U	5	2.4~2.4835	PCB	i-pex(MHF)	130
				4.9	5.15~5.25			
				4.3	5.25~5.35			
				4.3	5.47~5.725			
				4.3	5.725~5.85			
2	WiFi Chain1	Cradlepoint	ANT2_N03UEADA-T-PK1-G230U	3.4	2.4~2.4835	PCB	i-pex(MHF)	230
				4.5	5.15~5.25			
				1.9	5.25~5.35			
				1.9	5.47~5.725			
				1.9	5.725~5.85			

For WWAN

Ant. Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (MHz)	Antenna Type	Connector Type	Cable Length (mm)
3	LTE MAIN	Cradlepoint	YWX-UM03SAX9-711B	1.1	615~960	Dipole	SMA	95
				0.6	1445~1515			
				2.63	1710~2700			
				4	3400~3800			
4	LTE AUX	Cradlepoint	YWX-UM03SAX9-711B	1.1	615~960	Dipole	SMA	95
				0.6	1445~1515			
				2.63	1710~2700			
				4	3400~3800			
Note: Max. gain was selected for the final test.								

6. 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
VHT20	2TX	2RX
VHT40	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

Note:
1. All of modulation mode support beamforming function except 802.11a/b/g modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz), VHT mode for 20MHz (40MHz), therefore the manufacturer will control the power for 802.11n mode is the same as the VHT mode or more lower than it and investigated worst case to representative mode in test report. (Final test mode refer to section 3.2.1)

7. 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.
8. 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), VHT20:

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

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

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

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 laying-flat and wall-mount. The worst case was found when positioned of on laying-flat.

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.

CDD Mode					
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
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
VHT40	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.

CDD Mode					
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.

CDD Mode					
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.

CDD Mode					
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
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
VHT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5
Beamforming Mode (output power only)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
VHT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5
VHT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

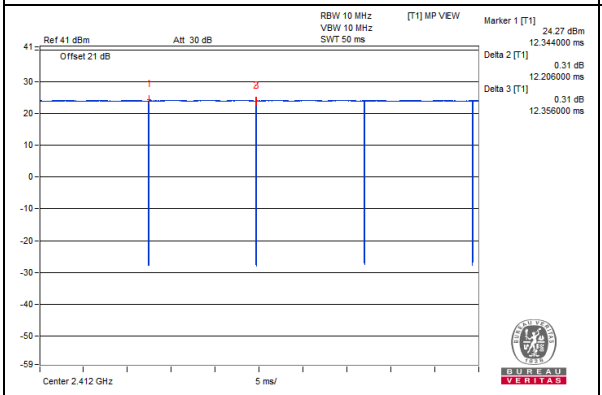
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Spencer Liao
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Carter Lin
PLC	25deg. C, 75%RH	120Vac, 60Hz	Carter Lin
APCM	25deg. C, 60%RH	120Vac, 60Hz	Leon Dai

3.3 Duty Cycle of Test Signal

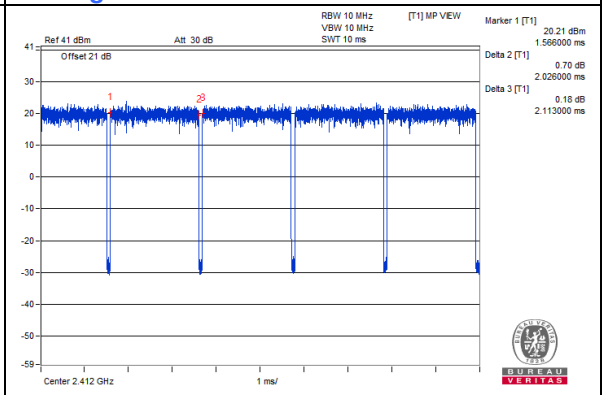
If duty cycle of test signal is ≥ 98 %, duty factor is not required.
If duty cycle of test signal is < 98 %, duty factor shall be considered.

802.11b: Duty cycle = 12.206 ms /12.356 ms=0.988
802.11g: Duty cycle = 2.026 ms /2.113 ms=0.959, Duty factor = 10 * log (1/Duty cycle) = 0.18 dB
VHT20: Duty cycle = 4.97 ms /5.065 ms=0.981
VHT40: Duty cycle = 2.415 ms /2.51 ms=0.962, Duty factor = 10 * log (1/Duty cycle) = 0.17 dB

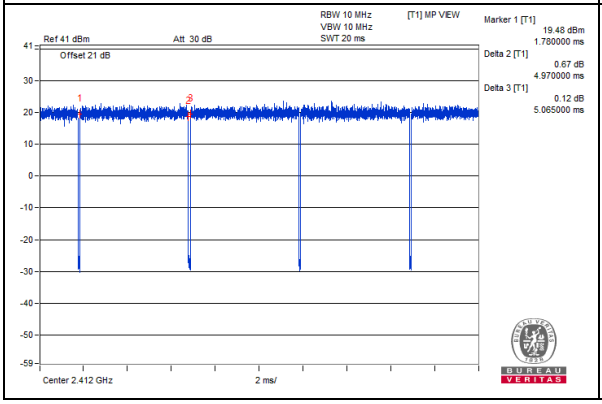
802.11b



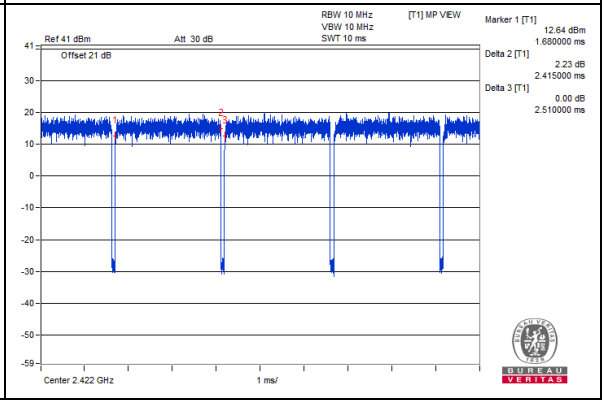
802.11g



VHT20



VHT40



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.

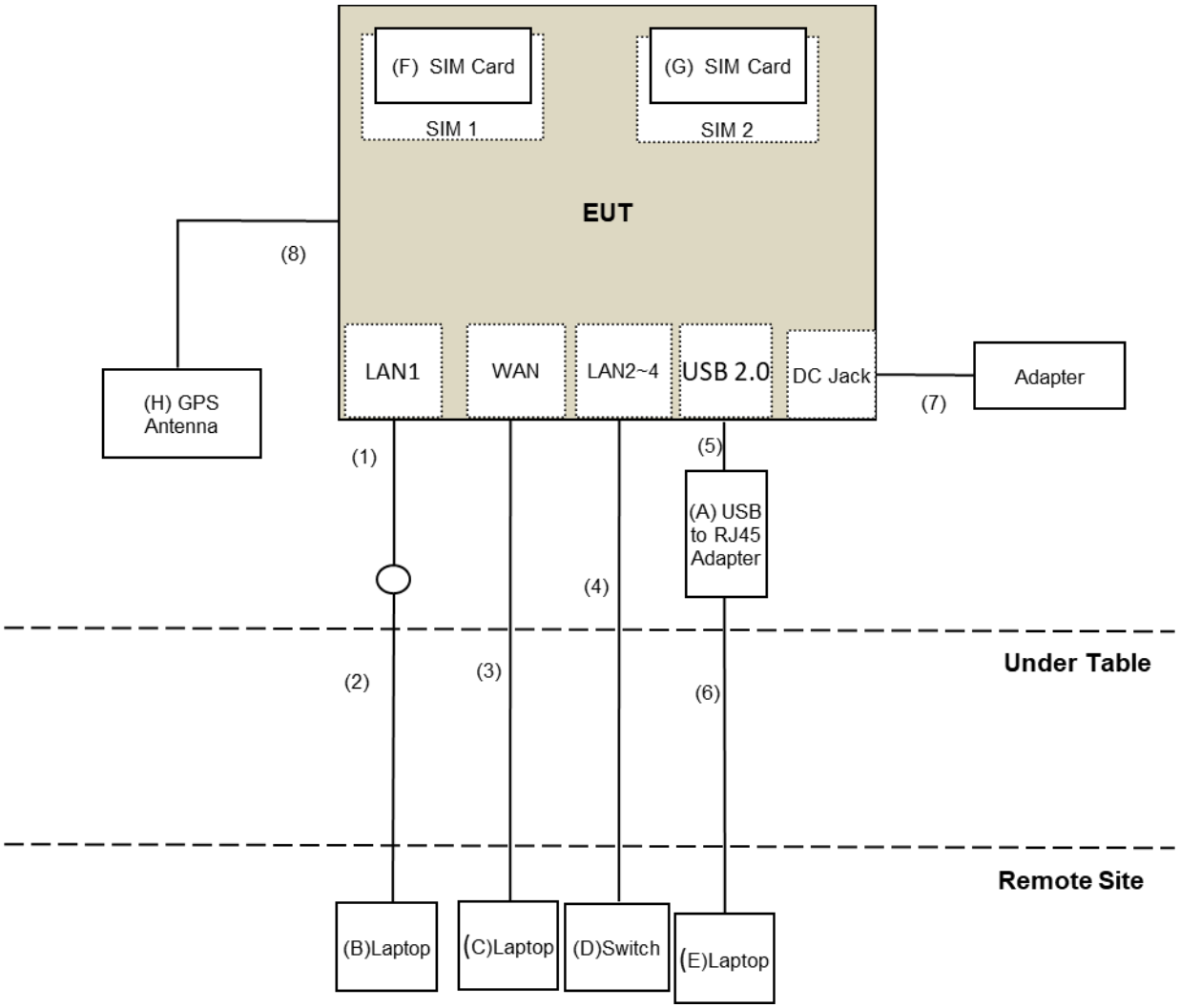
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	USB to RJ45 Adapter	UNITEK	N/A	NA	NA	Supplied by client
B.	Laptop	Lenovo	81A4	YD02YN76	NA	Provided by Lab
C.	Laptop	DELL	E6420	B92T3R1	FCC DoC	Provided by Lab
D.	Switch	D-Link	DGS-1005D	DR8WC92000523	NA	Provided by Lab
E.	Laptop	DELL	Inspiron 7570	DW3CSJ2	NA	Provided by Lab
F.	SIM Card	R&S	CRT-Z3	NA	NA	Provided by Lab
G.	SIM Card	R&S	CRT-Z3	NA	NA	Provided by Lab
H.	GPS Antenna	BV_Cradle	IBR200/250	NA	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	1.5	No	0	Supplied by client
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	3	10	No	0	Provided by Lab
4.	RJ-45 Cable	1	10	No	0	Provided by Lab
5.	USB Cable	1	0.1	No	0	Supplied by client
6.	RJ-45 Cable	1	10	No	0	Provided by Lab
7.	DC Cable	1	1.5	No	0	Supplied by client
8.	GPS Antenna Cable	1	3	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and References

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

Test Standard:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2013

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

References Test Guidance:

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

4.1.2 Test Instruments

For Radiated emission & BandEdge test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 01, 2020	Nov. 30, 2021
Pre-Amplifier EMCI	EMC001340	980142	May 24, 2021	May 23, 2022
Loop Antenna Electro-Metrics	EM-6879	264	Mar. 05, 2021	Mar. 04, 2022
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 EMCI	EMC330N	980701	Mar. 10, 2021	Mar. 09, 2022
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Nov. 06, 2020	Nov. 05, 2021
RF Cable	8D	966-4-1	Mar. 17, 2021	Mar. 16, 2022
RF Cable	8D	966-4-2	Mar. 17, 2021	Mar. 16, 2022
RF Cable	8D	966-4-3	Mar. 17, 2021	Mar. 16, 2022
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	Jan. 11, 2021	Jan. 10, 2022
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier EMCI	EMC 12630 SE	980638	Apr. 07, 2021	Apr. 06, 2022
RF Cable	EMC104-SM-SM-1200	160922	Dec. 25, 2020	Dec. 24, 2021
RF Cable	EMC104-SM-SM-2000	180502	Apr. 26, 2021	Apr. 25, 2022
RF Cable	EMC104-SM-SM-6000	180418	Apr. 26, 2021	Apr. 25, 2022
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. 10, 2021	Mar. 09, 2022
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. Tested Date: Aug. 03, 2021

For other test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	100964	Mar. 08, 2021	Mar. 07, 2022
Power meter Anritsu	ML2495A	1529002	June 21, 2021	June 20, 2022
Power sensor Anritsu	MA2411B	1339443	May 31, 2021	May 30, 2022
10dB Attenuator Woken	MDCS18N-10	MDCS18N-10-01	Apr. 13, 2021	Apr. 12, 2022
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: July 29, 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:

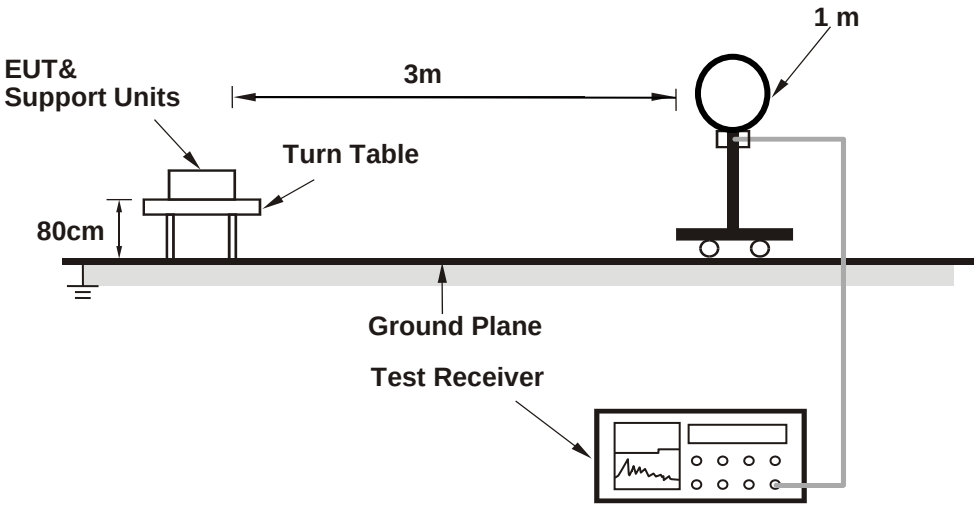
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

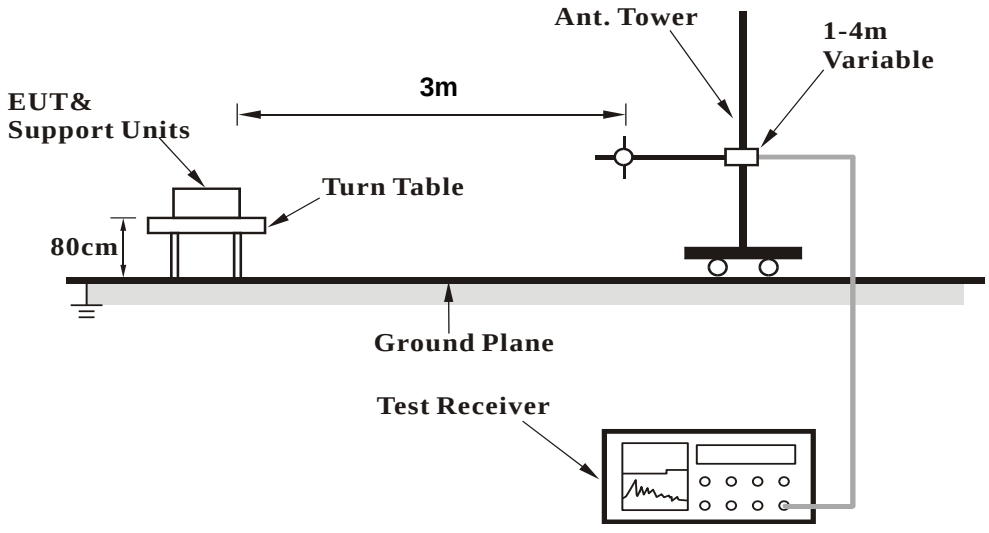
No deviation.

4.1.5 Test Setup

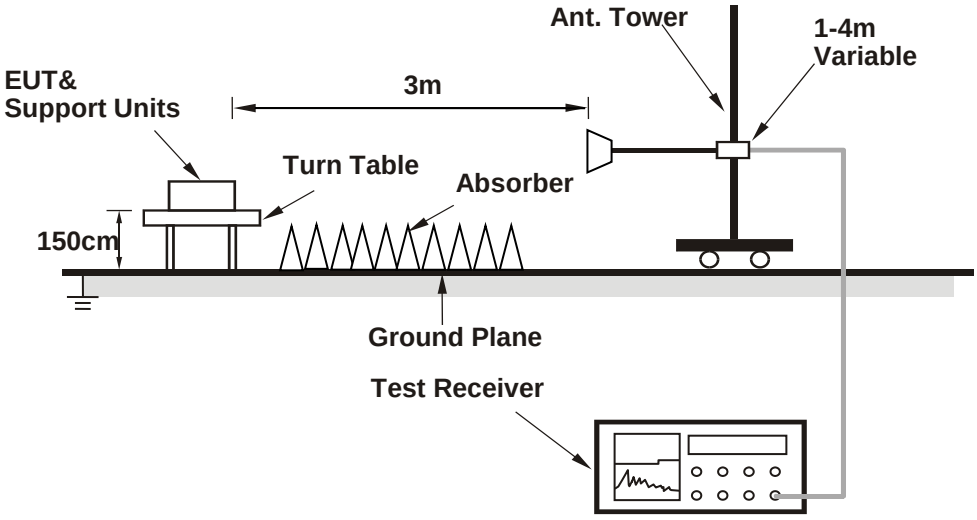
For Radiated emission below 30MHz



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_1.0.44) 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	2390.00	56.8 PK	74.0	-17.2	3.16 H	217	61.3	-4.5
2	2390.00	45.5 AV	54.0	-8.5	3.16 H	217	50.0	-4.5
3	*2412.00	104.9 PK			3.16 H	217	109.3	-4.4
4	*2412.00	102.8 AV			3.16 H	217	107.2	-4.4
5	4824.00	53.7 PK	74.0	-20.3	2.99 H	228	53.6	0.1
6	4824.00	49.7 AV	54.0	-4.3	2.99 H	228	49.6	0.1
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	56.4 PK	74.0	-17.6	2.09 V	358	60.9	-4.5
2	2390.00	50.3 AV	54.0	-3.7	2.09 V	358	54.8	-4.5
3	*2412.00	114.4 PK			2.09 V	358	118.8	-4.4
4	*2412.00	110.5 AV			2.09 V	358	114.9	-4.4
5	4824.00	56.0 PK	74.0	-18.0	2.48 V	308	55.9	0.1
6	4824.00	52.6 AV	54.0	-1.4	2.48 V	308	52.5	0.1

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 802.11b	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	*2437.00	106.3 PK			1.00 H	283	110.7	-4.4
2	*2437.00	104.1 AV			1.00 H	283	108.5	-4.4
3	4874.00	54.0 PK	74.0	-20.0	2.93 H	232	53.9	0.1
4	4874.00	50.1 AV	54.0	-3.9	2.93 H	232	50.0	0.1
5	7311.00	57.1 PK	74.0	-16.9	1.96 H	113	50.8	6.3
6	7311.00	51.9 AV	54.0	-2.1	1.96 H	113	45.6	6.3
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	*2437.00	110.3 PK			1.36 V	359	114.7	-4.4
2	*2437.00	108.2 AV			1.36 V	359	112.6	-4.4
3	4874.00	53.4 PK	74.0	-20.6	4.00 V	87	53.3	0.1
4	4874.00	50.7 AV	54.0	-3.3	4.00 V	87	50.6	0.1
5	7311.00	57.6 PK	74.0	-16.4	1.13 V	268	51.3	6.3
6	7311.00	53.3 AV	54.0	-0.7	1.13 V	268	47.0	6.3

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 802.11b	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	105.3 PK			1.17 H	173	109.7	-4.4
2	*2462.00	103.3 AV			1.17 H	173	107.7	-4.4
3	2483.50	51.4 PK	74.0	-22.6	1.17 H	173	55.9	-4.5
4	2483.50	40.6 AV	54.0	-13.4	1.17 H	173	45.1	-4.5
5	4924.00	54.7 PK	74.0	-19.3	3.08 H	227	54.4	0.3
6	4924.00	51.4 AV	54.0	-2.6	3.08 H	227	51.1	0.3
7	7386.00	57.0 PK	74.0	-17.0	1.88 H	106	50.4	6.6
8	7386.00	51.3 AV	54.0	-2.7	1.88 H	106	44.7	6.6
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	110.4 PK			1.51 V	353	114.8	-4.4
2	*2462.00	108.2 AV			1.51 V	353	112.6	-4.4
3	2483.50	56.5 PK	74.0	-17.5	1.51 V	353	61.0	-4.5
4	2483.50	45.0 AV	54.0	-9.0	1.51 V	353	49.5	-4.5
5	4924.00	55.3 PK	74.0	-18.7	4.00 V	86	55.0	0.3
6	4924.00	52.4 AV	54.0	-1.6	4.00 V	86	52.1	0.3
7	7386.00	57.5 PK	74.0	-16.5	1.49 V	239	50.9	6.6
8	7386.00	53.2 AV	54.0	-0.8	1.49 V	239	46.6	6.6

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	64.4 PK	74.0	-9.6	1.31 H	306	68.9	-4.5
2	2390.00	49.4 AV	54.0	-4.6	1.31 H	306	53.9	-4.5
3	*2412.00	113.3 PK			1.31 H	306	117.7	-4.4
4	*2412.00	104.7 AV			1.31 H	306	109.1	-4.4
5	4824.00	51.1 PK	74.0	-22.9	2.44 H	228	51.0	0.1
6	4824.00	41.1 AV	54.0	-12.9	2.44 H	228	41.0	0.1
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	68.0 PK	74.0	-6.0	1.53 V	356	72.5	-4.5
2	2390.00	53.3 AV	54.0	-0.7	1.53 V	356	57.8	-4.5
3	*2412.00	114.8 PK			1.53 V	356	119.2	-4.4
4	*2412.00	106.2 AV			1.53 V	356	110.6	-4.4
5	4824.00	50.3 PK	74.0	-23.7	2.89 V	306	50.2	0.1
6	4824.00	40.5 AV	54.0	-13.5	2.89 V	306	40.4	0.1

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 802.11g	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	*2437.00	111.1 PK			1.29 H	298	115.5	-4.4
2	*2437.00	102.6 AV			1.29 H	298	107.0	-4.4
3	4874.00	51.6 PK	74.0	-22.4	2.53 H	227	51.5	0.1
4	4874.00	41.7 AV	54.0	-12.3	2.53 H	227	41.6	0.1
5	7311.00	64.9 PK	74.0	-9.1	1.21 H	89	58.6	6.3
6	7311.00	52.4 AV	54.0	-1.6	1.21 H	89	46.1	6.3
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	*2437.00	113.6 PK			1.35 V	352	118.0	-4.4
2	*2437.00	105.0 AV			1.35 V	352	109.4	-4.4
3	4874.00	50.9 PK	74.0	-23.1	2.93 V	314	50.8	0.1
4	4874.00	41.0 AV	54.0	-13.0	2.93 V	314	40.9	0.1
5	7311.00	65.8 PK	74.0	-8.2	2.48 V	98	59.5	6.3
6	**7311.00**	**53.7 AV**	**54.0**	**-0.3**	**2.48 V**	**98**	**47.4**	**6.3**

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 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	106.5 PK			1.46 H	259	110.9	-4.4
2	*2462.00	98.2 AV			1.46 H	259	102.6	-4.4
3	2483.50	60.9 PK	74.0	-13.1	1.46 H	259	65.4	-4.5
4	2483.50	47.2 AV	54.0	-6.8	1.46 H	259	51.7	-4.5
5	4924.00	51.3 PK	74.0	-22.7	2.38 H	221	51.0	0.3
6	4924.00	41.3 AV	54.0	-12.7	2.38 H	221	41.0	0.3
7	7386.00	63.1 PK	74.0	-10.9	1.14 H	85	56.5	6.6
8	7386.00	51.9 AV	54.0	-2.1	1.14 H	85	45.3	6.6
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	113.4 PK			1.50 V	350	117.8	-4.4
2	*2462.00	104.7 AV			1.50 V	350	109.1	-4.4
3	2483.50	69.3 PK	74.0	-4.7	1.50 V	350	73.8	-4.5
4	**2483.50**	**53.7 AV**	**54.0**	**-0.3**	**1.50 V**	**350**	**58.2**	**-4.5**
5	4924.00	51.4 PK	74.0	-22.6	2.81 V	327	51.1	0.3
6	4924.00	41.5 AV	54.0	-12.5	2.81 V	327	41.2	0.3
7	7386.00	64.4 PK	74.0	-9.6	2.54 V	92	57.8	6.6
8	7386.00	52.5 AV	54.0	-1.5	2.54 V	92	45.9	6.6

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 VHT20	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	68.4 PK	74.0	-5.6	1.00 H	302	72.9	-4.5
2	2390.00	52.8 AV	54.0	-1.2	1.00 H	302	57.3	-4.5
3	*2412.00	112.8 PK			1.00 H	302	117.2	-4.4
4	*2412.00	103.2 AV			1.00 H	302	107.6	-4.4
5	4824.00	49.7 PK	74.0	-24.3	2.72 H	237	49.6	0.1
6	4824.00	38.6 AV	54.0	-15.4	2.72 H	237	38.5	0.1
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	57.7 PK	74.0	-16.3	1.52 V	350	62.2	-4.5
2	2390.00	42.8 AV	54.0	-11.2	1.52 V	350	47.3	-4.5
3	*2412.00	114.5 PK			1.52 V	350	118.9	-4.4
4	*2412.00	104.9 AV			1.52 V	350	109.3	-4.4
5	4824.00	52.4 PK	74.0	-21.6	2.27 V	313	52.3	0.1
6	4824.00	40.3 AV	54.0	-13.7	2.27 V	313	40.2	0.1

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 VHT20	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	*2437.00	113.3 PK			1.03 H	299	117.7	-4.4
2	*2437.00	103.1 AV			1.03 H	299	107.5	-4.4
3	4874.00	53.9 PK	74.0	-20.1	1.00 H	241	53.8	0.1
4	4874.00	41.3 AV	54.0	-12.7	1.00 H	241	41.2	0.1
5	7311.00	63.1 PK	74.0	-10.9	1.08 H	92	56.8	6.3
6	7311.00	50.2 AV	54.0	-3.8	1.08 H	92	43.9	6.3
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	*2437.00	115.3 PK			1.53 V	344	119.7	-4.4
2	*2437.00	105.7 AV			1.53 V	344	110.1	-4.4
3	4874.00	56.8 PK	74.0	-17.2	3.55 V	214	56.7	0.1
4	4874.00	44.5 AV	54.0	-9.5	3.55 V	214	44.4	0.1
5	7311.00	65.7 PK	74.0	-8.3	2.40 V	97	59.4	6.3
6	7311.00	52.9 AV	54.0	-1.1	2.40 V	97	46.6	6.3

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 VHT20	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	110.8 PK			1.13 H	304	115.2	-4.4
2	*2462.00	100.6 AV			1.13 H	304	105.0	-4.4
3	2483.50	67.9 PK	74.0	-6.1	1.13 H	304	72.4	-4.5
4	2483.50	52.4 AV	54.0	-1.6	1.13 H	304	56.9	-4.5
5	4924.00	49.4 PK	74.0	-24.6	1.02 H	303	49.1	0.3
6	4924.00	38.0 AV	54.0	-16.0	1.02 H	303	37.7	0.3
7	7386.00	58.9 PK	74.0	-15.1	1.12 H	108	52.3	6.6
8	7386.00	46.0 AV	54.0	-8.0	1.12 H	108	39.4	6.6
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	113.0 PK			1.52 V	338	117.4	-4.4
2	*2462.00	103.4 AV			1.52 V	338	107.8	-4.4
3	2483.50	69.0 PK	74.0	-5.0	1.52 V	338	73.5	-4.5
4	2483.50	52.9 AV	54.0	-1.1	1.52 V	338	57.4	-4.5
5	4924.00	52.5 PK	74.0	-21.5	3.13 V	271	52.2	0.3
6	4924.00	41.5 AV	54.0	-12.5	3.13 V	271	41.2	0.3
7	7386.00	62.3 PK	74.0	-11.7	2.55 V	95	55.7	6.6
8	7386.00	49.4 AV	54.0	-4.6	2.55 V	95	42.8	6.6

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 VHT40	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	59.9 PK	74.0	-14.1	1.00 H	299	64.4	-4.5
2	2390.00	46.1 AV	54.0	-7.9	1.00 H	299	50.6	-4.5
3	*2422.00	110.3 PK			1.00 H	299	114.7	-4.4
4	*2422.00	101.7 AV			1.00 H	299	106.1	-4.4
5	4844.00	49.8 PK	74.0	-24.2	2.51 H	227	49.7	0.1
6	4844.00	40.3 AV	54.0	-13.7	2.51 H	227	40.2	0.1
7	7266.00	59.4 PK	74.0	-14.6	2.04 H	111	53.2	6.2
8	7266.00	47.4 AV	54.0	-6.6	2.04 H	111	41.2	6.2
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	64.1 PK	74.0	-9.9	1.53 V	355	68.6	-4.5
2	2390.00	52.8 AV	54.0	-1.2	1.53 V	355	57.3	-4.5
3	*2422.00	110.5 PK			1.53 V	355	114.9	-4.4
4	*2422.00	102.2 AV			1.53 V	355	106.6	-4.4
5	4844.00	49.7 PK	74.0	-24.3	2.76 V	318	49.6	0.1
6	4844.00	40.9 AV	54.0	-13.1	2.76 V	318	40.8	0.1
7	7266.00	62.0 PK	74.0	-12.0	2.05 V	105	55.8	6.2
8	7266.00	49.6 AV	54.0	-4.4	2.05 V	105	43.4	6.2

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 VHT40	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	*2437.00	110.1 PK			1.00 H	298	114.5	-4.4
2	*2437.00	101.4 AV			1.00 H	298	105.8	-4.4
3	4874.00	51.8 PK	74.0	-22.2	2.53 H	233	51.7	0.1
4	4874.00	41.8 AV	54.0	-12.2	2.53 H	233	41.7	0.1
5	7311.00	61.1 PK	74.0	-12.9	2.24 H	112	54.8	6.3
6	7311.00	49.0 AV	54.0	-5.0	2.24 H	112	42.7	6.3
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	*2437.00	112.6 PK			1.52 V	348	117.0	-4.4
2	*2437.00	104.0 AV			1.52 V	348	108.4	-4.4
3	4874.00	55.1 PK	74.0	-18.9	3.95 V	60	55.0	0.1
4	4874.00	43.3 AV	54.0	-10.7	3.95 V	60	43.2	0.1
5	7311.00	70.6 PK	74.0	-3.4	2.32 V	98	64.3	6.3
6	7311.00	53.4 AV	54.0	-0.6	2.32 V	98	47.1	6.3

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 VHT40	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	106.7 PK			1.00 H	305	111.1	-4.4
2	*2452.00	98.0 AV			1.00 H	305	102.4	-4.4
3	2483.50	66.6 PK	74.0	-7.4	1.00 H	305	71.1	-4.5
4	2483.50	52.6 AV	54.0	-1.4	1.00 H	305	57.1	-4.5
5	4904.00	50.3 PK	74.0	-23.7	2.76 H	232	50.1	0.2
6	4904.00	40.4 AV	54.0	-13.6	2.76 H	232	40.2	0.2
7	7356.00	56.4 PK	74.0	-17.6	2.37 H	109	50.0	6.4
8	7356.00	44.5 AV	54.0	-9.5	2.37 H	109	38.1	6.4
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	108.4 PK			1.36 V	11	112.8	-4.4
2	*2452.00	99.7 AV			1.36 V	11	104.1	-4.4
3	2483.50	67.2 PK	74.0	-6.8	1.36 V	11	71.7	-4.5
4	2483.50	53.3 AV	54.0	-0.7	1.36 V	11	57.8	-4.5
5	4904.00	49.9 PK	74.0	-24.1	2.38 V	278	49.7	0.2
6	4904.00	38.9 AV	54.0	-15.1	2.38 V	278	38.7	0.2
7	7356.00	59.7 PK	74.0	-14.3	2.47 V	95	53.3	6.4
8	7356.00	48.0 AV	54.0	-6.0	2.47 V	95	41.6	6.4

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.

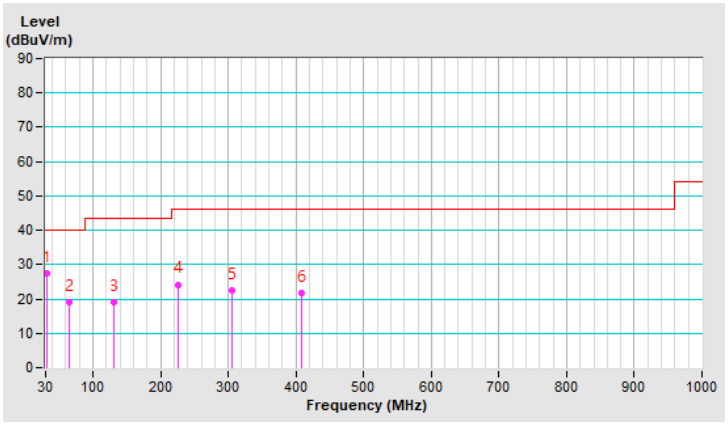
Below 1GHz Data:

RF Mode	TX 802.11b	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	32.01	27.4 QP	40.0	-12.6	1.00 H	86	40.9	-13.5
2	65.26	19.2 QP	40.0	-20.8	1.00 H	80	33.2	-14.0
3	130.10	19.1 QP	43.5	-24.4	1.00 H	94	32.3	-13.2
4	225.02	24.2 QP	46.0	-21.8	1.00 H	60	39.4	-15.2
5	306.23	22.5 QP	46.0	-23.5	1.00 H	119	33.0	-10.5
6	408.88	21.8 QP	46.0	-24.2	1.00 H	302	29.4	-7.6

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.

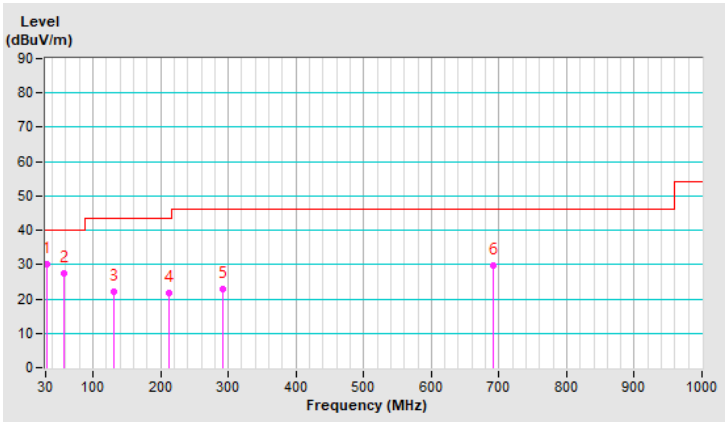


RF Mode	TX 802.11b	Channel	CH 1：2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	32.23	30.0 QP	40.0	-10.0	1.00 V	173	43.6	-13.6
2	57.62	27.3 QP	40.0	-12.7	1.00 V	110	40.4	-13.1
3	131.44	22.2 QP	43.5	-21.3	1.00 V	360	35.3	-13.1
4	213.11	21.6 QP	43.5	-21.9	1.00 V	360	36.7	-15.1
5	292.14	22.9 QP	46.0	-23.1	1.00 V	61	33.9	-11.0
6	691.47	29.6 QP	46.0	-16.4	1.00 V	216	30.3	-0.7

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 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. 26, 2021	Mar. 25, 2022
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: July 24, 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.

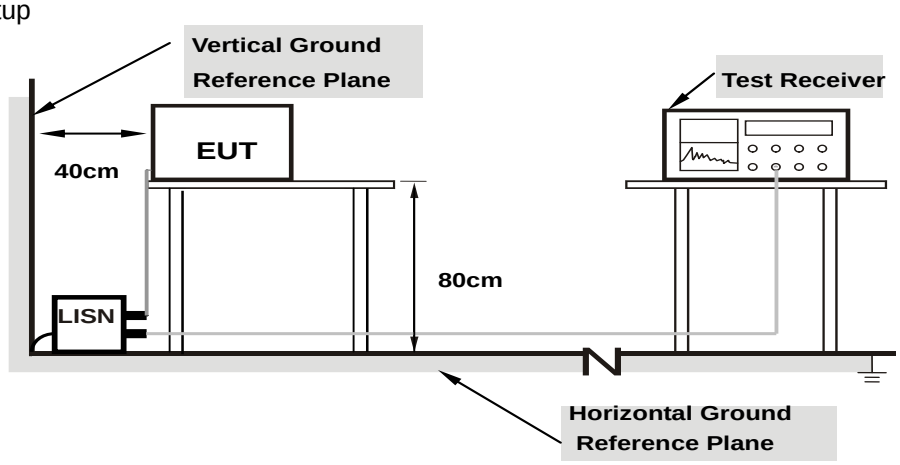
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 802.11b	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	9.95	39.74	22.54	49.69	32.49	66.00	56.00	-16.31	-23.51
2	0.16953	9.97	36.89	22.98	46.86	32.95	64.98	54.98	-18.12	-22.03
3	**0.34922**	**10.00**	**34.24**	**29.42**	**44.24**	**39.42**	**58.98**	**48.98**	**-14.74**	**-9.56**
4	3.48438	10.21	13.88	4.15	24.09	14.36	56.00	46.00	-31.91	-31.64
5	5.74219	10.39	11.79	5.06	22.18	15.45	60.00	50.00	-37.82	-34.55
6	13.80469	11.06	10.00	5.04	21.06	16.10	60.00	50.00	-38.94	-33.90

Remarks:

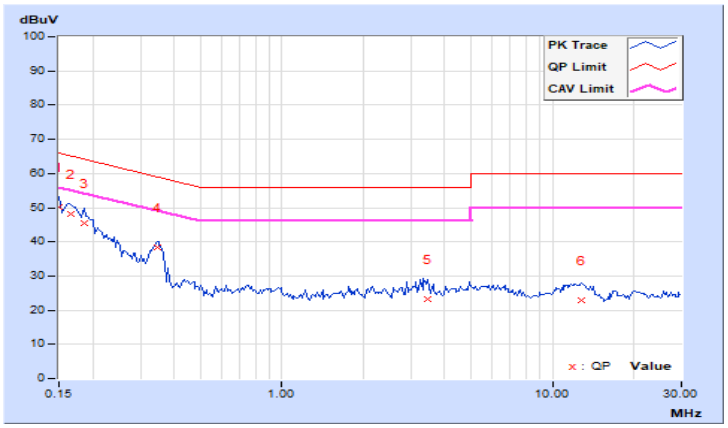
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

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	0.15000	9.97	40.21	24.04	50.18	34.01	66.00	56.00	-15.82	-21.99
2	0.16562	9.98	38.20	25.69	48.18	35.67	65.18	55.18	-17.00	-19.51
3	0.18516	10.00	35.50	21.90	45.50	31.90	64.25	54.25	-18.75	-22.35
4	0.34531	10.03	28.23	22.93	38.26	32.96	59.07	49.07	-20.81	-16.11
5	3.47656	10.24	13.10	4.56	23.34	14.80	56.00	46.00	-32.66	-31.20
6	12.79688	10.82	12.10	6.60	22.92	17.42	60.00	50.00	-37.08	-32.58

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

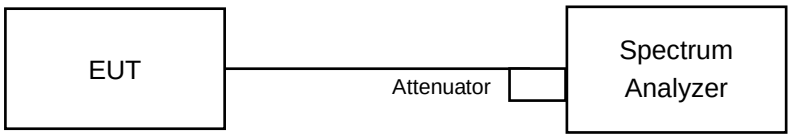


4.3 6dB Bandwidth Measurement

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	9.55	9.12	0.5	PASS
6	2437	8.09	8.1	0.5	PASS
11	2462	8.58	8.11	0.5	PASS

802.11g

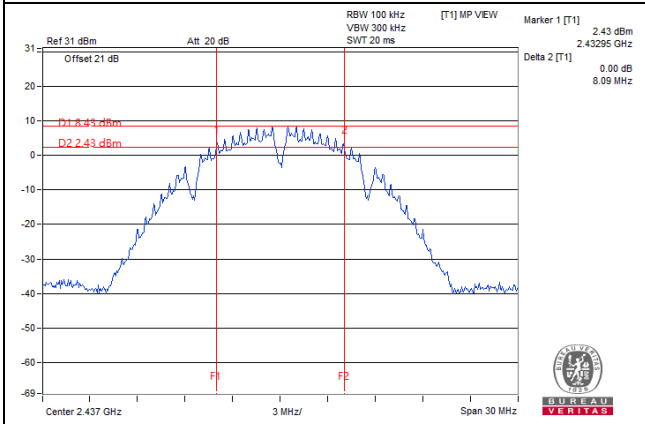
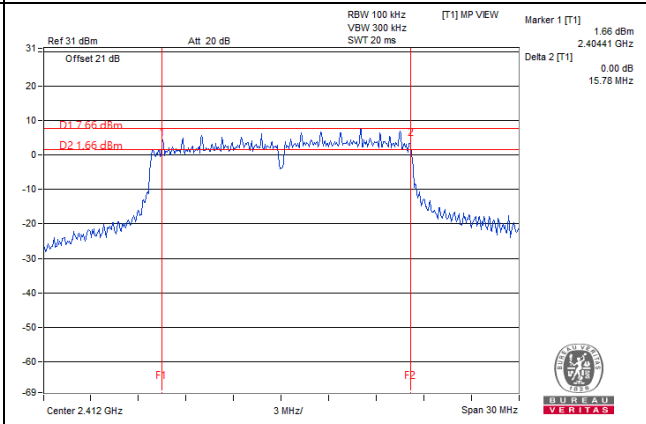
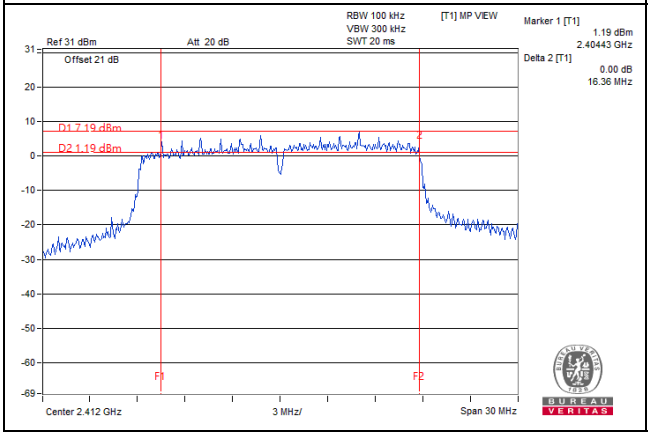
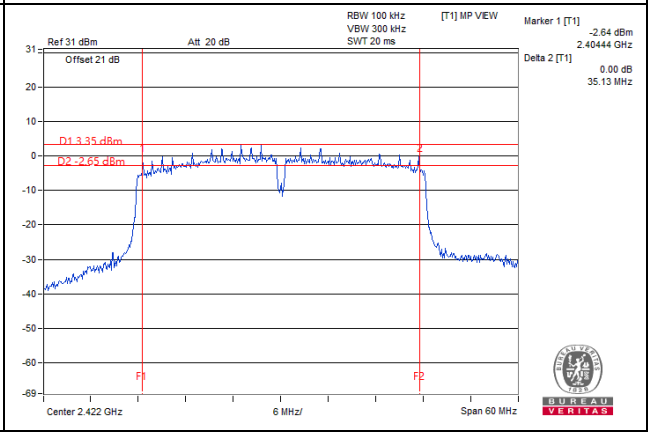
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	16.39	15.78	0.5	PASS
6	2437	16.39	16.41	0.5	PASS
11	2462	16.37	16.42	0.5	PASS

VHT20

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.23	16.36	0.5	PASS
6	2437	17.64	17.65	0.5	PASS
11	2462	17.65	17.68	0.5	PASS

VHT40

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
3	2422	35.26	35.13	0.5	PASS
6	2437	35.24	35.48	0.5	PASS
9	2452	36.04	35.5	0.5	PASS

Spectrum Plot of Worst Value	
802.11b / Chain 0 : CH6	**802.11g / Chain 1 : CH1**
	
VHT20 / Chain 1 : CH1	**VHT40 / Chain 1 : CH3**
	

4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

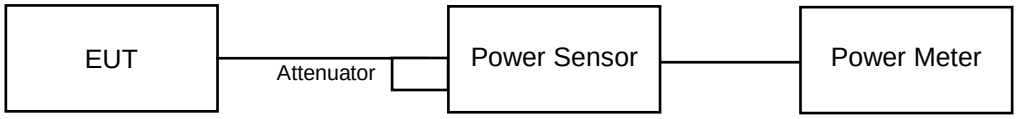
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

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

CDD Mode

802.11b

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.28	21.36	271.049	24.33	30	Pass
6	2437	16.55	16.72	92.175	19.65	30	Pass
11	2462	16.56	16.72	92.279	19.65	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	18.36	18.32	136.469	21.35	30	Pass
6	2437	16.76	16.85	95.841	19.82	30	Pass
11	2462	16.24	16.29	84.633	19.28	30	Pass

VHT20

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.87	18.04	124.915	20.97	30	Pass
6	2437	17.27	17.54	110.088	20.42	30	Pass
11	2462	15.33	15.57	70.177	18.46	30	Pass

VHT40

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.39	16.65	89.789	19.53	30	Pass
6	2437	17.75	18.32	127.487	21.05	30	Pass
9	2452	14.53	14.68	57.756	17.62	30	Pass

Beamforming Mode

VHT20

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	17.87	18.04	124.915	20.97	28.75	Pass
6	2437	17.27	17.54	110.088	20.42	28.75	Pass
11	2462	15.33	15.57	70.177	18.46	28.75	Pass

Note: Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 7.25dBi > 6dBi , so the power limit shall be reduced to 30-(7.25-6) = 28.75dBm.

VHT40

Chan.	Frequency (MHz)	Avg. Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	16.39	16.65	89.789	19.53	28.75	Pass
6	2437	17.75	18.32	127.487	21.05	28.75	Pass
9	2452	14.53	14.68	57.756	17.62	28.75	Pass

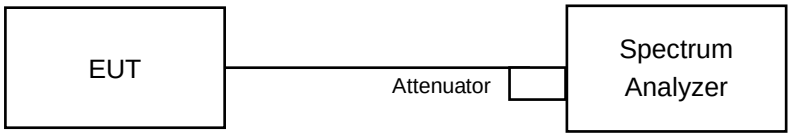
Note: Directional gain = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 7.25dBi > 6dBi , so the power limit shall be reduced to 30-(7.25-6) = 28.75dBm.

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, VHT20

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, VHT40

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 w/o Duty Factor (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1			
1	2412	-9.06	-8.62	-5.82	6.75	PASS
6	2437	-13.94	-13.98	-10.95	6.75	PASS
11	2462	-13.78	-13.73	-10.74	6.75	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 = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 7.25dBi > 6dBi , so the power limit shall be reduced to 8-(7.25-6) = 6.75dBm.

802.11g

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1				
1	2412	-14.04	-14.85	0.18	-11.23	6.75	PASS
6	2437	-15.02	-16.49	0.18	-12.50	6.75	PASS
11	2462	-16.43	-17.06	0.18	-13.54	6.75	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 = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 7.25dBi > 6dBi , so the power limit shall be reduced to 8-(7.25-6) = 6.75dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

VHT20

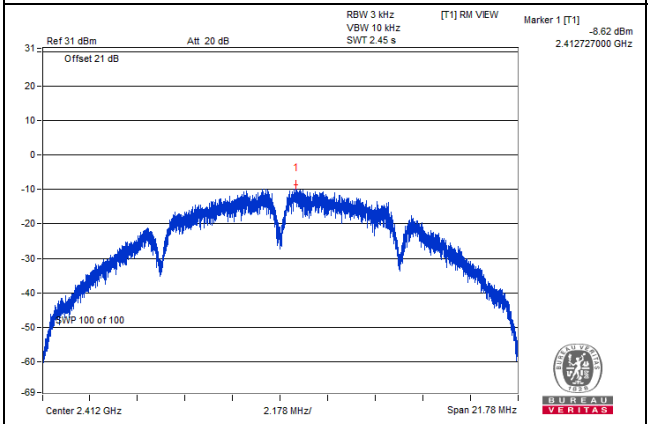
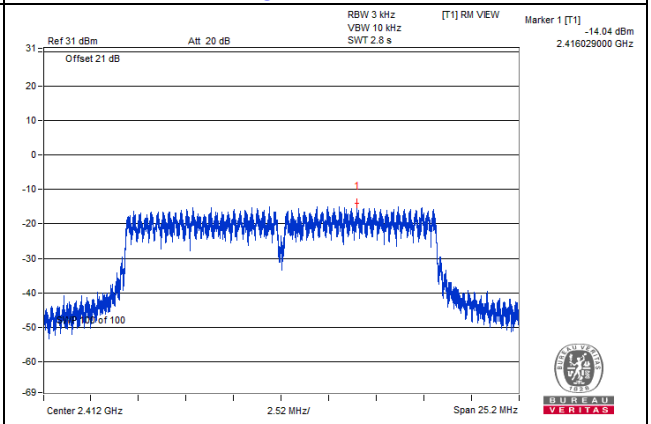
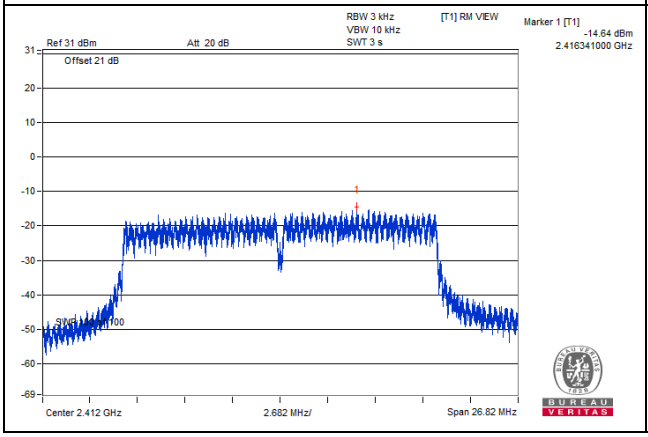
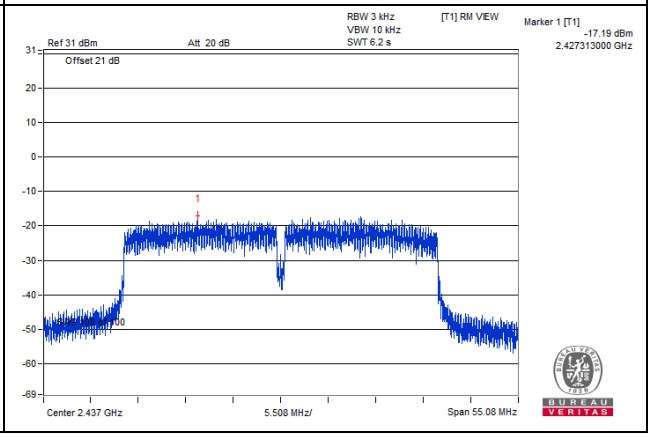
Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1			
1	2412	-14.85	-14.64	-11.73	6.75	PASS
6	2437	-15.73	-15.15	-12.42	6.75	PASS
11	2462	-17.71	-18.02	-14.85	6.75	PASS

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 = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 7.25dBi > 6dBi , so the power limit shall be reduced to 8-(7.25-6) = 6.75dBm.

VHT40

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Duty Factor (dB)	Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1				
3	2422	-18.29	-18.32	0.17	-15.13	6.75	PASS
6	2437	-17.34	-17.19	0.17	-14.09	6.75	PASS
9	2452	-21.09	-20.92	0.17	-17.83	6.75	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 = 10 log[($10^{G0/20}$ + $10^{G1/20}$)^2 / 2] = 7.25dBi > 6dBi , so the power limit shall be reduced to 8-(7.25-6) = 6.75dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

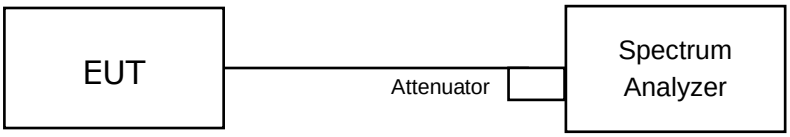
Spectrum Plot of Worst Value	
802.11b / Chain 1 : CH1	**802.11g / Chain 0 : CH1**
	
VHT20 / Chain 1 : CH1	**VHT40 / Chain 1 : CH6**
	

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

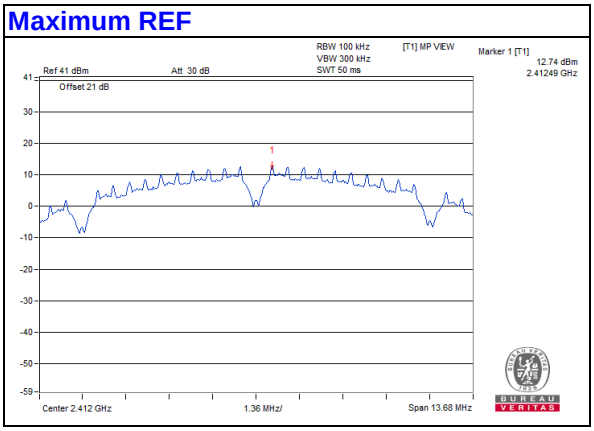
Same as Item 4.3.6

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.

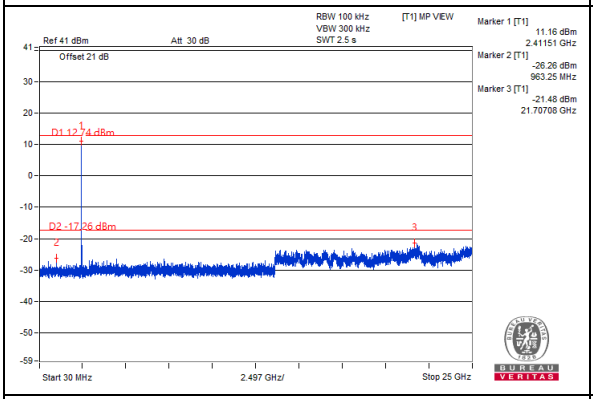
802.11b

Maximum REF

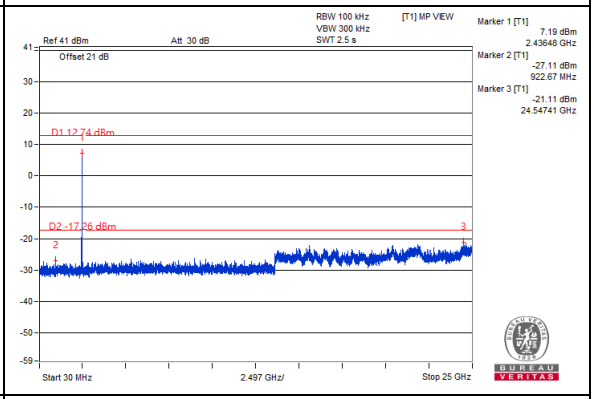


Chain 0

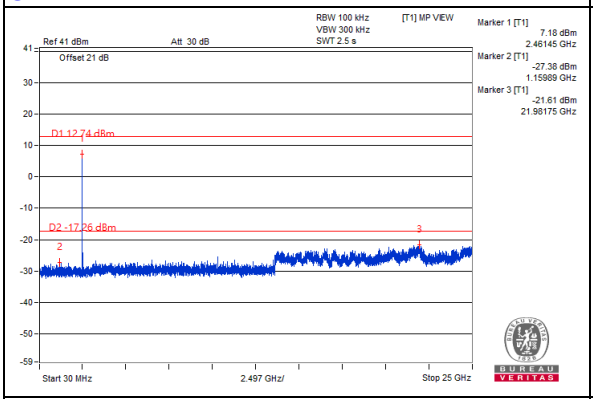
CH 1



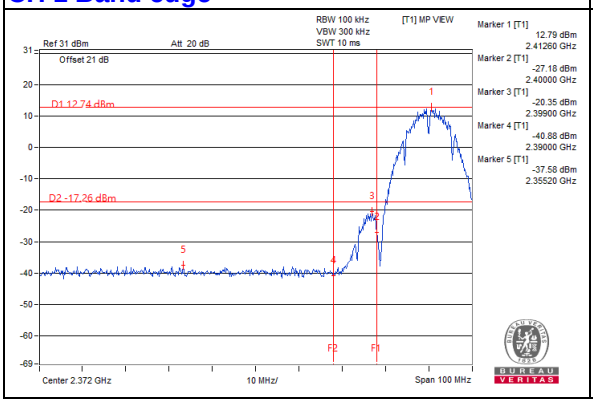
CH 6



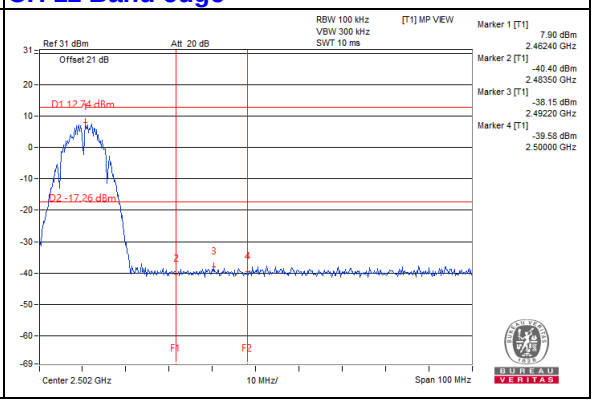
CH 11



CH 1 Band edge

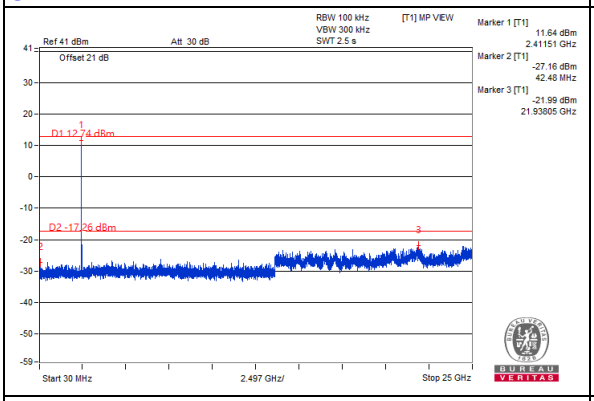


CH 11 Band edge

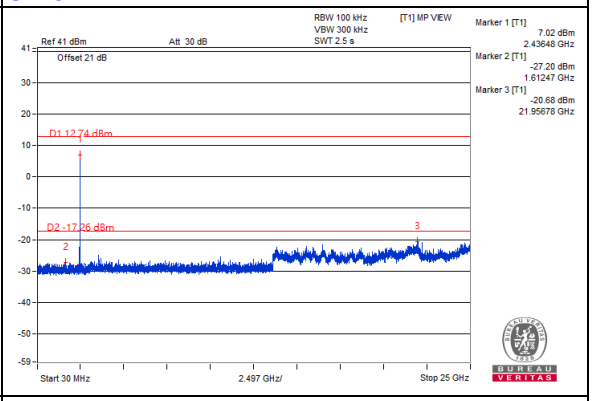


Chain 1

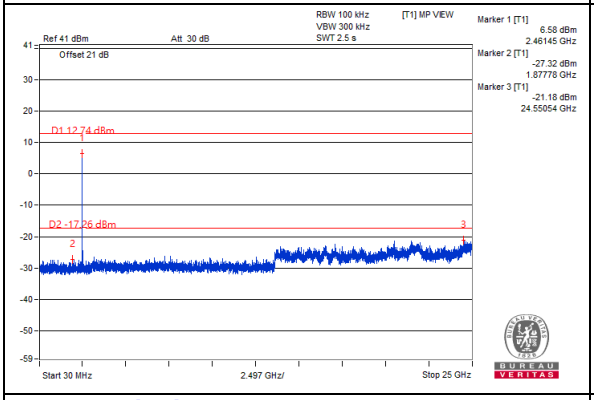
CH 1



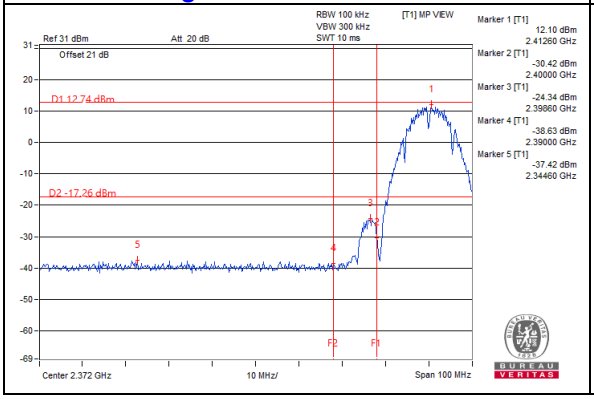
CH 6



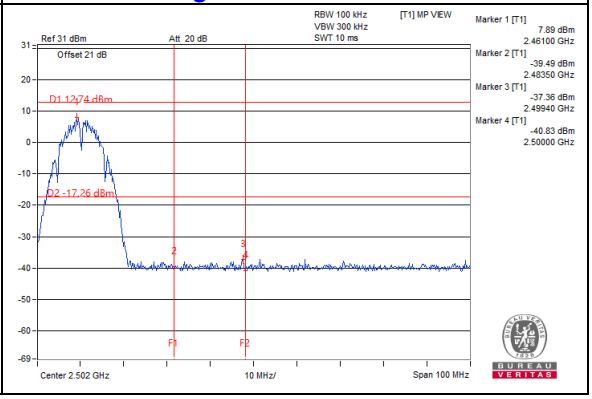
CH 11



CH 1 Band edge

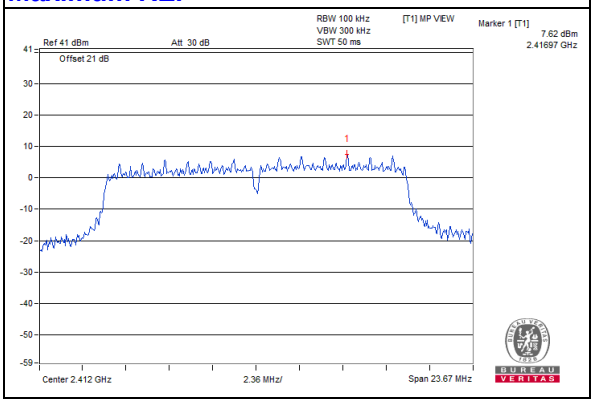


CH 11 Band edge



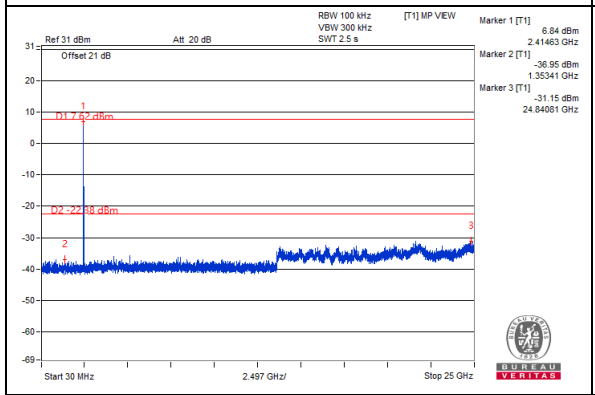
802.11g

Maximum REF

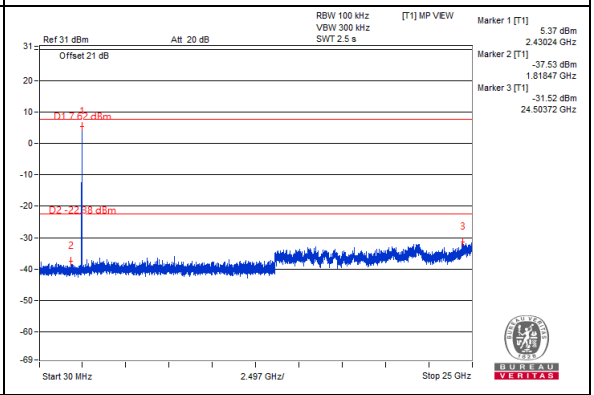


Chain 0

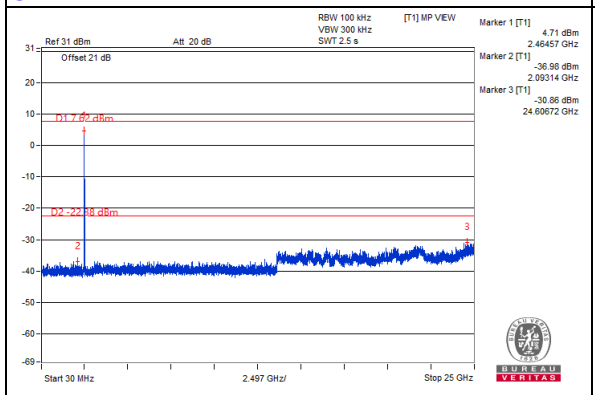
CH 1



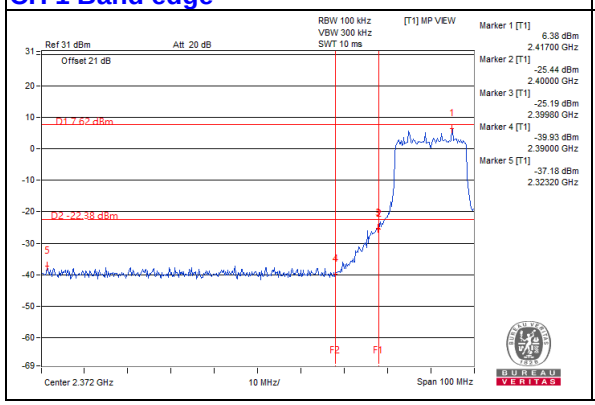
CH 6



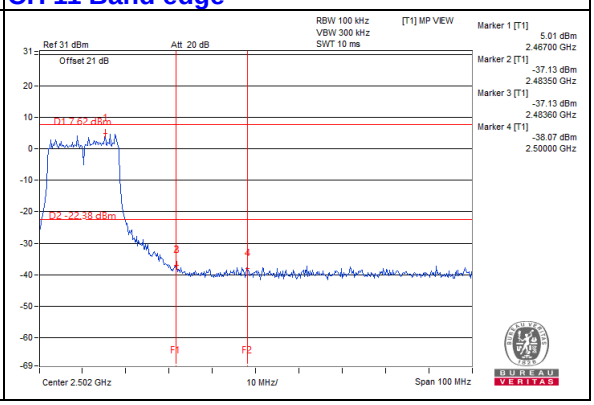
CH 11



CH 1 Band edge

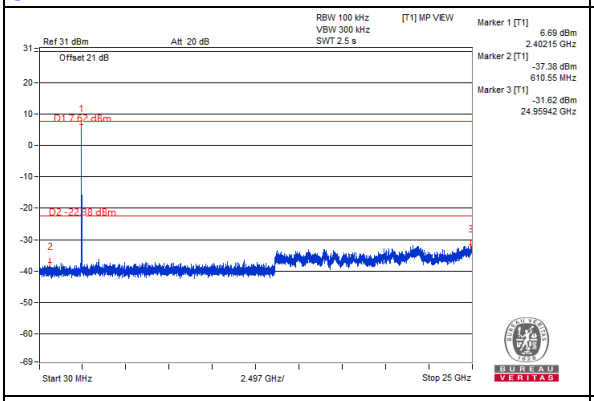


CH 11 Band edge

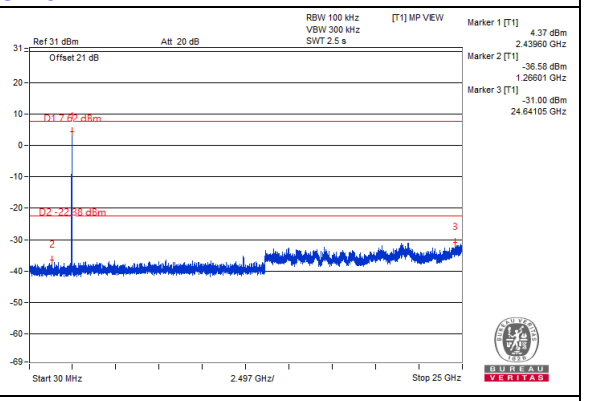


Chain 1

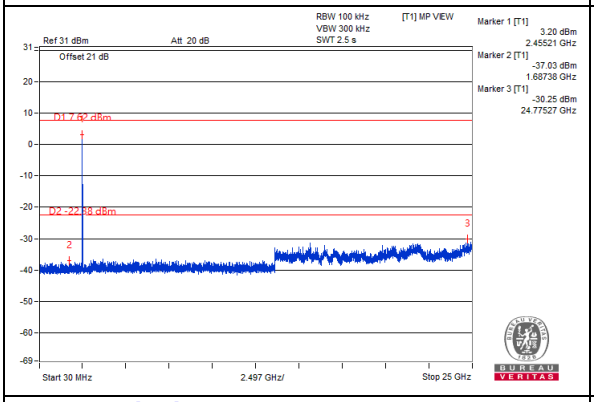
CH 1



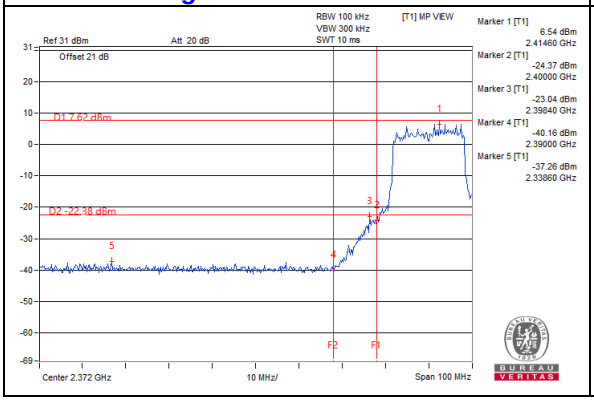
CH 6



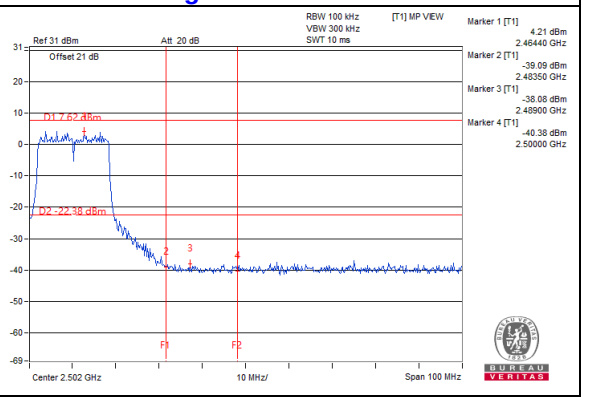
CH 11



CH 1 Band edge

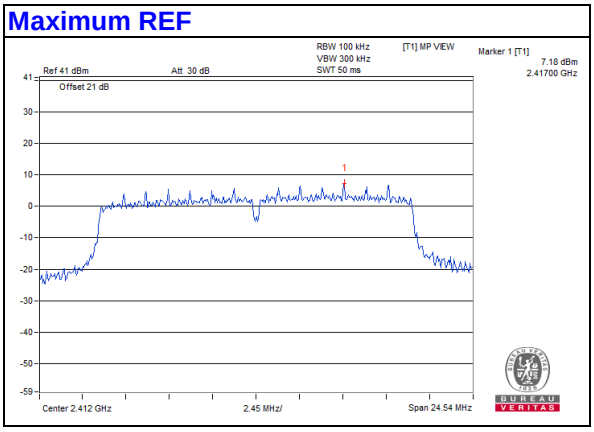


CH 11 Band edge



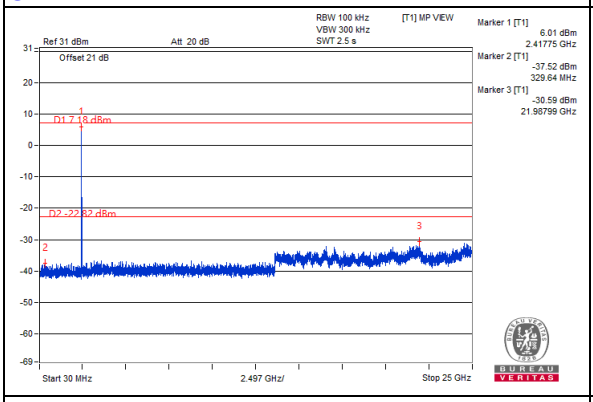
VHT20

Maximum REF

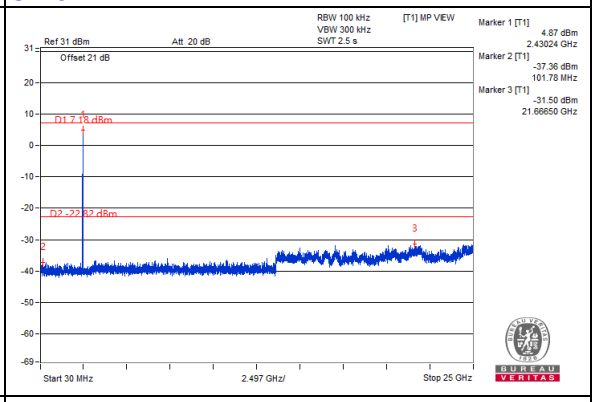


Chain 0

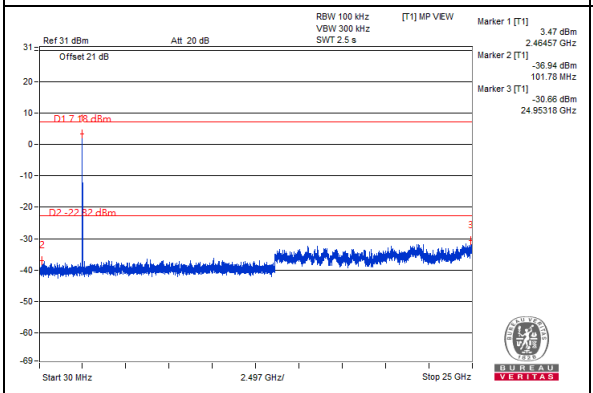
CH 1



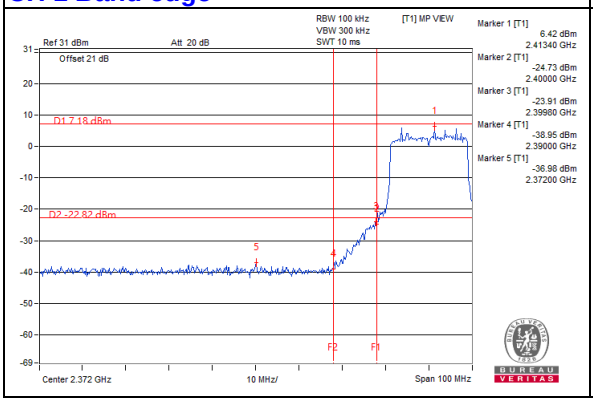
CH 6



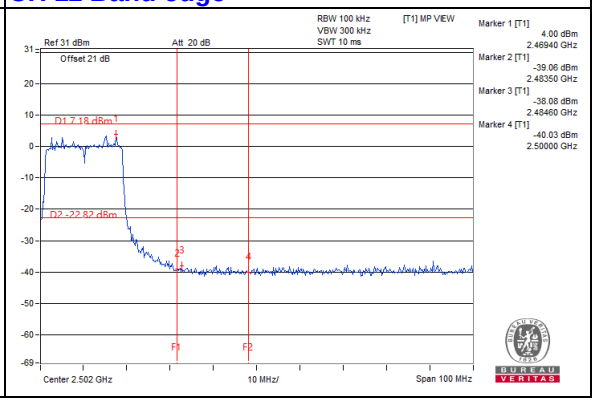
CH 11



CH 1 Band edge

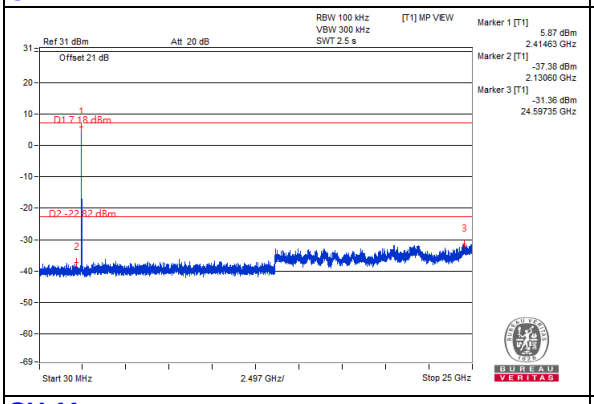


CH 11 Band edge

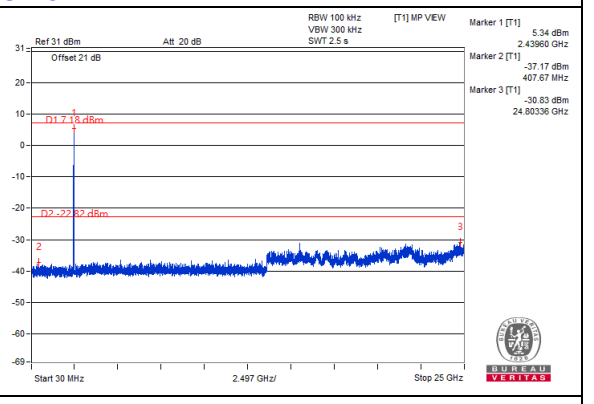


Chain 1

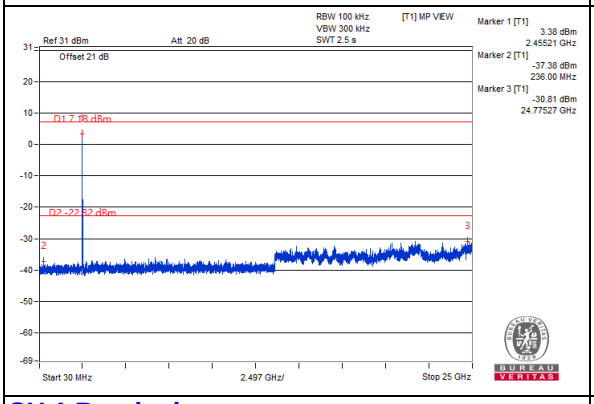
CH 1



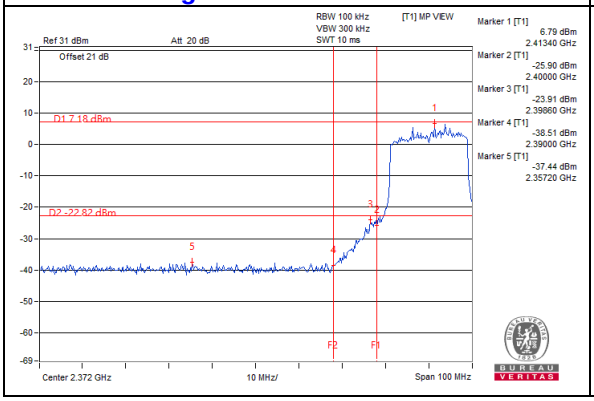
CH 6



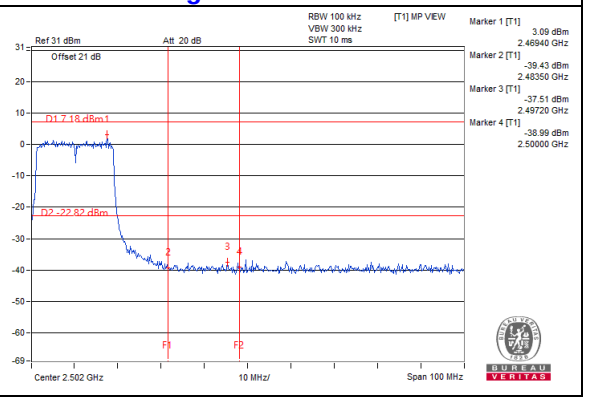
CH 11



CH 1 Band edge

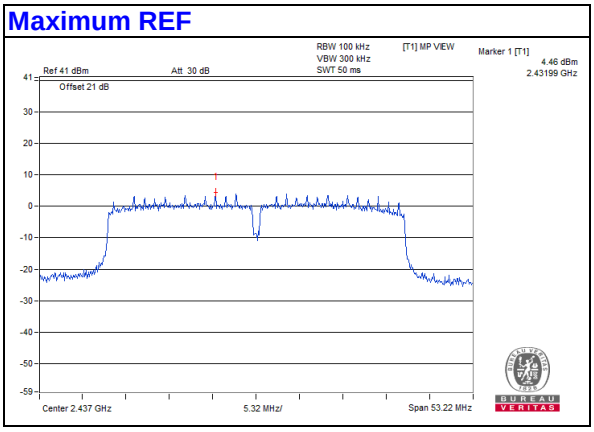


CH 11 Band edge



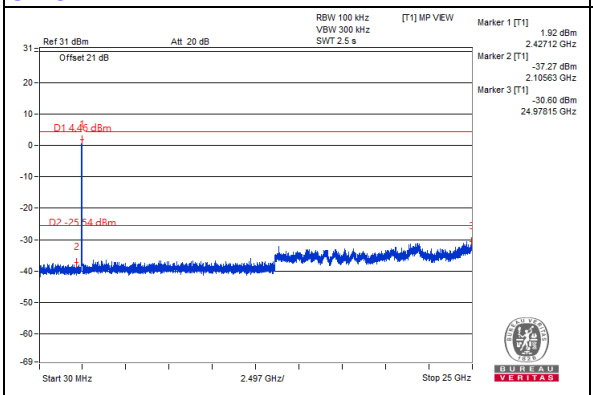
VHT40

Maximum REF

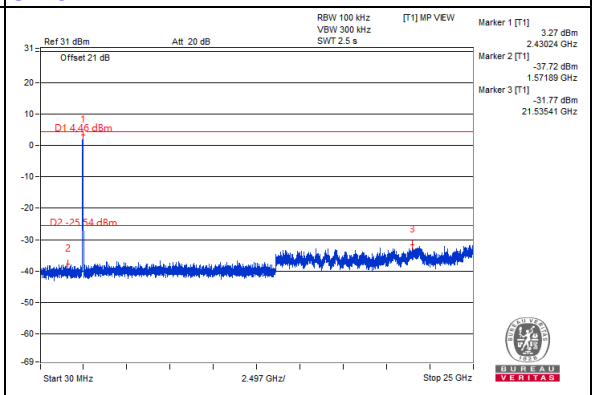


Chain 0

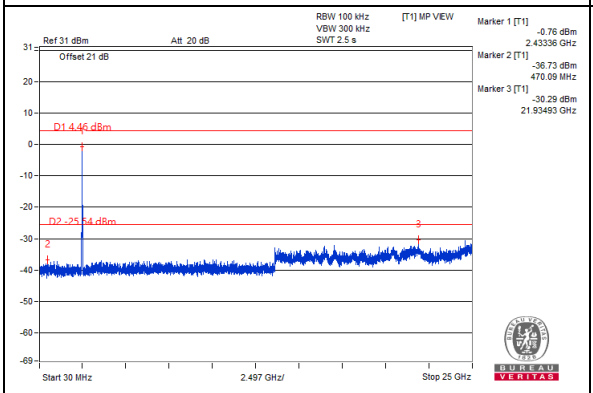
CH 3



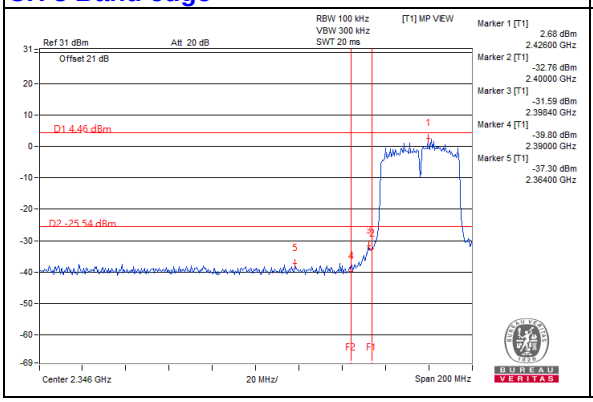
CH 6



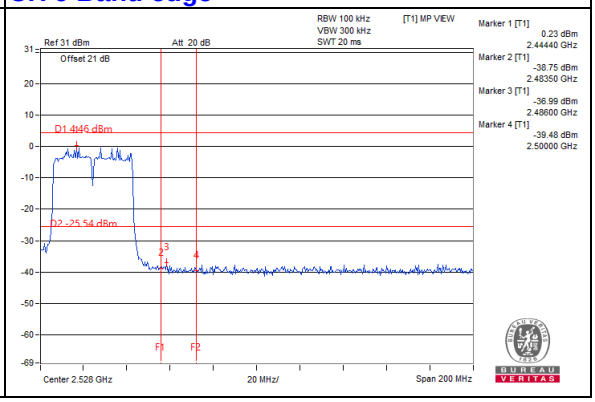
CH 9



CH 3 Band edge

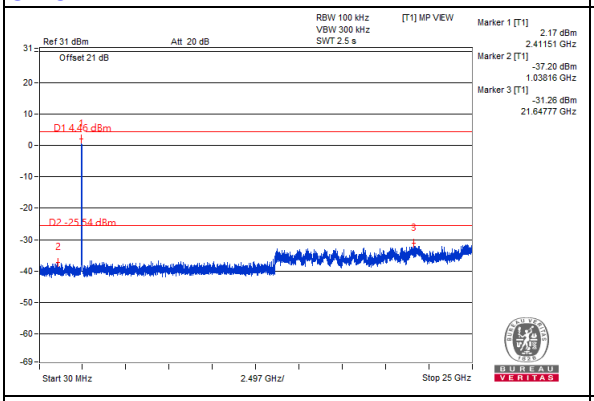


CH 9 Band edge

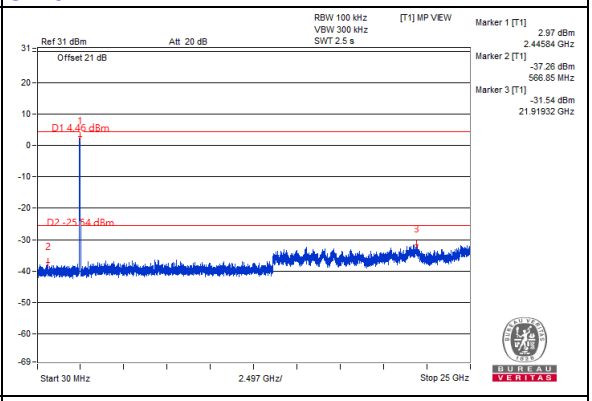


Chain 1

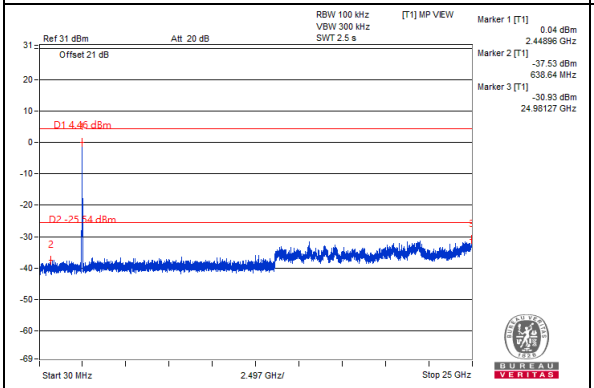
CH 3



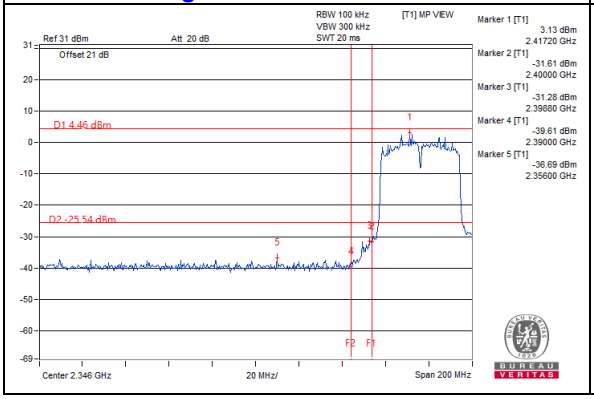
CH 6



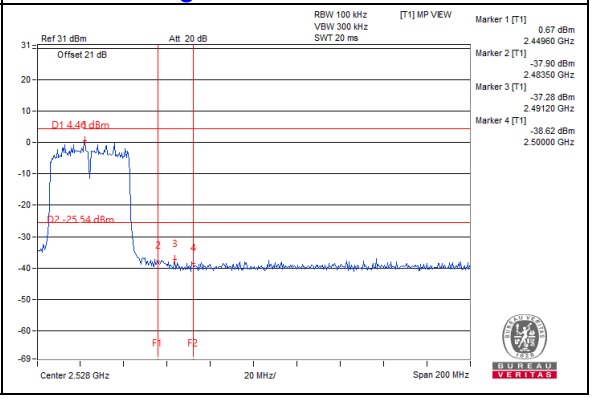
CH 9



CH 3 Band edge



CH 9 Band edge



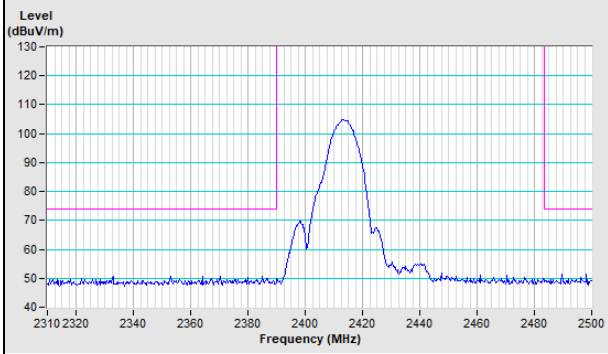
5 Pictures of Test Arrangements

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

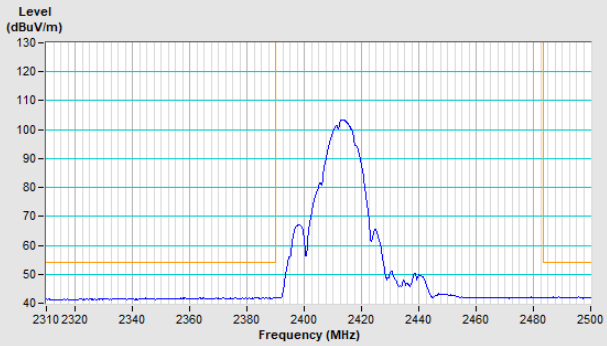
Annex A - Band-Edge Measurement

802.11b Channel 1

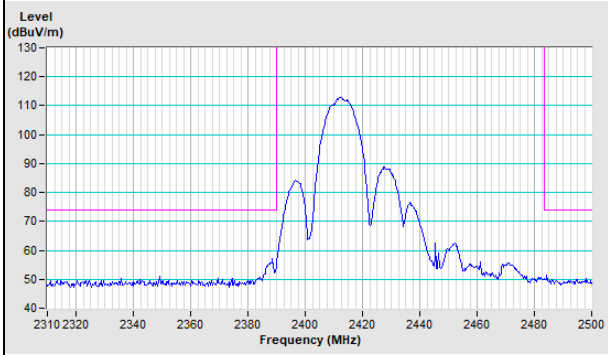
Horizontal (Peak)



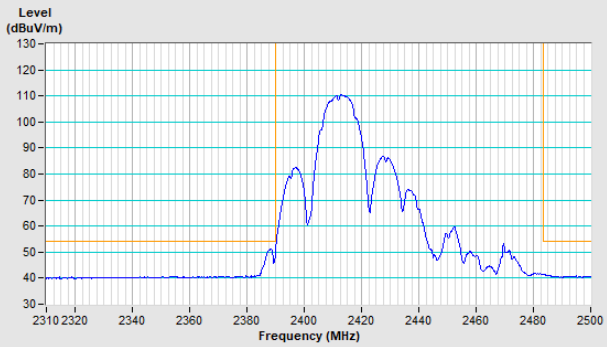
Horizontal (Average)



Vertical (Peak)

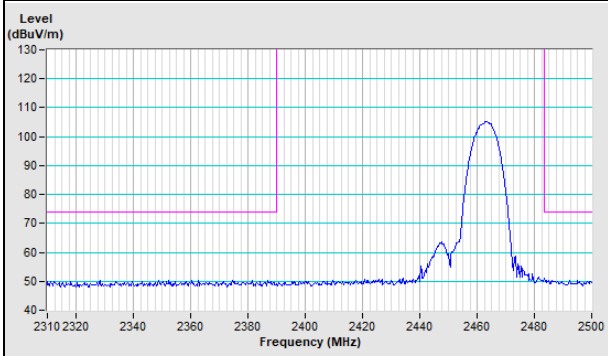


Vertical (Average)

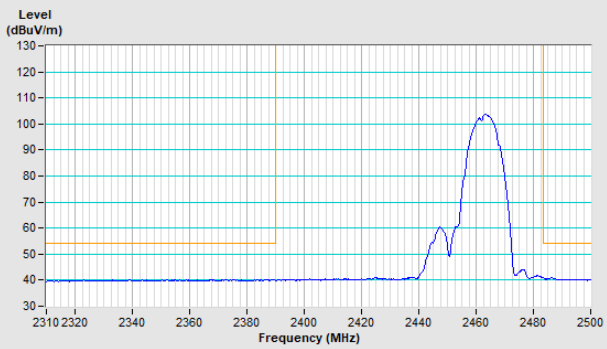


802.11b Channel 11

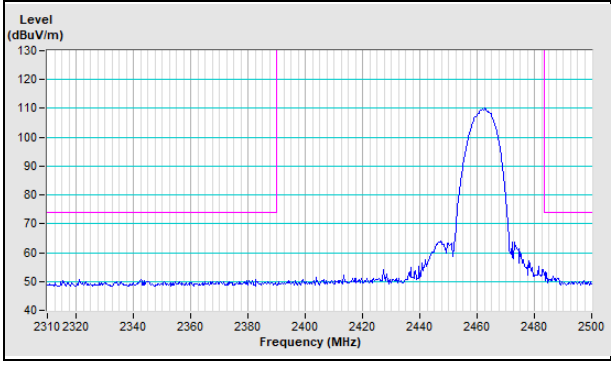
Horizontal (Peak)



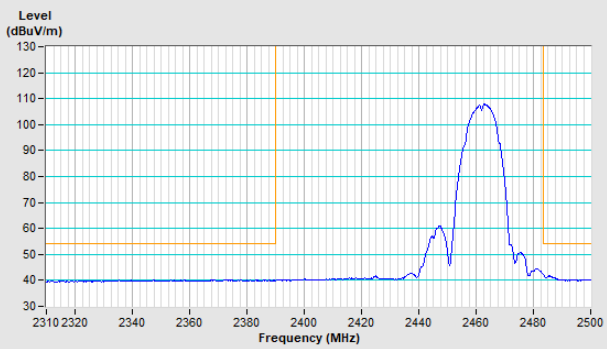
Horizontal (Average)



Vertical (Peak)

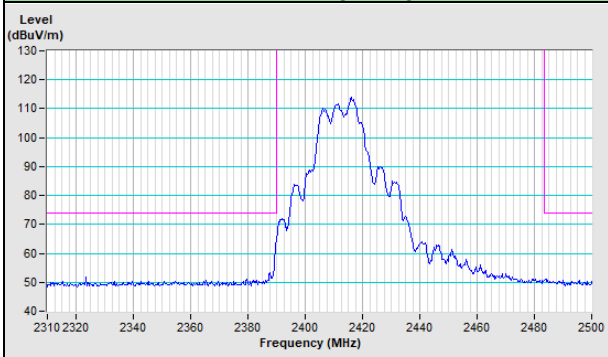


Vertical (Average)

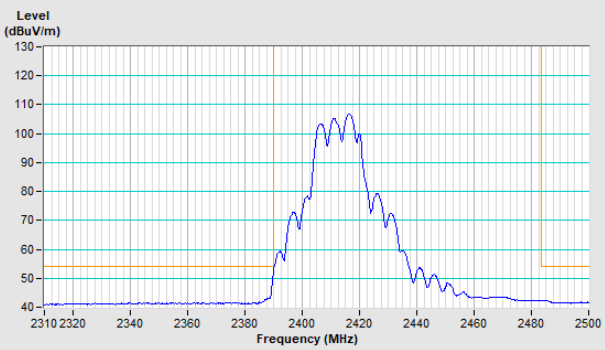


802.11g Channel 1

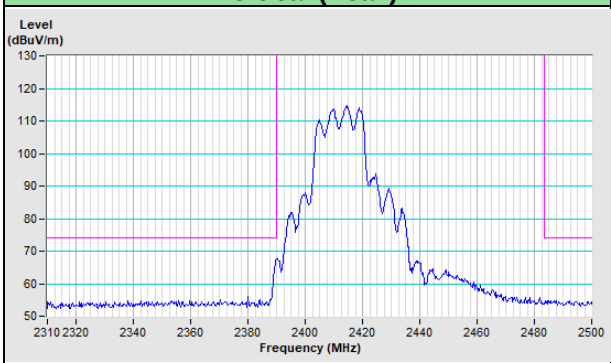
Horizontal (Peak)



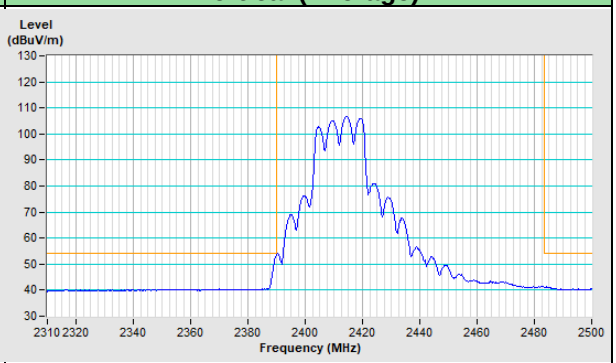
Horizontal (Average)



Vertical (Peak)

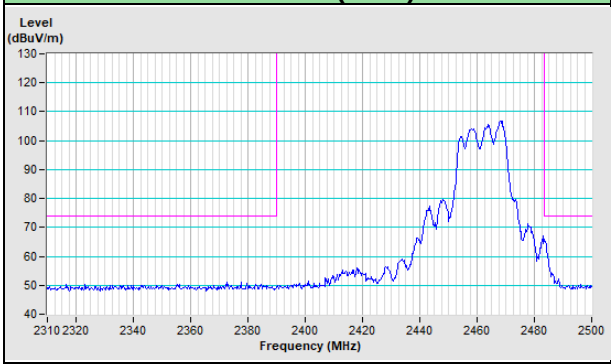


Vertical (Average)

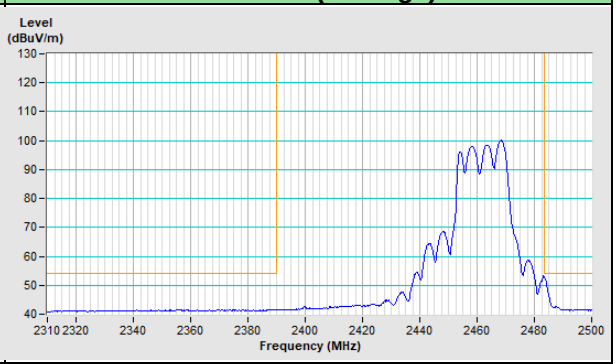


802.11g Channel 11

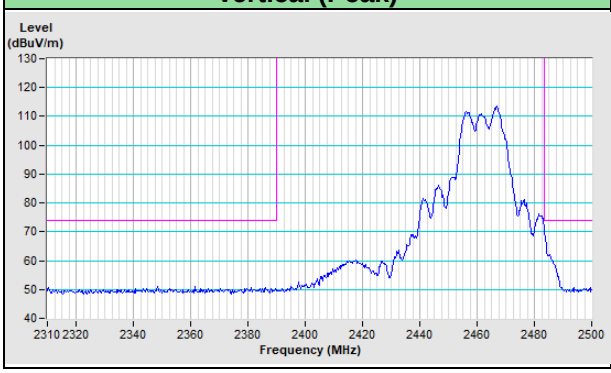
Horizontal (Peak)



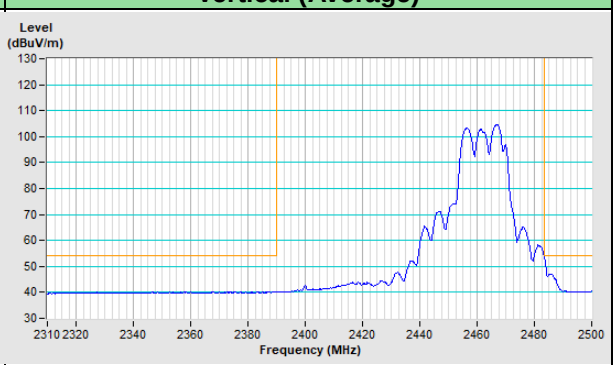
Horizontal (Average)



Vertical (Peak)

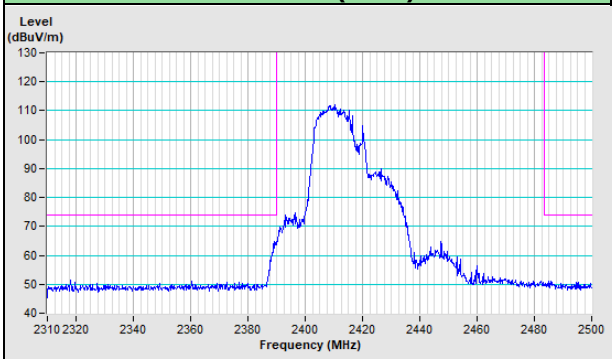


Vertical (Average)

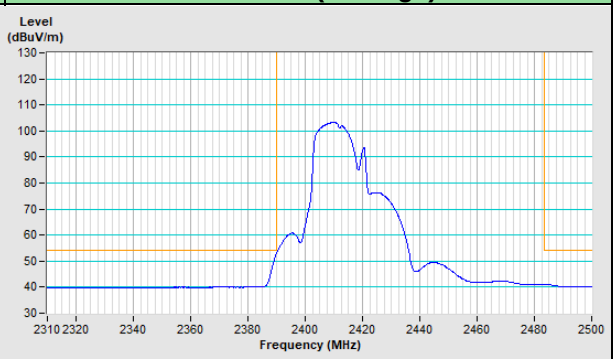


VHT20 Channel 1

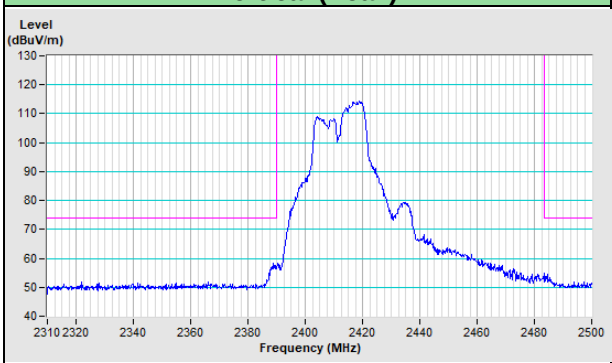
Horizontal (Peak)



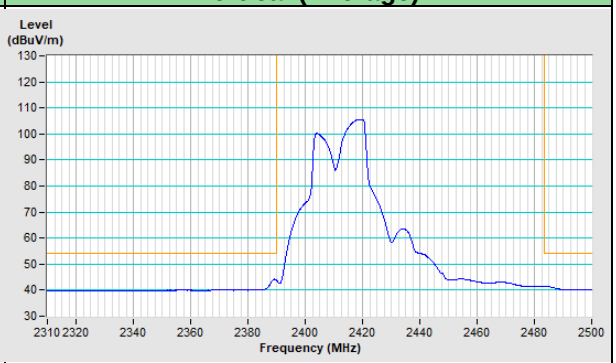
Horizontal (Average)



Vertical (Peak)

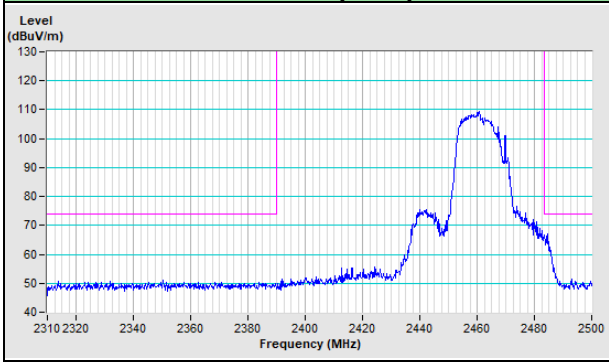


Vertical (Average)

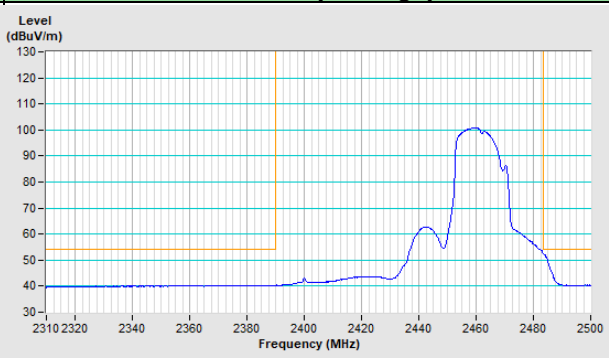


VHT20 Channel 11

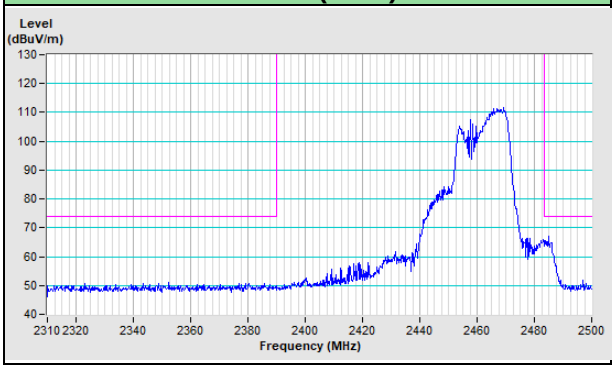
Horizontal (Peak)



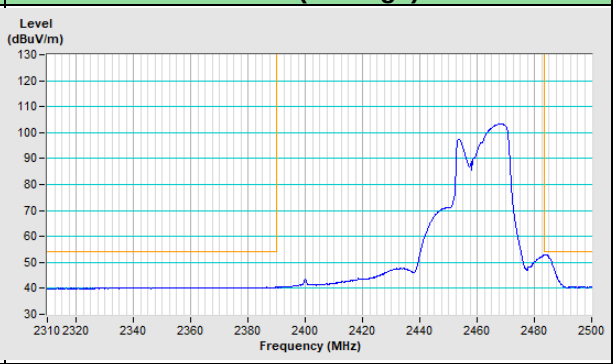
Horizontal (Average)



Vertical (Peak)

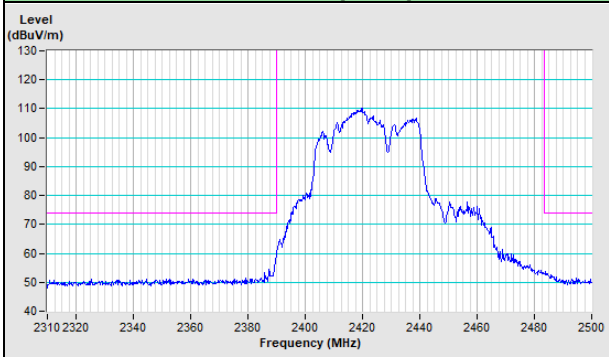


Vertical (Average)

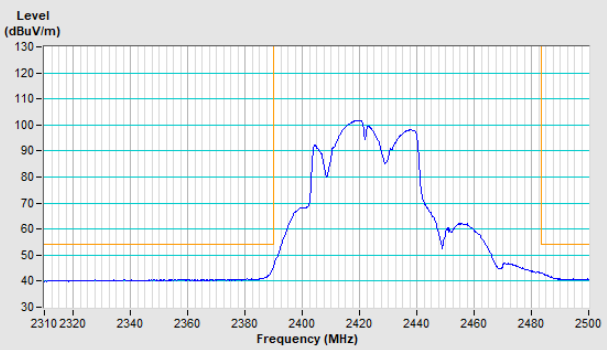


VHT40 Channel 3

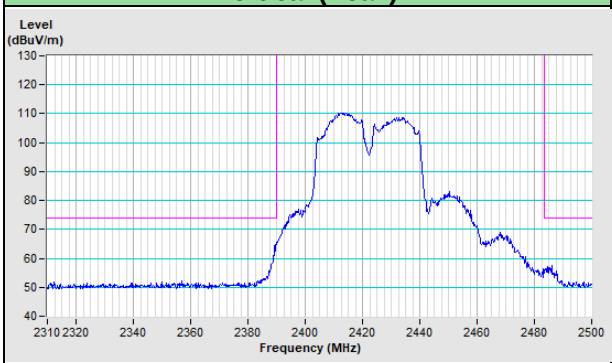
Horizontal (Peak)



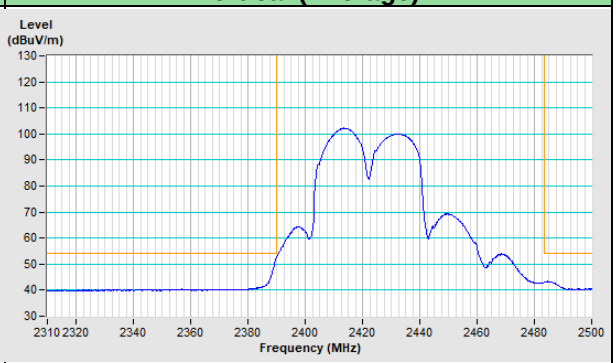
Horizontal (Average)



Vertical (Peak)

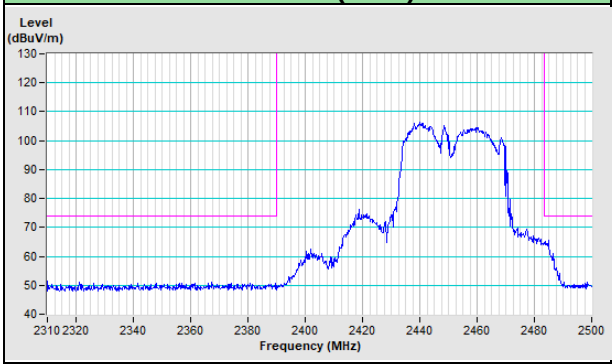


Vertical (Average)

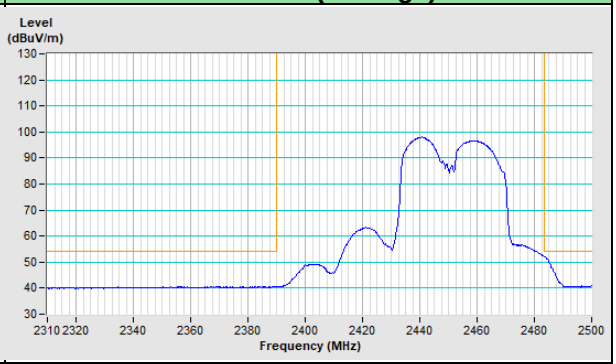


VHT40 Channel 9

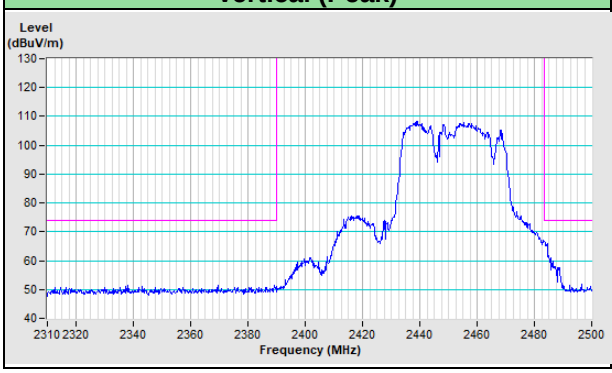
Horizontal (Peak)



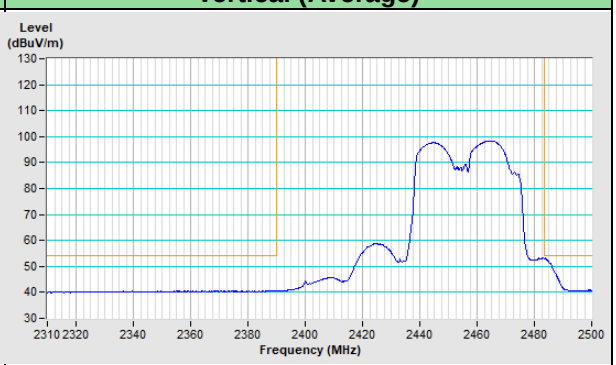
Horizontal (Average)



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

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