

FCC Test Report (2.4GHz WLAN)

Report No.: RFBCYA-WTW-P21030934

FCC ID: YAIWB17

Test Model: WB17

Received Date: Mar. 25, 2021

Test Date: May 12 to June 03, 2021

Issued Date: July 21, 2021

Applicant: InnoComm Mobile Technology Corporation

Address: 3F, No. 6, Hsin Ann Rd., Hsinchu Science Park, Hsinchu 300092, 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



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

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 (2.4GHz WLAN)	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	14
3.5 General Description of Applied Standards and References	15
4 Test Types and Results	16
4.1 Radiated Emission and Bandedge Measurement.....	16
4.1.1 Limits of Radiated Emission and Bandedge Measurement	16
4.1.2 Test Instruments	17
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 (Mode 1).....	23
4.1.8 Test Results (Mode 2).....	34
4.2 Conducted Emission Measurement	45
4.2.1 Limits of Conducted Emission Measurement	45
4.2.2 Test Instruments	45
4.2.3 Test Procedures.....	46
4.2.4 Deviation from Test Standard	46
4.2.5 Test Setup.....	46
4.2.6 EUT Operating Conditions.....	46
4.2.7 Test Results	47
4.3 6dB Bandwidth Measurement	49
4.3.1 Limits of 6dB Bandwidth Measurement	49
4.3.2 Test Setup.....	49
4.3.3 Test Instruments	49
4.3.4 Test Procedure	49
4.3.5 Deviation from Test Standard	49
4.3.6 EUT Operating Conditions.....	49
4.3.7 Test Result.....	50
4.4 Conducted Output Power Measurement.....	52
4.4.1 Limits of Conducted Output Power Measurement	52
4.4.2 Test Setup.....	52
4.4.3 Test Instruments	52
4.4.4 Test Procedures.....	52
4.4.5 Deviation from Test Standard	52
4.4.6 EUT Operating Conditions.....	52
4.4.7 Test Results	53
4.5 Power Spectral Density Measurement.....	55
4.5.1 Limits of Power Spectral Density Measurement	55
4.5.2 Test Setup.....	55
4.5.3 Test Instruments	55
4.5.4 Test Procedure	55
4.5.5 Deviation from Test Standard	55

4.5.6 EUT Operating Condition	55
4.5.7 Test Results	56
4.6 Conducted Out of Band Emission Measurement	58
4.6.1 Limits of Conducted Out of Band Emission Measurement.....	58
4.6.2 Test Setup.....	58
4.6.3 Test Instruments	58
4.6.4 Test Procedure	58
4.6.5 Deviation from Test Standard	58
4.6.6 EUT Operating Condition	58
4.6.7 Test Results	58
5 Pictures of Test Arrangements.....	63
Annex A - Band-Edge Measurement.....	64
Appendix – Information of the Testing Laboratories	70

Release Control Record

Issue No.	Description	Date Issued
RFBCYA-WTW-P21030934	Original release.	July 21, 2021

1 Certificate of Conformity

Product: Wireless Audio Module

Brand: InnoComm

Test Model: WB17

Sample Status: Engineering sample

Applicant: InnoComm Mobile Technology Corporation

Test Date: May 12 to June 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 :  , **Date:** July 21, 2021
Claire Kuan / Specialist

Approved by :  , **Date:** July 21, 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 -13.63 dB at 0.57578 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.5dB at 2390.00 MHz
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

Note:

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	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 (2.4GHz WLAN)

Product	Wireless Audio Module
Brand	InnoComm
Test Model	WB17
Status of EUT	Engineering sample
Power Supply Rating	5 Vdc from host equipment
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: 5.18~5.32GHz, 5.50~5.72GHz, 5.745 ~ 5.825GHz
Number of Channel	2.4GHz: 802.11b, 802.11g, 802.11n (HT20): 11 5GHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 25 802.11n (HT40), 802.11ac (VHT40): 12 802.11ac (VHT80): 6
Output Power	2.412 ~ 2.472 GHz: 503.631 mW 5.18 ~ 5.24 GHz: 83.56 mW 5.26 ~ 5.32 GHz: 60.509 mW 5.5 ~ 5.72 GHz: 40.07 mW 5.745 ~ 5.825 GHz: 62.23 mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. There are Bluetooth and WLAN (2.4GHz & 5GHz) technology used for the EUT.
2. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (2.4GHz)	Bluetooth
2	WLAN (5GHz)	Bluetooth

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

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

Antenna Set	RF Chain No.	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
Ant. Set 1	0	5.26	2.4~2.4835GHz	PCB	i-pex(MHF)	172
		6.27	5.15~5.85GHz			
	1	5.26	2.4~2.4835GHz	PCB	i-pex(MHF)	172
		6.27	5.15~5.85GHz			
	BT	5.26	2.4~2.4835GHz	PCB	i-pex(MHF)	172
Ant. Set 2	0	5	2.4~2.4835GHz	Dipole	i-pex(MHF)	NA
		5	5.15~5.85GHz			
	1	5	2.4~2.4835GHz	Dipole	i-pex(MHF)	NA
		5	5.15~5.85GHz			
	BT	5	2.4~2.4835GHz	PCB	i-pex(MHF)	NA
Ant. Set 3	0	-0.96	2.4~2.4835GHz	PCB	i-pex(MHF)	520
		-1.35	5.15~5.85GHz			
	1	-0.96	2.4~2.4835GHz	PCB	i-pex(MHF)	520
		-1.35	5.15~5.85GHz			
	BT	-0.96	2.4~2.4835GHz	PCB	i-pex(MHF)	520
Ant. Set 4	0	4.56	2.4~2.4835GHz	PCB	i-pex(MHF)	210
		2.09	5.15~5.85GHz			
	1	4.56	2.4~2.4835GHz	PCB	i-pex(MHF)	210
		2.09	5.15~5.85GHz			
	BT	4.56	2.4~2.4835GHz	PCB	i-pex(MHF)	210
Ant. Set 5	0	2.9	2.4~2.4835GHz	PCB	i-pex(MHF)	250
		2.77	5.15~5.85GHz			
	1	2.9	2.4~2.4835GHz	PCB	i-pex(MHF)	250
		2.77	5.15~5.85GHz			
	BT	2.9	2.4~2.4835GHz	PCB	i-pex(MHF)	250
Ant. Set 6	0	0.94	2.4~2.4835GHz	PCB	i-pex(MHF)	300
		2.91	5.15~5.85GHz			
	1	0.94	2.4~2.4835GHz	PCB	i-pex(MHF)	300
		2.91	5.15~5.85GHz			
	BT	0.94	2.4~2.4835GHz	PCB	i-pex(MHF)	300
Ant. Set 7	0	4.42	2.4~2.4835GHz	PCB	i-pex(MHF)	387
		3.76	5.15~5.85GHz			
	1	4.42	2.4~2.4835GHz	PCB	i-pex(MHF)	387
		3.76	5.15~5.85GHz			
	BT	4.42	2.4~2.4835GHz	PCB	i-pex(MHF)	387
Ant. Set 8	0	2.76	2.4~2.4835GHz	PCB	i-pex(MHF)	245
		-	5.15~5.85GHz			
	1	2.76	2.4~2.4835GHz	PCB	i-pex(MHF)	24
		-	5.15~5.85GHz			
	BT	2.66	2.4~2.4835GHz	PCB	i-pex(MHF)	245
Ant. Set 9	0	5.13	2.4~2.4835GHz	PCB	i-pex(MHF)	228
		-	5.15~5.85GHz			
	1	5.13	2.4~2.4835GHz	PCB	i-pex(MHF)	228
		-	5.15~5.85GHz			
	BT	5.13	2.4~2.4835GHz	PCB	i-pex(MHF)	228

Note: Antenna Set. 1 & 2 was selected for final test.

4. The EUT incorporates a MIMO function:

2.4GHz BAND		
MODULATION MODE	TX & RX CONFIGURATION	
802.11b	1TX Diversity	2RX
802.11g	1TX Diversity	2RX
802.11n (HT20)	2TX	2RX
5GHz Band		
MODULATION MODE	TX & RX CONFIGURATION	
802.11a	1TX Diversity	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: The EUT doesn't support beamforming function.

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

3.2 Description of Test Modes

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
1	√	√	-	-	With Dipole antenna (Ant. Set 2)
2	√	√	√	√	With PCB antenna (Ant. Set 1)

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's PCB antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-place.

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 Parameter
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1Mb/s
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6Mb/s
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0

Radiated Emission Test (Below 1GHz):

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

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

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11b	1 to 11	1	DSSS	DBPSK	1Mb/s

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 Parameter
802.11b	1 to 11	1	DSSS	DBPSK	1Mb/s

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 Parameter
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1Mb/s
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6Mb/s
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested By
RE $\geq$ 1G	25deg. C, 65%RH,	120Vac, 60Hz	Ryan Du Nelson Teng
RE<1G	25deg. C, 65%RH,	120Vac, 60Hz	Ryan Du
PLC	25deg. C, 75%RH	120Vac, 60Hz	Ryan Du
APCM	25deg. C, 60%RH	120Vac, 60Hz	Kevin Ko

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11b: Duty cycle = $20.5 \text{ ms} / 20.569 \text{ ms} = 0.997$

802.11g: Duty cycle = $3.395 \text{ ms} / 3.44 \text{ ms} = 0.987$

802.11n (HT20): Duty cycle = $3.14 \text{ ms} / 3.198 \text{ ms} = 0.982$



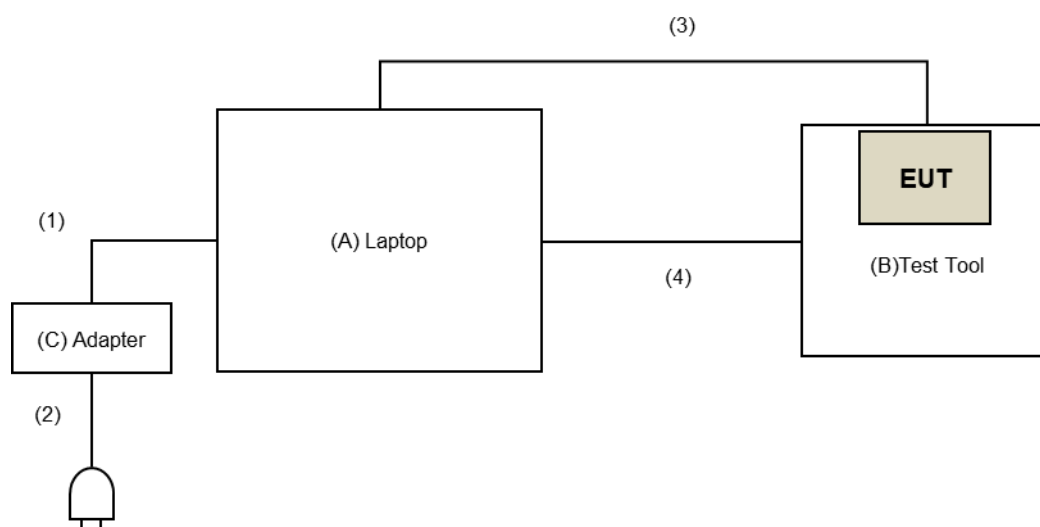
3.4 Description of Support Units

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-28LKK7	NA	Provided by Lab
B.	Test Tool	INNOCOMM	N/A	NA	NA	Supplied by client
C.	Adapter	Lenovo	ADLX45YLC3D	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.8	No	0	Provided by Lab
2.	AC Cable	1	0.9	No	0	Provided by Lab
3.	Micro USB Cable	1	1	Yes	0	Provided by Lab
4.	Micro USB Cable	1	1.2	Yes	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 20dB below the highest level of the desired power:

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

Note:

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

4.1.2 Test Instruments

For Radiated Emission below 1GHz 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 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 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. 16, 2021	Mar. 15, 2022
RF Cable	8D	966-3-2	Mar. 16, 2021	Mar. 15, 2022
RF Cable	8D	966-3-3	Mar. 16, 2021	Mar. 15, 2022
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Sep. 24, 2020	Sep. 23, 2021
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	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: May 29, 2021

For Radiated Emission above 1GHz 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. 11, 2021	Jan. 10, 2022
RF Cable	EMC104-SM-SM-1500	180504	Apr. 26, 2021	Apr. 25, 2022
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. 10, 2021	Mar. 09, 2022
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: May 12 to 28, 2021

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	101516	Mar. 08, 2021	Mar. 07, 2022
Power meter Anritsu	ML2495A	1529002	July 22, 2020	July 21, 2021
Power sensor Anritsu	MA2411B	1339443	July 22, 2020	July 21, 2021
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: June 03, 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:

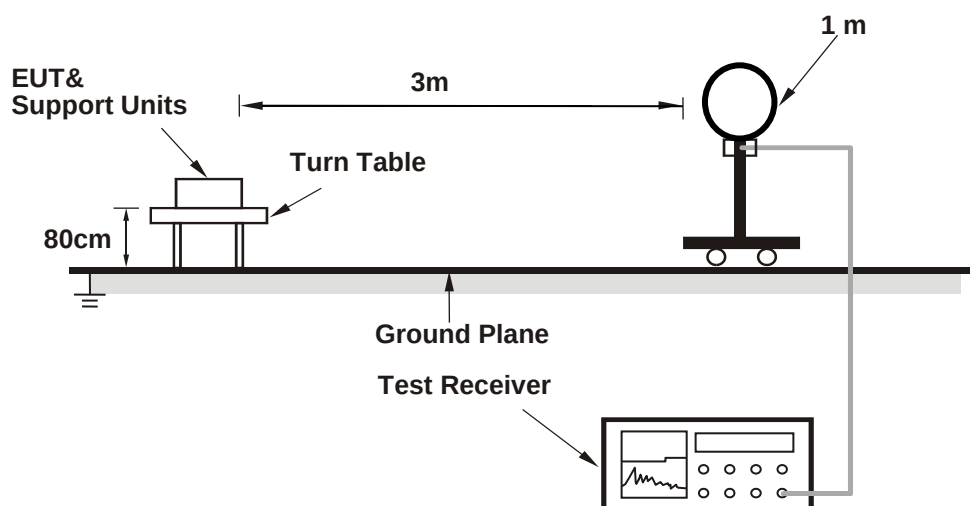
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

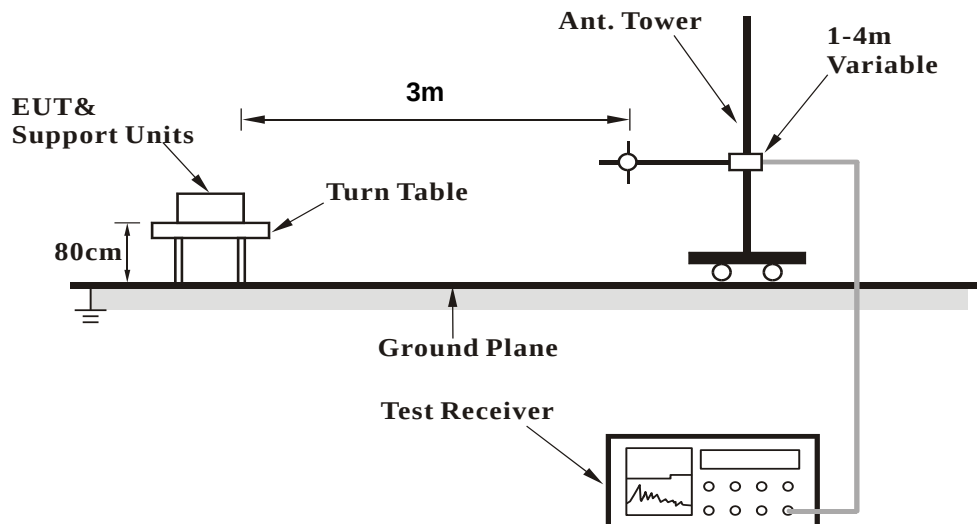
No deviation.

4.1.5 Test Setup

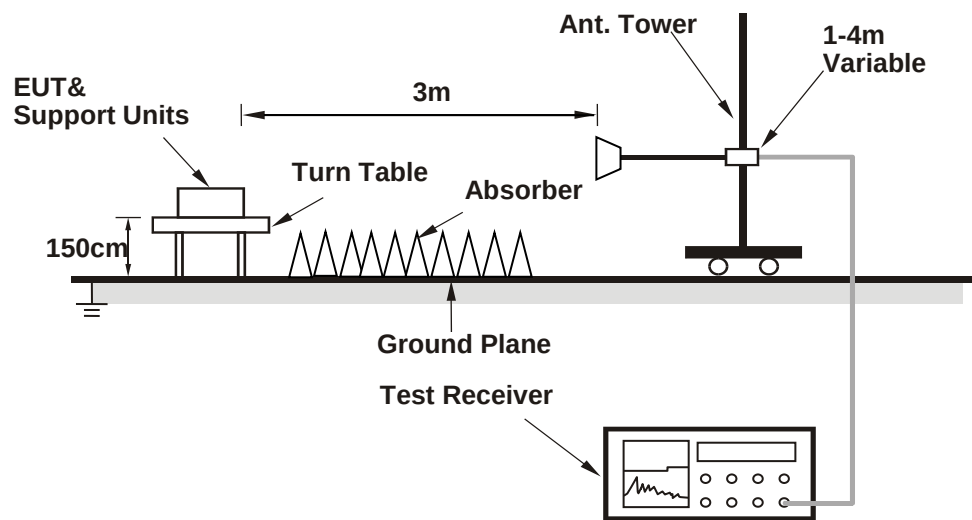
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Controlling software (adb paste command WIFI SOP-eng.doc) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results (Mode 1)

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	55.9 PK	74.0	-18.1	1.59 H	260	57.1	-1.2
2	2390.00	44.2 AV	54.0	-9.8	1.59 H	260	45.4	-1.2
3	*2412.00	93.2 PK			1.59 H	260	94.4	-1.2
4	*2412.00	91.2 AV			1.59 H	260	92.4	-1.2
5	4824.00	47.6 PK	74.0	-26.4	1.91 H	77	44.0	3.6
6	4824.00	35.6 AV	54.0	-18.4	1.91 H	77	32.0	3.6
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	2390.00	56.0 PK	74.0	-18.0	1.04 V	269	57.2	-1.2
2	2390.00	44.5 AV	54.0	-9.5	1.04 V	269	45.7	-1.2
3	*2412.00	103.8 PK			1.04 V	269	105.0	-1.2
4	*2412.00	101.8 AV			1.04 V	269	103.0	-1.2
5	4824.00	47.4 PK	74.0	-26.6	1.58 V	188	43.8	3.6
6	4824.00	35.5 AV	54.0	-18.5	1.58 V	188	31.9	3.6

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 802.11b	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	55.2 PK	74.0	-18.8	1.63 H	236	56.4	-1.2
2	2390.00	43.7 AV	54.0	-10.3	1.63 H	236	44.9	-1.2
3	*2437.00	93.5 PK			1.63 H	236	94.7	-1.2
4	*2437.00	91.6 AV			1.63 H	236	92.8	-1.2
5	2483.50	55.3 PK	74.0	-18.7	1.63 H	236	56.4	-1.1
6	2483.50	43.5 AV	54.0	-10.5	1.63 H	236	44.6	-1.1
7	4874.00	48.2 PK	74.0	-25.8	1.90 H	93	44.4	3.8
8	4874.00	36.0 AV	54.0	-18.0	1.90 H	93	32.2	3.8
9	7311.00	47.0 PK	74.0	-27.0	1.68 H	141	37.4	9.6
10	7311.00	35.5 AV	54.0	-18.5	1.68 H	141	25.9	9.6
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	2390.00	55.9 PK	74.0	-18.1	1.04 V	259	57.1	-1.2
2	2390.00	44.3 AV	54.0	-9.7	1.04 V	259	45.5	-1.2
3	*2437.00	104.1 PK			1.04 V	259	105.3	-1.2
4	*2437.00	101.8 AV			1.04 V	259	103.0	-1.2
5	2483.50	55.7 PK	74.0	-18.3	1.04 V	259	56.8	-1.1
6	2483.50	44.4 AV	54.0	-9.6	1.04 V	259	45.5	-1.1
7	4874.00	47.5 PK	74.0	-26.5	1.53 V	201	43.7	3.8
8	4874.00	35.5 AV	54.0	-18.5	1.53 V	201	31.7	3.8
9	7311.00	48.0 PK	74.0	-26.0	1.46 V	248	38.4	9.6
10	7311.00	35.7 AV	54.0	-18.3	1.46 V	248	26.1	9.6

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 802.11b	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	93.6 PK			1.54 H	264	94.7	-1.1
2	*2462.00	91.7 AV			1.54 H	264	92.8	-1.1
3	2483.50	55.6 PK	74.0	-18.4	1.54 H	264	56.7	-1.1
4	2483.50	44.0 AV	54.0	-10.0	1.54 H	264	45.1	-1.1
5	4924.00	47.8 PK	74.0	-26.2	1.90 H	76	44.0	3.8
6	4924.00	36.0 AV	54.0	-18.0	1.90 H	76	32.2	3.8
7	7386.00	46.8 PK	74.0	-27.2	1.64 H	145	37.1	9.7
8	7386.00	35.1 AV	54.0	-18.9	1.64 H	145	25.4	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	103.9 PK			1.05 V	271	105.0	-1.1
2	*2462.00	101.9 AV			1.05 V	271	103.0	-1.1
3	2483.50	56.0 PK	74.0	-18.0	1.05 V	271	57.1	-1.1
4	2483.50	44.7 AV	54.0	-9.3	1.05 V	271	45.8	-1.1
5	4924.00	47.5 PK	74.0	-26.5	1.63 V	189	43.7	3.8
6	4924.00	35.8 AV	54.0	-18.2	1.63 V	189	32.0	3.8
7	7386.00	47.7 PK	74.0	-26.3	1.42 V	254	38.0	9.7
8	7386.00	35.5 AV	54.0	-18.5	1.42 V	254	25.8	9.7

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	56.5 PK	74.0	-17.5	1.03 H	256	57.7	-1.2
2	2390.00	46.2 AV	54.0	-7.8	1.03 H	256	47.4	-1.2
3	*2412.00	97.4 PK			1.03 H	256	98.6	-1.2
4	*2412.00	89.3 AV			1.03 H	256	90.5	-1.2
5	4824.00	47.0 PK	74.0	-27.0	1.91 H	73	43.4	3.6
6	4824.00	35.1 AV	54.0	-18.9	1.91 H	73	31.5	3.6
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	2390.00	59.4 PK	74.0	-14.6	1.06 V	269	60.6	-1.2
2	2390.00	47.8 AV	54.0	-6.2	1.06 V	269	49.0	-1.2
3	*2412.00	106.4 PK			1.06 V	269	107.6	-1.2
4	*2412.00	98.8 AV			1.06 V	269	100.0	-1.2
5	4824.00	47.2 PK	74.0	-26.8	1.58 V	199	43.6	3.6
6	4824.00	35.3 AV	54.0	-18.7	1.58 V	199	31.7	3.6

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 6 : 2437 MHz
Frequency Range	1GHz ~ 25GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	55.8 PK	74.0	-18.2	1.03 H	258	57.0	-1.2
2	2390.00	44.5 AV	54.0	-9.5	1.03 H	258	45.7	-1.2
3	*2437.00	97.7 PK			1.03 H	258	98.9	-1.2
4	*2437.00	89.4 AV			1.03 H	258	90.6	-1.2
5	2483.50	54.9 PK	74.0	-19.1	1.03 H	258	56.0	-1.1
6	2483.50	43.6 AV	54.0	-10.4	1.03 H	258	44.7	-1.1
7	4874.00	48.3 PK	74.0	-25.7	1.87 H	84	44.5	3.8
8	4874.00	36.0 AV	54.0	-18.0	1.87 H	84	32.2	3.8
9	7311.00	47.1 PK	74.0	-26.9	1.68 H	135	37.5	9.6
10	7311.00	35.3 AV	54.0	-18.7	1.68 H	135	25.7	9.6

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	2390.00	55.1 PK	74.0	-18.9	1.03 V	271	56.3	-1.2
2	2390.00	43.6 AV	54.0	-10.4	1.03 V	271	44.8	-1.2
3	*2437.00	106.0 PK			1.03 V	271	107.2	-1.2
4	*2437.00	98.3 AV			1.03 V	271	99.5	-1.2
5	2483.50	55.5 PK	74.0	-18.5	1.03 V	271	56.6	-1.1
6	2483.50	44.1 AV	54.0	-9.9	1.03 V	271	45.2	-1.1
7	4874.00	47.4 PK	74.0	-26.6	1.64 V	195	43.6	3.8
8	4874.00	35.7 AV	54.0	-18.3	1.64 V	195	31.9	3.8
9	7311.00	48.1 PK	74.0	-25.9	1.46 V	239	38.5	9.6
10	7311.00	35.9 AV	54.0	-18.1	1.46 V	239	26.3	9.6

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 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	97.1 PK			1.02 H	260	98.2	-1.1
2	*2462.00	89.2 AV			1.02 H	260	90.3	-1.1
3	2483.50	56.5 PK	74.0	-17.5	1.02 H	260	57.6	-1.1
4	2483.50	45.6 AV	54.0	-8.4	1.02 H	260	46.7	-1.1
5	4924.00	47.9 PK	74.0	-26.1	1.96 H	81	44.1	3.8
6	4924.00	35.7 AV	54.0	-18.3	1.96 H	81	31.9	3.8
7	7386.00	46.9 PK	74.0	-27.1	1.57 H	142	37.2	9.7
8	7386.00	35.2 AV	54.0	-18.8	1.57 H	142	25.5	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	106.2 PK			1.02 V	272	107.3	-1.1
2	*2462.00	98.5 AV			1.02 V	272	99.6	-1.1
3	2483.50	59.5 PK	74.0	-14.5	1.02 V	272	60.6	-1.1
4	2483.50	47.5 AV	54.0	-6.5	1.02 V	272	48.6	-1.1
5	4924.00	47.1 PK	74.0	-26.9	1.61 V	179	43.3	3.8
6	4924.00	35.2 AV	54.0	-18.8	1.61 V	179	31.4	3.8
7	7386.00	47.4 PK	74.0	-26.6	1.38 V	258	37.7	9.7
8	7386.00	35.4 AV	54.0	-18.6	1.38 V	258	25.7	9.7

Remarks:

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

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

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	60.8 PK	74.0	-13.2	1.40 H	271	62.0	-1.2
2	2390.00	47.0 AV	54.0	-7.0	1.40 H	271	48.2	-1.2
3	*2412.00	103.1 PK			1.40 H	271	104.3	-1.2
4	*2412.00	95.9 AV			1.40 H	271	97.1	-1.2
5	4824.00	48.0 PK	74.0	-26.0	1.85 H	69	44.4	3.6
6	4824.00	35.8 AV	54.0	-18.2	1.85 H	69	32.2	3.6
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	2390.00	69.8 PK	74.0	-4.2	1.09 V	267	71.0	-1.2
2	2390.00	53.4 AV	54.0	-0.6	1.09 V	267	54.6	-1.2
3	*2412.00	112.8 PK			1.09 V	267	114.0	-1.2
4	*2412.00	104.9 AV			1.09 V	267	106.1	-1.2
5	4824.00	47.2 PK	74.0	-26.8	1.52 V	194	43.6	3.6
6	4824.00	35.5 AV	54.0	-18.5	1.52 V	194	31.9	3.6

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 802.11n (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	63.3 PK	74.0	-10.7	1.44 H	264	64.5	-1.2
2	2390.00	47.5 AV	54.0	-6.5	1.44 H	264	48.7	-1.2
3	*2437.00	103.7 PK			1.44 H	264	104.9	-1.2
4	*2437.00	96.3 AV			1.44 H	264	97.5	-1.2
5	2483.50	64.2 PK	74.0	-9.8	1.44 H	264	65.3	-1.1
6	2483.50	48.1 AV	54.0	-5.9	1.44 H	264	49.2	-1.1
7	4874.00	47.9 PK	74.0	-26.1	1.98 H	84	44.1	3.8
8	4874.00	35.8 AV	54.0	-18.2	1.98 H	84	32.0	3.8
9	7311.00	47.0 PK	74.0	-27.0	1.55 H	133	37.4	9.6
10	7311.00	35.1 AV	54.0	-18.9	1.55 H	133	25.5	9.6

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	2390.00	65.9 PK	74.0	-8.1	1.04 V	271	67.1	-1.2
2	2390.00	52.4 AV	54.0	-1.6	1.04 V	271	53.6	-1.2
3	*2437.00	116.3 PK			1.04 V	271	117.5	-1.2
4	*2437.00	108.6 AV			1.04 V	271	109.8	-1.2
5	2483.50	66.0 PK	74.0	-8.0	1.04 V	271	67.1	-1.1
6	2483.50	50.9 AV	54.0	-3.1	1.04 V	271	52.0	-1.1
7	4874.00	48.0 PK	74.0	-26.0	1.61 V	185	44.2	3.8
8	4874.00	35.8 AV	54.0	-18.2	1.61 V	185	32.0	3.8
9	7311.00	47.8 PK	74.0	-26.2	1.40 V	246	38.2	9.6
10	7311.00	35.8 AV	54.0	-18.2	1.40 V	246	26.2	9.6

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 802.11n (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	103.8 PK			1.33 H	274	104.9	-1.1
2	*2462.00	96.8 AV			1.33 H	274	97.9	-1.1
3	2483.50	64.0 PK	74.0	-10.0	1.33 H	274	65.1	-1.1
4	2483.50	47.9 AV	54.0	-6.1	1.33 H	274	49.0	-1.1
5	4924.00	47.4 PK	74.0	-26.6	1.93 H	83	43.6	3.8
6	4924.00	35.3 AV	54.0	-18.7	1.93 H	83	31.5	3.8
7	7386.00	47.4 PK	74.0	-26.6	1.52 H	127	37.7	9.7
8	7386.00	35.5 AV	54.0	-18.5	1.52 H	127	25.8	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	113.6 PK			1.03 V	269	114.7	-1.1
2	*2462.00	105.7 AV			1.03 V	269	106.8	-1.1
3	2483.50	73.2 PK	74.0	-0.8	1.03 V	269	74.3	-1.1
4	2483.50	53.4 AV	54.0	-0.6	1.03 V	269	54.5	-1.1
5	4924.00	47.3 PK	74.0	-26.7	1.57 V	193	43.5	3.8
6	4924.00	35.2 AV	54.0	-18.8	1.57 V	193	31.4	3.8
7	7386.00	47.3 PK	74.0	-26.7	1.47 V	267	37.6	9.7
8	7386.00	35.4 AV	54.0	-18.6	1.47 V	267	25.7	9.7

Remarks:

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

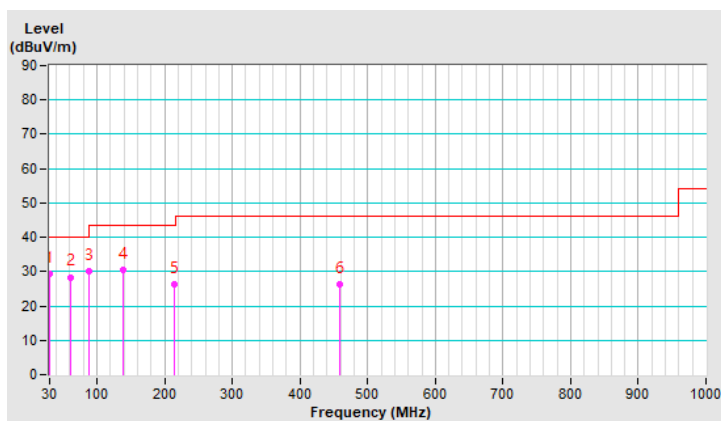
Below 1GHz Data:

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	30.37	29.3 QP	40.0	-10.7	1.50 H	51	38.7	-9.4
2	60.65	28.4 QP	40.0	-11.6	1.50 H	72	37.3	-8.9
3	88.16	30.2 QP	43.5	-13.3	2.50 H	264	44.1	-13.9
4	139.29	30.4 QP	43.5	-13.1	2.00 H	241	38.5	-8.1
5	214.04	26.2 QP	43.5	-17.3	2.00 H	132	36.8	-10.6
6	458.83	26.3 QP	46.0	-19.7	1.50 H	91	28.2	-1.9

Remarks:

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

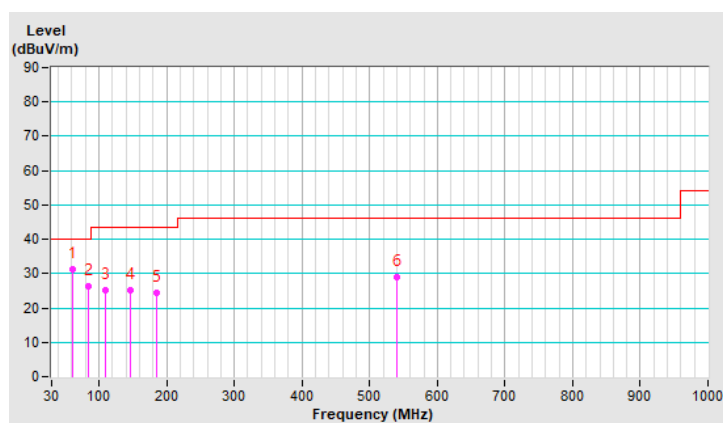


RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	60.96	31.1 QP	40.0	-8.9	1.00 V	158	40.1	-9.0
2	85.01	26.2 QP	40.0	-13.8	1.50 V	34	39.9	-13.7
3	110.18	25.2 QP	43.5	-18.3	1.00 V	139	36.0	-10.8
4	146.87	25.0 QP	43.5	-18.5	1.50 V	158	32.5	-7.5
5	185.97	24.3 QP	43.5	-19.2	1.00 V	168	34.1	-9.8
6	539.88	29.1 QP	46.0	-16.9	1.00 V	147	29.5	-0.4

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 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.



4.1.8 Test Results (Mode 2)

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	56.5 PK	74.0	-17.5	1.00 H	268	57.7	-1.2
2	2390.00	42.7 AV	54.0	-11.3	1.00 H	268	43.9	-1.2
3	*2412.00	94.9 PK			1.00 H	268	96.1	-1.2
4	*2412.00	92.6 AV			1.00 H	268	93.8	-1.2
5	4824.00	47.3 PK	74.0	-26.7	1.95 H	41	43.7	3.6
6	4824.00	35.3 AV	54.0	-18.7	1.95 H	41	31.7	3.6
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	2390.00	56.0 PK	74.0	-18.0	1.48 V	108	57.2	-1.2
2	2390.00	42.8 AV	54.0	-11.2	1.48 V	108	44.0	-1.2
3	*2412.00	95.4 PK			1.48 V	108	96.6	-1.2
4	*2412.00	92.7 AV			1.48 V	108	93.9	-1.2
5	4824.00	47.1 PK	74.0	-26.9	1.65 V	191	43.5	3.6
6	4824.00	35.3 AV	54.0	-18.7	1.65 V	191	31.7	3.6

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 802.11b	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	55.9 PK	74.0	-18.1	1.08 H	284	57.1	-1.2
2	2390.00	42.6 AV	54.0	-11.4	1.08 H	284	43.8	-1.2
3	*2437.00	97.0 PK			1.08 H	284	98.2	-1.2
4	*2437.00	94.5 AV			1.08 H	284	95.7	-1.2
5	2483.50	55.5 PK	74.0	-18.5	1.08 H	284	56.6	-1.1
6	2483.50	42.5 AV	54.0	-11.5	1.08 H	284	43.6	-1.1
7	4874.00	47.2 PK	74.0	-26.8	1.93 H	57	43.4	3.8
8	4874.00	35.4 AV	54.0	-18.6	1.93 H	57	31.6	3.8
9	7311.00	46.6 PK	74.0	-27.4	1.64 H	141	37.0	9.6
10	7311.00	35.3 AV	54.0	-18.7	1.64 H	141	25.7	9.6

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	2390.00	55.9 PK	74.0	-18.1	1.76 V	251	57.1	-1.2
2	2390.00	42.8 AV	54.0	-11.2	1.76 V	251	44.0	-1.2
3	*2437.00	96.5 PK			1.76 V	251	97.7	-1.2
4	*2437.00	94.1 AV			1.76 V	251	95.3	-1.2
5	2483.50	55.4 PK	74.0	-18.6	1.76 V	251	56.5	-1.1
6	2483.50	42.7 AV	54.0	-11.3	1.76 V	251	43.8	-1.1
7	4874.00	47.3 PK	74.0	-26.7	1.64 V	183	43.5	3.8
8	4874.00	35.4 AV	54.0	-18.6	1.64 V	183	31.6	3.8
9	7311.00	47.1 PK	74.0	-26.9	1.39 V	251	37.5	9.6
10	7311.00	35.5 AV	54.0	-18.5	1.39 V	251	25.9	9.6

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 802.11b	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	97.1 PK			1.03 H	271	98.2	-1.1
2	*2462.00	94.7 AV			1.03 H	271	95.8	-1.1
3	2483.50	55.7 PK	74.0	-18.3	1.03 H	271	56.8	-1.1
4	2483.50	42.6 AV	54.0	-11.4	1.03 H	271	43.7	-1.1
5	4924.00	47.6 PK	74.0	-26.4	1.91 H	67	43.8	3.8
6	4924.00	35.7 AV	54.0	-18.3	1.91 H	67	31.9	3.8
7	7386.00	46.1 PK	74.0	-27.9	1.68 H	130	36.4	9.7
8	7386.00	35.0 AV	54.0	-19.0	1.68 H	130	25.3	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	96.8 PK			1.80 V	236	97.9	-1.1
2	*2462.00	94.4 AV			1.80 V	236	95.5	-1.1
3	2483.50	56.1 PK	74.0	-17.9	1.80 V	236	57.2	-1.1
4	2483.50	42.3 AV	54.0	-11.7	1.80 V	236	43.4	-1.1
5	4924.00	47.4 PK	74.0	-26.6	1.66 V	182	43.6	3.8
6	4924.00	35.3 AV	54.0	-18.7	1.66 V	182	31.5	3.8
7	7386.00	47.9 PK	74.0	-26.1	1.33 V	245	38.2	9.7
8	7386.00	36.0 AV	54.0	-18.0	1.33 V	245	26.3	9.7

Remarks:

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

RF Mode	TX 802.11g	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	56.4 PK	74.0	-17.6	1.01 H	269	57.6	-1.2
2	2390.00	43.7 AV	54.0	-10.3	1.01 H	269	44.9	-1.2
3	*2412.00	98.8 PK			1.01 H	269	100.0	-1.2
4	*2412.00	90.4 AV			1.01 H	269	91.6	-1.2
5	4824.00	47.1 PK	74.0	-26.9	1.93 H	42	43.5	3.6
6	4824.00	35.3 AV	54.0	-18.7	1.93 H	42	31.7	3.6
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	2390.00	56.6 PK	74.0	-17.4	1.49 V	109	57.8	-1.2
2	2390.00	43.6 AV	54.0	-10.4	1.49 V	109	44.8	-1.2
3	*2412.00	98.6 PK			1.49 V	109	99.8	-1.2
4	*2412.00	89.0 AV			1.49 V	109	90.2	-1.2
5	4824.00	47.3 PK	74.0	-26.7	1.67 V	177	43.7	3.6
6	4824.00	35.4 AV	54.0	-18.6	1.67 V	177	31.8	3.6

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 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	56.2 PK	74.0	-17.8	1.04 H	283	57.4	-1.2
2	2390.00	43.0 AV	54.0	-11.0	1.04 H	283	44.2	-1.2
3	*2437.00	100.1 PK			1.04 H	283	101.3	-1.2
4	*2437.00	91.7 AV			1.04 H	283	92.9	-1.2
5	2483.50	55.3 PK	74.0	-18.7	1.04 H	283	56.4	-1.1
6	2483.50	42.2 AV	54.0	-11.8	1.04 H	283	43.3	-1.1
7	4874.00	47.1 PK	74.0	-26.9	1.97 H	45	43.3	3.8
8	4874.00	35.5 AV	54.0	-18.5	1.97 H	45	31.7	3.8
9	7311.00	46.9 PK	74.0	-27.1	1.58 H	147	37.3	9.6
10	7311.00	35.5 AV	54.0	-18.5	1.58 H	147	25.9	9.6
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	2390.00	55.9 PK	74.0	-18.1	1.52 V	94	57.1	-1.2
2	2390.00	42.6 AV	54.0	-11.4	1.52 V	94	43.8	-1.2
3	*2437.00	101.3 PK			1.52 V	94	102.5	-1.2
4	*2437.00	91.6 AV			1.52 V	94	92.8	-1.2
5	2483.50	55.1 PK	74.0	-18.9	1.52 V	94	56.2	-1.1
6	2483.50	42.3 AV	54.0	-11.7	1.52 V	94	43.4	-1.1
7	4874.00	47.8 PK	74.0	-26.2	1.63 V	175	44.0	3.8
8	4874.00	35.6 AV	54.0	-18.4	1.63 V	175	31.8	3.8
9	7311.00	46.6 PK	74.0	-27.4	1.43 V	245	37.0	9.6
10	7311.00	35.1 AV	54.0	-18.9	1.43 V	245	25.5	9.6

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 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	100.3 PK			1.01 H	271	101.4	-1.1
2	*2462.00	92.0 AV			1.01 H	271	93.1	-1.1
3	2483.50	56.4 PK	74.0	-17.6	1.01 H	271	57.5	-1.1
4	2483.50	43.5 AV	54.0	-10.5	1.01 H	271	44.6	-1.1
5	4924.00	46.8 PK	74.0	-27.2	1.95 H	53	43.0	3.8
6	4924.00	35.0 AV	54.0	-19.0	1.95 H	53	31.2	3.8
7	7386.00	46.3 PK	74.0	-27.7	1.68 H	127	36.6	9.7
8	7386.00	34.8 AV	54.0	-19.2	1.68 H	127	25.1	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	101.1 PK			1.26 V	106	102.2	-1.1
2	*2462.00	91.5 AV			1.26 V	106	92.6	-1.1
3	2483.50	56.7 PK	74.0	-17.3	1.26 V	106	57.8	-1.1
4	2483.50	43.7 AV	54.0	-10.3	1.26 V	106	44.8	-1.1
5	4924.00	47.1 PK	74.0	-26.9	1.65 V	180	43.3	3.8
6	4924.00	35.4 AV	54.0	-18.6	1.65 V	180	31.6	3.8
7	7386.00	47.4 PK	74.0	-26.6	1.43 V	236	37.7	9.7
8	7386.00	35.5 AV	54.0	-18.5	1.43 V	236	25.8	9.7

Remarks:

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

RF Mode	TX 802.11n (HT20)	Channel	CH 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	66.2 PK	74.0	-7.8	1.01 H	269	67.4	-1.2
2	2390.00	50.1 AV	54.0	-3.9	1.01 H	269	51.3	-1.2
3	*2412.00	104.3 PK			1.01 H	269	105.5	-1.2
4	*2412.00	92.7 AV			1.01 H	269	93.9	-1.2
5	4824.00	47.2 PK	74.0	-26.8	1.98 H	49	43.6	3.6
6	4824.00	35.6 AV	54.0	-18.4	1.98 H	49	32.0	3.6
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	2390.00	69.4 PK	74.0	-4.6	1.03 V	350	70.6	-1.2
2	2390.00	53.5 AV	54.0	-0.5	1.03 V	350	54.7	-1.2
3	*2412.00	106.7 PK			1.03 V	350	107.9	-1.2
4	*2412.00	96.5 AV			1.03 V	350	97.7	-1.2
5	4824.00	47.5 PK	74.0	-26.5	1.66 V	170	43.9	3.6
6	4824.00	35.6 AV	54.0	-18.4	1.66 V	170	32.0	3.6

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 802.11n (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	58.2 PK	74.0	-15.8	1.03 H	262	59.4	-1.2
2	2390.00	44.8 AV	54.0	-9.2	1.03 H	262	46.0	-1.2
3	*2437.00	105.2 PK			1.03 H	262	106.4	-1.2
4	*2437.00	94.2 AV			1.03 H	262	95.4	-1.2
5	2483.50	56.7 PK	74.0	-17.3	1.03 H	262	57.8	-1.1
6	2483.50	43.5 AV	54.0	-10.5	1.03 H	262	44.6	-1.1
7	4874.00	47.3 PK	74.0	-26.7	1.90 H	43	43.5	3.8
8	4874.00	35.3 AV	54.0	-18.7	1.90 H	43	31.5	3.8
9	7311.00	47.0 PK	74.0	-27.0	1.64 H	143	37.4	9.6
10	7311.00	35.7 AV	54.0	-18.3	1.64 H	143	26.1	9.6

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	2390.00	58.6 PK	74.0	-15.4	1.51 V	97	59.8	-1.2
2	2390.00	45.3 AV	54.0	-8.7	1.51 V	97	46.5	-1.2
3	*2437.00	107.6 PK			1.51 V	97	108.8	-1.2
4	*2437.00	97.2 AV			1.51 V	97	98.4	-1.2
5	2483.50	57.0 PK	74.0	-17.0	1.51 V	97	58.1	-1.1
6	2483.50	43.8 AV	54.0	-10.2	1.51 V	97	44.9	-1.1
7	4874.00	47.1 PK	74.0	-26.9	1.67 V	177	43.3	3.8
8	4874.00	35.4 AV	54.0	-18.6	1.67 V	177	31.6	3.8
9	7311.00	47.4 PK	74.0	-26.6	1.35 V	259	37.8	9.6
10	7311.00	35.9 AV	54.0	-18.1	1.35 V	259	26.3	9.6

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 802.11n (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	105.5 PK			1.05 H	271	106.6	-1.1
2	*2462.00	94.5 AV			1.05 H	271	95.6	-1.1
3	2483.50	67.5 PK	74.0	-6.5	1.05 H	271	68.6	-1.1
4	2483.50	46.7 AV	54.0	-7.3	1.05 H	271	47.8	-1.1
5	4924.00	47.4 PK	74.0	-26.6	1.89 H	62	43.6	3.8
6	4924.00	35.3 AV	54.0	-18.7	1.89 H	62	31.5	3.8
7	7386.00	46.6 PK	74.0	-27.4	1.65 H	136	36.9	9.7
8	7386.00	35.0 AV	54.0	-19.0	1.65 H	136	25.3	9.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	107.8 PK			1.01 V	349	108.9	-1.1
2	*2462.00	97.4 AV			1.01 V	349	98.5	-1.1
3	2483.50	73.3 PK	74.0	-0.7	1.01 V	349	74.4	-1.1
4	2483.50	49.5 AV	54.0	-4.5	1.01 V	349	50.6	-1.1
5	4924.00	47.7 PK	74.0	-26.3	1.62 V	199	43.9	3.8
6	4924.00	35.5 AV	54.0	-18.5	1.62 V	199	31.7	3.8
7	7386.00	47.3 PK	74.0	-26.7	1.44 V	258	37.6	9.7
8	7386.00	35.6 AV	54.0	-18.4	1.44 V	258	25.9	9.7

Remarks:

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

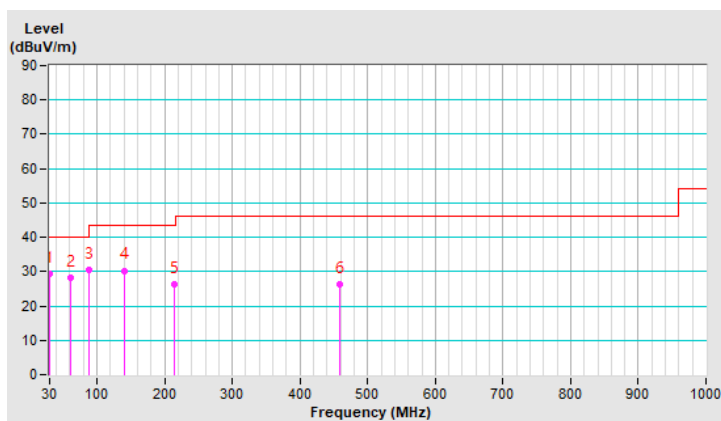
Below 1GHz Data:

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	30.77	29.2 QP	40.0	-10.8	1.50 H	68	38.7	-9.5
2	61.06	28.2 QP	40.0	-11.8	1.50 H	89	37.2	-9.0
3	88.66	30.4 QP	43.5	-13.1	2.50 H	154	44.2	-13.8
4	139.81	30.3 QP	43.5	-13.2	2.00 H	169	38.4	-8.1
5	214.49	26.2 QP	43.5	-17.3	2.00 H	127	36.8	-10.6
6	459.40	26.4 QP	46.0	-19.6	1.50 H	58	28.3	-1.9

Remarks:

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

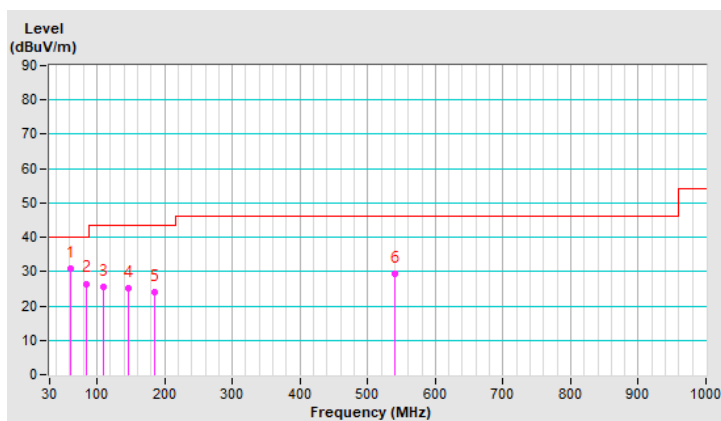


RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	60.96	31.0 QP	40.0	-9.0	1.00 V	142	40.0	-9.0
2	84.82	26.5 QP	40.0	-13.5	1.50 V	63	40.2	-13.7
3	109.97	25.4 QP	43.5	-18.1	1.00 V	113	36.3	-10.9
4	146.65	25.2 QP	43.5	-18.3	1.50 V	202	32.8	-7.6
5	185.77	24.1 QP	43.5	-19.4	1.00 V	149	33.9	-9.8
6	539.67	29.3 QP	46.0	-16.7	1.00 V	154	29.7	-0.4

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 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: May 29, 2021

4.2.3 Test Procedures

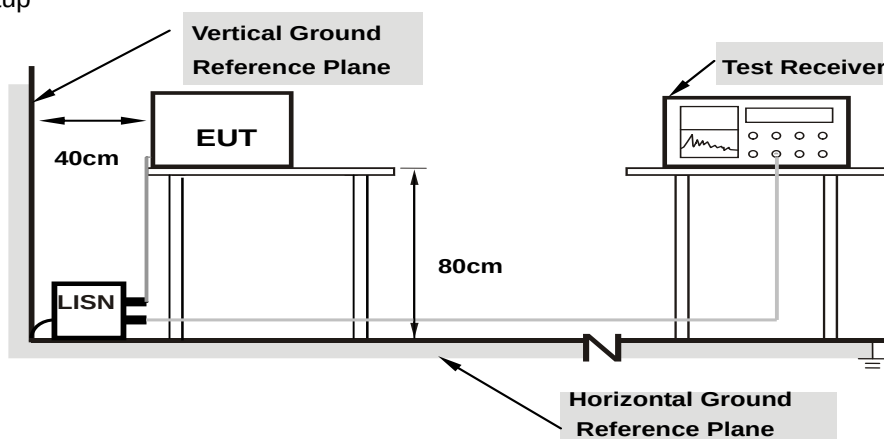
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

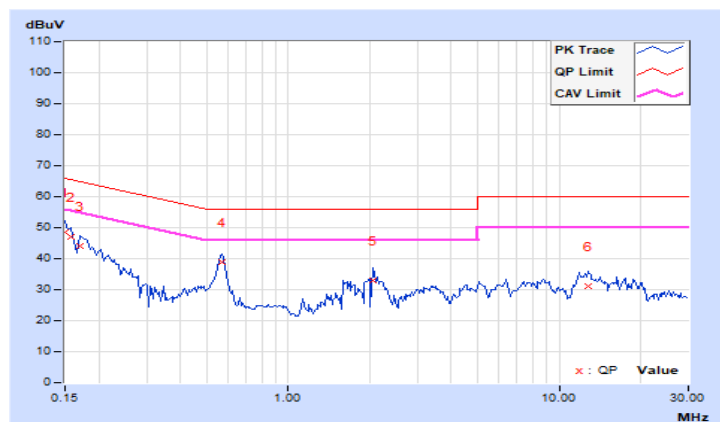
4.2.7 Test Results

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

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.95	38.40	23.04	48.35	32.99	66.00	56.00	-17.65	-23.01
2	0.15781	9.95	37.04	21.60	46.99	31.55	65.58	55.58	-18.59	-24.03
3	0.16953	9.96	34.08	15.00	44.04	24.96	64.98	54.98	-20.94	-30.02
4	0.56797	10.00	29.05	21.63	39.05	31.63	56.00	46.00	-16.95	-14.37
5	2.05078	10.07	22.88	9.88	32.95	19.95	56.00	46.00	-23.05	-26.05
6	12.74609	10.69	20.50	15.55	31.19	26.24	60.00	50.00	-28.81	-23.76

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

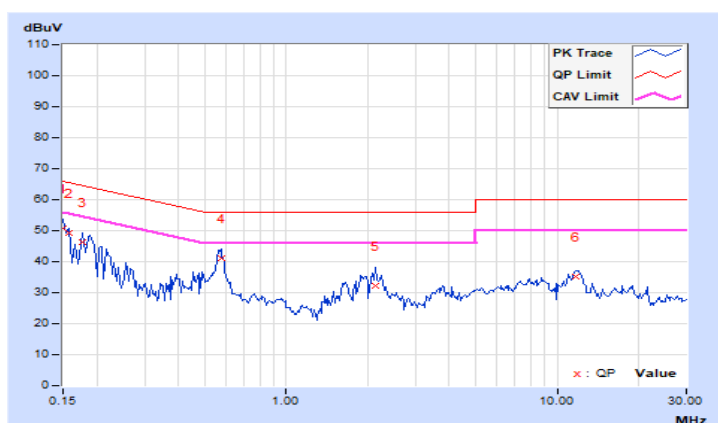


RF Mode	TX 802.11b	Channel	CH 1 : 2412 MHz
Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz

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	9.92	40.66	24.36	50.58	34.28	66.00	56.00	-15.42	-21.72
2	0.15781	9.92	39.50	23.18	49.42	33.10	65.58	55.58	-16.16	-22.48
3	0.17734	9.94	36.29	20.09	46.23	30.03	64.61	54.61	-18.38	-24.58
4	0.57578	9.97	31.15	22.40	41.12	32.37	56.00	46.00	-14.88	-13.63
5	2.13672	10.05	22.20	13.13	32.25	23.18	56.00	46.00	-23.75	-22.82
6	11.68359	10.49	24.87	19.48	35.36	29.97	60.00	50.00	-24.64	-20.03

Remarks:

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

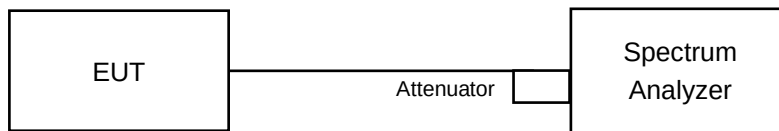


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.3.7 Test Result

802.11b

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	10.09	0.5	Pass
6	2437	9.62	0.5	Pass
11	2462	9.15	0.5	Pass

802.11g

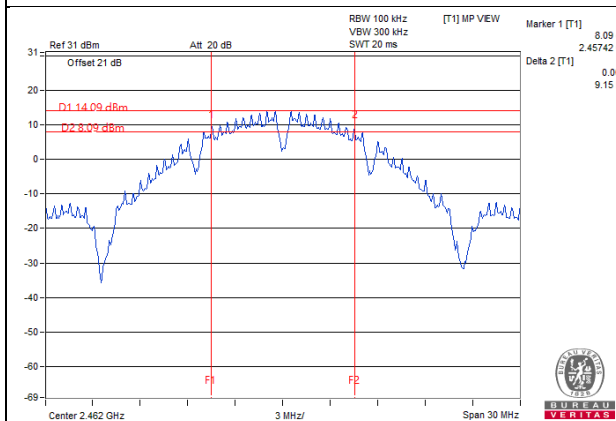
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.79	0.5	Pass
6	2437	15.86	0.5	Pass
11	2462	15.73	0.5	Pass

802.11n (HT20)

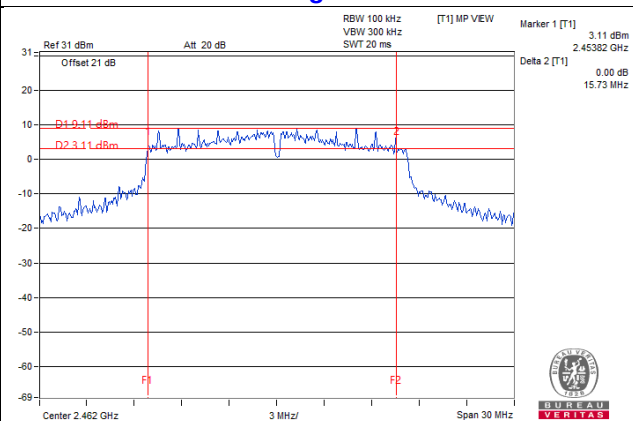
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
1	2412	17.32	17.03	0.5	Pass
6	2437	17.35	17.6	0.5	Pass
11	2462	17.62	17.59	0.5	Pass

Spectrum Plot of Worst Value

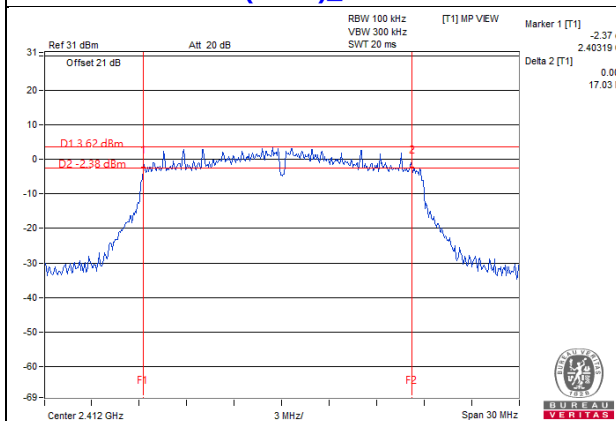
802.11b / CH11



802.11g / CH11



802.11n (HT20) Chain 1 / CH1



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,

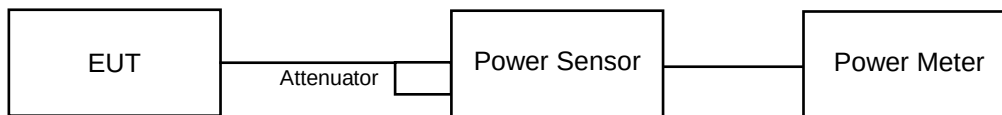
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

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

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

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

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

FOR PEAK POWER

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	305.492	24.85	30	Pass
6	2437	304.089	24.83	30	Pass
11	2462	299.916	24.77	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	2412	310.456	24.92	30	Pass
6	2437	304.089	24.83	30	Pass
11	2462	302.691	24.81	30	Pass

802.11n (HT20)

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	23.25	24.05	465.446	26.68	30	Pass
6	2437	21.13	21.26	263.377	24.21	30	Pass
11	2462	23.78	24.23	503.631	27.02	30	Pass

FOR AVERAGE POWER

802.11b

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	217.771	23.38
6	2437	217.27	23.37
11	2462	208.449	23.19

802.11g

Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	2412	129.122	21.11
6	2437	126.474	21.02
11	2462	115.878	20.64

802.11n (HT20)

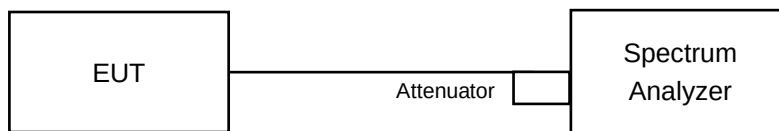
Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Average Power (mW)	Total Average Power (dBm)
		Chain 0	Chain 1		
1	2412	13.87	15.15	57.112	17.57
6	2437	12.09	12.15	32.587	15.13
11	2462	14.16	15.48	61.38	17.88

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

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

Same as Item 4.3.6

4.5.7 Test Results

802.11b

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-0.03	8	Pass
6	2437	-0.03	8	Pass
11	2462	0.14	8	Pass

802.11g

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass /Fail
1	2412	-3.18	8	Pass
6	2437	-3.09	8	Pass
11	2462	-3.67	8	Pass

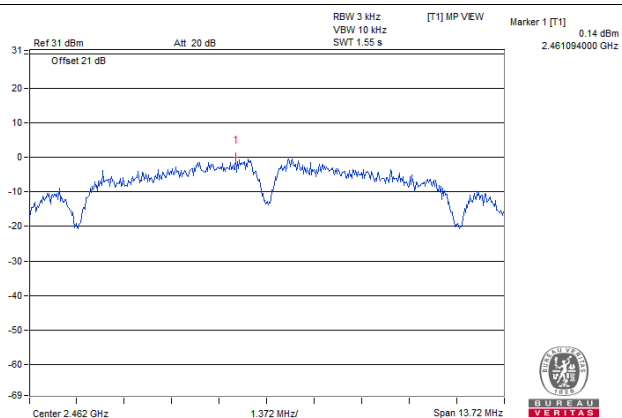
802.11n (HT20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/3kHz)		Total PSD (dBm/3kHz)	PSD Limit (dBm/3kHz)	Pass / Fail
		Chain 0	Chain 1			
1	2412	-10.96	-9.11	-6.93	5.73	Pass
6	2437	-12.03	-12.64	-9.31	5.73	Pass
11	2462	-10.49	-8.26	-6.22	5.73	Pass

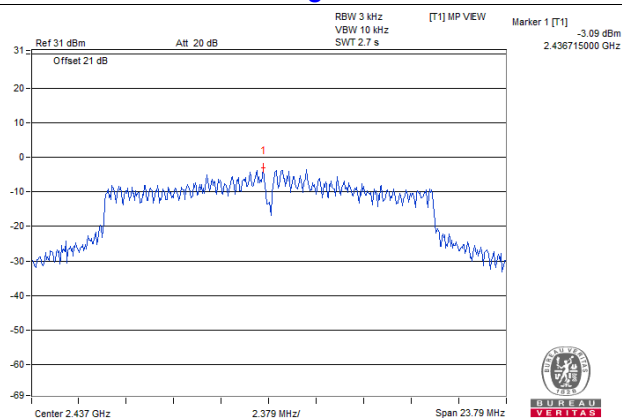
Note: The directional gain = $5.26 \text{ dBi} + 10\log(2) = 8.27 \text{ dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $8-(8.27-6) = 5.73 \text{ dBm}$.

Spectrum Plot of Worst Value

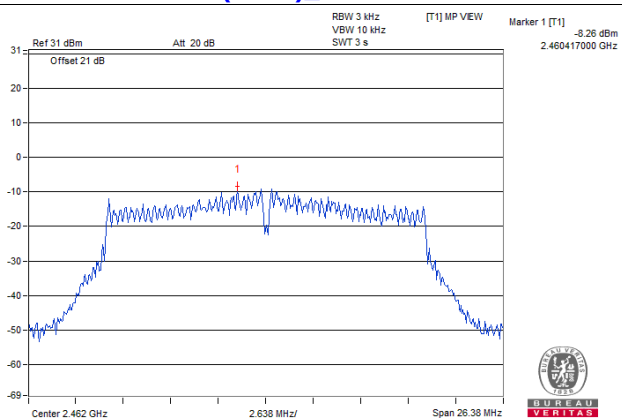
802.11b / CH11



802.11g / CH6



802.11n (HT20) Chain 1 / CH11

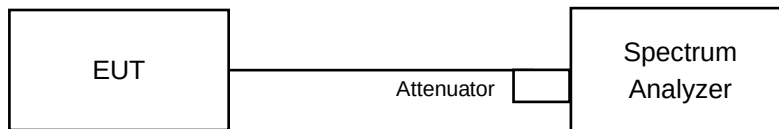


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

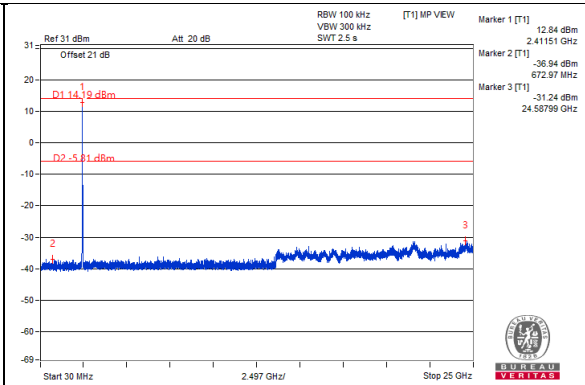
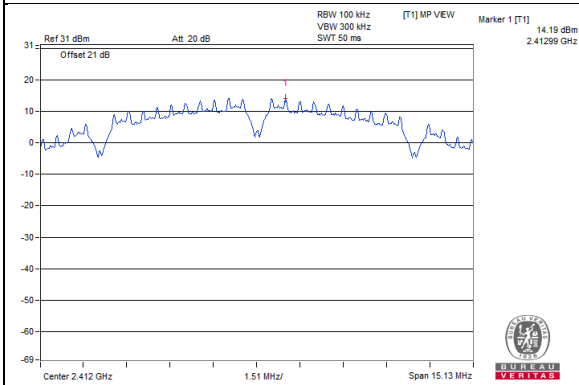
Same as Item 4.3.6

4.6.7 Test Results

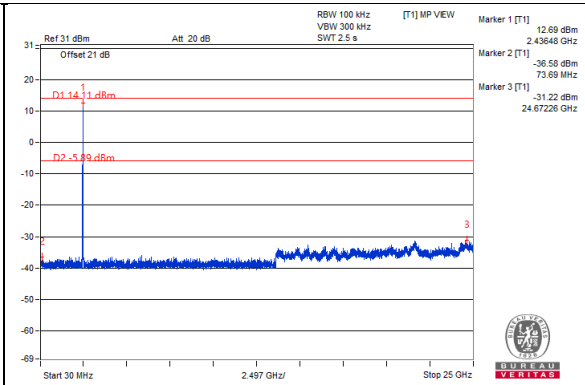
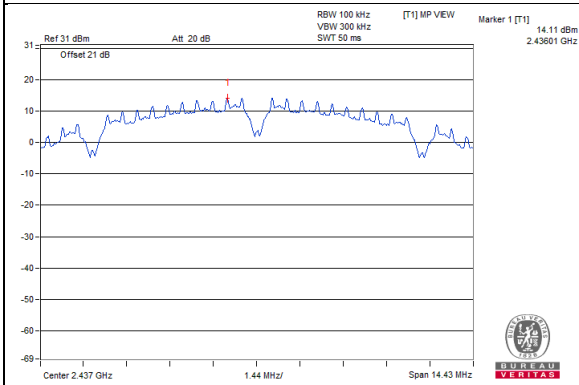
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

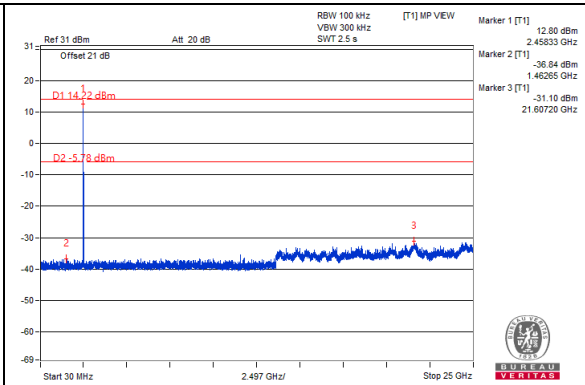
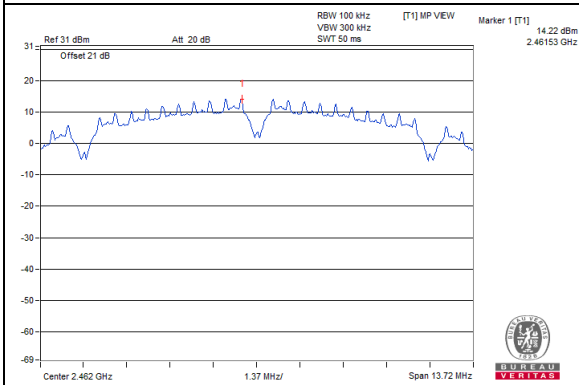
CH 1



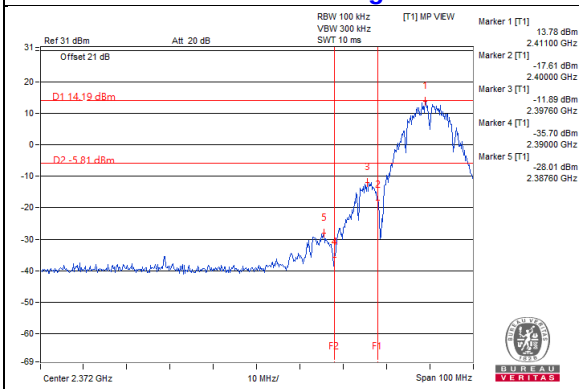
CH 6



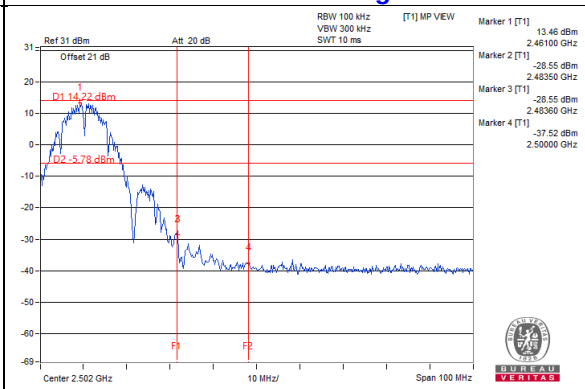
CH 11



CH 1 Band edge

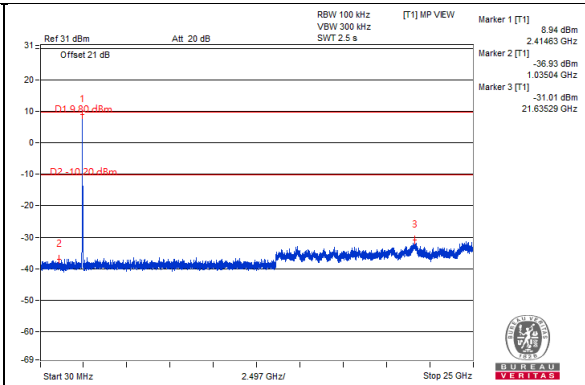
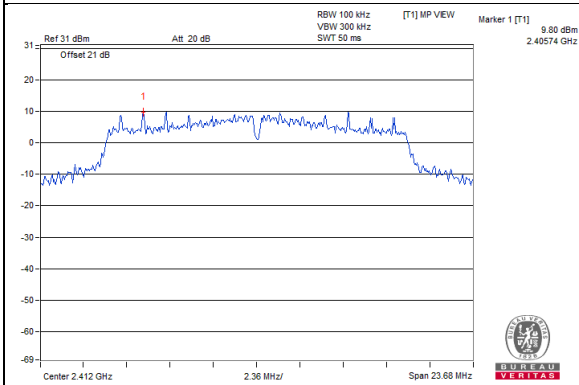


CH 11 Band edge

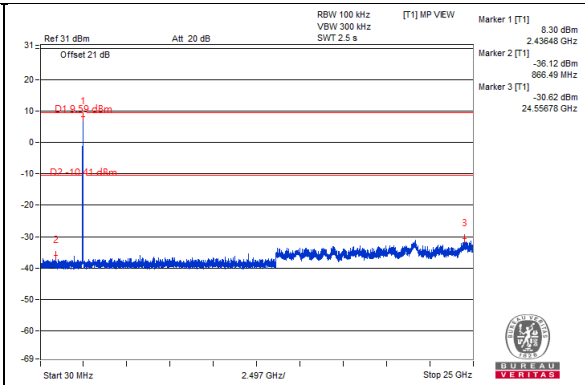
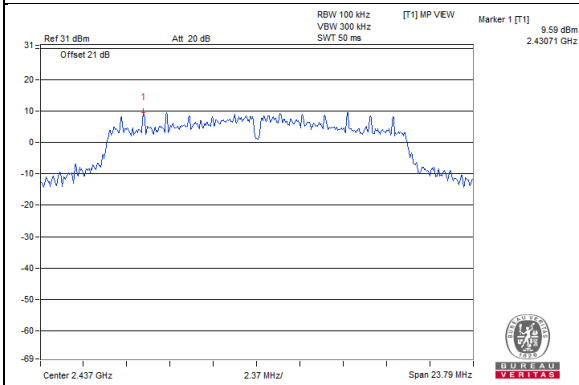


802.11g

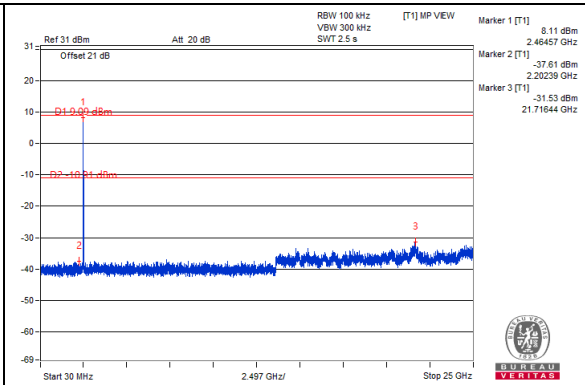
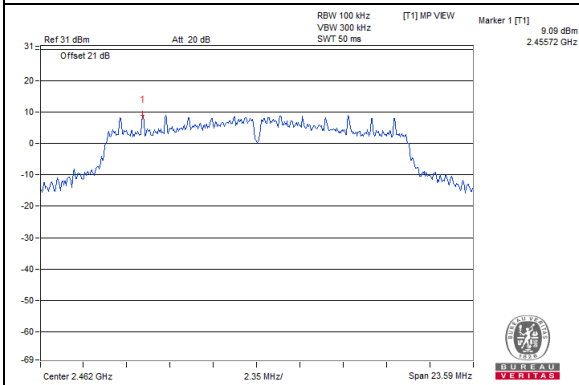
CH 1



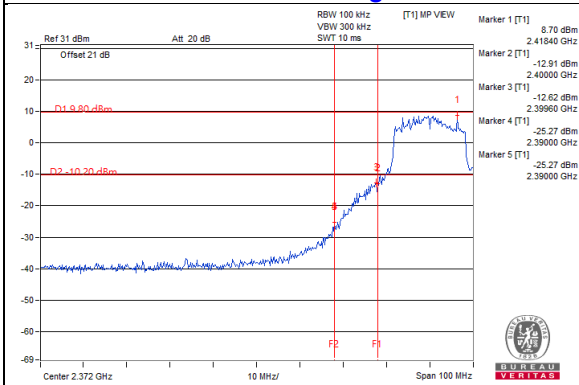
CH 6



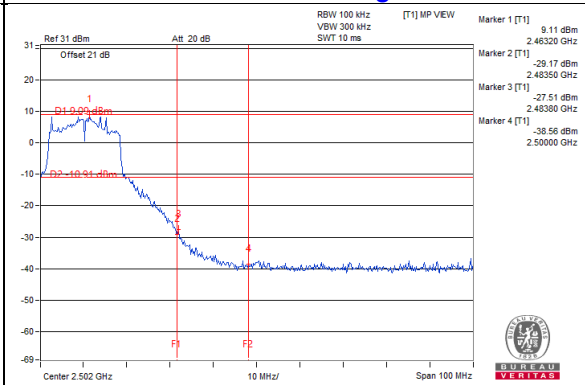
CH 11



CH 1 Band edge



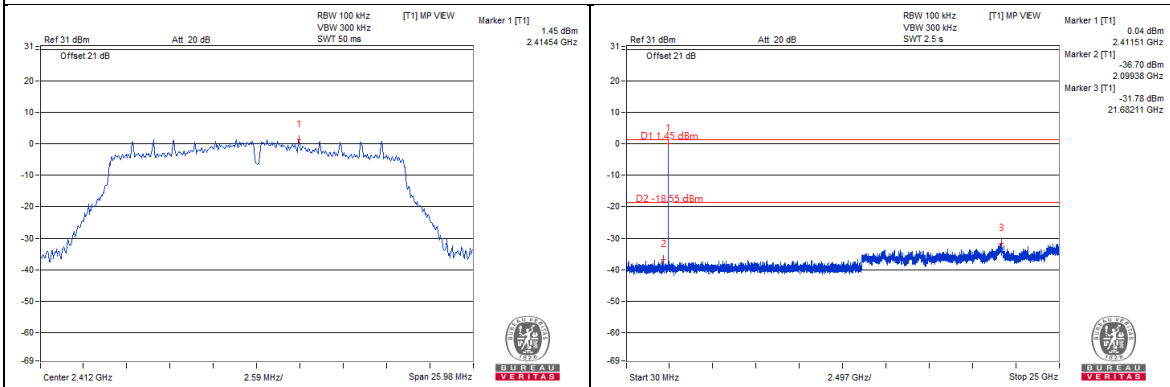
CH 11 Band edge



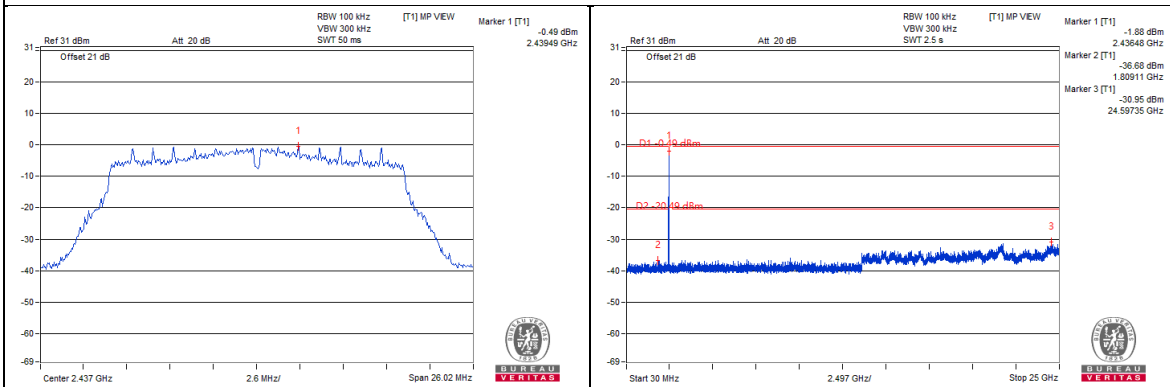
802.11n (HT20)

Chain 0

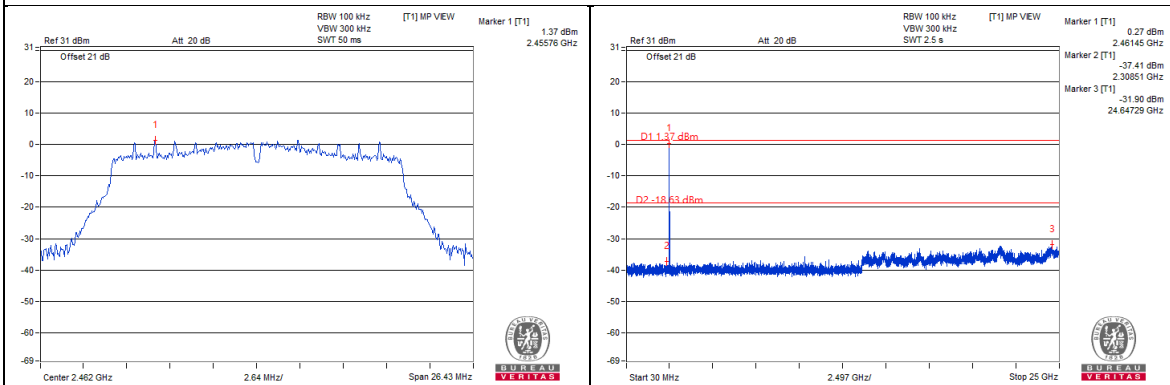
CH 1



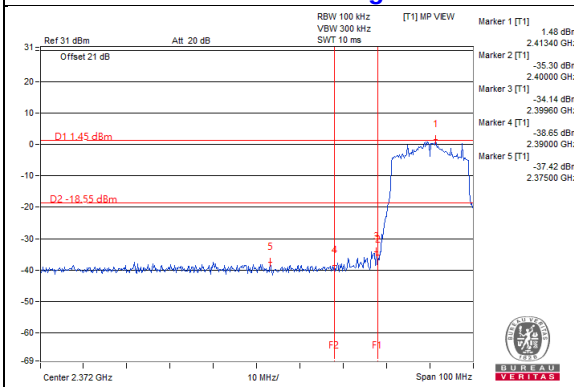
CH 6



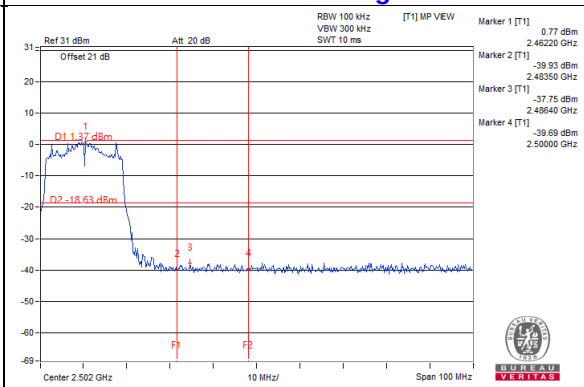
CH 11



CH 1 Band edge

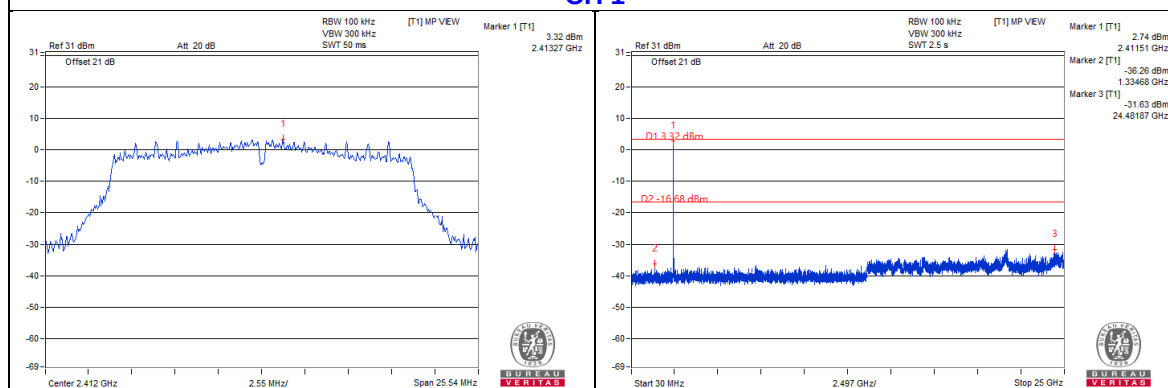


CH 11 Band edge

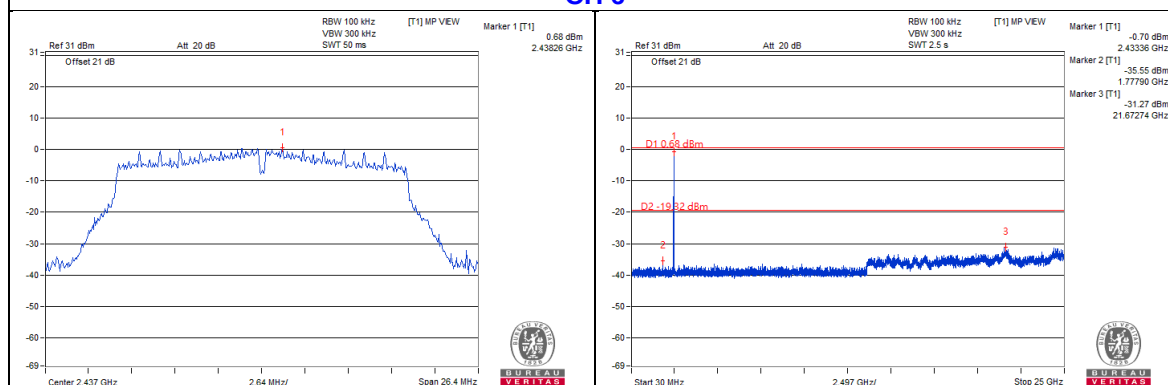


Chain 1

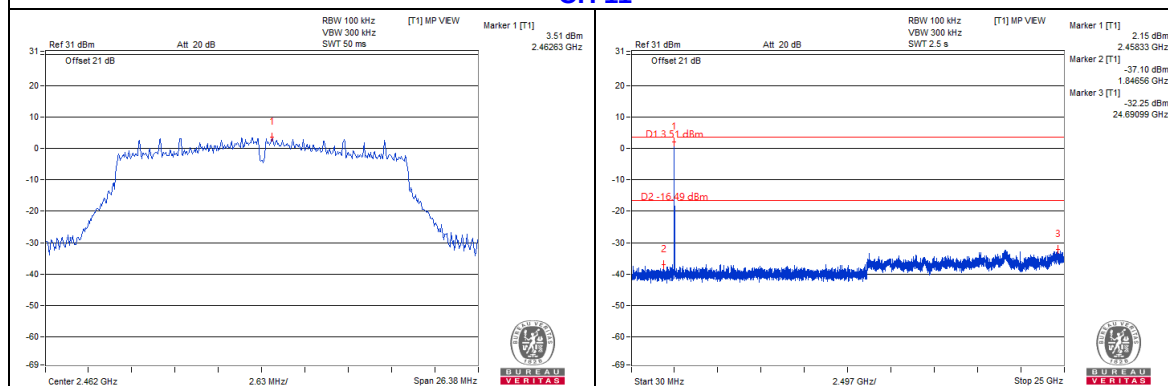
CH 1



CH 6

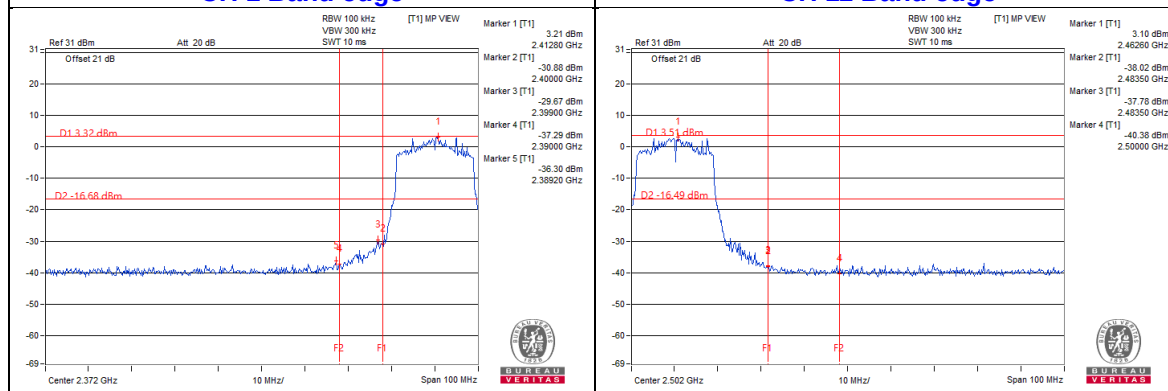


CH 11



CH 1 Band edge

CH 11 Band edge

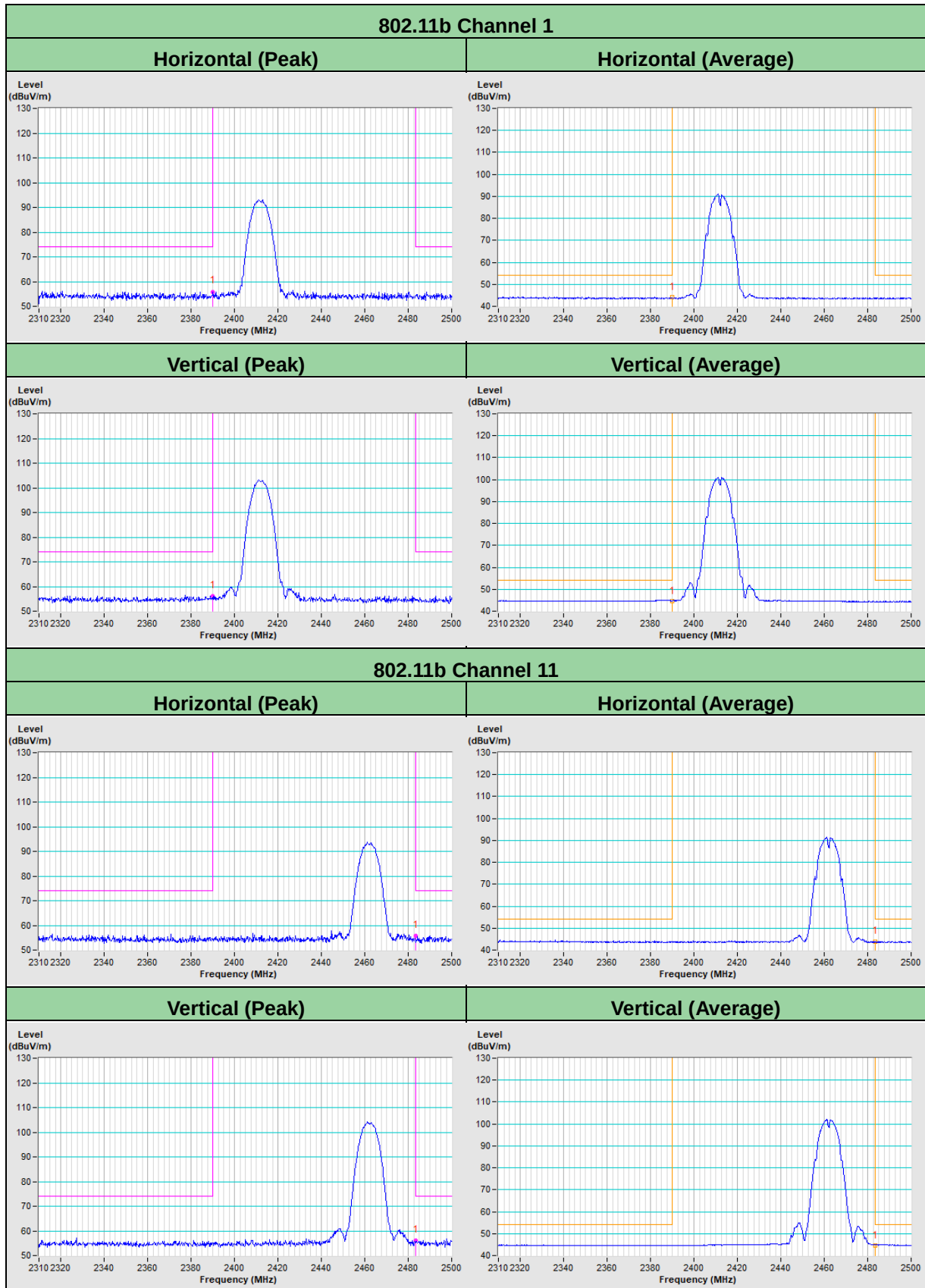


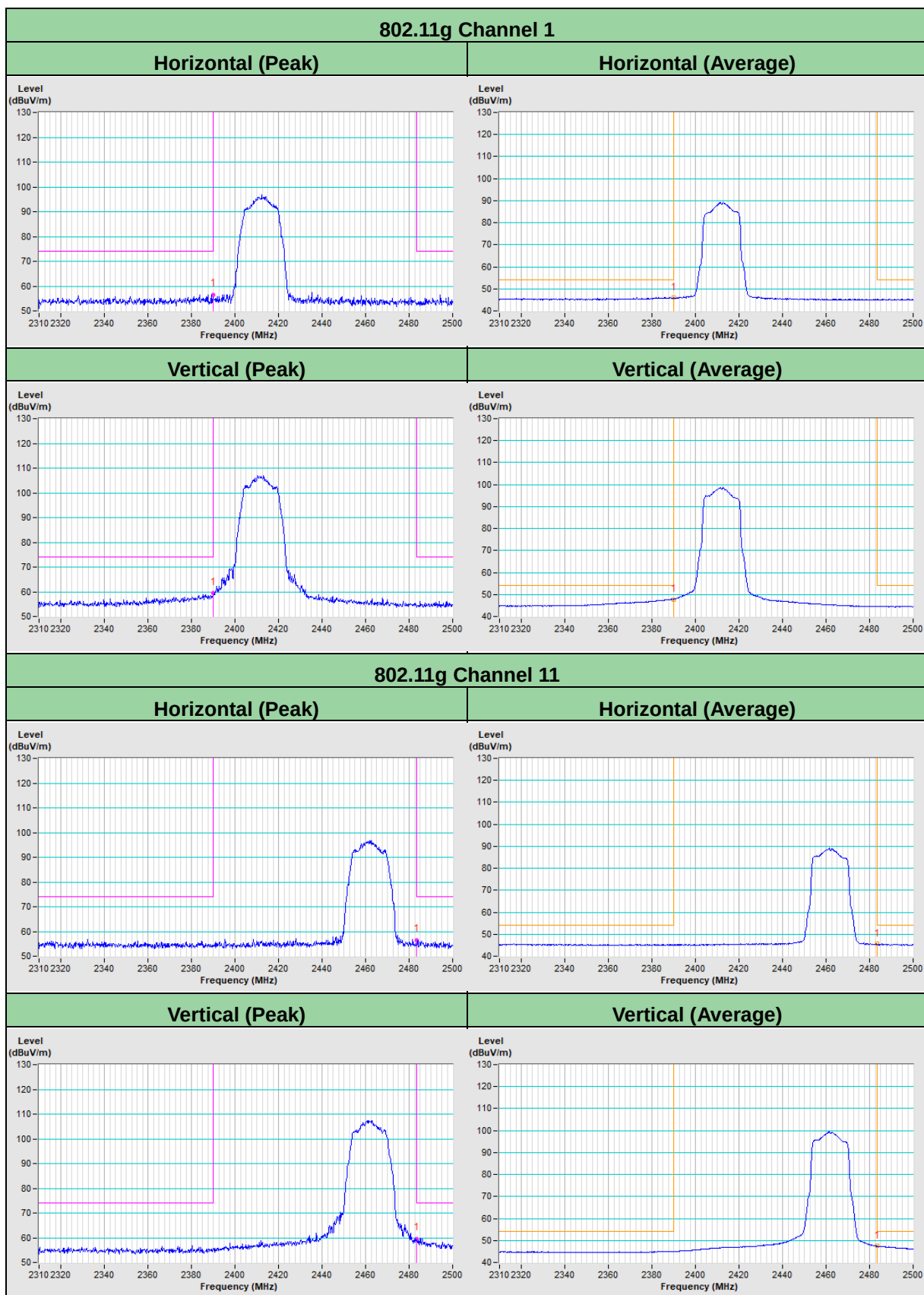
5 Pictures of Test Arrangements

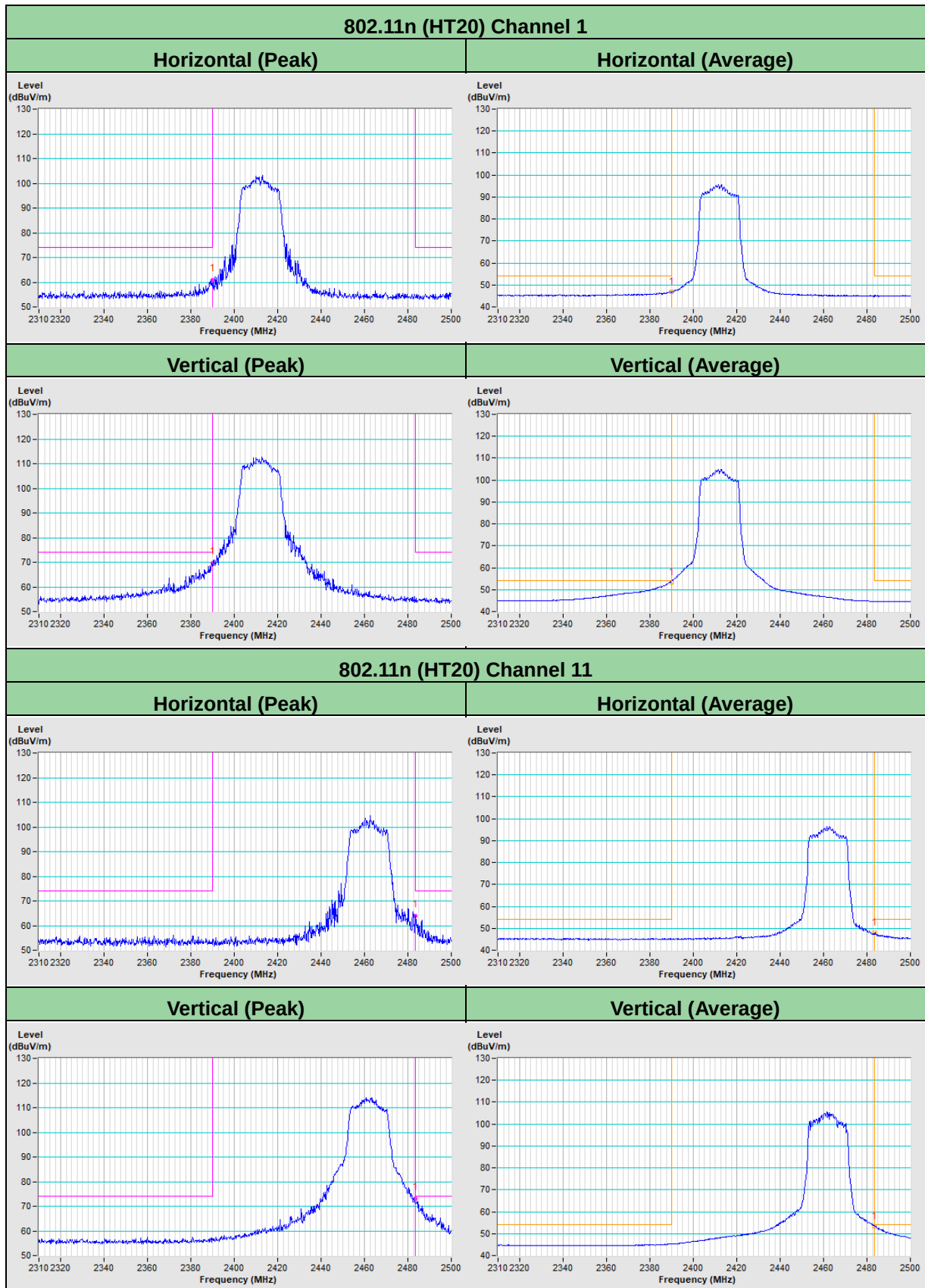
Please refer to the attached file (Test Setup Photo).

Annex A - Band-Edge Measurement

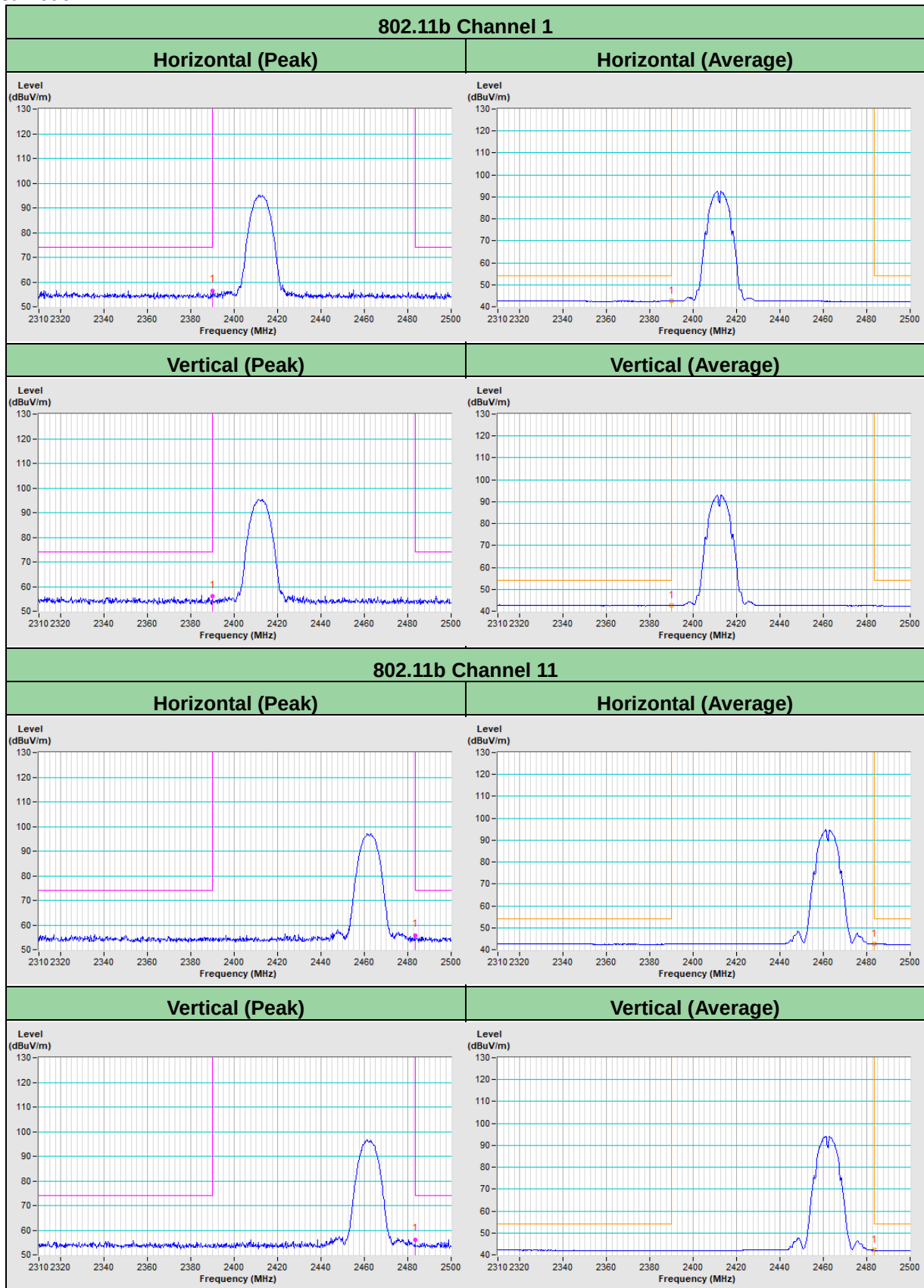
Test Mode 1

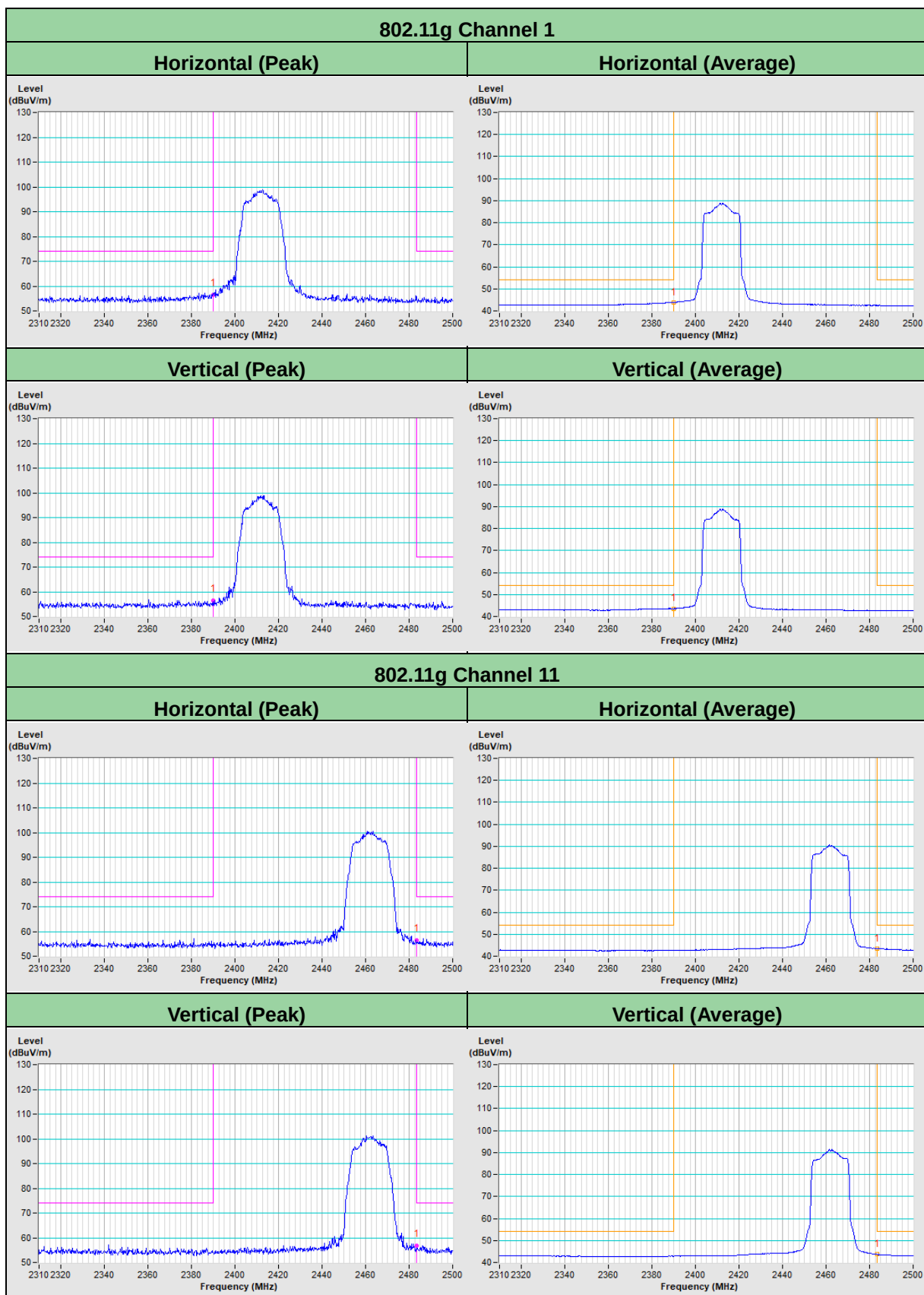


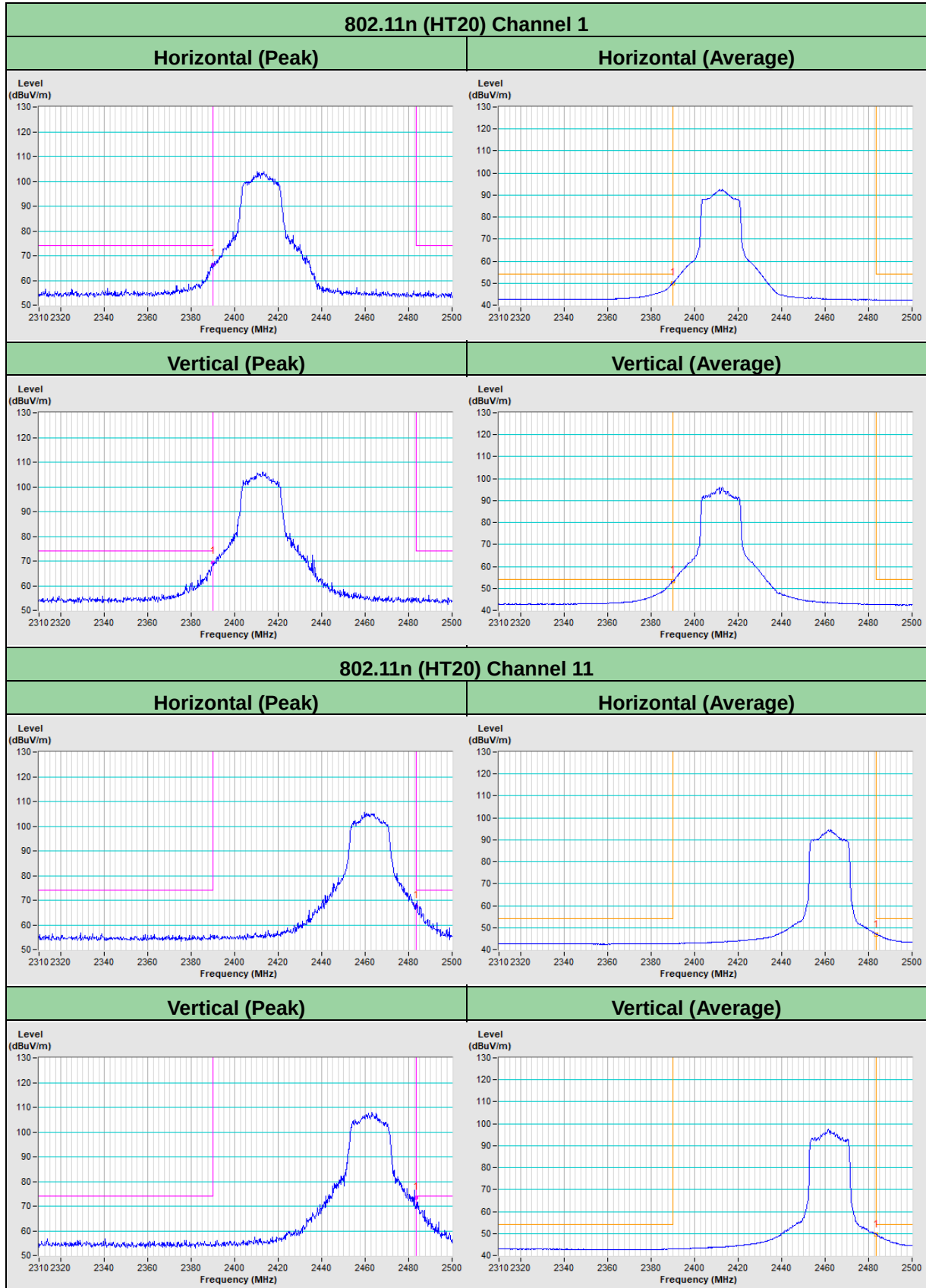




Test Mode 2







Appendix – Information of the Testing Laboratories

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

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

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---