

FCC Test Report

Report No.: RF180109C09

FCC ID: 2AMRF-FCM9000S

Test Model: FCM9000SC-100, FCM9000SE-100 (Refer section 3.1 for more details)

Received Date: Jan. 09, 2018

Test Date: Jan. 19, 2018 ~ Feb. 27, 2018

Issued Date: Mar. 02, 2018

Applicant: FCI Inc.

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**FCC Registration /
Designation Number:** 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF180109C09	Original Release	Mar. 02, 2018

1 Certificate of Conformity

Product: FC9000 Small Module

Brand: FCI

Test Model: FCM9000SC-100, FCM9000SE-100 (Refer section 3.1 for more details)

Sample Status: Production Unit

Applicant: FCI Inc.

Test Date: Jan. 19, 2018 ~ Feb. 27, 2018

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

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

Prepared by : Gina Liu, **Date:** Mar. 02, 2018
Gina Liu / Specialist

Approved by : Dylan Chiou, **Date:** Mar. 02, 2018
Dylan Chiou / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -7.26 dB at 0.18508 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.02 dB at 2389.94 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6 dB Bandwidth	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Reference only
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	No antenna connector is used.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Frequency	Expanded Uncertainty (k=2) (\pm)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	FC9000 Small Module
Brand	FCI
Test Model	FCM9000SC-100, FCM9000SE-100 (Refer to Note for more details)
Status of EUT	Production Unit
Power Supply Rating	5 Vdc (Host equipment)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: 72.2 Mbps
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20)
Output Power	169.434 mW
Antenna Type	Chip antenna with 1.99 dBi gain Dipole antenna with 2.5 dBi gain
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

- All models are listed as below.

Sample	Brand	Model	Difference
A	FCI	FCM9000SC-100	Chip antenna used
B		FCM9000SE-100	External antenna used thru u.FL connector

- The EUT provide one completed transmitter and one receiver.

Modulation Mode	Tx Function
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

- The EUT contains following accessory devices.

Product	Brand	Model	Description
USB Cable	USB2.0 AM to micro USB type B	USB2.0 AM-micro5P	0.6 m shielded cable w/o core

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

3.2 Description of Test Modes

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE \geq 1G	RE $<$ 1G	PLC	APCM	
A	√	√	√	√	Sample A
B	√	√	√	√	Sample B

Where **RE \geq 1G**: Radiated Emission above 1 GHz **RE $<$ 1G**: Radiated Emission below 1 GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane** for Sample A and **Z-plane** for Sample B.

NOTE: “-” means no effect.

Radiated Emission Test (Above 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0

Radiated Emission Test (Below 1 GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11n (HT20)	1 to 11	1	OFDM	BPSK	MCS0
B	802.11n (HT20)	1 to 11	11	OFDM	BPSK	MCS0

Power Line Conducted Emission Test:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11n (HT20)	1 to 11	1	OFDM	BPSK	MCS0
B	802.11n (HT20)	1 to 11	1	OFDM	BPSK	MCS0

Bandedge Measurement:

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
	802.11n (HT20)	1 to 11	1, 11	OFDM	BPSK	MCS0

Antenna Port Conducted Measurement:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Jisyong Wang
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Vincent Huang

3.3 Duty Cycle of Test Signal

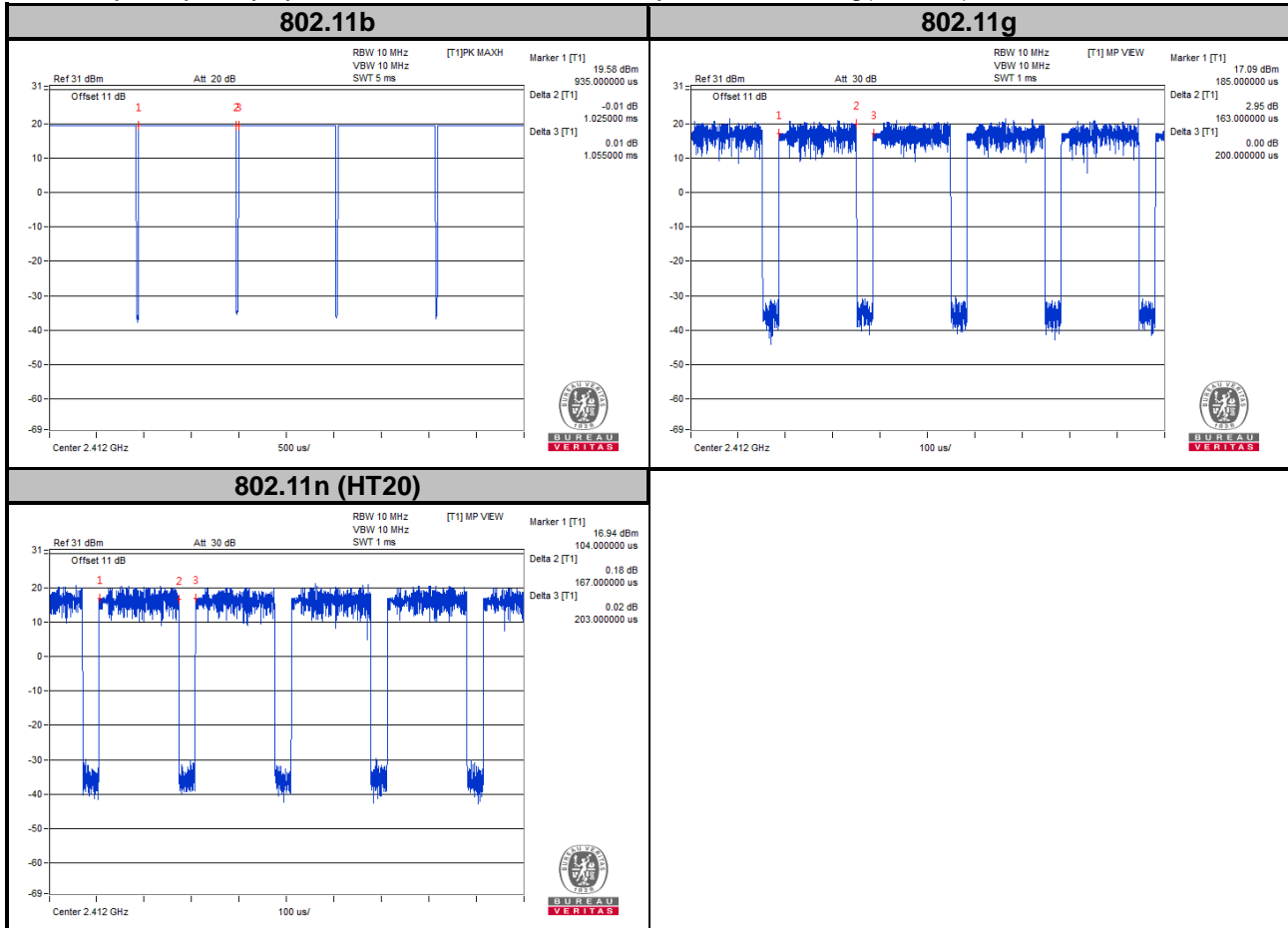
Mode A

Duty cycle of test signal is < 98 %

802.11b: Duty cycle = $1.025/1.055 = 0.972$, Duty factor = $10 * \log(1/0.972) = 0.13$

802.11g: Duty cycle = $0.163/0.2 = 0.815$, Duty factor = $10 * \log(1/0.815) = 0.89$

802.11n (HT20): Duty cycle = $0.167/0.203 = 0.823$, Duty factor = $10 * \log(1/0.823) = 0.85$



Mode B

Duty cycle of test signal is < 98 %

802.11b: Duty cycle = $625/655 = 0.954$, Duty factor = $10 * \log(1/0.954) = 0.20$

802.11g: Duty cycle = $0.692/0.736 = 0.940$, Duty factor = $10 * \log(1/0.940) = 0.27$

802.11n (HT20): Duty cycle = $0.656/0.701 = 0.936$, Duty factor = $10 * \log(1/0.936) = 0.29$

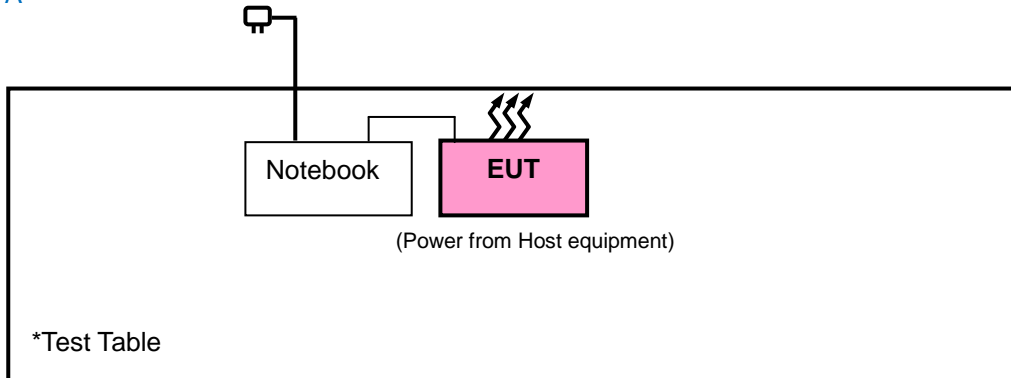


3.4 Description of Support Units

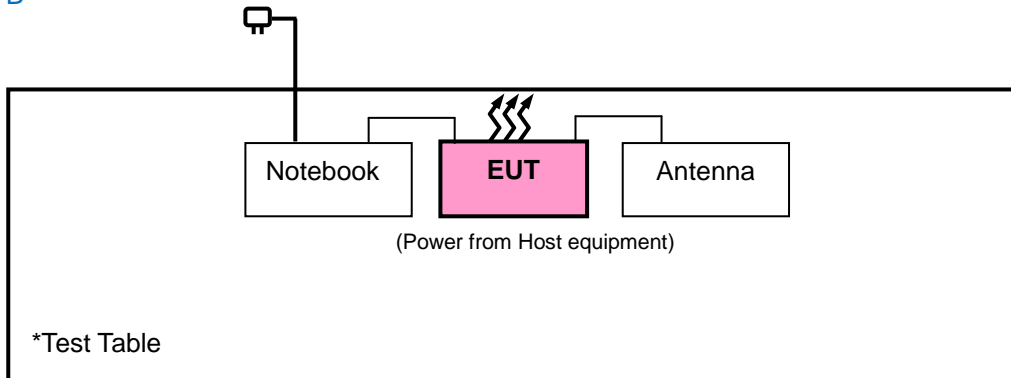
The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.4.1 Configuration of System under Test

Mode A



Mode B



3.5 General Description of Applied Standards

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

- FCC Part 15, Subpart C (15.247)**
- 558074 D01 DTS Meas Guidance v04**
- ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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 20 dB 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 1000 MHz, 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 20 dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Feb. 17, 2017	Feb. 16, 2018
			Feb. 17, 2018	Feb. 16, 2019
Spectrum Analyzer Agilent	N9010A	MY52220314	Nov. 24, 2017	Nov. 23, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	100115	Nov. 23, 2017	Nov. 22, 2018
Double Ridge Guide Horn Antenna EMCO	3115	5619	Nov. 30, 2017	Nov. 29, 2018
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Dec. 06, 2017	Dec. 05, 2018
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(RFC -SMS-100-SMS-12 0+RFC-SMS-100-S MS-400)	Jun. 23, 2017	Jun. 22, 2018
Loop Antenna	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier EMCI	EMC001340	980201	Nov. 01, 2017	Oct. 30, 2018
Bluetooth Tester	CBT	100946	Jul. 29, 2016	Jul. 28, 2018
Preamplifier EMCI	EMC 012645	980115	Oct. 20, 2017	Oct. 19, 2018
Preamplifier EMCI	EMC 184045	980116	Oct. 20, 2017	Oct. 19, 2018
Preamplifier EMCI	EMC 330H	980112	Oct. 13, 2017	Oct. 12, 2018
Power Meter Anritsu	ML2495A	1012010	Aug. 15, 2017	Aug. 14, 2018
Power Sensor Anritsu	MA2411B	1315050	Aug. 15, 2017	Aug. 14, 2018
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-800 0&3000	140811+170717	Oct. 20, 2017	Oct. 19, 2018
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1 000(140807)	Oct. 20, 2017	Oct. 19, 2018
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 20, 2017	Oct. 19, 2018
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	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 HwaYa Chamber 10.
 3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is IC7450F-10.

4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) 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 detected 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:

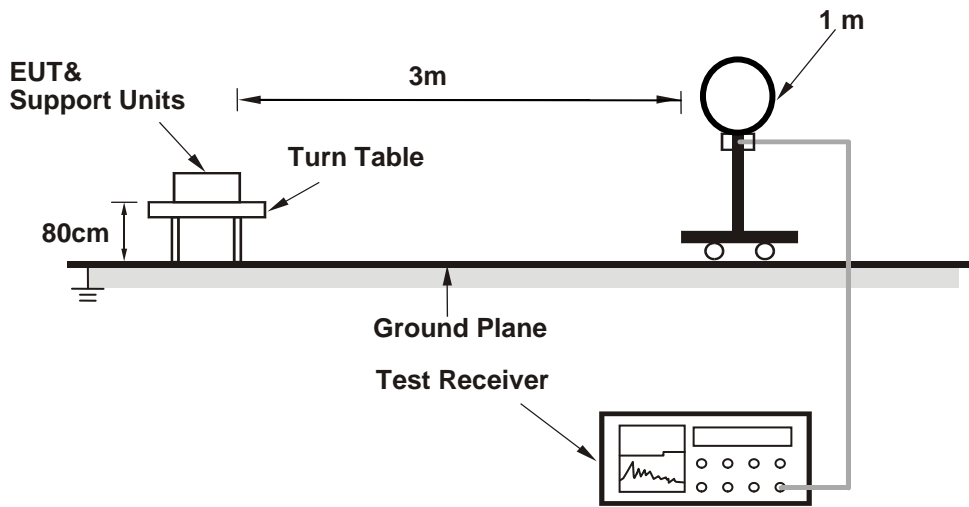
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 KHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for Average (Duty cycle < 98 %) detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle \geq 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

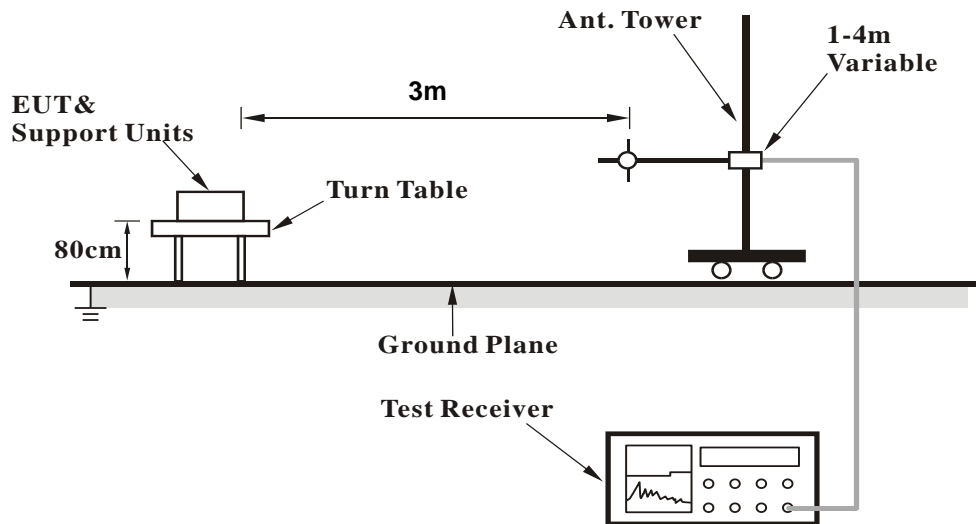
No deviation.

4.1.5 Test Set Up

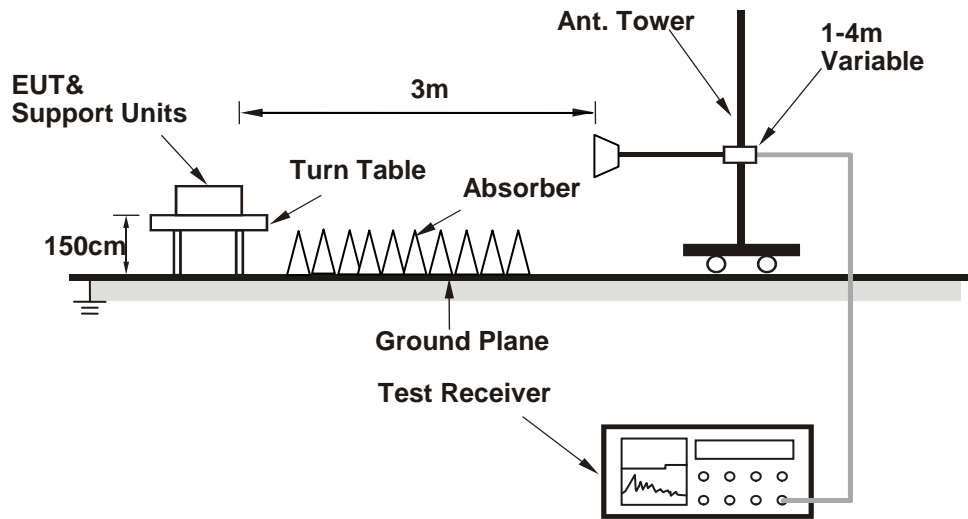
<Radiated emission below 30 MHz>



<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



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

4.1.6 EUT Operating Conditions

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1 GHz Data :
 Mode A
 802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	42.84	48.84	54	-11.16	27.16	4.36	37.52	147	74	Average
2389.94	52.8	58.8	74	-21.2	27.16	4.36	37.52	147	74	Peak
2412	104.05	109.96			27.23	4.38	37.52	147	74	Average
2412	111.07	116.98			27.23	4.38	37.52	147	74	Peak
4824	52.94	67.85	54	-1.06	31.17	6.81	52.89	150	100	Average
4824	56.99	71.9	74	-17.01	31.17	6.81	52.89	150	100	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.24	35.47	41.45	54	-18.53	27.16	4.36	37.5	100	268	Average
2389.24	47.2	53.18	74	-26.8	27.16	4.36	37.5	100	268	Peak
2412	89.73	95.64			27.23	4.38	37.52	100	268	Average
2412	95.75	101.66			27.23	4.38	37.52	100	268	Peak
4824	51.3	66.58	54	-2.7	30.99	6.81	53.08	121	111	Average
4824	55.23	70.51	74	-18.77	30.99	6.81	53.08	121	111	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
 Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.68	37.36	43.34	54	-16.64	27.16	4.36	37.5	148	73	Average
2388.68	50.31	56.29	74	-23.69	27.16	4.36	37.5	148	73	Peak
2437	103.36	109.04			27.38	4.4	37.46	148	73	Average
2437	110.26	115.94			27.38	4.4	37.46	148	73	Peak
2486.6	37.1	42.46	54	-16.9	27.53	4.43	37.32	148	73	Average
2486.6	49.29	54.65	74	-24.71	27.53	4.43	37.32	148	73	Peak
4874	51.65	66.4	54	-2.35	31.25	6.86	52.86	138	97	Average
4874	55.35	70.1	74	-18.65	31.25	6.86	52.86	138	97	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	35.4	41.4	54	-18.6	27.16	4.36	37.52	130	243	Average
2389.94	49.25	55.25	74	-24.75	27.16	4.36	37.52	130	243	Peak
2437	92.67	98.35			27.38	4.4	37.46	130	243	Average
2437	99.58	105.26			27.38	4.4	37.46	130	243	Peak
2488.56	35.9	41.18	54	-18.1	27.61	4.43	37.32	130	243	Average
2488.56	48.23	53.51	74	-25.77	27.61	4.43	37.32	130	243	Peak
4874	50.74	65.87	54	-3.26	31.06	6.86	53.05	177	43	Average
4874	54.87	70	74	-19.13	31.06	6.86	53.05	177	43	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	101.65	107.17			27.46	4.41	37.39	146	75	Average
2462	108.66	114.18			27.46	4.41	37.39	146	75	Peak
2483.52	38.95	44.31	54	-15.05	27.53	4.43	37.32	146	75	Average
2483.52	51.02	56.38	74	-22.98	27.53	4.43	37.32	146	75	Peak
4924	49.33	63.99	54	-4.67	31.34	6.89	52.89	111	123	Average
4924	52.86	67.52	74	-21.14	31.34	6.89	52.89	111	123	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	91.72	97.24			27.46	4.41	37.39	130	244	Average
2462	97.34	102.86			27.46	4.41	37.39	130	244	Peak
2499.12	35.78	40.98	54	-18.22	27.61	4.44	37.25	130	244	Average
2499.12	48.47	53.67	74	-25.53	27.61	4.44	37.25	130	244	Peak
4924	48.65	63.67	54	-5.35	31.12	6.89	53.03	158	42	Average
4924	50.49	65.51	74	-23.51	31.12	6.89	53.03	158	42	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	50.33	56.33	54	-3.67	27.16	4.36	37.52	169	108	Average
2389.94	71.51	77.51	74	-2.49	27.16	4.36	37.52	169	108	Peak
2412	96.97	102.88			27.23	4.38	37.52	169	108	Average
2412	108.93	114.84			27.23	4.38	37.52	169	108	Peak
4824	39.32	54.23	54	-14.68	31.17	6.81	52.89	203	256	Average
4824	49.42	64.33	74	-24.58	31.17	6.81	52.89	203	256	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	39.76	45.76	54	-14.24	27.16	4.36	37.52	100	256	Average
2389.94	60.05	66.05	74	-13.95	27.16	4.36	37.52	100	256	Peak
2412	84.13	90.04			27.23	4.38	37.52	100	256	Average
2412	95.84	101.75			27.23	4.38	37.52	100	256	Peak
4824	40.97	56.25	54	-13.03	30.99	6.81	53.08	105	256	Average
4824	50.99	66.27	74	-23.01	30.99	6.81	53.08	105	256	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyoung Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.66	36.37	42.35	54	-17.63	27.16	4.36	37.5	162	94	Average
2389.66	48.37	54.35	74	-25.63	27.16	4.36	37.5	162	94	Peak
2437	97.03	102.71			27.38	4.4	37.46	162	94	Average
2437	109.37	115.05			27.38	4.4	37.46	162	94	Peak
2483.76	36.31	41.67	54	-17.69	27.53	4.43	37.32	162	94	Average
2483.76	49.95	55.31	74	-24.05	27.53	4.43	37.32	162	94	Peak
4874	39.5	54.25	54	-14.5	31.25	6.86	52.86	102	256	Average
4874	49.58	64.33	74	-24.42	31.25	6.86	52.86	102	256	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2378.74	35.41	41.48	54	-18.59	27.08	4.35	37.5	126	250	Average
2378.74	46.96	53.03	74	-27.04	27.08	4.35	37.5	126	250	Peak
2437	84.43	90.11			27.38	4.4	37.46	126	250	Average
2437	96.17	101.85			27.38	4.4	37.46	126	250	Peak
2484.6	35.48	40.84	54	-18.52	27.53	4.43	37.32	126	250	Average
2484.6	47.98	53.34	74	-26.02	27.53	4.43	37.32	126	250	Peak
4874	39.46	54.59	54	-14.54	31.06	6.86	53.05	222	236	Average
4874	49.48	64.61	74	-24.52	31.06	6.86	53.05	222	236	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	96.39	101.91			27.46	4.41	37.39	145	71	Average
2462	108.61	114.13			27.46	4.41	37.39	145	71	Peak
2483.64	44.36	49.72	54	-9.64	27.53	4.43	37.32	145	71	Average
2483.64	65.23	70.59	74	-8.77	27.53	4.43	37.32	145	71	Peak
4924	35.84	50.5	54	-18.16	31.34	6.89	52.89	102	236	Average
4924	46.09	60.75	74	-27.91	31.34	6.89	52.89	102	236	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	83.39	88.91			27.46	4.41	37.39	162	242	Average
2462	95.04	100.56			27.46	4.41	37.39	162	242	Peak
2483.52	36.11	41.47	54	-17.89	27.53	4.43	37.32	162	242	Average
2483.52	52.72	58.08	74	-21.28	27.53	4.43	37.32	162	242	Peak
4924	37.51	52.53	54	-16.49	31.12	6.89	53.03	265	236	Average
4924	47.53	62.55	74	-26.47	31.12	6.89	53.03	265	236	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	51.43	57.43	54	-2.57	27.16	4.36	37.52	152	69	Average
2389.94	72.98	78.98	74	-1.02	27.16	4.36	37.52	152	69	Peak
2412	96.84	102.75			27.23	4.38	37.52	152	69	Average
2412	108.98	114.89			27.23	4.38	37.52	152	69	Peak
4824	40.34	55.25	54	-13.66	31.17	6.81	52.89	165	236	Average
4824	50.34	65.25	74	-23.66	31.17	6.81	52.89	165	236	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.8	40.69	46.69	54	-13.31	27.16	4.36	37.52	100	249	Average
2389.8	59.87	65.87	74	-14.13	27.16	4.36	37.52	100	249	Peak
2412	85.13	91.04			27.23	4.38	37.52	100	249	Average
2412	96.65	102.56			27.23	4.38	37.52	100	249	Peak
4824	40.97	56.25	54	-13.03	30.99	6.81	53.08	256	325	Average
4824	51.58	66.86	74	-22.42	30.99	6.81	53.08	256	325	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2384.62	36.22	42.29	54	-17.78	27.08	4.35	37.5	147	66	Average
2384.62	49.87	55.94	74	-24.13	27.08	4.35	37.5	147	66	Peak
2437	97.03	102.71			27.38	4.4	37.46	147	66	Average
2437	108.96	114.64			27.38	4.4	37.46	147	66	Peak
2484.08	36.21	41.57	54	-17.79	27.53	4.43	37.32	147	66	Average
2484.08	49.97	55.33	74	-24.03	27.53	4.43	37.32	147	66	Peak
4874	41.1	55.85	54	-12.9	31.25	6.86	52.86	152	236	Average
4874	51.14	65.89	74	-22.86	31.25	6.86	52.86	152	236	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	35.08	41.08	54	-18.92	27.16	4.36	37.52	165	244	Average
2389.94	47.5	53.5	74	-26.5	27.16	4.36	37.52	165	244	Peak
2437	84.03	89.71			27.38	4.4	37.46	165	244	Average
2437	96.59	102.27			27.38	4.4	37.46	165	244	Peak
2495.84	35.45	40.65	54	-18.55	27.61	4.44	37.25	165	244	Average
2495.84	47.97	53.17	74	-26.03	27.61	4.44	37.25	165	244	Peak
4874	39.38	54.51	54	-14.62	31.06	6.86	53.05	201	256	Average
4874	49.79	64.92	74	-24.21	31.06	6.86	53.05	201	256	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	96.39	101.91			27.46	4.41	37.39	103	91	Average
2462	108.78	114.3			27.46	4.41	37.39	103	91	Peak
2483.52	45.39	50.75	54	-8.61	27.53	4.43	37.32	103	91	Average
2483.52	67.83	73.19	74	-6.17	27.53	4.43	37.32	103	91	Peak
4924	36.14	50.8	54	-17.86	31.34	6.89	52.89	165	236	Average
4924	46.21	60.87	74	-27.79	31.34	6.89	52.89	165	236	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	84.93	90.45			27.46	4.41	37.39	100	270	Average
2462	94.93	100.45			27.46	4.41	37.39	100	270	Peak
2483.6	36.53	41.89	54	-17.47	27.53	4.43	37.32	100	270	Average
2483.6	56.1	61.46	74	-17.9	27.53	4.43	37.32	100	270	Peak
4924	37.27	52.29	54	-16.73	31.12	6.89	53.03	102	111	Average
4924	47.29	62.31	74	-26.71	31.12	6.89	53.03	102	111	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

Mode B
802.11b

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.8	37.07	43.07	54	-16.93	27.16	4.36	37.52	106	139	Average
2389.8	48.64	54.64	74	-25.36	27.16	4.36	37.52	106	139	Peak
2412	97.5	103.41			27.23	4.38	37.52	106	139	Average
2412	104.48	110.39			27.23	4.38	37.52	106	139	Peak
4824	51.71	66.62	54	-2.29	31.17	6.81	52.89	140	84	Average
4824	56.59	71.5	74	-17.41	31.17	6.81	52.89	140	84	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.66	40.2	46.18	54	-13.8	27.16	4.36	37.5	140	41	Average
2389.66	51.09	57.07	74	-22.91	27.16	4.36	37.5	140	41	Peak
2412	99.13	105.04			27.23	4.38	37.52	140	41	Average
2412	105.77	111.68			27.23	4.38	37.52	140	41	Peak
4824	52.4	67.68	54	-1.6	30.99	6.81	53.08	158	47	Average
4824	56.68	71.96	74	-17.32	30.99	6.81	53.08	158	47	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyoung Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2384.06	35.3	40.88	54	-18.7	27.08	4.84	37.5	139	139	Average
2384.06	48	53.58	74	-26	27.08	4.84	37.5	139	139	Peak
2437	98.36	103.55			27.38	4.89	37.46	139	139	Average
2437	105.35	110.54			27.38	4.89	37.46	139	139	Peak
2484.6	35.39	40.24	54	-18.61	27.53	4.94	37.32	139	139	Average
2484.6	48.66	53.51	74	-25.34	27.53	4.94	37.32	139	139	Peak
4874	51.83	50.93	54	-2.17	31.25	6.86	37.21	100	212	Average
4874	57.34	56.44	74	-16.66	31.25	6.86	37.21	100	212	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2325.54	35.54	41.52	54	-18.46	26.72	4.77	37.47	137	60	Average
2325.54	48.12	54.1	74	-25.88	26.72	4.77	37.47	137	60	Peak
2437	100.21	105.72			27.06	4.89	37.46	137	60	Average
2437	107.21	112.72			27.06	4.89	37.46	137	60	Peak
2487.24	36.18	41.41	54	-17.82	27.15	4.94	37.32	137	60	Average
2487.24	48.77	54	74	-25.23	27.15	4.94	37.32	137	60	Peak
4874	52.41	51.7	54	-1.59	31.06	6.86	37.21	166	45	Average
4874	57.1	56.39	74	-16.9	31.06	6.86	37.21	166	45	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	99.2	104.21			27.46	4.92	37.39	132	141	Average
2462	106	111.01			27.46	4.92	37.39	132	141	Peak
2483.52	40.46	45.31	54	-13.54	27.53	4.94	37.32	132	141	Average
2483.52	50.53	55.38	74	-23.47	27.53	4.94	37.32	132	141	Peak
4924	51.77	50.73	54	-2.23	31.34	6.89	37.19	111	132	Average
4924	53.6	52.56	74	-20.4	31.34	6.89	37.19	111	132	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	100.39	105.91			27.46	4.41	37.39	106	57	Average
2462	107.4	112.92			27.46	4.41	37.39	106	57	Peak
2483.52	43.23	48.59	54	-10.77	27.53	4.43	37.32	106	57	Average
2483.52	52.75	58.11	74	-21.25	27.53	4.43	37.32	106	57	Peak
4924	52.99	68.01	54	-1.01	31.12	6.89	53.03	177	43	Average
4924	54.36	69.38	74	-19.64	31.12	6.89	53.03	177	43	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11g

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	47.69	53.69	54	-6.31	27.16	4.36	37.52	157	254	Average
2389.94	66.1	72.1	74	-7.9	27.16	4.36	37.52	157	254	Peak
2412	98.13	104.04			27.23	4.38	37.52	157	254	Average
2412	104.71	110.62			27.23	4.38	37.52	157	254	Peak
4824	50.67	65.58	54	-3.33	31.17	6.81	52.89	132	256	Average
4824	53.65	68.56	74	-20.35	31.17	6.81	52.89	132	256	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	51.63	57.63	54	-2.37	27.16	4.36	37.52	142	11	Average
2389.94	72.57	78.57	74	-1.43	27.16	4.36	37.52	142	11	Peak
2412	100.24	106.15			27.23	4.38	37.52	142	11	Average
2412	107.14	113.05			27.23	4.38	37.52	142	11	Peak
4824	51.57	66.85	54	-2.43	30.99	6.81	53.08	111	132	Average
4824	54.7	69.98	74	-19.3	30.99	6.81	53.08	111	132	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.52	35.28	41.26	54	-18.72	27.16	4.36	37.5	180	269	Average
2389.52	50.42	56.4	74	-23.58	27.16	4.36	37.5	180	269	Peak
2437	98.63	104.31			27.38	4.4	37.46	180	269	Average
2437	104.94	110.62			27.38	4.4	37.46	180	269	Peak
2483.72	35.42	40.78	54	-18.58	27.53	4.43	37.32	180	269	Average
2483.72	49.54	54.9	74	-24.46	27.53	4.43	37.32	180	269	Peak
4874	47.1	61.85	54	-6.9	31.25	6.86	52.86	102	236	Average
4874	50.17	64.92	74	-23.83	31.25	6.86	52.86	102	236	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	37.78	43.78	54	-16.22	27.16	4.36	37.52	138	36	Average
2389.94	50.83	56.83	74	-23.17	27.16	4.36	37.52	138	36	Peak
2437	99.3	104.98			27.38	4.4	37.46	138	36	Average
2437	106.35	112.03			27.38	4.4	37.46	138	36	Peak
2484.44	37.07	42.43	54	-16.93	27.53	4.43	37.32	138	36	Average
2484.44	54.96	60.32	74	-19.04	27.53	4.43	37.32	138	36	Peak
4874	48.44	63.57	54	-5.56	31.06	6.86	53.05	123	256	Average
4874	52.27	67.4	74	-21.73	31.06	6.86	53.05	123	256	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	95.72	100.73			27.46	4.92	37.39	151	273	Average
2462	102.33	107.34			27.46	4.92	37.39	151	273	Peak
2483.52	47.93	52.78	54	-6.07	27.53	4.94	37.32	151	273	Average
2483.52	70.33	75.18	74	-3.67	27.53	4.94	37.32	151	273	Peak
4924	45.59	44.55	54	-8.41	31.34	6.89	37.19	102	236	Average
4924	49.16	48.12	74	-24.84	31.34	6.89	37.19	102	236	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	97.83	103.35			27.46	4.41	37.39	121	59	Average
2462	104.39	109.91			27.46	4.41	37.39	121	59	Peak
2483.56	50.44	55.8	54	-3.56	27.53	4.43	37.32	121	59	Average
2483.56	72.83	78.19	74	-1.17	27.53	4.43	37.32	121	59	Peak
4924	47.42	62.44	54	-6.58	31.12	6.89	53.03	111	165	Average
4924	50.95	65.97	74	-23.05	31.12	6.89	53.03	111	165	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	43.36	49.36	54	-10.64	27.16	4.36	37.52	153	253	Average
2389.94	66.14	72.14	74	-7.86	27.16	4.36	37.52	153	253	Peak
2412	97.13	103.04			27.23	4.38	37.52	153	253	Average
2412	103.61	109.52			27.23	4.38	37.52	153	253	Peak
4824	48.24	63.15	54	-5.76	31.17	6.81	52.89	156	123	Average
4824	51.25	66.16	74	-22.75	31.17	6.81	52.89	156	123	Peak

Antennal Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2389.94	47.71	53.71	54	-6.29	27.16	4.36	37.52	139	11	Average
2389.94	68.77	74.77	74	-5.23	27.16	4.36	37.52	139	11	Peak
2412	98.46	104.37			27.23	4.38	37.52	139	11	Average
2412	105.47	111.38			27.23	4.38	37.52	139	11	Peak
4824	48.62	63.9	54	-5.38	30.99	6.81	53.08	156	236	Average
4824	51.62	66.9	74	-22.38	30.99	6.81	53.08	156	236	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2412 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 6	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2387.28	35.13	41.11	54	-18.87	27.16	4.36	37.5	151	252	Average
2387.28	48.58	54.56	74	-25.42	27.16	4.36	37.5	151	252	Peak
2437	97.63	103.31			27.38	4.4	37.46	151	252	Average
2437	104.59	110.27			27.38	4.4	37.46	151	252	Peak
2484.52	36.03	41.39	54	-17.97	27.53	4.43	37.32	151	252	Average
2484.52	54.34	59.7	74	-19.66	27.53	4.43	37.32	151	252	Peak
4874	47.11	61.86	54	-6.89	31.25	6.86	52.86	125	236	Average
4874	50.16	64.91	74	-23.84	31.25	6.86	52.86	125	236	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2388.4	38.95	44.69	54	-15.05	26.91	4.85	37.5	136	35	Average
2388.4	53.1	58.84	74	-20.9	26.91	4.85	37.5	136	35	Peak
2437	99.34	104.85			27.06	4.89	37.46	136	35	Average
2437	106.36	111.87			27.06	4.89	37.46	136	35	Peak
2483.76	37.48	42.71	54	-16.52	27.15	4.94	37.32	136	35	Average
2483.76	55.37	60.6	74	-18.63	27.15	4.94	37.32	136	35	Peak
4874	47.22	46.51	54	-6.78	31.06	6.86	37.21	102	231	Average
4874	50.95	50.24	74	-23.05	31.06	6.86	37.21	102	231	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2437 MHz: Fundamental frequency.

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	1 GHz ~ 25 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	95.52	101.04			27.46	4.41	37.39	177	272	Average
2462	102.26	107.78			27.46	4.41	37.39	177	272	Peak
2483.52	47.21	52.57	54	-6.79	27.53	4.43	37.32	177	272	Average
2483.52	69.04	74.4	74	-4.96	27.53	4.43	37.32	177	272	Peak
4924	43.87	58.53	54	-10.13	31.34	6.89	52.89	123	256	Average
4924	46.82	61.48	74	-27.18	31.34	6.89	52.89	123	256	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	96.41	101.93			27.46	4.41	37.39	120	57	Average
2462	103.31	108.83			27.46	4.41	37.39	120	57	Peak
2483.6	50.46	55.82	54	-3.54	27.53	4.43	37.32	120	57	Average
2483.6	72.05	77.41	74	-1.95	27.53	4.43	37.32	120	57	Peak
4924	44.51	59.53	54	-9.49	31.12	6.89	53.03	256	123	Average
4924	47.52	62.54	74	-26.48	31.12	6.89	53.03	256	123	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2462 MHz: Fundamental frequency.

9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

30 MHz ~ 1 GHz Worst-Case Data:

Mode A

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 1	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyoung Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
75.59	36.26	57.92	40	-3.74	9.33	0.66	31.65	125	111	Peak
173.56	39.93	59.23	43.5	-3.57	11.38	1.09	31.77	102	236	Peak
246.31	38.97	58.07	46	-7.03	11.32	1.46	31.88	111	152	Peak
323.91	40.9	57.47	46	-5.1	13.52	1.77	31.86	111	165	Peak
546.04	31.03	41.84	46	-14.97	18.37	2.68	31.86	174	123	Peak
894.27	31.94	36.5	46	-14.06	23.44	4	32	256	236	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
76.56	31.04	52.91	40	-8.96	9.09	0.66	31.62	152	236	Peak
174.53	32.12	51.53	43.5	-11.38	11.28	1.09	31.78	102	256	Peak
304.51	31.43	48.59	46	-14.57	13.06	1.67	31.89	174	123	Peak
335.55	30.67	46.87	46	-15.33	13.8	1.82	31.82	145	236	Peak
896.21	33.29	37.81	46	-12.71	23.46	4.02	32	111	165	Peak
965.08	33.96	37.69	54	-20.04	23.87	4.3	31.9	256	325	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

Mode B

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 11	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Jisyong Wang

Antennal Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
57.16	38.53	57.06	40	-1.47	12.25	0.57	31.35	123	256	Peak
147.37	41.65	59.69	43.5	-1.85	12.61	0.97	31.62	185	142	Peak
312.27	43.22	60.21	46	-2.78	13.24	1.71	31.94	111	169	Peak
450.01	36.68	50.05	46	-9.32	16.33	2.28	31.98	185	142	Peak
540.22	32.19	43.02	46	-13.81	18.24	2.66	31.73	163	256	Peak
965.08	31.85	35.58	54	-22.15	23.87	4.3	31.9	184	265	Peak

Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
57.16	35.09	53.62	40	-4.91	12.25	0.57	31.35	185	236	Peak
148.34	35.07	53.08	43.5	-8.43	12.64	0.97	31.62	165	245	Peak
335.55	29.31	45.51	46	-16.69	13.8	1.82	31.82	111	196	Peak
564.47	29.1	39.62	46	-16.9	18.79	2.76	32.07	174	185	Peak
685.72	30.46	38.42	46	-15.54	20.64	3.24	31.84	102	162	Peak
946.65	33.13	37	46	-12.87	23.77	4.21	31.85	175	146	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

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 0.50 MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	Apr. 20, 2017	Apr. 19, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	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 HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

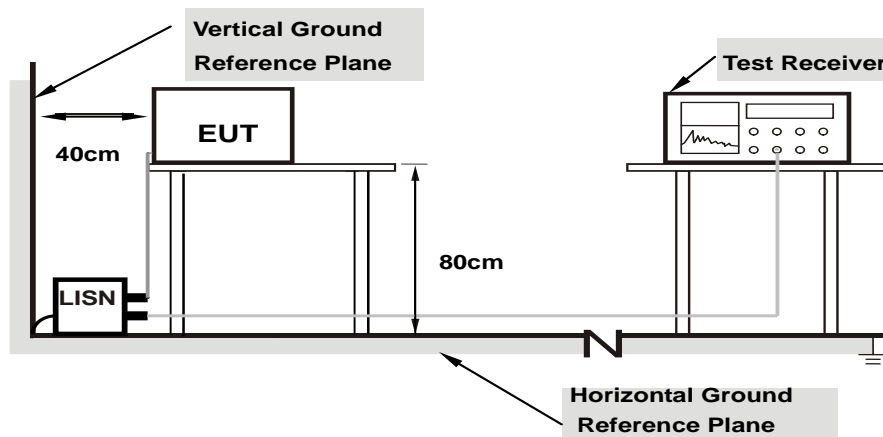
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling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

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

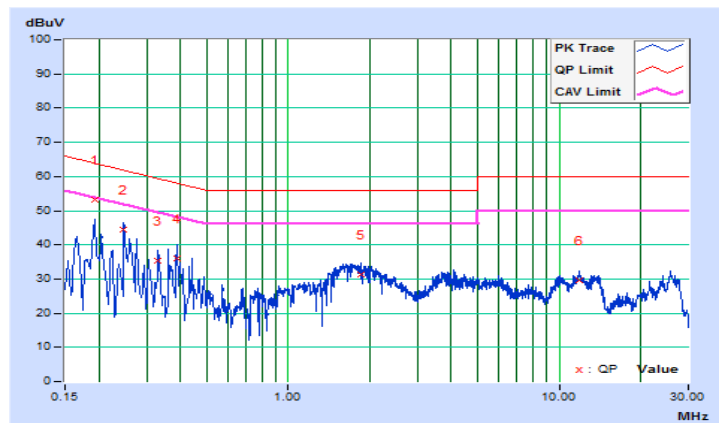
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2018/1/19
Test Mode	Mode A		

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	0.19301	10.10	42.97	25.37	53.07	35.47	63.91	53.91	-10.84	-18.44
2	0.24775	10.11	34.49	21.03	44.60	31.14	61.83	51.83	-17.23	-20.69
3	0.32986	10.11	25.39	9.72	35.50	19.83	59.45	49.45	-23.95	-29.62
4	0.38851	10.12	25.89	10.28	36.01	20.40	58.10	48.10	-22.09	-27.70
5	1.85476	10.18	21.13	10.63	31.31	20.81	56.00	46.00	-24.69	-25.19
6	11.90737	10.73	18.76	11.71	29.49	22.44	60.00	50.00	-30.51	-27.56

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

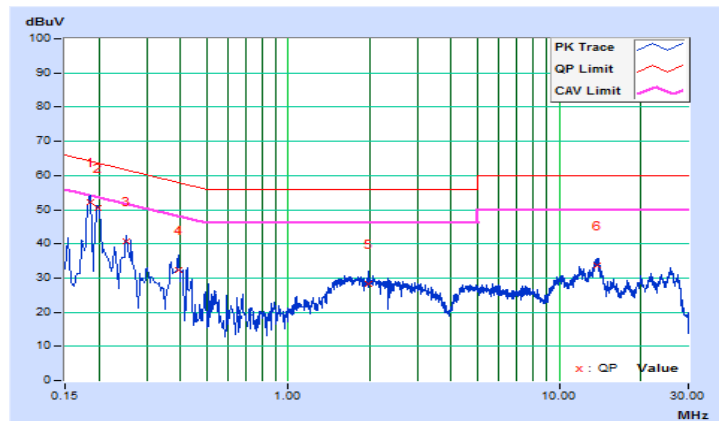


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2018/1/19
Test Mode	Mode A		

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	0.18508	10.10	42.18	27.08	52.28	37.18	64.25	54.25	-11.97	-17.07
2	0.19717	10.10	40.50	23.45	50.60	33.55	63.73	53.73	-13.13	-20.18
3	0.25166	10.11	30.50	16.90	40.61	27.01	61.70	51.70	-21.09	-24.69
4	0.39242	10.12	22.07	7.98	32.19	18.10	58.01	48.01	-25.82	-29.91
5	1.96815	10.17	18.08	8.79	28.25	18.96	56.00	46.00	-27.75	-27.04
6	13.75680	10.68	23.07	11.86	33.75	22.54	60.00	50.00	-26.25	-27.46

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

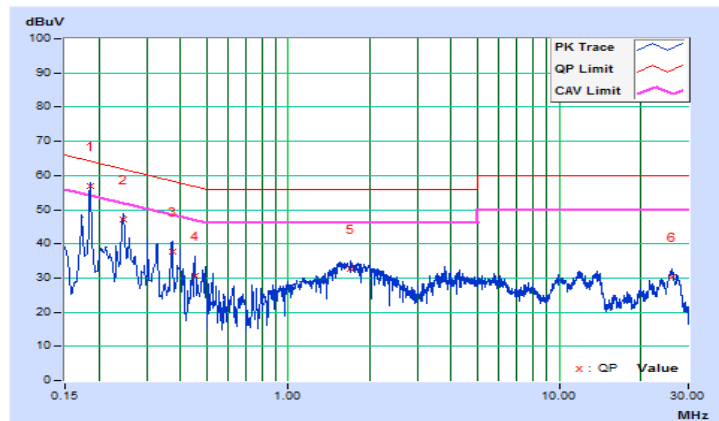


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2018/1/19
Test Mode	Mode B		

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	0.18508	10.10	46.89	30.66	56.99	40.76	64.25	54.25	-7.26	-13.49
2	0.24731	10.11	37.01	23.47	47.12	33.58	61.85	51.85	-14.73	-18.27
3	0.37287	10.11	27.76	16.36	37.87	26.47	58.44	48.44	-20.57	-21.97
4	0.45107	10.12	20.40	3.64	30.52	13.76	56.86	46.86	-26.34	-33.10
5	1.69836	10.17	22.33	12.20	32.50	22.37	56.00	46.00	-23.50	-23.63
6	26.20233	11.32	19.14	11.26	30.46	22.58	60.00	50.00	-29.54	-27.42

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

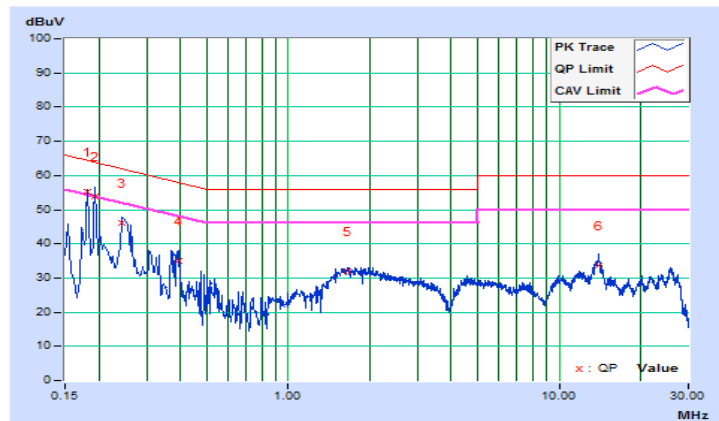


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2018/1/19
Test Mode	Mode B		

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	0.18122	10.10	45.28	26.62	55.38	36.72	64.43	54.43	-9.05	-17.71
2	0.19301	10.10	43.75	25.52	53.85	35.62	63.91	53.91	-10.06	-18.29
3	0.24407	10.11	35.89	20.86	46.00	30.97	61.96	51.96	-15.96	-20.99
4	0.39635	10.12	24.84	9.74	34.96	19.86	57.93	47.93	-22.97	-28.07
5	1.66622	10.16	21.85	9.42	32.01	19.58	56.00	46.00	-23.99	-26.42
6	14.06960	10.69	22.92	11.09	33.61	21.78	60.00	50.00	-26.39	-28.22

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

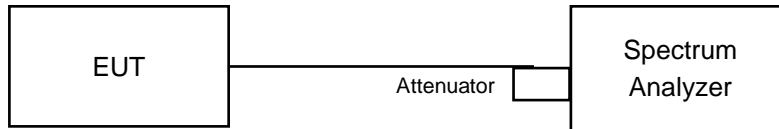


4.3 6 dB Bandwidth Measurement

4.3.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Mode A

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.05	0.5	Pass
6	2437	9.10	0.5	Pass
11	2462	9.10	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.34	0.5	Pass
6	2437	15.36	0.5	Pass
11	2462	15.19	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.16	0.5	Pass
6	2437	15.19	0.5	Pass
11	2462	15.18	0.5	Pass

Mode B
802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.08	0.5	Pass
6	2437	9.03	0.5	Pass
11	2462	9.07	0.5	Pass

802.11g

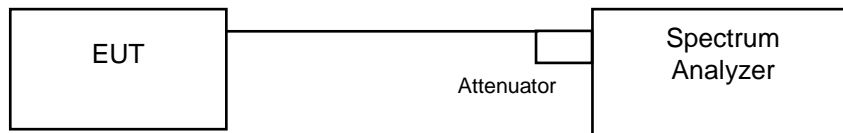
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.16	0.5	Pass
6	2437	15.19	0.5	Pass
11	2462	15.36	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.45	0.5	Pass
6	2437	15.19	0.5	Pass
11	2462	15.19	0.5	Pass

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to PEAK. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

4.4.4 Deviation from Test Standard

No deviation.

4.4.5 EUT Operating Conditions

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

4.4.6 Test Results

Mode A

802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	13.35	Pass
6	2437	13.70	Pass
11	2462	13.45	Pass

802.11g

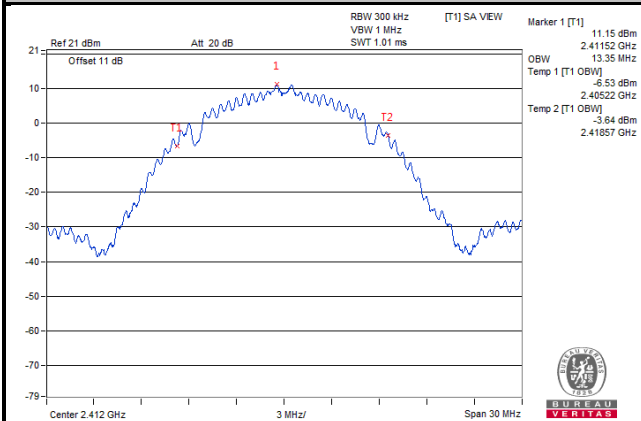
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	16.86	Pass
6	2437	16.75	Pass
11	2462	16.60	Pass

802.11n (HT20)

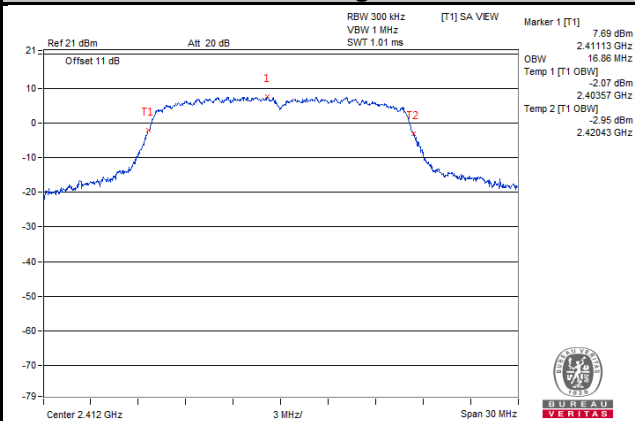
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	17.55	Pass
6	2437	17.65	Pass
11	2462	17.60	Pass

Spectrum Plot of Worst Value

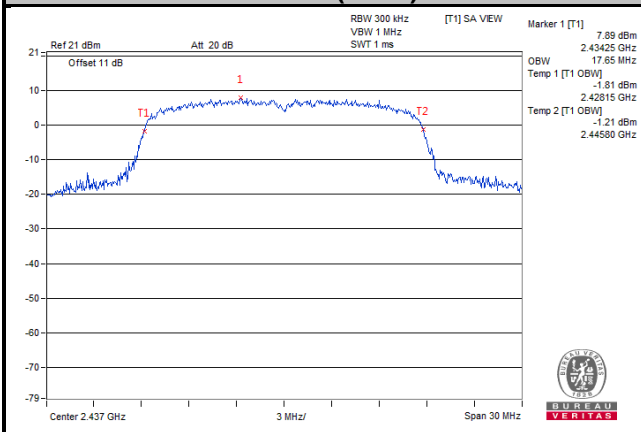
802.11b



802.11g



802.11n (HT20)



Mode B

802.11b

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	13.35	Pass
6	2437	13.40	Pass
11	2462	13.50	Pass

802.11g

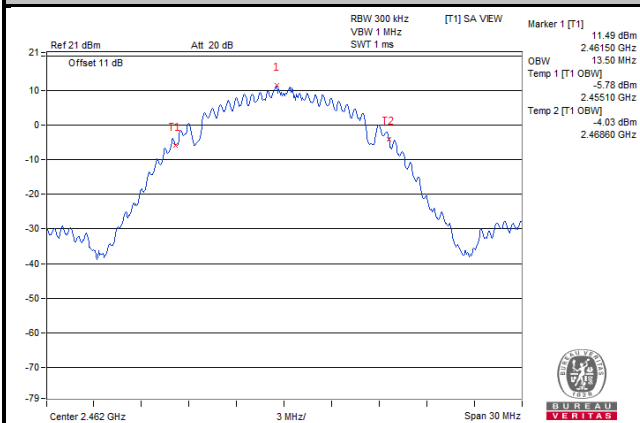
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	16.89	Pass
6	2437	16.90	Pass
11	2462	16.60	Pass

802.11n (HT20)

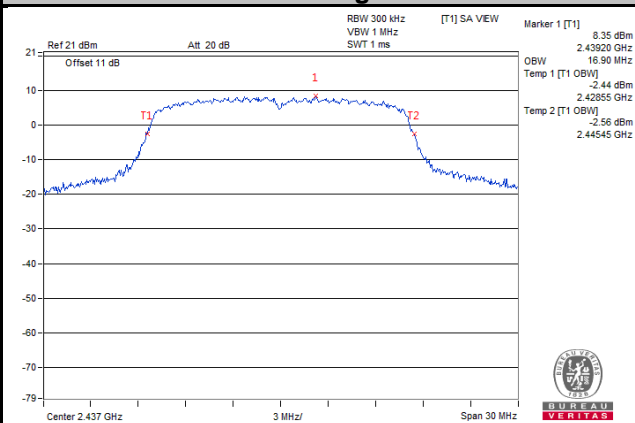
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Pass / Fail
1	2412	17.58	Pass
6	2437	17.60	Pass
11	2462	17.45	Pass

Spectrum Plot of Worst Value

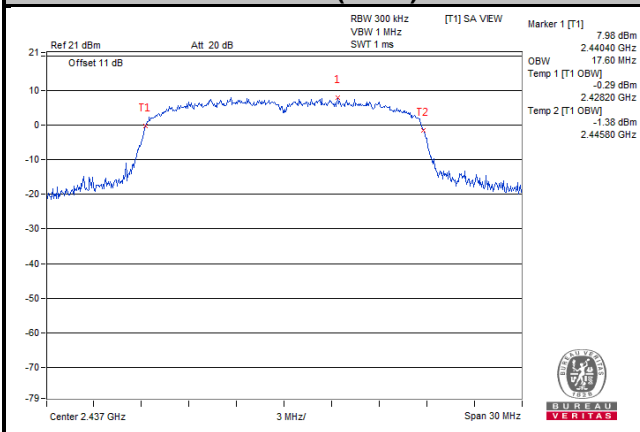
802.11b



802.11g



802.11n (HT20)

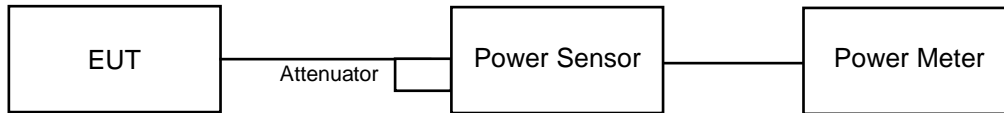


4.5 Conducted Output Power Measurement

4.5.1 Limits of Conducted Output Power Measurement

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

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 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

Mode A

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	85.901	19.34	30	Pass
6	2437	100.462	20.02	30	Pass
11	2462	94.406	19.75	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	150.314	21.77	30	Pass
6	2437	161.065	22.07	30	Pass
11	2462	157.761	21.98	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	155.597	21.92	30	Pass
6	2437	169.434	22.29	30	Pass
11	2462	162.555	22.11	30	Pass

Mode B
802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	82.035	19.14	30	Pass
6	2437	77.804	18.91	30	Pass
11	2462	92.683	19.67	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	169.044	22.28	30	Pass
6	2437	164.816	22.17	30	Pass
11	2462	153.109	21.85	30	Pass

802.11n (HT20)

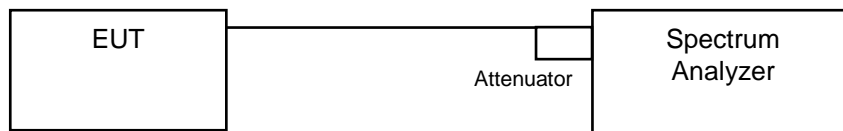
Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	154.882	21.90	30	Pass
6	2437	169.044	22.28	30	Pass
11	2462	133.968	21.27	30	Pass

4.6 Power Spectral Density Measurement

4.6.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 dBm.

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

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Mode A

802.11b

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-5.02	8	Pass
6	2437	-4.20	8	Pass
11	2462	-4.45	8	Pass

802.11g

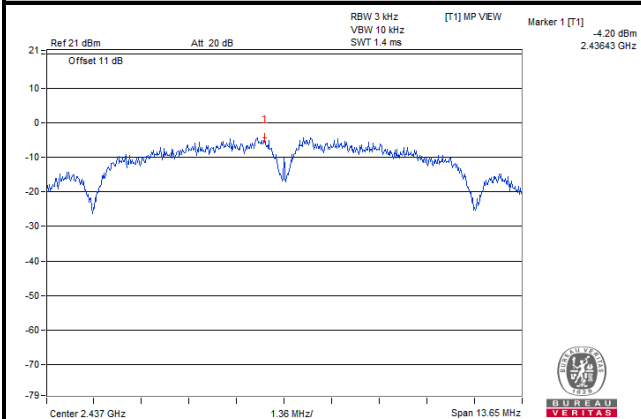
Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-9.25	8	Pass
6	2437	-8.49	8	Pass
11	2462	-8.71	8	Pass

802.11n (HT20)

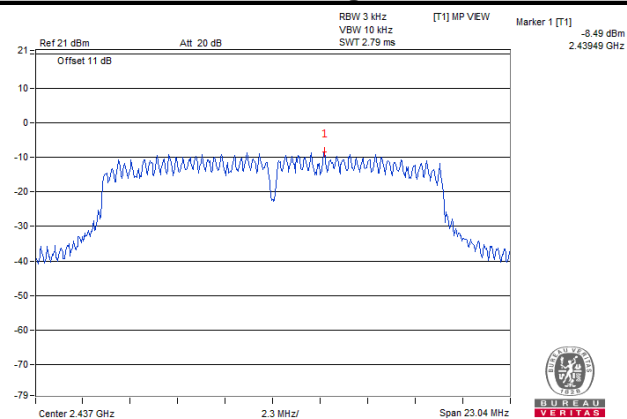
Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-9.05	8	Pass
6	2437	-8.47	8	Pass
11	2462	-8.70	8	Pass

Spectrum Plot of Worst Value

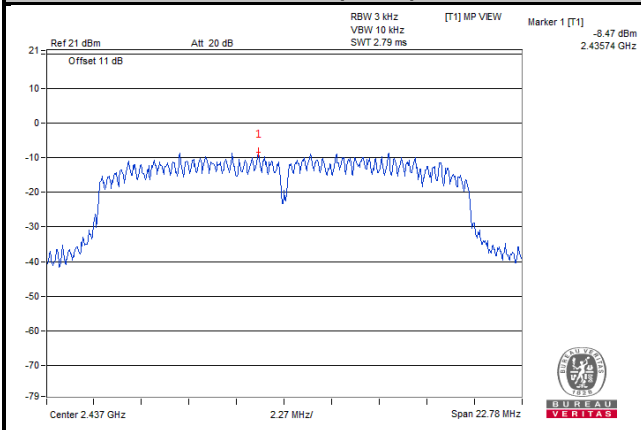
802.11b



802.11g



802.11n (HT20)



Mode B
802.11b

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-5.35	8	Pass
6	2437	-5.68	8	Pass
11	2462	-4.97	8	Pass

802.11g

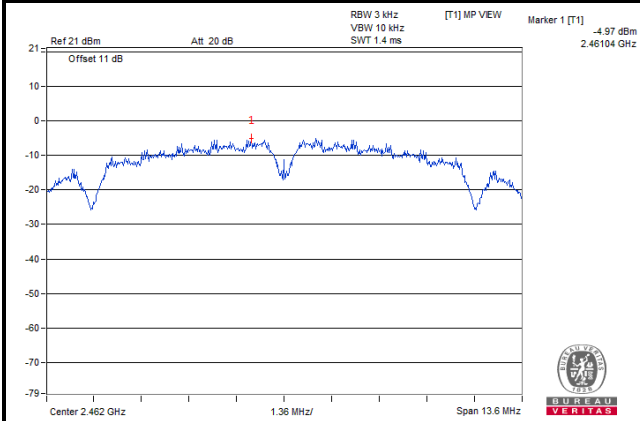
Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-8.01	8	Pass
6	2437	-8.30	8	Pass
11	2462	-9.56	8	Pass

802.11n (HT20)

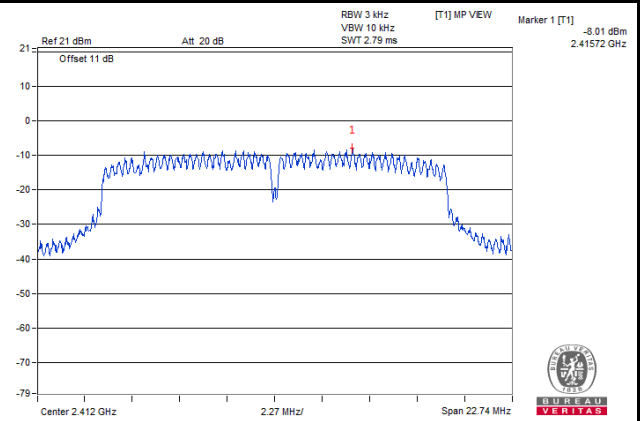
Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Pass / Fail
1	2412	-9.79	8	Pass
6	2437	-9.20	8	Pass
11	2462	-11.01	8	Pass

Spectrum Plot of Worst Value

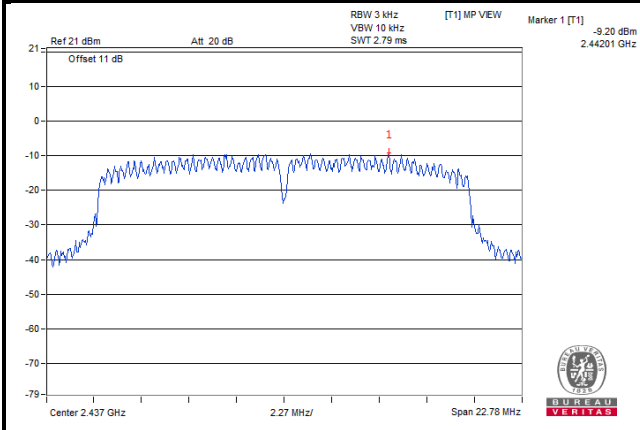
802.11b



802.11g



802.11n (HT20)

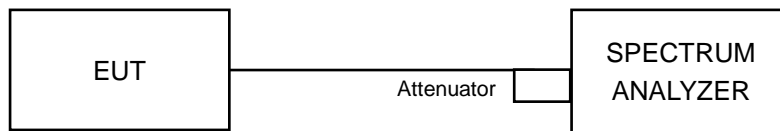


4.7 Conducted Out of Band Emission Measurement

4.7.1 Limits of Conducted Out of Band Emission Measurement

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

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 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 OOBE

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.

4.7.5 Deviation from Test Standard

No deviation.

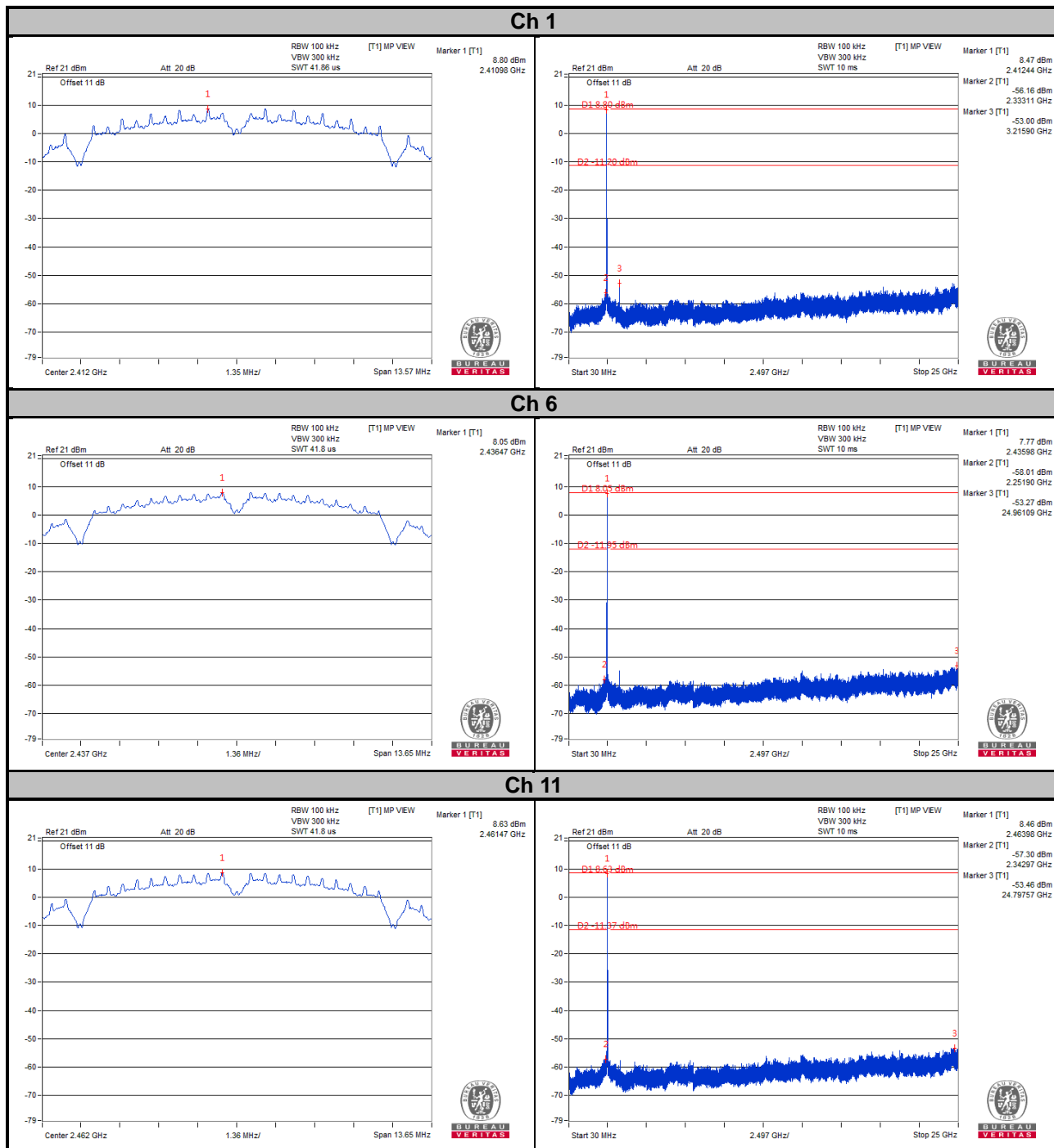
4.7.6 EUT Operating Condition

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

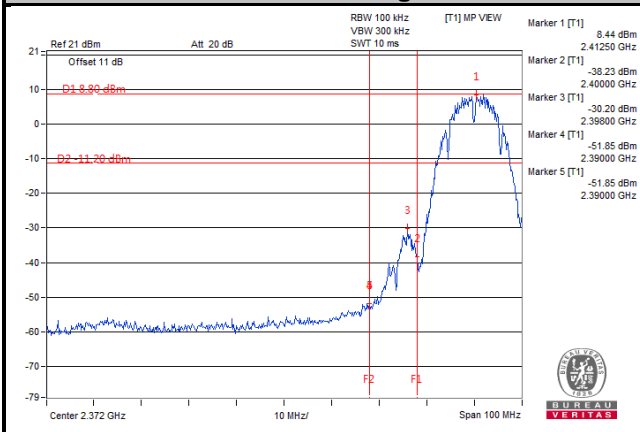
4.7.7 Test Results

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

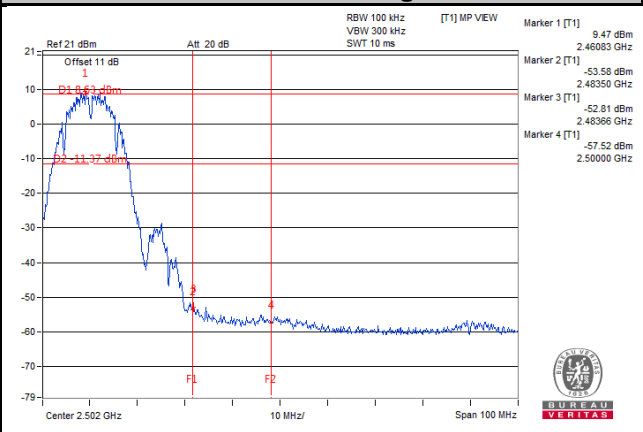
Mode A 802.11b



Ch 1 Band Edge

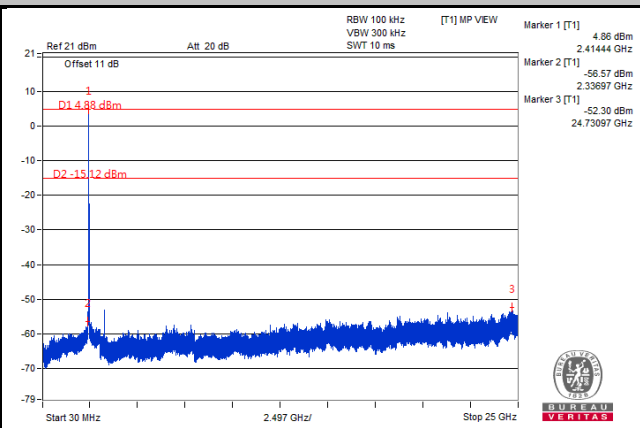
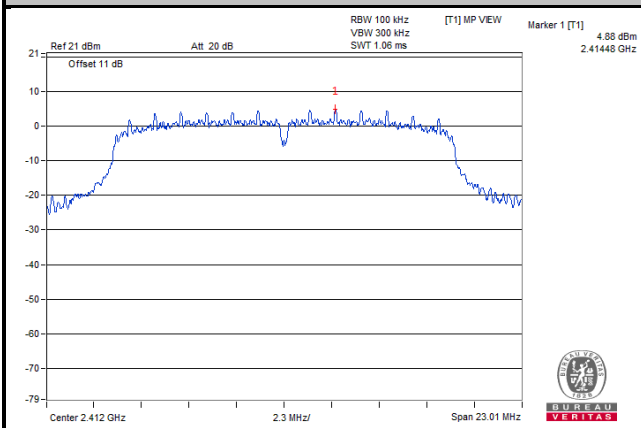


Ch 11 Band Edge

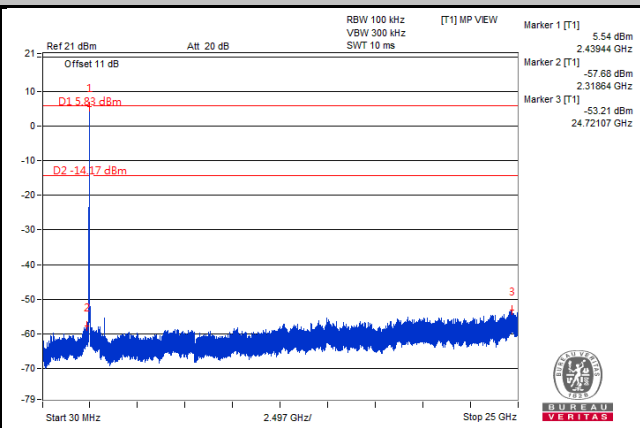
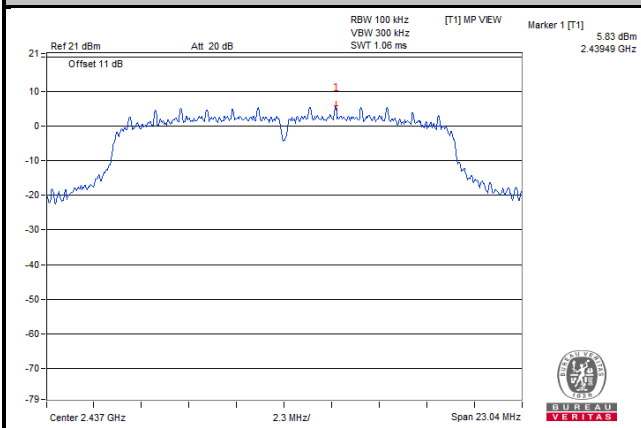


802.11g

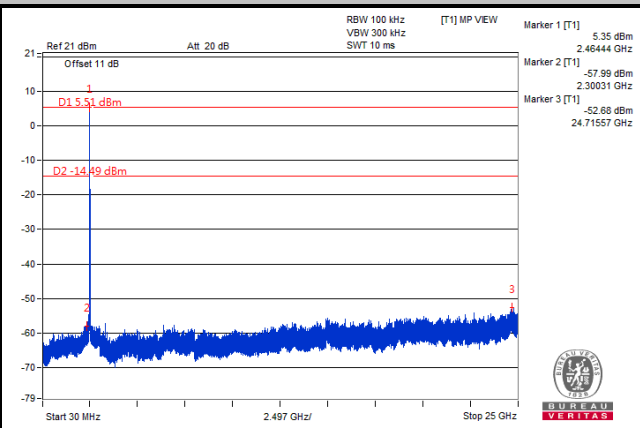
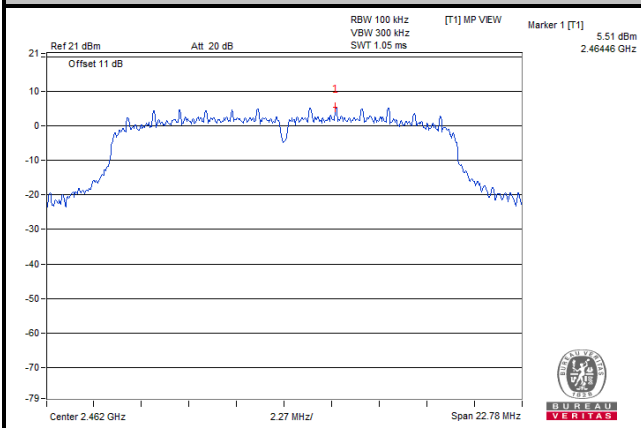
Ch 1



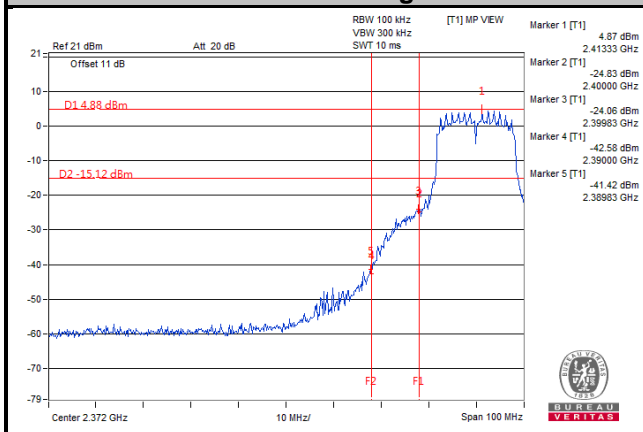
Ch 6



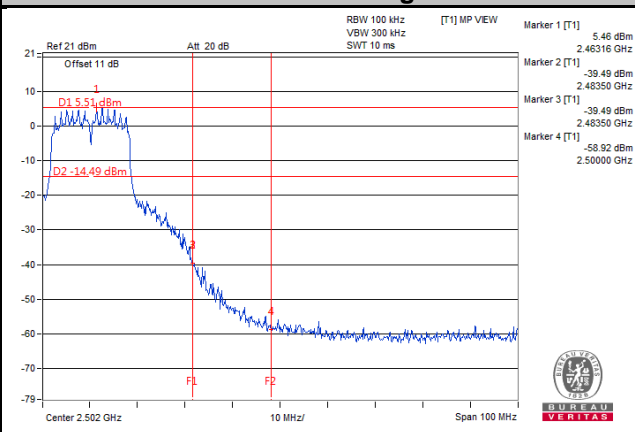
Ch 11



Ch 1 Band Edge

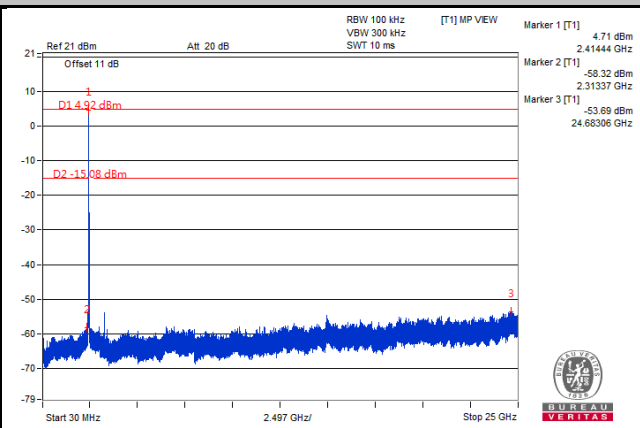
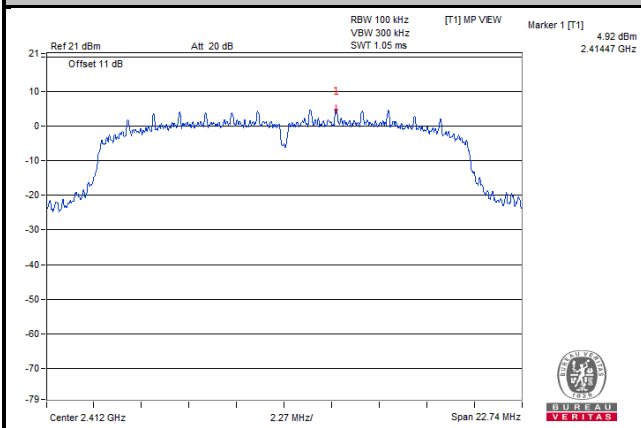


Ch 11 Band Edge

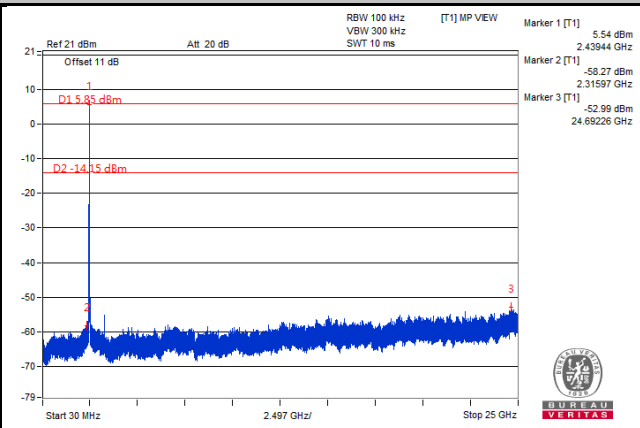
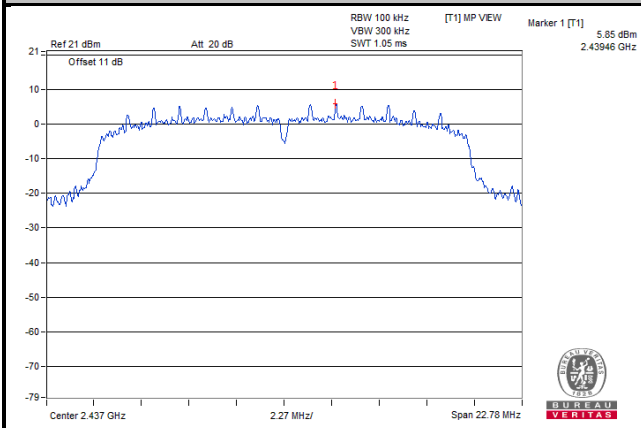


802.11n (HT20)

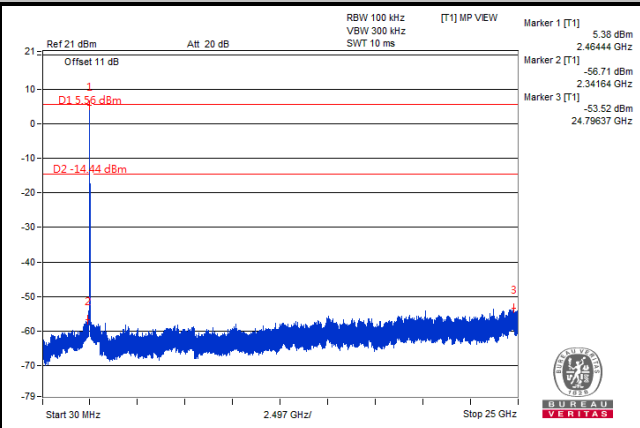
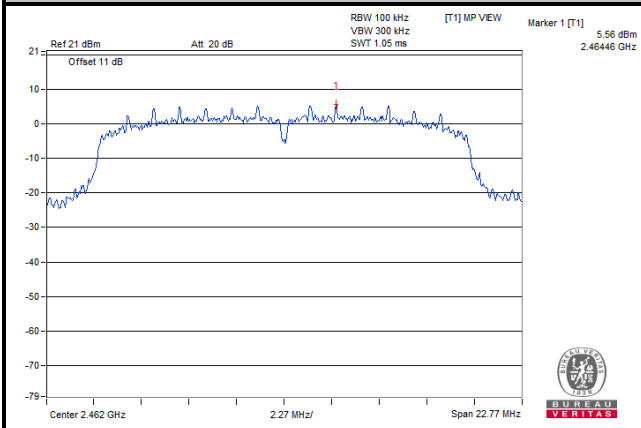
Ch 1

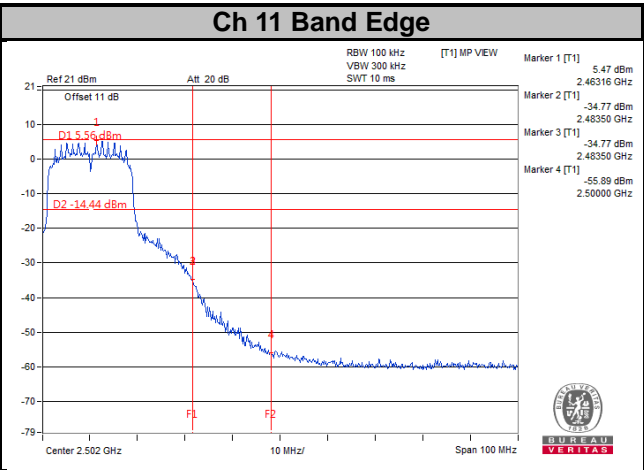
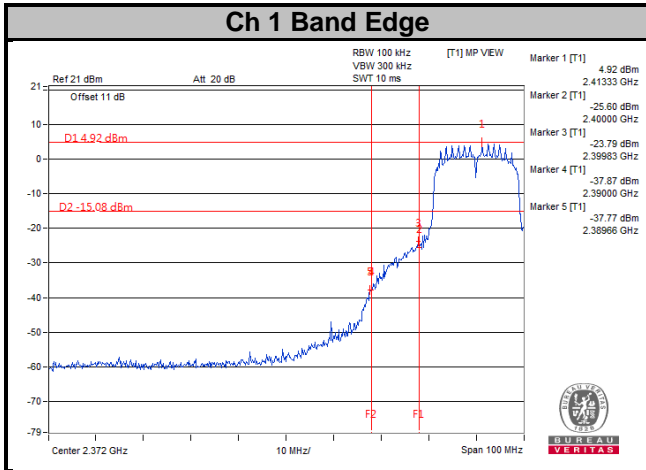


Ch 6

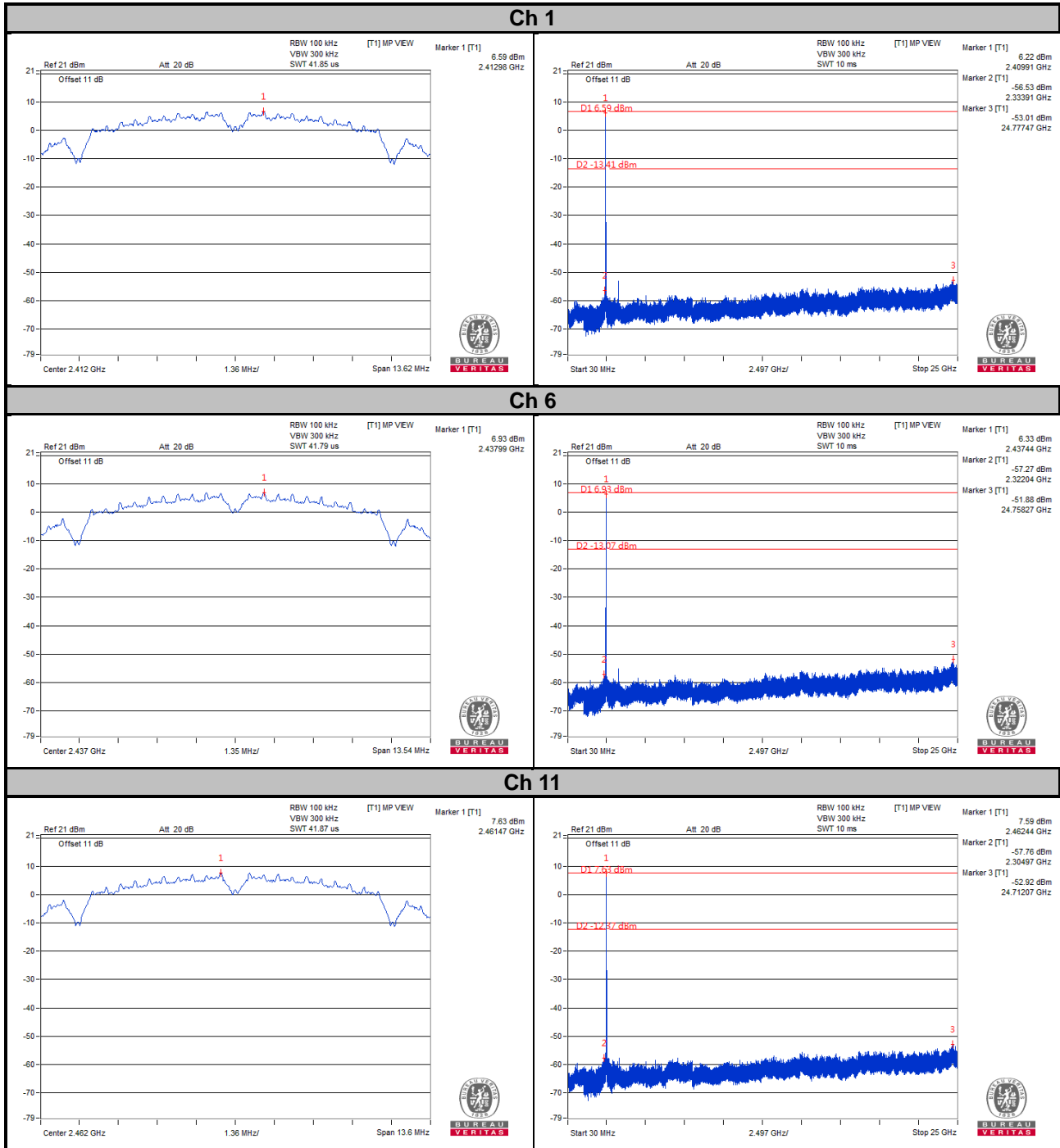


Ch 11

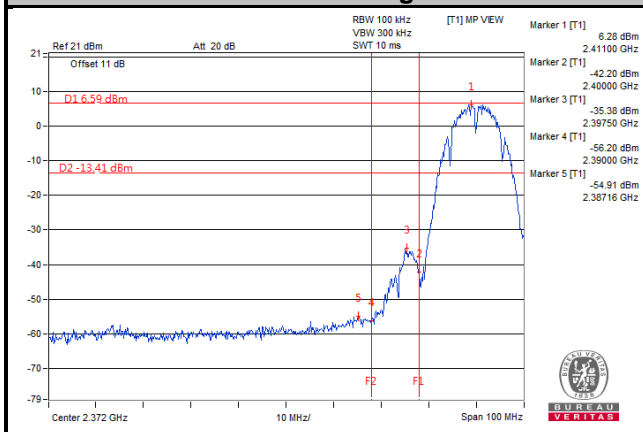




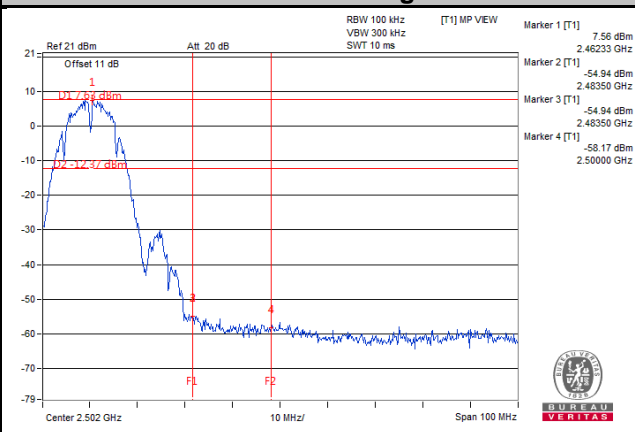
Mode B
802.11b



Ch 1 Band Edge

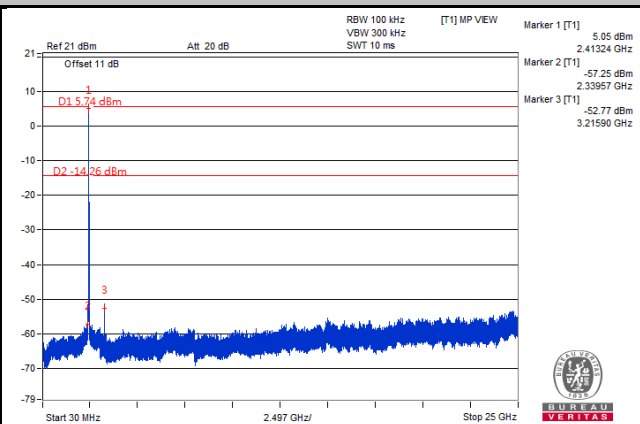
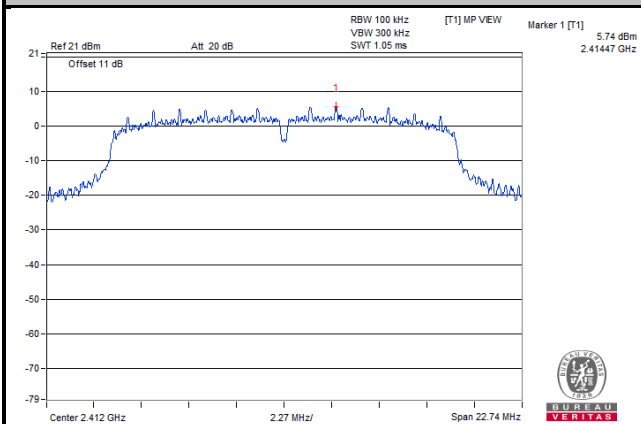


Ch 11 Band Edge

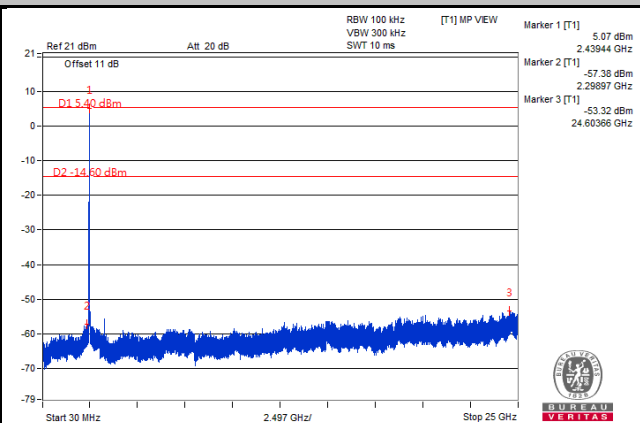
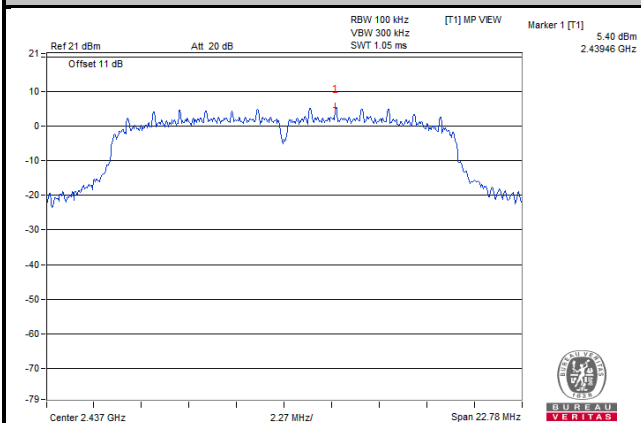


802.11g

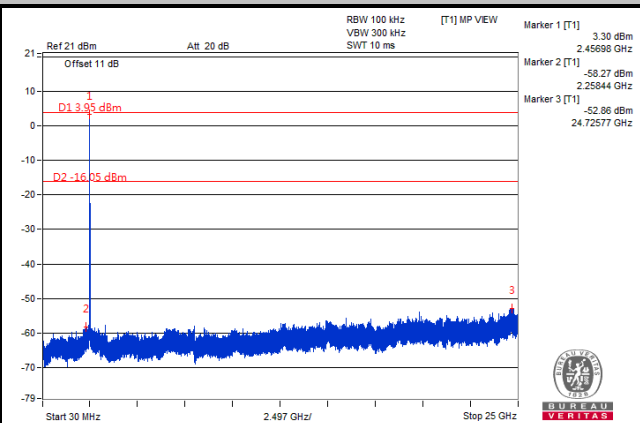
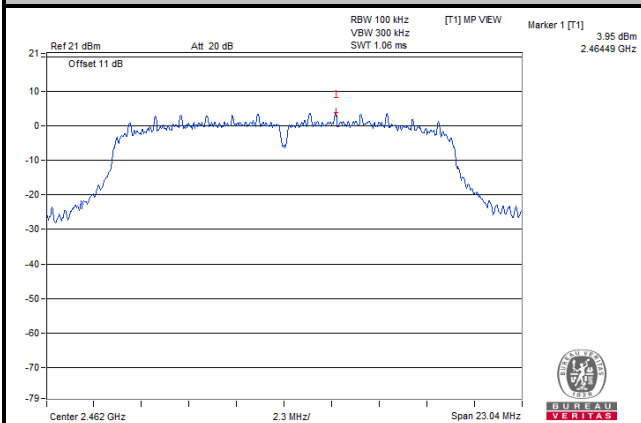
Ch 1



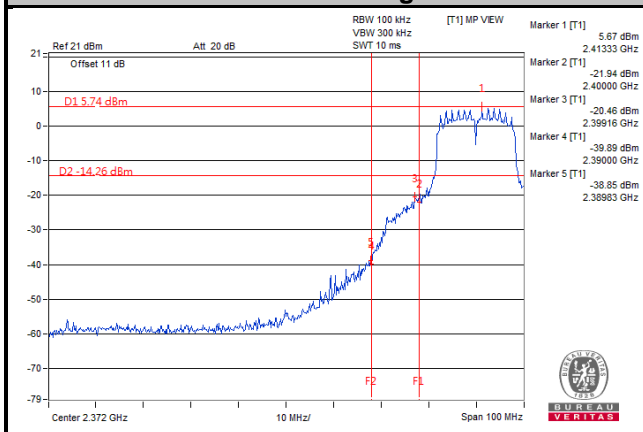
Ch 6



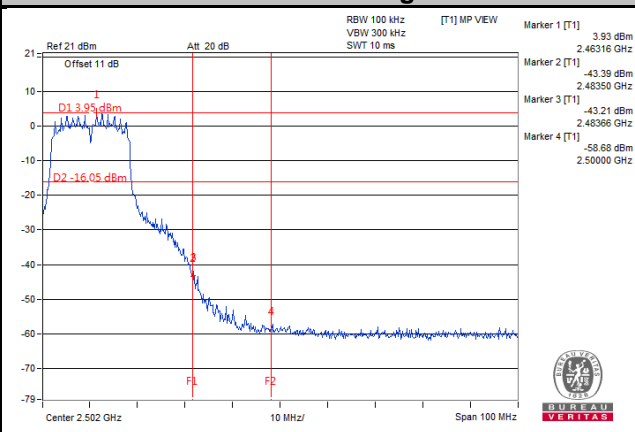
Ch 11



Ch 1 Band Edge

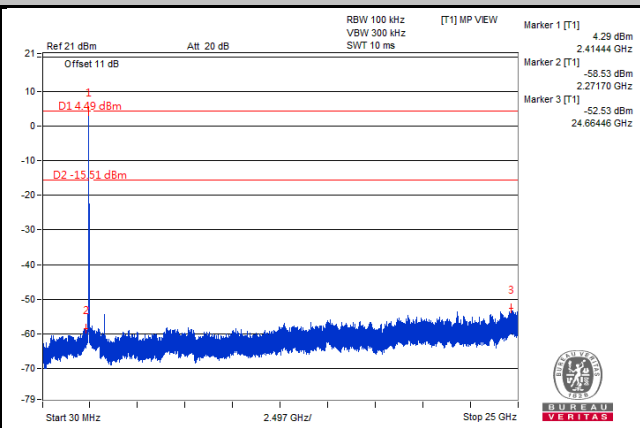
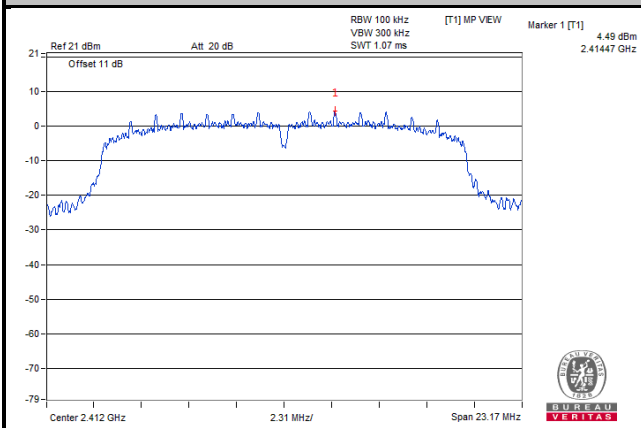


Ch 11 Band Edge

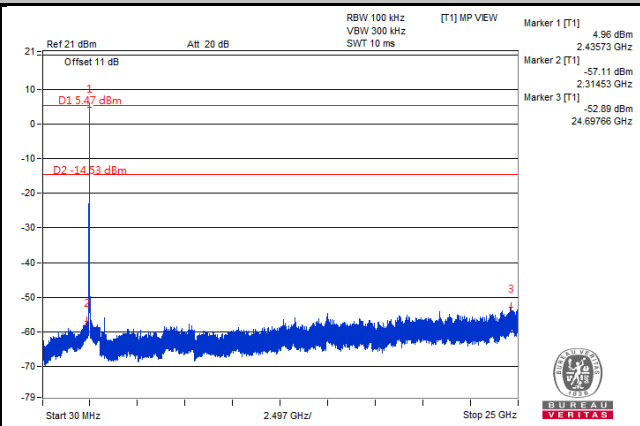
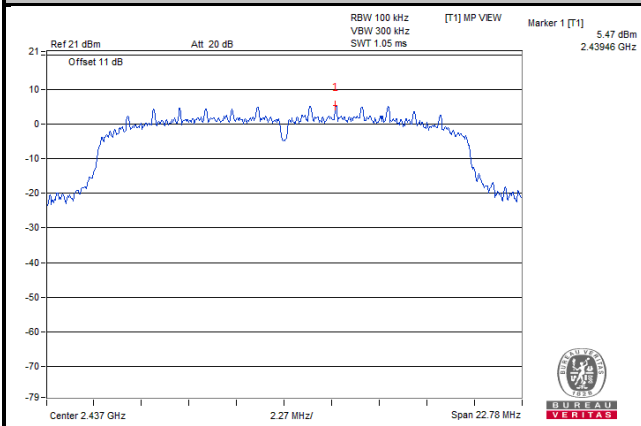


802.11n (HT20)

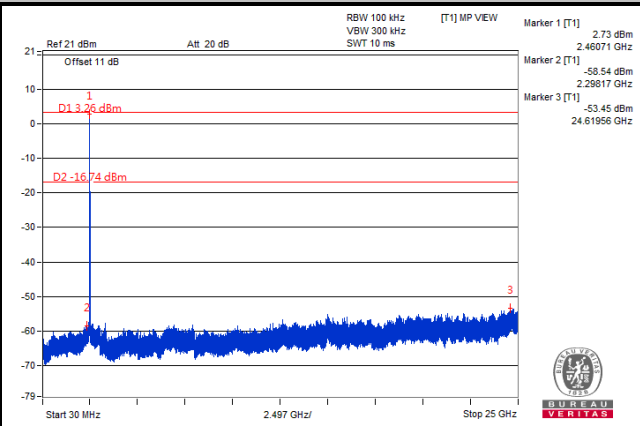
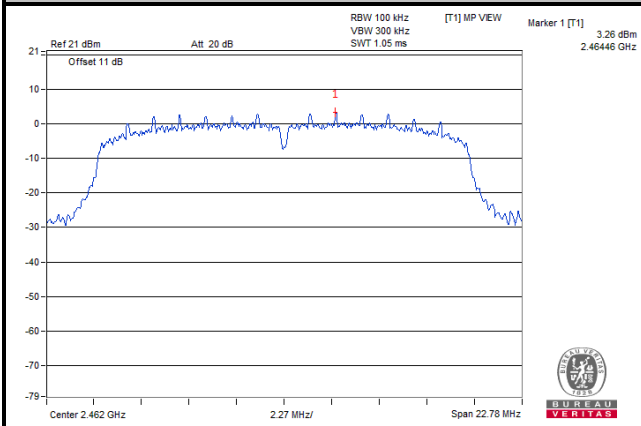
Ch 1



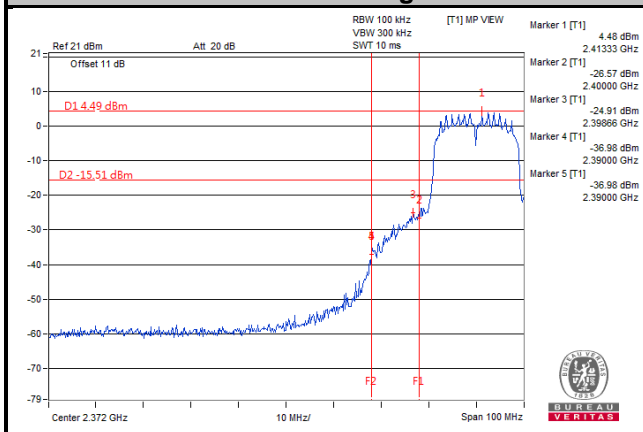
Ch 6



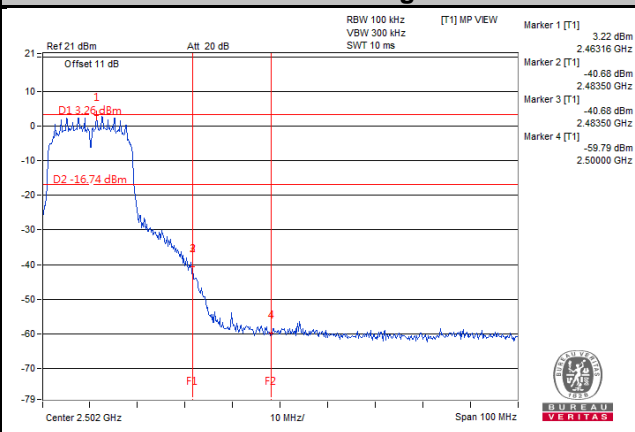
Ch 11



Ch 1 Band Edge



Ch 11 Band Edge



5 Pictures of Test Arrangements

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

Appendix – Information on 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:

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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.

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