

FCC Test Report

Report No.: RF170320C17-3 R1

FCC ID: 2AFD7-P0501

Test Model: P0501

Received Date: Mar. 20, 2017

Test Date: Mar. 31, 2017 ~ Apr. 11, 2017

Issued Date: Jun. 19, 2017

Applicant: COMPAL ELECTRONICS, INC.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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Release Control Record

Issue No.	Description	Date Issued
RF170320C17-3	Original Release	May 15, 2017
RF170320C17-3 R1	Revise model no.	Jun. 19, 2017

1 Certificate of Conformity

Product: Smart Terminal

Brand: Poynt

Test Model: P0501

Sample Status: Identical Prototype

Applicant: COMPAL ELECTRONICS, INC.

Test Date: Mar. 31, 2017 ~ Apr. 11, 2017

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 : Gina Liu, **Date:** Jun. 19, 2017
Gina Liu / Specialist

Approved by : David Huang, **Date:** Jun. 19, 2017
David Huang / 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 -9.01 dB at 0.52544 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.93 dB at 2483.6 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.
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	Smart Terminal
Brand	Poynt
Test Model	P0501
Status of EUT	Identical Prototype
Power Supply Rating	5.0 Vdc (adapter) 3.8 Vdc (Li-ion battery)
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: up to MCS7
Operating Frequency	2412 ~ 2462 MHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Output Power	28.314 mW
Antenna Type	PCB antenna with 1.63 dBi gain
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. The EUT provides one completed transmitter and one receiver.

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

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	MASS POWER	NBS10B050200VU U	I/P: 100-240 Vac, 50/60 Hz, 0.3 A O/P: 5.0 Vdc, 2.0 A
Battery	Getac Technology corp.	CCQ60	3.8 Vdc, 1900 mAh
BT/WLAN Module	Mediatek	MT6625L	
NFC Module	NXP	CLRC663	

3. 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		

7 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	7	2442
4	2427	8	2447
5	2432	9	2452
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	
-	√	√	√	√	-

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**.

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)
-	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
-	802.11n (HT40)	3 to 9	3, 6, 9	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)
-	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)
-	802.11n (HT20)	1 to 11	11	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)
-	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
-	802.11n (HT40)	3 to 9	3, 9	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)
-	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
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE \geq 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
APCM	25 deg. C, 65 % RH	3.8 Vdc	Carlos Chen

3.3 Duty Cycle of Test Signal

802.11b: Duty cycle of test signal is 100 %

802.11g: Duty cycle = $1.386218 / 1.418269 = 0.977$, Duty factor = $10 * \log(1/0.977) = 0.10$

802.11n (HT20): Duty cycle = $1.298077 / 1.346154 = 0.964$, Duty factor = $10 * \log(1/0.964) = 0.16$

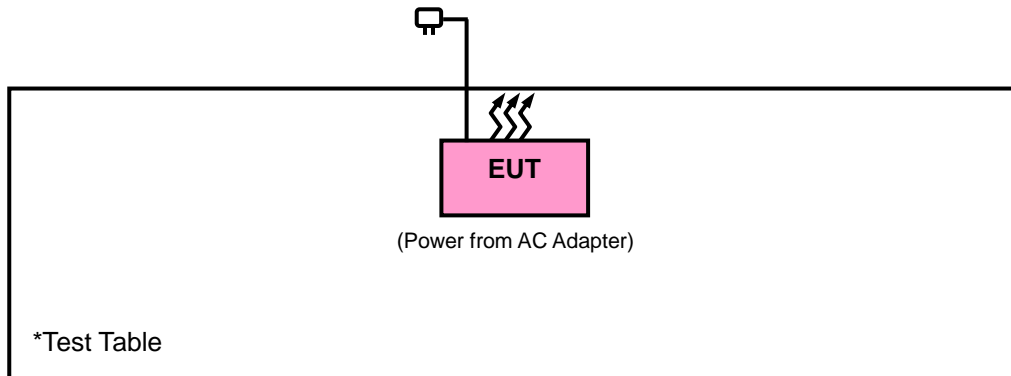
802.11n (HT40): Duty cycle = $0.649038462 / 0.682692308 = 0.951$, Duty factor = $10 * \log(1/0.951) = 0.22$



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



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 v03r05

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
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 16, 2016	Dec. 15, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 26, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 12, 2016	Dec. 13, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 14, 2016	Dec. 13, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier EMCI	EMC 012645	980115	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 184045	980116	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 330H	980112	Oct. 21, 2016	Oct. 20, 2017
Power Meter Anritsu	ML2495A	1232002	Sep. 08, 2016	Sep. 07, 2017
Power Sensor Anritsu	MA2411B	1207325	Sep. 08, 2016	Sep. 07, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 21, 2016	Oct. 20, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 21, 2016	Oct. 20, 2017
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 21, 2016	Oct. 20, 2017
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 FCC Site Registration No. is 690701.
5. 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:

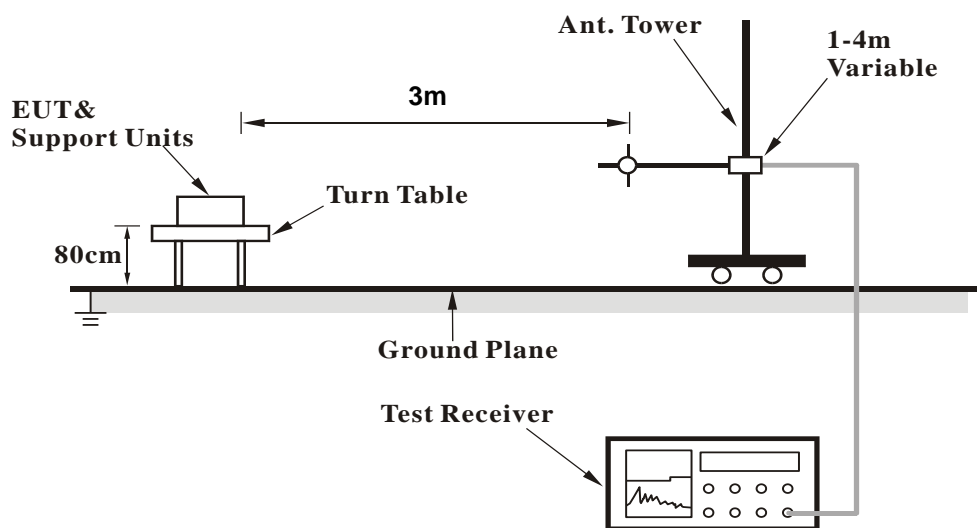
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 KHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for RMS Average (Duty cycle < 98 %) for Peak 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 ≥ 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

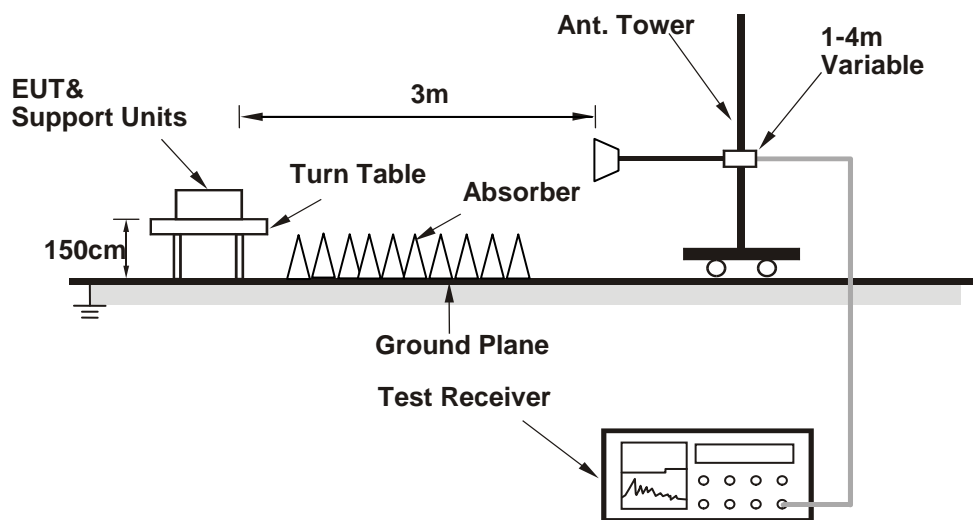
No deviation.

4.1.5 Test Set Up

<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

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

4.1.7 Test Results

Above 1 GHz Data :

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	Gavin Wu

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
2374.44	51.86	58.43	74	-22.14	26.86	4.07	37.5	103	168	Peak
2374.98	42.64	49.21	54	-11.36	26.86	4.07	37.5	103	168	Average
2412	102.9	109.37			26.96	4.09	37.52	103	168	Average
2412	105.56	112.03			26.96	4.09	37.52	103	168	Peak
4824	40.07	55.37	54	-13.93	30.99	6.79	53.08	151	126	Average
4824	47.94	63.24	74	-26.06	30.99	6.79	53.08	151	126	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
2389.2	37.08	43.59	54	-16.92	26.91	4.08	37.5	101	240	Average
2389.92	47.23	53.76	74	-26.77	26.91	4.08	37.52	101	240	Peak
2412	94.43	100.9			26.96	4.09	37.52	101	240	Average
2412	97.64	104.11			26.96	4.09	37.52	101	240	Peak
4824	39.75	55.05	54	-14.25	30.99	6.79	53.08	115	240	Average
4824	47.4	62.7	74	-26.6	30.99	6.79	53.08	115	240	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	Gavin Wu

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
2384.79	51.68	58.24	74	-22.32	26.86	4.08	37.5	103	169	Peak
2386.95	39.02	45.53	54	-14.98	26.91	4.08	37.5	103	169	Average
2437	102.52	108.8			27.06	4.12	37.46	103	169	Average
2437	105.82	112.1			27.06	4.12	37.46	103	169	Peak
2487.4	38.62	44.63	54	-15.38	27.15	4.16	37.32	103	169	Average
2488.2	50.97	56.93	74	-23.03	27.2	4.16	37.32	103	169	Peak
4874	42.4	57.54	54	-11.6	31.06	6.85	53.05	100	177	Average
4874	48.13	63.27	74	-25.87	31.06	6.85	53.05	100	177	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
2386.77	38.02	44.53	54	-15.98	26.91	4.08	37.5	101	242	Average
2389.47	48.7	55.21	74	-25.3	26.91	4.08	37.5	101	242	Peak
2437	93.85	100.13			27.06	4.12	37.46	101	242	Average
2437	97.11	103.39			27.06	4.12	37.46	101	242	Peak
2487.28	36.98	42.99	54	-17.02	27.15	4.16	37.32	101	242	Average
2489.84	47.74	53.7	74	-26.26	27.2	4.16	37.32	101	242	Peak
4874	42.3	57.44	54	-11.7	31.06	6.85	53.05	100	123	Average
4874	46.46	61.6	74	-27.54	31.06	6.85	53.05	100	123	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	Gavin Wu

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	101.7	107.86			27.1	4.13	37.39	103	192	Average
2462	104.89	111.05			27.1	4.13	37.39	103	192	Peak
2483.52	41.14	47.16	54	-12.86	27.15	4.15	37.32	103	192	Average
2484.24	49.72	55.74	74	-24.28	27.15	4.15	37.32	103	192	Peak
4924	43.21	58.24	54	-10.79	31.12	6.88	53.03	153	129	Average
4924	47.66	62.69	74	-26.34	31.12	6.88	53.03	153	129	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	90.04	96.2			27.1	4.13	37.39	100	290	Average
2462	93.24	99.4			27.1	4.13	37.39	100	290	Peak
2483.52	37.17	43.19	54	-16.83	27.15	4.15	37.32	100	290	Average
2485.84	47.52	53.54	74	-26.48	27.15	4.15	37.32	100	290	Peak
4924	39.48	54.51	54	-14.52	31.12	6.88	53.03	118	237	Average
4924	47.23	62.26	74	-26.77	31.12	6.88	53.03	118	237	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	Gavin Wu

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
2389.74	66.14	72.65	74	-7.86	26.91	4.08	37.5	105	184	Peak
2389.92	51.27	57.8	54	-2.73	26.91	4.08	37.52	105	184	Average
2412	100.38	106.85			26.96	4.09	37.52	105	184	Average
2412	107.6	114.07			26.96	4.09	37.52	105	184	Peak
4824	34.04	49.34	54	-19.96	30.99	6.79	53.08	119	232	Average
4824	44.89	60.19	74	-29.11	30.99	6.79	53.08	119	232	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
2389.56	56.77	63.28	74	-17.23	26.91	4.08	37.5	102	285	Peak
2389.83	43.47	50	54	-10.53	26.91	4.08	37.52	102	285	Average
2412	91.07	97.54			26.96	4.09	37.52	102	285	Average
2412	98.1	104.57			26.96	4.09	37.52	102	285	Peak
4824	33.49	48.79	54	-20.51	30.99	6.79	53.08	103	341	Average
4824	45.7	61	74	-28.3	30.99	6.79	53.08	103	341	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	Gavin Wu

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
2383.44	55.25	61.81	74	-18.75	26.86	4.08	37.5	103	186	Peak
2389.56	45.65	52.16	54	-8.35	26.91	4.08	37.5	103	186	Average
2437	100.74	107.02			27.06	4.12	37.46	103	186	Average
2437	108.18	114.46			27.06	4.12	37.46	103	186	Peak
2483.72	45.56	51.58	54	-8.44	27.15	4.15	37.32	103	186	Average
2492.36	57.54	63.43	74	-16.46	27.2	4.16	37.25	103	186	Peak
4874	34.09	49.23	54	-19.91	31.06	6.85	53.05	153	124	Average
4874	45.18	60.32	74	-28.82	31.06	6.85	53.05	153	124	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
2382.09	49.05	55.61	74	-24.95	26.86	4.08	37.5	100	256	Peak
2388.48	39.44	45.95	54	-14.56	26.91	4.08	37.5	100	256	Average
2437	91.82	98.1			27.06	4.12	37.46	100	256	Average
2437	99.8	106.08			27.06	4.12	37.46	100	256	Peak
2484.56	39.09	45.11	54	-14.91	27.15	4.15	37.32	100	256	Average
2485.32	48.96	54.98	74	-25.04	27.15	4.15	37.32	100	256	Peak
4874	34.11	49.25	54	-19.89	31.06	6.85	53.05	113	242	Average
4874	44.66	59.8	74	-29.34	31.06	6.85	53.05	113	242	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	Gavin Wu

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	100.74	106.9			27.1	4.13	37.39	102	192	Average
2462	108.06	114.22			27.1	4.13	37.39	102	192	Peak
2483.52	52.9	58.92	54	-1.1	27.15	4.15	37.32	102	192	Average
2483.72	69.93	75.95	74	-4.07	27.15	4.15	37.32	102	192	Peak
4924	34.08	49.11	54	-19.92	31.12	6.88	53.03	121	234	Average
4924	45.77	60.8	74	-28.23	31.12	6.88	53.03	121	234	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	89.05	95.21			27.1	4.13	37.39	100	296	Average
2462	96.18	102.34			27.1	4.13	37.39	100	296	Peak
2483.52	41.99	48.01	54	-12.01	27.15	4.15	37.32	100	296	Average
2483.88	56.88	62.9	74	-17.12	27.15	4.15	37.32	100	296	Peak
4924	33.91	48.94	54	-20.09	31.12	6.88	53.03	105	339	Average
4924	45.5	60.53	74	-28.5	31.12	6.88	53.03	105	339	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	Gavin Wu

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
2388.3	69.24	75.75	74	-4.76	26.91	4.08	37.5	104	184	Peak
2389.92	52.43	58.96	54	-1.57	26.91	4.08	37.52	104	184	Average
2412	99.08	105.55			26.96	4.09	37.52	104	184	Average
2412	106.26	112.73			26.96	4.09	37.52	104	184	Peak
4824	34.71	50.01	54	-19.29	30.99	6.79	53.08	126	221	Average
4824	45.27	60.57	74	-28.73	30.99	6.79	53.08	126	221	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
2389.83	58.93	65.46	74	-15.07	26.91	4.08	37.52	100	245	Peak
2389.92	43.88	50.41	54	-10.12	26.91	4.08	37.52	100	245	Average
2412	90.11	96.58			26.96	4.09	37.52	100	245	Average
2412	97.81	104.28			26.96	4.09	37.52	100	245	Peak
4824	34.43	49.73	54	-19.57	30.99	6.79	53.08	107	332	Average
4824	45.14	60.44	74	-28.86	30.99	6.79	53.08	107	332	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	Gavin Wu

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
2388.21	46.35	52.86	54	-7.65	26.91	4.08	37.5	103	188	Average
2388.48	56.73	63.24	74	-17.27	26.91	4.08	37.5	103	188	Peak
2437	98.74	105.02			27.06	4.12	37.46	103	188	Average
2437	106.63	112.91			27.06	4.12	37.46	103	188	Peak
2484.16	45.66	51.68	54	-8.34	27.15	4.15	37.32	103	188	Average
2484.92	56.38	62.4	74	-17.62	27.15	4.15	37.32	103	188	Peak
4874	34.47	49.61	54	-19.53	31.06	6.85	53.05	142	128	Average
4874	45.62	60.76	74	-28.38	31.06	6.85	53.05	142	128	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
2389.65	39.47	45.98	54	-14.53	26.91	4.08	37.5	100	252	Average
2389.65	50.18	56.69	74	-23.82	26.91	4.08	37.5	100	252	Peak
2437	90.62	96.9			27.06	4.12	37.46	100	252	Average
2437	98.47	104.75			27.06	4.12	37.46	100	252	Peak
2485.84	48.62	54.64	74	-25.38	27.15	4.15	37.32	100	252	Peak
2488.68	38.4	44.36	54	-15.6	27.2	4.16	37.32	100	252	Average
4874	34.57	49.71	54	-19.43	31.06	6.85	53.05	112	239	Average
4874	44.57	59.71	74	-29.43	31.06	6.85	53.05	112	239	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	Gavin Wu

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	99.08	105.24			27.1	4.13	37.39	100	175	Average
2462	106.47	112.63			27.1	4.13	37.39	100	175	Peak
2483.6	53.07	59.09	54	-0.93	27.15	4.15	37.32	100	175	Average
2484	69.24	75.26	74	-4.76	27.15	4.15	37.32	100	175	Peak
4924	34.95	49.98	54	-19.05	31.12	6.88	53.03	118	235	Average
4924	44.66	59.69	74	-29.34	31.12	6.88	53.03	118	235	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	88.17	94.33			27.1	4.13	37.39	100	291	Average
2462	95.54	101.7			27.1	4.13	37.39	100	291	Peak
2483.52	41.89	47.91	54	-12.11	27.15	4.15	37.32	100	291	Average
2485.08	56.37	62.39	74	-17.63	27.15	4.15	37.32	100	291	Peak
4924	34.17	49.2	54	-19.83	31.12	6.88	53.03	112	345	Average
4924	45.83	60.86	74	-28.17	31.12	6.88	53.03	112	345	Peak

Remarks:

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

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 3	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	Gavin Wu

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
2388.21	51.3	57.81	54	-2.7	26.91	4.08	37.5	105	197	Average
2388.75	67.79	74.3	74	-6.21	26.91	4.08	37.5	105	197	Peak
2422	93.89	100.23			27.01	4.11	37.46	105	197	Average
2422	101.41	107.75			27.01	4.11	37.46	105	197	Peak
2484.6	40.16	46.18	54	-13.84	27.15	4.15	37.32	105	197	Average
2489.96	50.25	56.21	74	-23.75	27.2	4.16	37.32	105	197	Peak
4844	34.7	49.93	54	-19.3	31.01	6.82	53.06	115	229	Average
4844	45.64	60.87	74	-28.36	31.01	6.82	53.06	115	229	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
2387.94	38.76	45.27	54	-15.24	26.91	4.08	37.5	100	37	Average
2388.21	54.74	61.25	74	-19.26	26.91	4.08	37.5	100	37	Peak
2422	82.52	88.86			27.01	4.11	37.46	100	37	Average
2422	89.96	96.3			27.01	4.11	37.46	100	37	Peak
2494.24	37.86	43.75	54	-16.14	27.2	4.16	37.25	100	37	Average
2498.24	47.74	53.63	74	-26.26	27.2	4.16	37.25	100	37	Peak
4844	34.5	49.73	54	-19.5	31.01	6.82	53.06	108	338	Average
4844	44.95	60.18	74	-29.05	31.01	6.82	53.06	108	338	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2422 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	Gavin Wu

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
2389.92	43.23	49.76	54	-10.77	26.91	4.08	37.52	103	190	Average
2389.92	54.93	61.46	74	-19.07	26.91	4.08	37.52	103	190	Peak
2437	95.46	101.74			27.06	4.12	37.46	103	190	Average
2437	103.47	109.75			27.06	4.12	37.46	103	190	Peak
2484.4	55.96	61.98	74	-18.04	27.15	4.15	37.32	103	190	Peak
2484.64	43.6	49.62	54	-10.4	27.15	4.15	37.32	103	190	Average
4874	34.03	49.17	54	-19.97	31.06	6.85	53.05	153	119	Average
4874	43.87	59.01	74	-30.13	31.06	6.85	53.05	153	119	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
2388.12	38.41	44.92	54	-15.59	26.91	4.08	37.5	100	254	Average
2389.74	49.22	55.73	74	-24.78	26.91	4.08	37.5	100	254	Peak
2437	85.21	91.49			27.06	4.12	37.46	100	254	Average
2437	93.36	99.64			27.06	4.12	37.46	100	254	Peak
2486	48.76	54.78	74	-25.24	27.15	4.15	37.32	100	254	Peak
2498.08	38.51	44.4	54	-15.49	27.2	4.16	37.25	100	254	Average
4874	33.91	49.05	54	-20.09	31.06	6.85	53.05	119	234	Average
4874	43.92	59.06	74	-30.08	31.06	6.85	53.05	119	234	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 9	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	Gavin Wu

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
2388.3	51.01	57.52	74	-22.99	26.91	4.08	37.5	103	199	Peak
2389.47	40.25	46.76	54	-13.75	26.91	4.08	37.5	103	199	Average
2452	93.82	100.02			27.06	4.13	37.39	103	199	Average
2452	101.37	107.57			27.06	4.13	37.39	103	199	Peak
2484.36	47.98	54	54	-6.02	27.15	4.15	37.32	103	199	Average
2485.28	65.62	71.64	74	-8.38	27.15	4.15	37.32	103	199	Peak
4904	34.61	49.66	54	-19.39	31.1	6.88	53.03	127	223	Average
4904	45.22	60.27	74	-28.78	31.1	6.88	53.03	127	223	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
2370.39	46.98	53.55	74	-27.02	26.86	4.07	37.5	100	34	Peak
2387.22	37.27	43.78	54	-16.73	26.91	4.08	37.5	100	34	Average
2452	83.86	90.06			27.06	4.13	37.39	100	34	Average
2452	91.71	97.91			27.06	4.13	37.39	100	34	Peak
2483.52	40.47	46.49	54	-13.53	27.15	4.15	37.32	100	34	Average
2484.76	57.04	63.06	74	-16.96	27.15	4.15	37.32	100	34	Peak
4904	34.07	49.12	54	-19.93	31.1	6.88	53.03	106	343	Average
4904	44.64	59.69	74	-29.36	31.1	6.88	53.03	106	343	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 2452 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:

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	Getaz Yang

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
105.66	22.58	43.77	43.5	-20.92	9.62	1.08	31.89	101	247	Peak
175.5	26.53	45.97	43.5	-16.97	11.19	1.16	31.79	117	130	Peak
240.49	23.37	42.63	46	-22.63	11.07	1.46	31.79	128	226	Peak
326.82	28.53	45.07	46	-17.47	13.59	1.7	31.83	127	317	Peak
388.9	34.75	49.83	46	-11.25	15.07	1.88	32.03	103	267	Peak
747.8	25.83	33.15	46	-20.17	21.49	2.53	31.34	112	348	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
105.66	24.99	46.18	43.5	-18.51	9.62	1.08	31.89	115	344	Peak
175.5	25.16	44.6	43.5	-18.34	11.19	1.16	31.79	119	147	Peak
239.52	25.25	44.55	46	-20.75	11.03	1.45	31.78	134	245	Peak
357.86	29.08	44.9	46	-16.92	14.33	1.79	31.94	132	267	Peak
388.9	30.65	45.73	46	-15.35	15.07	1.88	32.03	107	132	Peak
701.24	24.46	32.96	46	-21.54	20.83	2.45	31.78	109	60	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. 21, 2016	Nov. 20, 2017
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
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

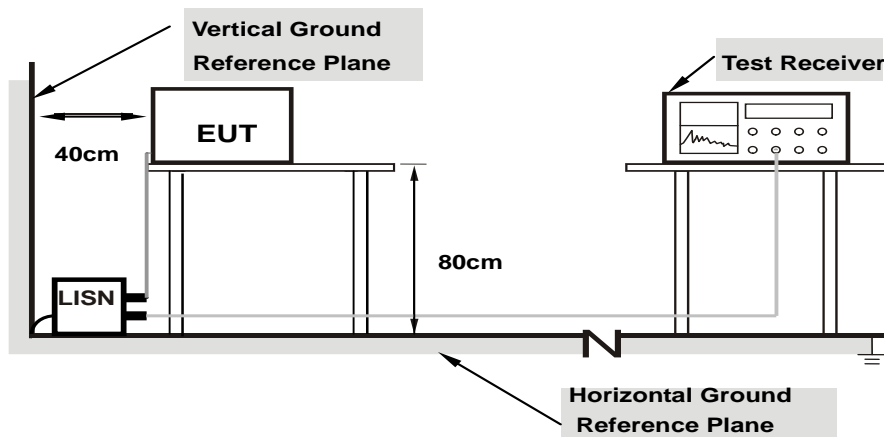
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance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

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

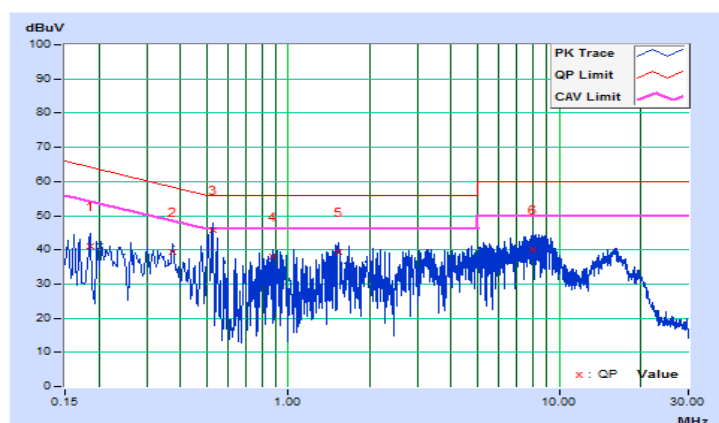
4.2.7 Test Results

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	2017/3/31

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	0.18519	10.36	30.76	16.46	41.12	26.82	64.25	54.25	-23.13	-27.43
2	0.37678	10.40	28.85	18.81	39.25	29.21	58.35	48.35	-19.10	-19.14
3	0.52544	10.40	35.49	26.59	45.89	36.99	56.00	46.00	-10.11	-9.01
4	0.88117	10.40	27.68	19.79	38.08	30.19	56.00	46.00	-17.92	-15.81
5	1.54196	10.43	28.82	18.30	39.25	28.73	56.00	46.00	-16.75	-17.27
6	7.96997	10.74	29.24	17.31	39.98	28.05	60.00	50.00	-20.02	-21.95

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

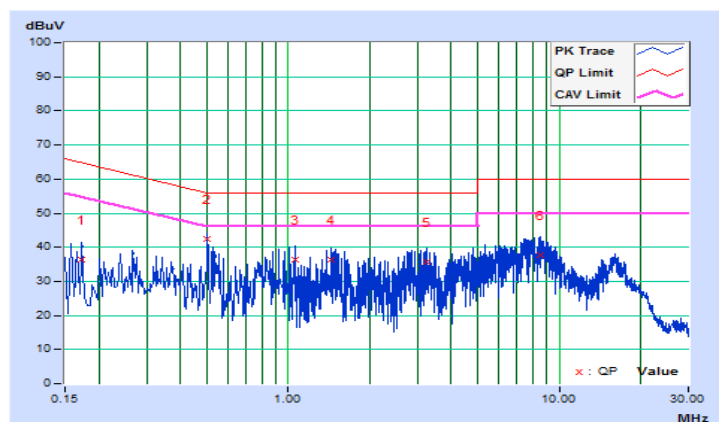


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2017/3/31

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	0.17346	10.12	26.23	10.30	36.35	20.42	64.79	54.79	-28.44	-34.37
2	0.50190	10.16	32.31	23.40	42.47	33.56	56.00	46.00	-13.53	-12.44
3	1.05712	10.17	26.18	13.02	36.35	23.19	56.00	46.00	-19.65	-22.81
4	1.44812	10.20	26.20	15.22	36.40	25.42	56.00	46.00	-19.60	-20.58
5	3.23499	10.30	25.31	12.95	35.61	23.25	56.00	46.00	-20.39	-22.75
6	8.53695	10.50	27.24	14.46	37.74	24.96	60.00	50.00	-22.26	-25.04

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

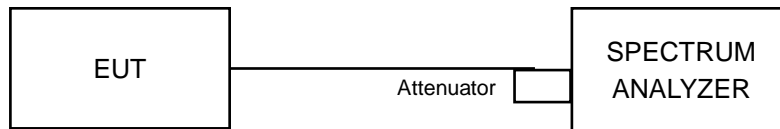


4.3 6 dB Bandwidth Measurement

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

802.11b

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	9.10	0.5	Pass
6	2437	9.10	0.5	Pass
11	2462	9.59	0.5	Pass

802.11g

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.36	0.5	Pass
6	2437	15.47	0.5	Pass
11	2462	15.37	0.5	Pass

802.11n (HT20)

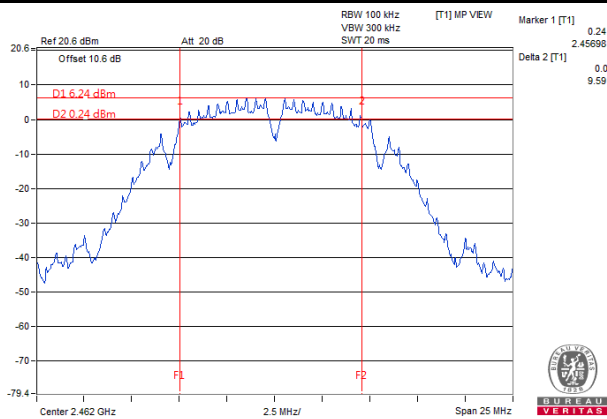
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	15.36	0.5	Pass
6	2437	15.20	0.5	Pass
11	2462	16.00	0.5	Pass

802.11n (HT40)

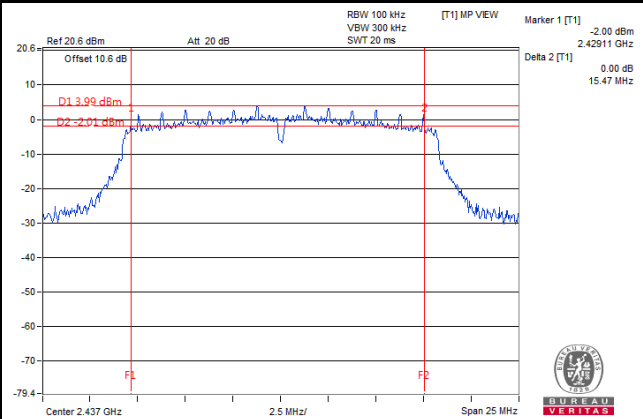
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.90	0.5	Pass
6	2437	35.26	0.5	Pass
9	2452	36.15	0.5	Pass

Spectrum Plot of Worst Value

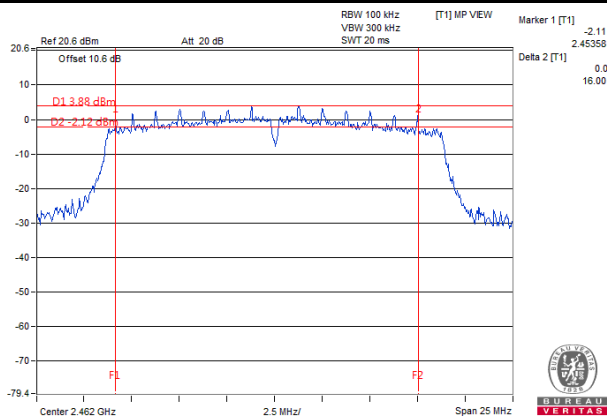
802.11b



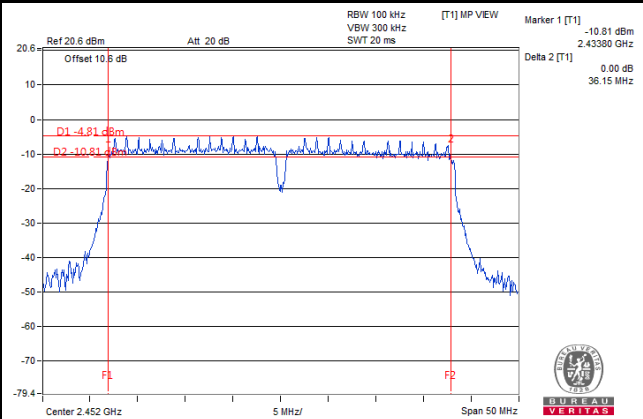
802.11g



802.11n (HT20)



802.11n (HT40)

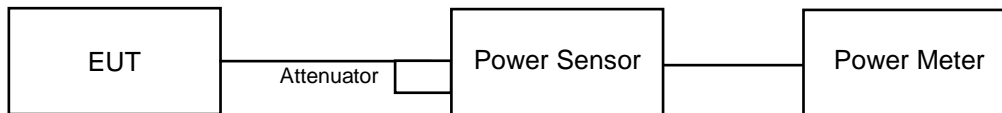


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

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

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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

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

4.4.7 Test Results

802.11b

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	27.227	14.35	30	Pass
6	2437	26.607	14.25	30	Pass
11	2462	28.314	14.52	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	24.099	13.82	30	Pass
6	2437	23.878	13.78	30	Pass
11	2462	24.322	13.86	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	24.266	13.85	30	Pass
6	2437	24.044	13.81	30	Pass
11	2462	24.889	13.96	30	Pass

802.11n (HT40)

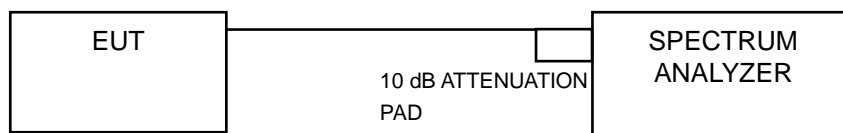
Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	8.147	9.11	30	Pass
6	2437	13.397	11.27	30	Pass
9	2452	8.375	9.23	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8 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 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

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

802.11b

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-8.40	8	Pass
6	2437	-7.85	8	Pass
11	2462	-7.84	8	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-9.82	8	Pass
6	2437	-10.59	8	Pass
11	2462	-10.27	8	Pass

802.11n (HT20)

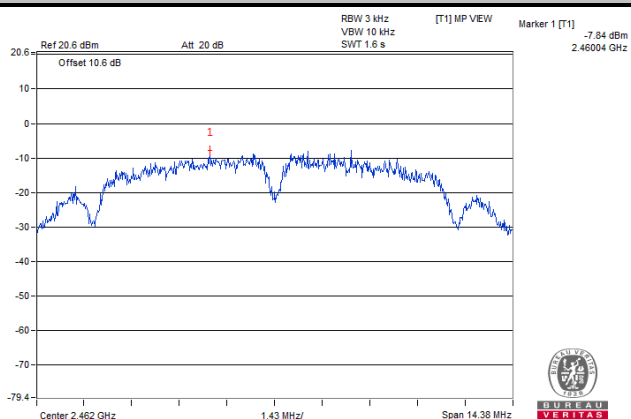
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-9.97	8	Pass
6	2437	-10.11	8	Pass
11	2462	-10.73	8	Pass

802.11n (HT40)

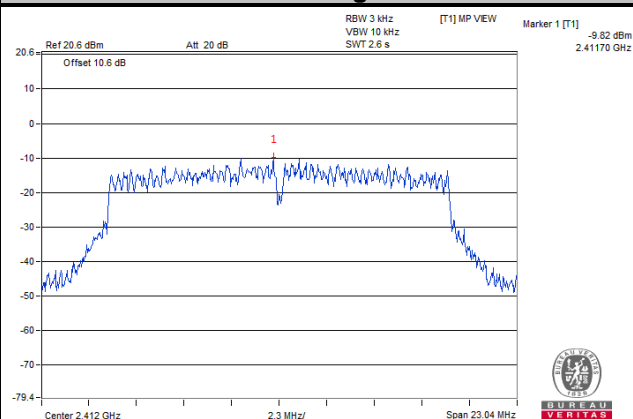
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
3	2422	-19.25	8	Pass
6	2437	-15.34	8	Pass
9	2452	-19.62	8	Pass

Spectrum Plot of Worst Value

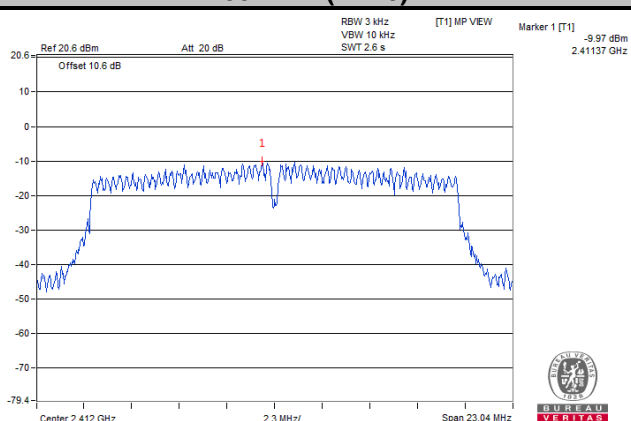
802.11b



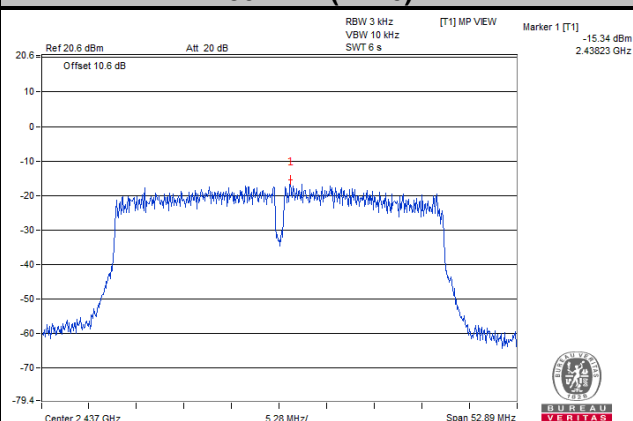
802.11g



802.11n (HT20)



802.11n (HT40)

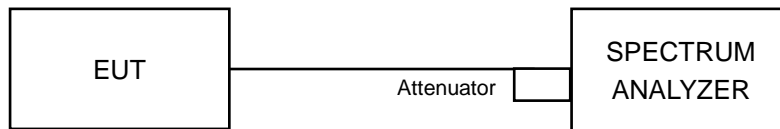


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

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

4.6.2 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.

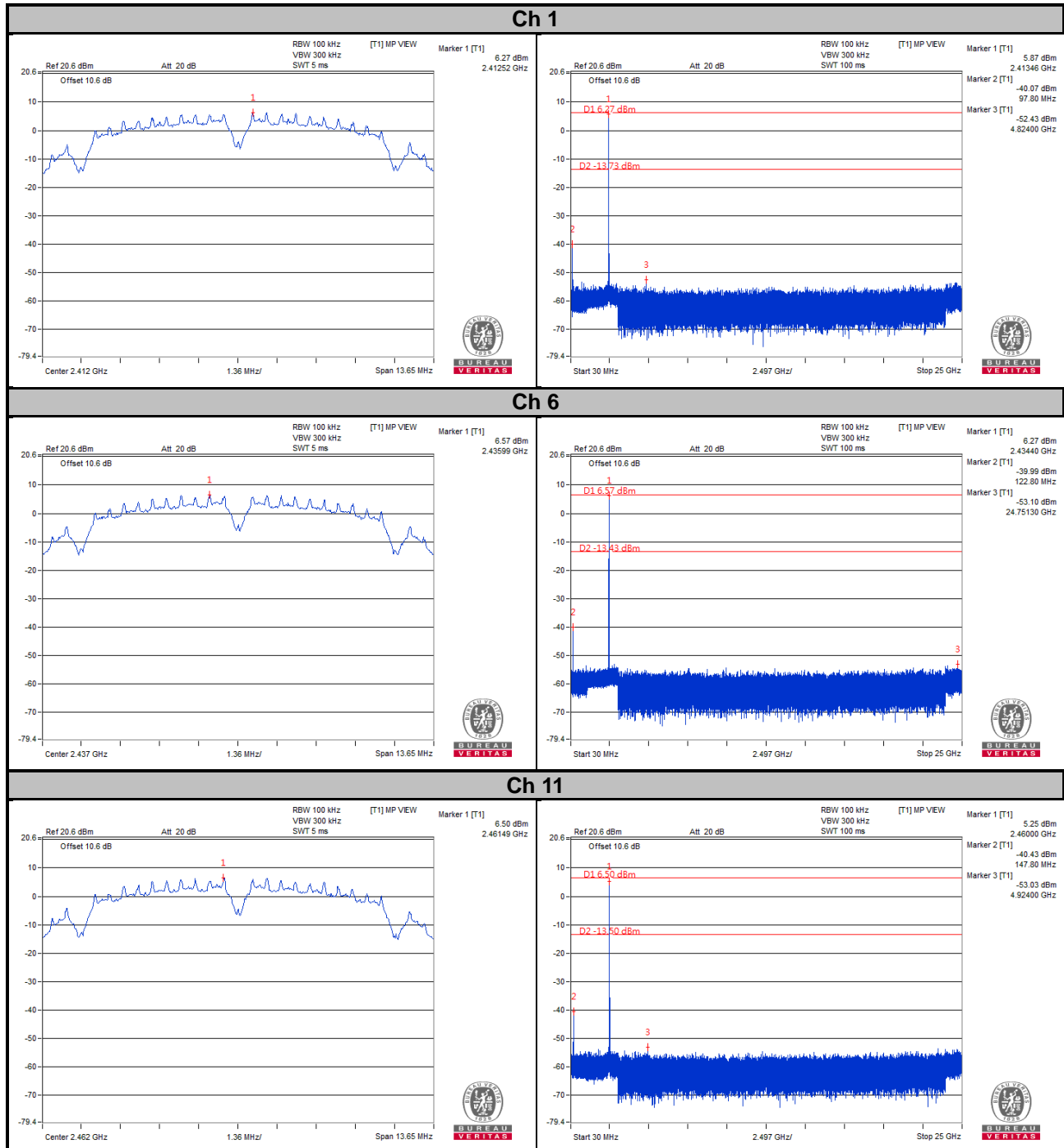
4.6.6 EUT Operating Condition

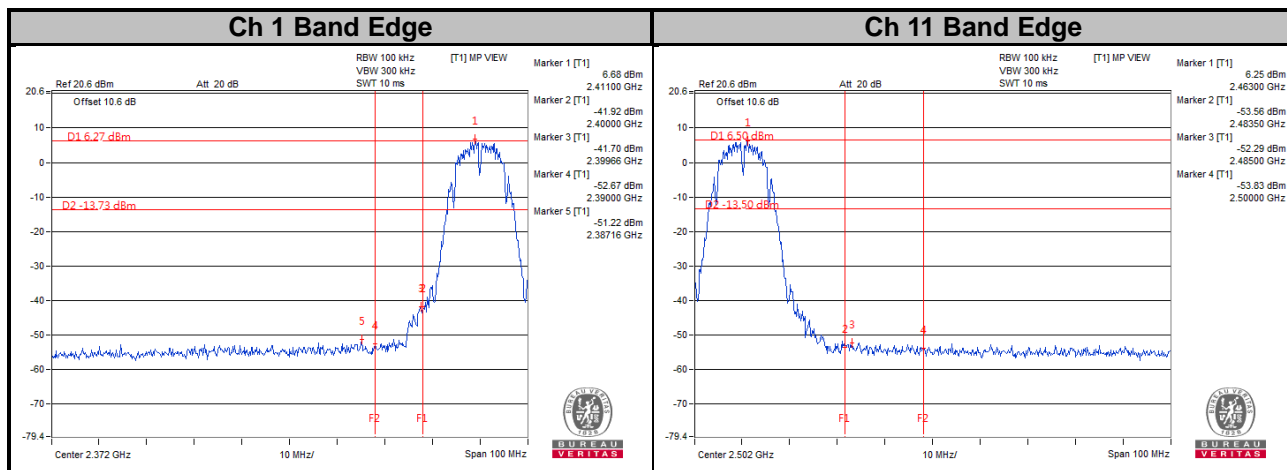
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.6.7 Test Results

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.

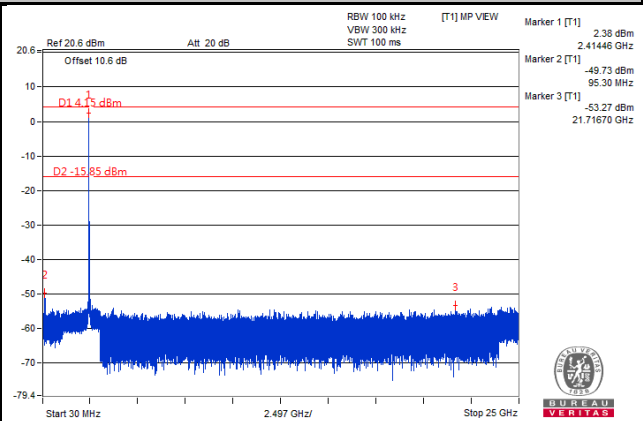
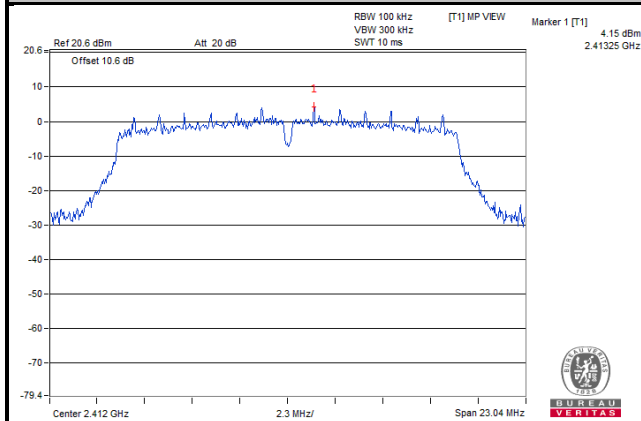
802.11b



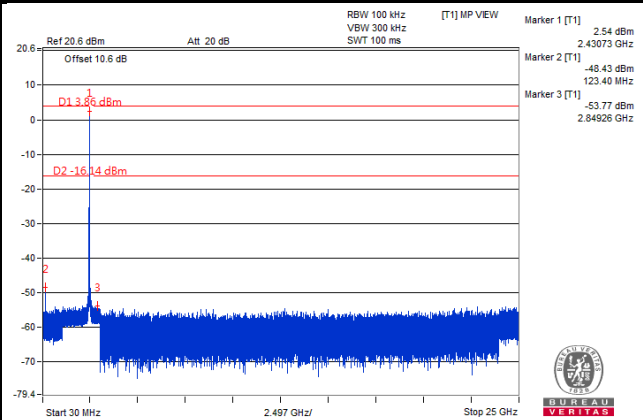
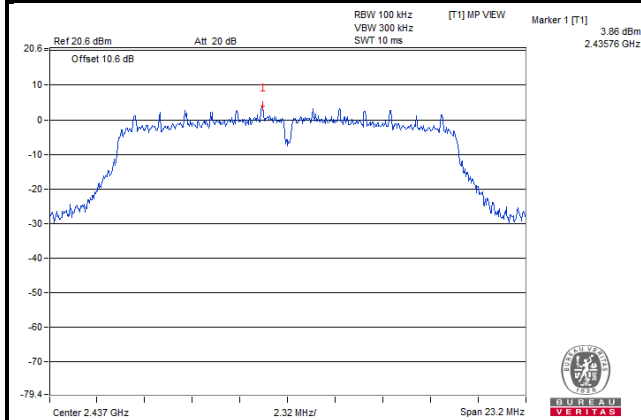


802.11g

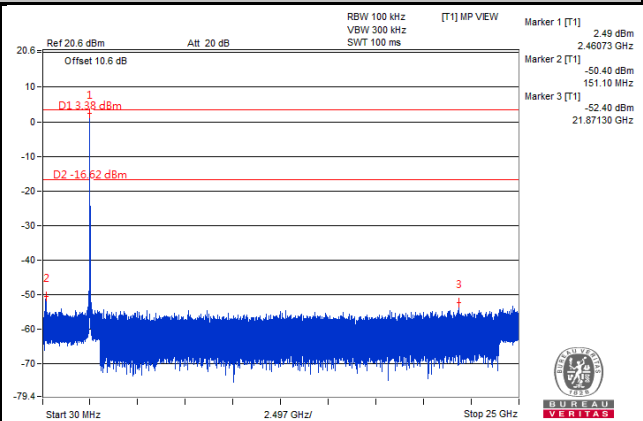
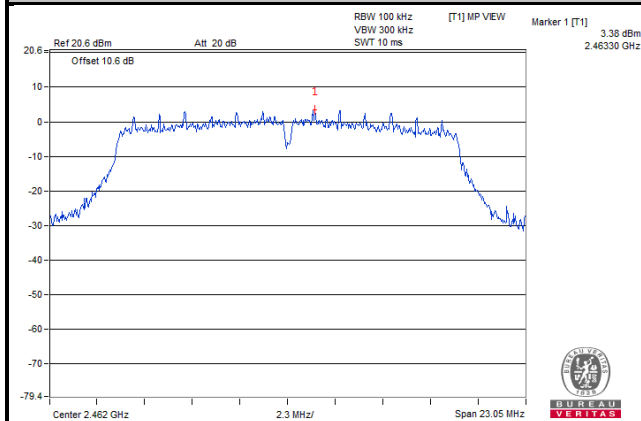
Ch 1

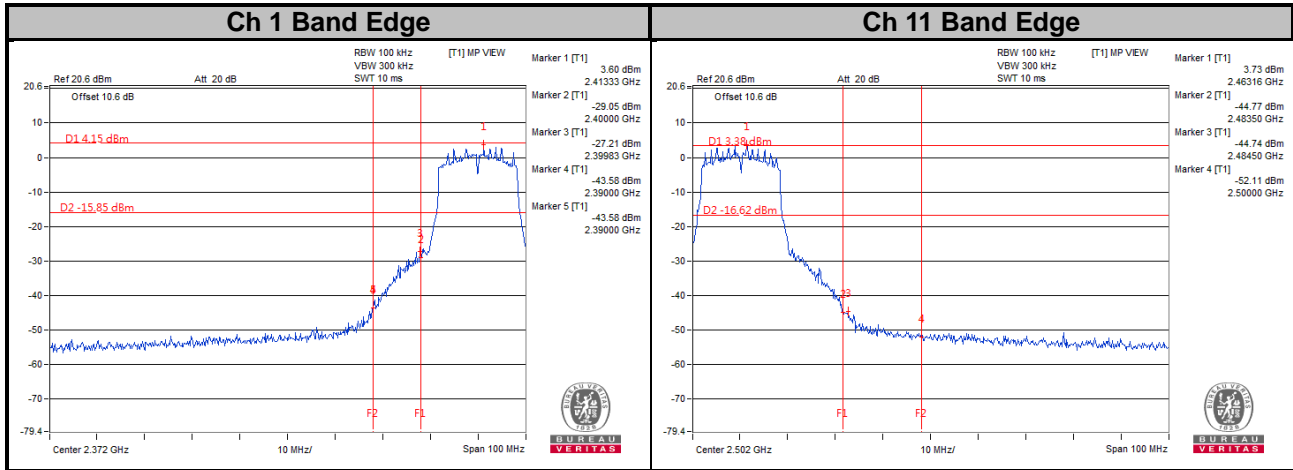


Ch 6



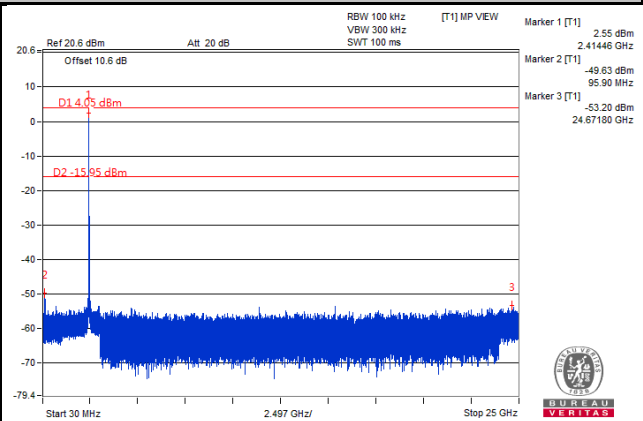
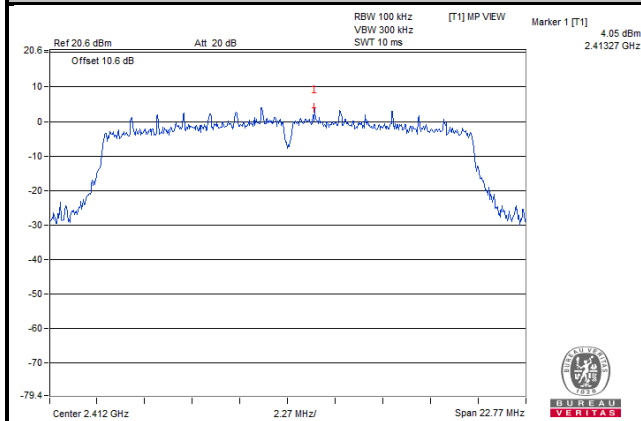
Ch 11



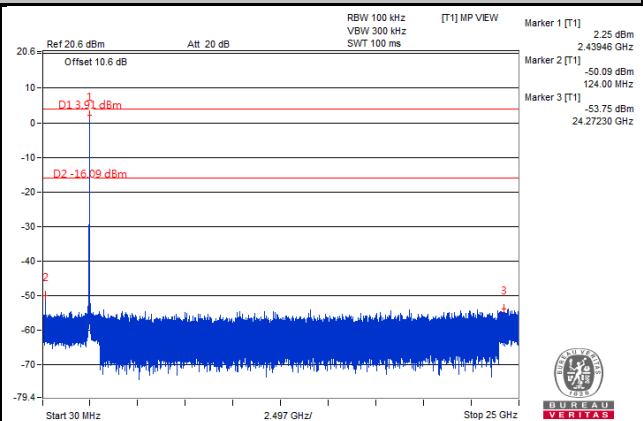
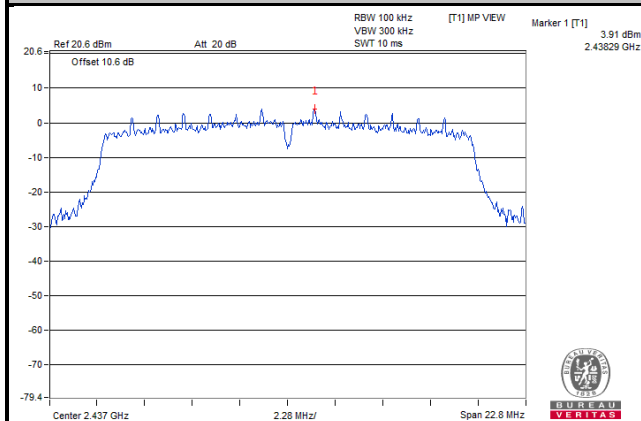


802.11n (HT20)

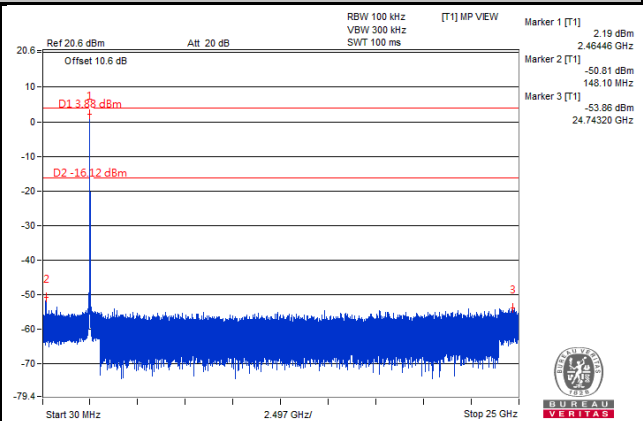
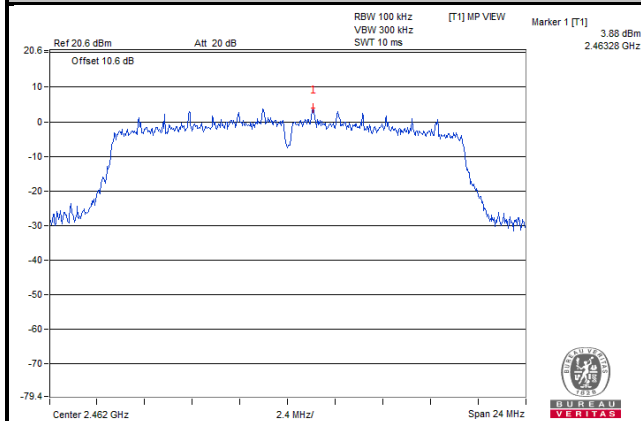
Ch 1

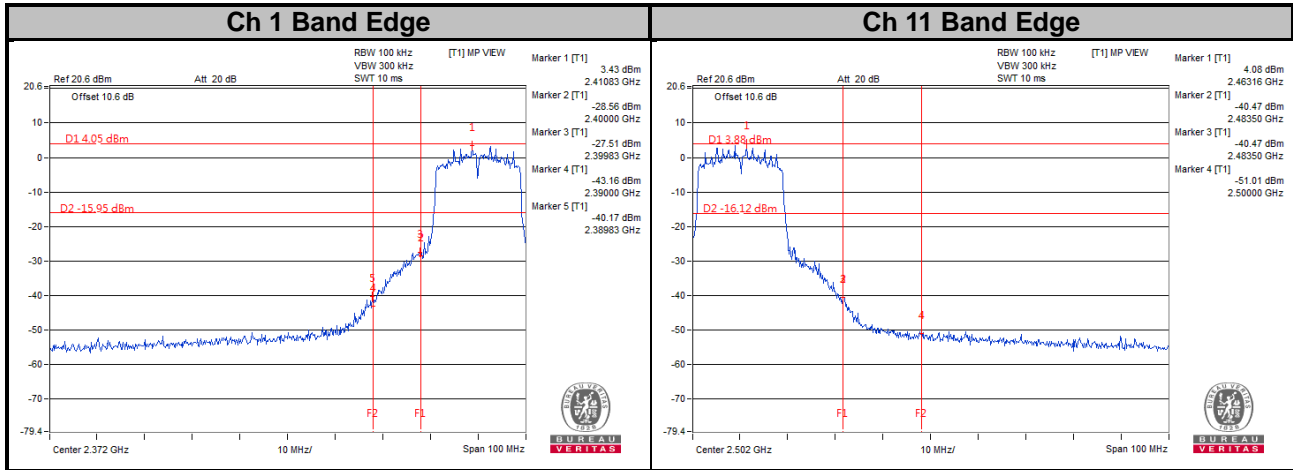


Ch 6



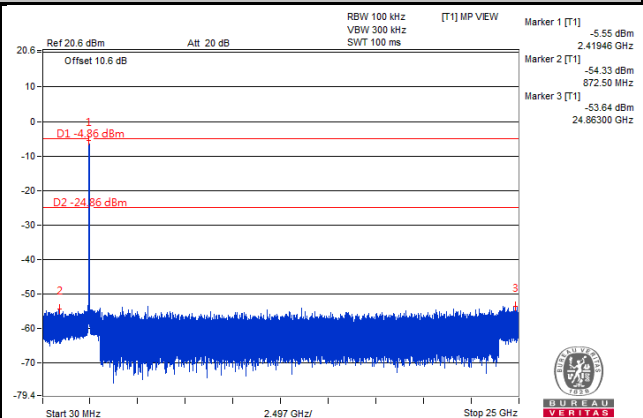
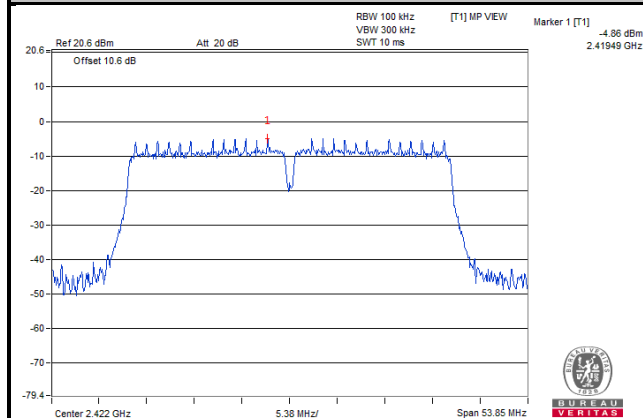
Ch 11



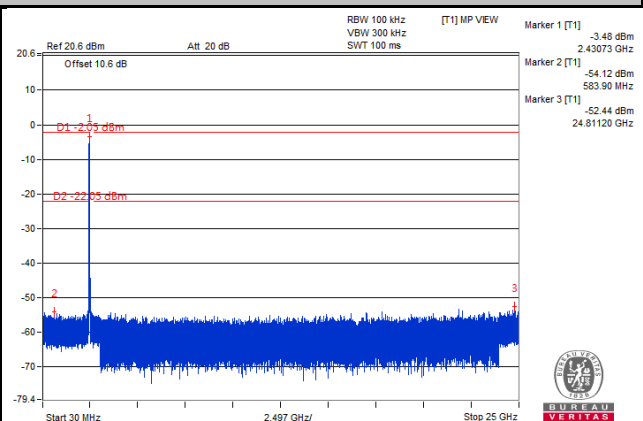
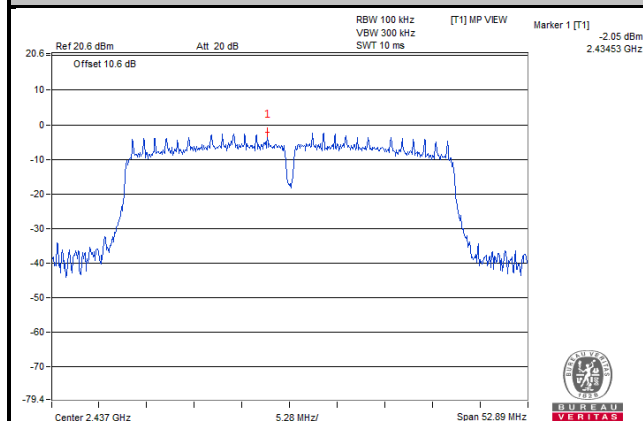


802.11n (HT40)

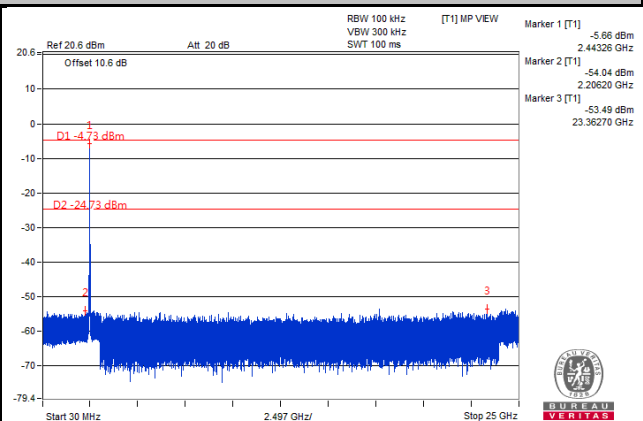
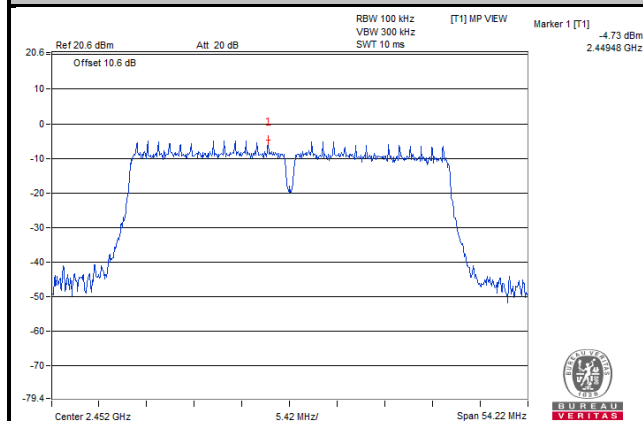
Ch 3

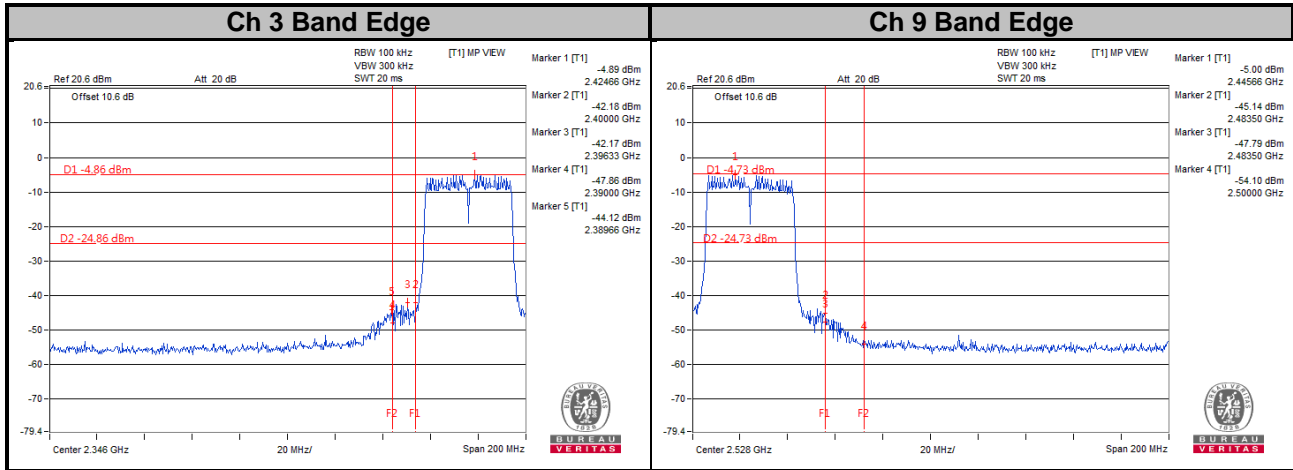


Ch 6



Ch 9





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 accredited and approved according to ISO/IEC 17025.

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

Linko 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.

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