

## FCC Test Report

**Report No.:** RF160601C39-6

**FCC ID:** MSQZ01BDC

**Test Model:** ASUS\_Z01BDC, ASUS\_Z01BDB

**Received Date:** Jun. 01, 2016

**Test Date:** Jun. 14, 2016 ~ Jul. 25, 2016

**Issued Date:** Aug. 01, 2016

**Applicant:** ASUSTek COMPUTER INC.

**Address:** 4F, No. 150, LI-TE Rd., PEITOU, TAIPEI 112, TAIWAN

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

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan  
( R.O.C )

**Test Location (1):** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan  
Hsien 333, Taiwan, R.O.C.



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### Release Control Record

Issue No.	Description	Date Issued
RF160601C39-6	Original Release	Aug. 01, 2016

## 1 Certificate of Conformity

**Product:** ASUS phone

**Brand:** ASUS

**Test Model:** ASUS\_Z01BDC, ASUS\_Z01BDB

**Sample Status:** Identical Prototype

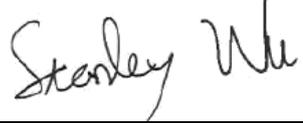
**Applicant:** ASUSTek COMPUTER INC.

**Test Date:** Jun. 14, 2016 ~ Jul. 25, 2016

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

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

**Prepared by :**  , **Date:** Aug. 01, 2016  
Ivonne Wu / Supervisor

**Approved by :**  , **Date:** Aug. 01, 2016  
Stanley Wu / Assistant Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -8.13 dB at 0.32986 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -9.78 dB at 2390.00 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

<b>Product</b>	ASUS phone
<b>Brand</b>	ASUS
<b>Test Model</b>	ASUS_Z01BDC, ASUS_Z01BDB
<b>Status of EUT</b>	Identical Prototype
<b>Power Supply Rating</b>	5.2 Vdc (adapter or host equipment) 3.85 Vdc (Li-ion battery)
<b>Modulation Type</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>Modulation Technology</b>	DSSS, OFDM
<b>Transfer Rate</b>	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
<b>Operating Frequency</b>	2412 ~ 2462 MHz
<b>Number of Channel</b>	11 for 802.11b, 802.11g, 802.11n (HT20)
<b>Output Power</b>	178.65 mW
<b>Antenna Type</b>	PIFA antenna with -3.5 dBi gain
<b>Antenna Connector</b>	N/A
<b>Accessory Device</b>	Refer to Note as below
<b>Data Cable Supplied</b>	Refer to Note as below

Note:

1. There're 2 configurations for the EUT listed as below.

Sample	Difference
Main Sample	Panel 1 + Front Camer 1 + Real Camera 1 + Battery1
2 <sup>nd</sup> Sample	Panel 2 + Front Camer 2 + Real Camera 2 + Battery2

✧ Only the worst test data was presented in the report.

2. The EUT's accessories list refers to Ext. Pho.
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		

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Main Sample
B	√	√	√	-	2 <sup>nd</sup> Sample

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 **Z-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)
A	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
B	802.11g	1 to 11	1	OFDM	BPSK	6.0

#### **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, B	802.11g	1 to 11	1	OFDM	BPSK	6.0

#### **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, B	802.11g	1 to 11	1	OFDM	BPSK	6.0

### **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	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	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	Getaz Yang
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Toby Tian
APCM	25 deg. C, 65 % RH	3.85 Vdc	Taylor Liu

### 3.3 Duty Cycle of Test Signal

**802.11b:** Duty cycle of test signal is 100 %

**802.11g:** Duty cycle =  $1.352/1.569 = 0.862$ , Duty factor =  $10 * \log(1/0.862) = 0.64$

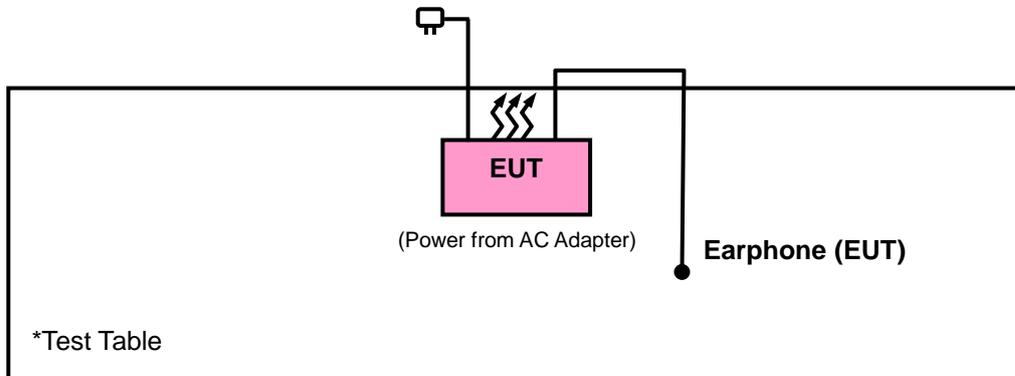
**802.11n (HT20):** Duty cycle =  $1.269/1.478 = 0.859$ , Duty factor =  $10 * \log(1/0.859) = 0.66$



### 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	Jan. 21, 2016	Jan. 20, 2017
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep. 03, 2015	Sep. 02, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 04, 2016	Jan. 03, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
Loop Antenna	EM-6879	269	Jul. 31, 2015	Jul. 30, 2016
Bluetooth Tester	CBT	100980	Apr. 27, 2015	Apr. 26, 2017
Agilent Communications Tester-Wireless	8960 Series 10	MY53201073	Jul. 03, 2015	Jul. 02, 2017
Preamplifier EMCI	EMC 012645	980115	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 184045	980116	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 12, 2015	Oct. 11, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 12, 2015	Oct. 11, 2016
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2015	Oct. 11, 2016
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:**

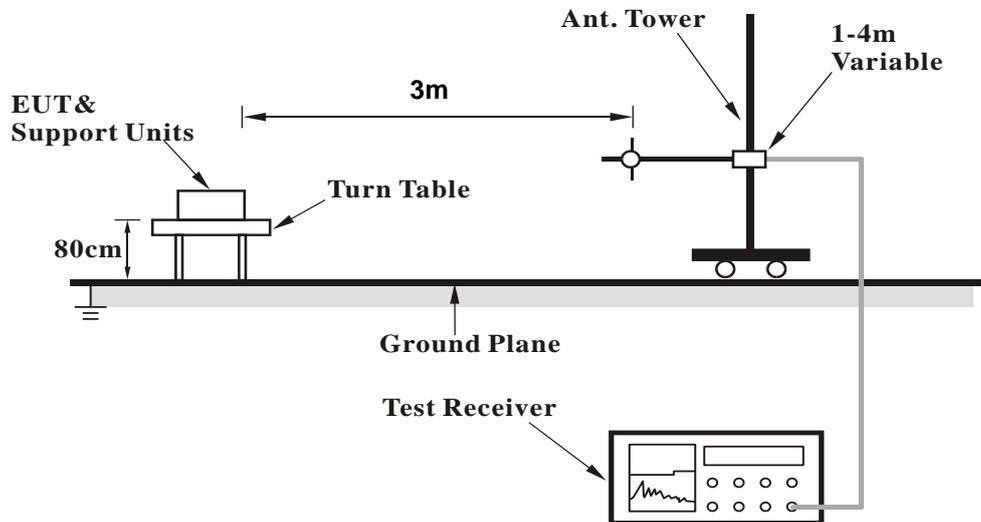
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for RMS Average (Duty cycle < 98 %) for Average detection (AV) at frequency above 1 GHz, then the measurement results was added to a correction factor ( $10 \log(1/\text{duty cycle})$ ).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz 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

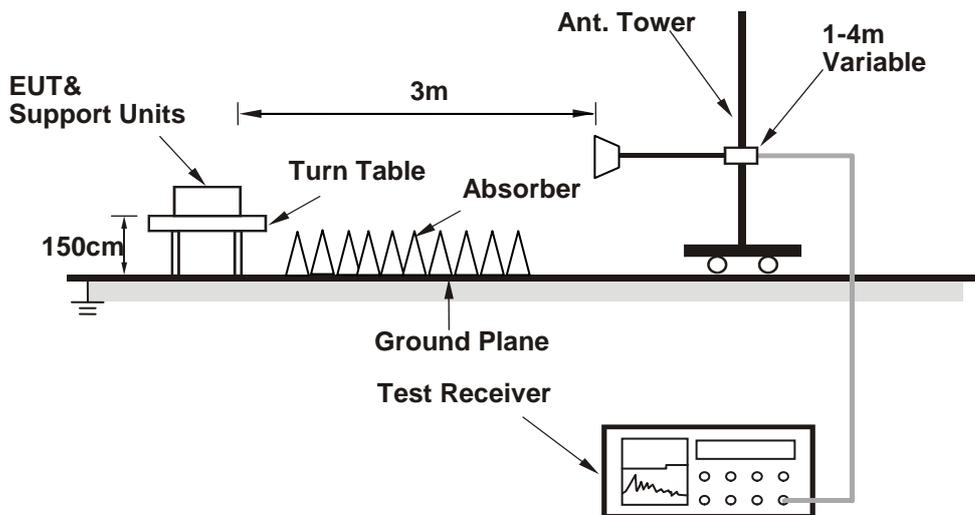
No deviation.

#### 4.1.5 Test Set Up

##### <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 :  
 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	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
2374	35.07	41.64	54	-18.93	26.86	4.07	37.5	116	7	Average
2374	57.44	64.01	74	-16.56	26.86	4.07	37.5	116	7	Peak
2412	96.57	103.04			26.96	4.09	37.52	116	7	Average
2412	100.91	107.38			26.96	4.09	37.52	116	7	Peak
2496	34.22	40.11	54	-19.78	27.2	4.16	37.25	116	7	Average
2496	57.58	63.47	74	-16.42	27.2	4.16	37.25	116	7	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
2374	34.48	41.05	54	-19.52	26.86	4.07	37.5	151	184	Average
2374	57.23	63.8	74	-16.77	26.86	4.07	37.5	151	184	Peak
2412	94.02	100.49			26.96	4.09	37.52	151	184	Average
2412	98.47	104.94			26.96	4.09	37.52	151	184	Peak
2490	33.89	39.85	54	-20.11	27.2	4.16	37.32	151	184	Average
2490	57.1	63.06	74	-16.9	27.2	4.16	37.32	151	184	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	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
2352	34.41	41.04	54	-19.59	26.81	4.05	37.49	120	21	Average
2352	57.09	63.72	74	-16.91	26.81	4.05	37.49	120	21	Peak
2437	96.72	103			27.06	4.12	37.46	120	21	Average
2437	101.12	107.4			27.06	4.12	37.46	120	21	Peak
2496	34.51	40.4	54	-19.49	27.2	4.16	37.25	120	21	Average
2496	58.21	64.1	74	-15.79	27.2	4.16	37.25	120	21	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	34.01	40.52	54	-19.99	26.91	4.08	37.5	165	180	Average
2386	57.17	63.68	74	-16.83	26.91	4.08	37.5	165	180	Peak
2437	93.65	99.93			27.06	4.12	37.46	165	180	Average
2437	98.23	104.51			27.06	4.12	37.46	165	180	Peak
2498	33.99	39.88	54	-20.01	27.2	4.16	37.25	165	180	Average
2498	57.94	63.83	74	-16.06	27.2	4.16	37.25	165	180	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	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
2326	33.74	40.46	54	-20.26	26.72	4.03	37.47	115	3	Average
2326	56.91	63.63	74	-17.09	26.72	4.03	37.47	115	3	Peak
2462	96.67	102.83			27.1	4.13	37.39	115	3	Average
2462	101.14	107.3			27.1	4.13	37.39	115	3	Peak
2490	35.65	41.61	54	-18.35	27.2	4.16	37.32	115	3	Average
2490	58.15	64.11	74	-15.85	27.2	4.16	37.32	115	3	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
2384	33.59	41.41	54	-20.41	26.86	4.08	38.76	151	201	Average
2384	57.23	65.05	74	-16.77	26.86	4.08	38.76	151	201	Peak
2462	93.95	101.47			27.1	4.13	38.75	151	201	Average
2462	98.33	105.85			27.1	4.13	38.75	151	201	Peak
2500	34.69	42.08	54	-19.31	27.2	4.16	38.75	151	201	Average
2500	57.56	64.95	74	-16.44	27.2	4.16	38.75	151	201	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	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
2390	42.28	48.81	54	-11.72	26.91	4.08	37.52	103	3	Average
2390	64.22	70.75	74	-9.78	26.91	4.08	37.52	103	3	Peak
2412	90.64	97.11			26.96	4.09	37.52	103	3	Average
2412	101.83	108.3			26.96	4.09	37.52	103	3	Peak
2488	35.12	41.08	54	-18.88	27.2	4.16	37.32	103	3	Average
2488	57.73	63.69	74	-16.27	27.2	4.16	37.32	103	3	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
2390	39.87	46.4	54	-14.13	26.91	4.08	37.52	167	170	Average
2390	57.34	63.87	74	-16.66	26.91	4.08	37.52	167	170	Peak
2412	88.58	95.05			26.96	4.09	37.52	167	170	Average
2412	98.46	104.93			26.96	4.09	37.52	167	170	Peak
2488	34.79	40.75	54	-19.21	27.2	4.16	37.32	167	170	Average
2488	57.5	63.46	74	-16.5	27.2	4.16	37.32	167	170	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	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
2362	36.67	43.3	54	-17.33	26.81	4.05	37.49	100	1	Average
2362	56.47	63.1	74	-17.53	26.81	4.05	37.49	100	1	Peak
2437	91.47	97.75			27.06	4.12	37.46	100	1	Average
2437	101.26	107.54			27.06	4.12	37.46	100	1	Peak
2484	37.61	43.63	54	-16.39	27.15	4.15	37.32	100	1	Average
2484	56.98	63	74	-17.02	27.15	4.15	37.32	100	1	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
2384	35.08	41.64	54	-18.92	26.86	4.08	37.5	167	170	Average
2384	57.12	63.68	74	-16.88	26.86	4.08	37.5	167	170	Peak
2437	88.53	94.81			27.06	4.12	37.46	167	170	Average
2437	98.29	104.57			27.06	4.12	37.46	167	170	Peak
2492	35.68	41.57	54	-18.32	27.2	4.16	37.25	167	170	Average
2492	56.91	62.8	74	-17.09	27.2	4.16	37.25	167	170	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	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
2362	34.73	41.36	54	-19.27	26.81	4.05	37.49	100	5	Average
2362	57.22	63.85	74	-16.78	26.81	4.05	37.49	100	5	Peak
2462	91.87	98.03			27.1	4.13	37.39	100	5	Average
2462	101.67	107.83			27.1	4.13	37.39	100	5	Peak
2486	42.93	48.95	54	-11.07	27.15	4.15	37.32	100	5	Average
2486	61.51	67.53	74	-12.49	27.15	4.15	37.32	100	5	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
2310	33.98	40.75	54	-20.02	26.67	4.01	37.45	147	168	Average
2310	54.6	61.37	74	-19.4	26.67	4.01	37.45	147	168	Peak
2462	89.26	95.42			27.1	4.13	37.39	147	168	Average
2462	98.98	105.14			27.1	4.13	37.39	147	168	Peak
2486	39.67	45.69	54	-14.33	27.15	4.15	37.32	147	168	Average
2486	59.78	65.8	74	-14.22	27.15	4.15	37.32	147	168	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	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
2352	37.54	44.17	54	-16.46	26.81	4.05	37.49	115	359	Average
2352	58.03	64.66	74	-15.97	26.81	4.05	37.49	115	359	Peak
2412	90.6	97.07			26.96	4.09	37.52	115	359	Average
2412	99.89	106.36			26.96	4.09	37.52	115	359	Peak
2490	35.03	40.99	54	-18.97	27.2	4.16	37.32	115	359	Average
2490	57.32	63.28	74	-16.68	27.2	4.16	37.32	115	359	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
2324	37.31	44.03	54	-16.69	26.72	4.03	37.47	168	186	Average
2324	57	63.72	74	-17	26.72	4.03	37.47	168	186	Peak
2412	86.62	93.09			26.96	4.09	37.52	168	186	Average
2412	96.94	103.41			26.96	4.09	37.52	168	186	Peak
2498	34.71	40.6	54	-19.29	27.2	4.16	37.25	168	186	Average
2498	56.41	62.3	74	-17.59	27.2	4.16	37.25	168	186	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	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
2340	36.39	43.07	54	-17.61	26.77	4.04	37.49	102	355	Average
2340	56.22	62.9	74	-17.78	26.77	4.04	37.49	102	355	Peak
2437	90.52	96.8			27.06	4.12	37.46	102	355	Average
2437	99.87	106.15			27.06	4.12	37.46	102	355	Peak
2484	36.27	42.29	54	-17.73	27.15	4.15	37.32	102	355	Average
2484	57.24	63.26	74	-16.76	27.15	4.15	37.32	102	355	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
2330	34.6	41.31	54	-19.4	26.72	4.04	37.47	121	194	Average
2330	56.35	63.06	74	-17.65	26.72	4.04	37.47	121	194	Peak
2437	87.52	93.8			27.06	4.12	37.46	121	194	Average
2437	97.17	103.45			27.06	4.12	37.46	121	194	Peak
2498	34.51	40.4	54	-19.49	27.2	4.16	37.25	121	194	Average
2498	56.72	62.61	74	-17.28	27.2	4.16	37.25	121	194	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	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
2382	34.16	40.72	54	-19.84	26.86	4.08	37.5	129	17	Average
2382	57.61	64.17	74	-16.39	26.86	4.08	37.5	129	17	Peak
2462	90.48	96.64			27.1	4.13	37.39	129	17	Average
2462	100.1	106.26			27.1	4.13	37.39	129	17	Peak
2486	39.92	45.94	54	-14.08	27.15	4.15	37.32	129	17	Average
2486	58.16	64.18	74	-15.84	27.15	4.15	37.32	129	17	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
2332	33.97	40.68	54	-20.03	26.72	4.04	37.47	148	189	Average
2332	57.08	63.79	74	-16.92	26.72	4.04	37.47	148	189	Peak
2462	87.44	93.6			27.1	4.13	37.39	148	189	Average
2462	97.15	103.31			27.1	4.13	37.39	148	189	Peak
2484	37.66	43.68	54	-16.34	27.15	4.15	37.32	148	189	Average
2484	57.19	63.21	74	-16.81	27.15	4.15	37.32	148	189	Peak

Remarks:

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

**Mode B**  
**802.11g**

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	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
2338	37.99	44.65	54	-16.01	26.77	4.04	37.47	130	355	Average
2338	56.7	63.36	74	-17.3	26.77	4.04	37.47	130	355	Peak
2412	87.55	94.02			26.96	4.09	37.52	130	355	Average
2412	98.31	104.78			26.96	4.09	37.52	130	355	Peak
2486	35.03	41.05	54	-18.97	27.15	4.15	37.32	130	355	Average
2486	56.55	62.57	74	-17.45	27.15	4.15	37.32	130	355	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	34.61	41.18	54	-19.39	26.86	4.07	37.5	248	4	Average
2378	55.85	62.42	74	-18.15	26.86	4.07	37.5	248	4	Peak
2412	80.38	86.85			26.96	4.09	37.52	248	4	Average
2412	89.16	95.63			26.96	4.09	37.52	248	4	Peak
2488	34.76	40.72	54	-19.24	27.2	4.16	37.32	248	4	Average
2488	56.02	61.98	74	-17.98	27.2	4.16	37.32	248	4	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 2412 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**

**802.11g**

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	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
58.13	17.02	35.44	40	-22.98	12.15	0.78	31.35	113	27	Peak
109.54	21.18	41.93	43.5	-22.32	9.99	1.1	31.84	109	80	Peak
190.05	19.79	40.15	43.5	-23.71	10.05	1.26	31.67	104	60	Peak
383.08	19.59	34.77	46	-26.41	14.94	1.86	31.98	118	225	Peak
565.44	24.03	35.09	46	-21.97	18.81	2.2	32.07	136	309	Peak
672.14	24.7	33.64	46	-21.3	20.48	2.4	31.82	132	71	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
30.97	27.03	45.42	40	-12.97	12.14	0.59	31.12	124	213	Peak
40.67	25.26	42.08	40	-14.74	13.55	0.65	31.02	114	12	Peak
62.01	19.32	38.23	40	-20.68	11.71	0.83	31.45	110	255	Peak
110.51	20.05	40.7	43.5	-23.45	10.09	1.11	31.85	106	126	Peak
223.03	15.7	35.72	46	-30.3	10.34	1.39	31.75	118	333	Peak
337.49	18.1	34.35	46	-27.9	13.84	1.73	31.82	133	7	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

**Mode B**
**802.11g**

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	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
58.13	15.94	34.36	40	-24.06	12.15	0.78	31.35	116	51	Peak
147.37	16.43	34.29	43.5	-27.07	12.61	1.15	31.62	111	331	Peak
198.78	18.45	39.49	43.5	-25.05	9.43	1.29	31.76	129	216	Peak
294.81	17.46	34.8	46	-28.54	12.8	1.62	31.76	102	101	Peak
321.97	19.13	35.84	46	-26.87	13.47	1.69	31.87	138	29	Peak
386.96	18	33.11	46	-28	15.03	1.87	32.01	111	264	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
40.67	25.95	42.77	40	-14.05	13.55	0.65	31.02	108	309	Peak
57.16	20.32	38.65	40	-19.68	12.25	0.77	31.35	137	152	Peak
113.42	19.63	40	43.5	-23.87	10.37	1.12	31.86	129	259	Peak
137.67	16.94	35.27	43.5	-26.56	12.21	1.15	31.69	111	334	Peak
180.35	13.78	33.66	43.5	-29.72	10.74	1.22	31.84	131	186	Peak
223.03	15.16	35.18	46	-30.84	10.34	1.39	31.75	114	171	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. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
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

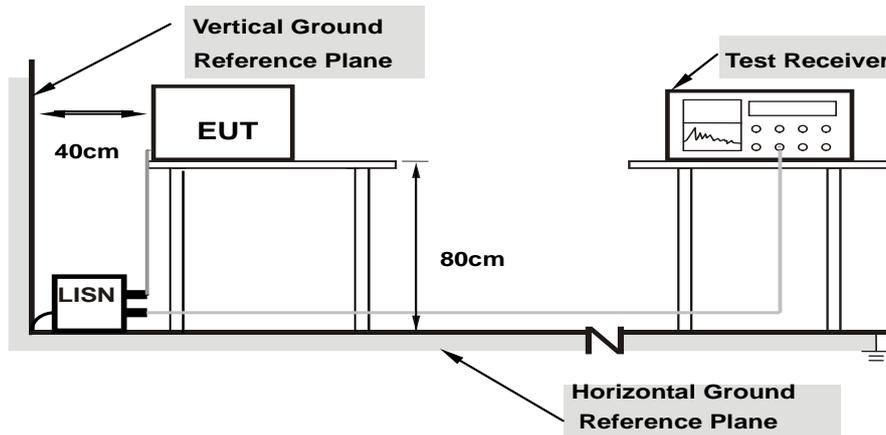
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling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

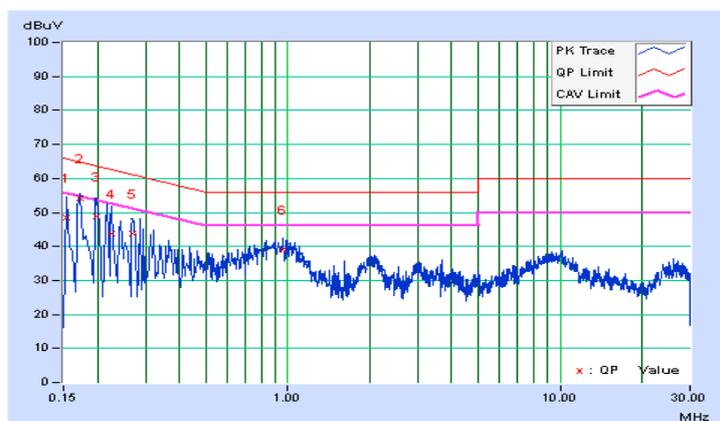
##### Mode A

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	Toby Tian	Test Date	2016/6/16

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	0.15391	10.02	38.33	17.94	48.35	27.96	65.79	55.79	-17.44	-27.83
2	0.17283	10.02	44.23	25.91	54.25	35.93	64.82	54.82	-10.57	-18.89
3	0.19717	10.03	38.73	19.24	48.76	29.27	63.73	53.73	-14.97	-24.46
4	0.22429	10.04	33.66	13.09	43.70	23.13	62.66	52.66	-18.96	-29.53
5	0.26765	10.06	33.85	16.18	43.91	26.24	61.19	51.19	-17.28	-24.95
6	0.96319	10.20	28.82	19.85	39.02	30.05	56.00	46.00	-16.98	-15.95

##### 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

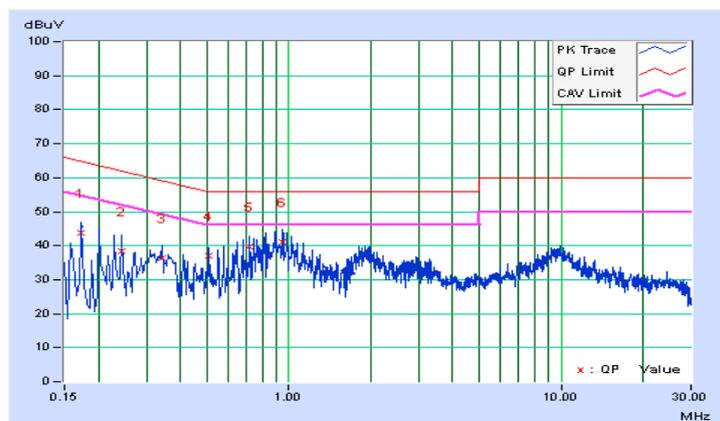


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Toby Tian	Test Date	2016/6/16

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	10.03	33.82	19.38	43.85	29.41	64.79	54.79	-20.94	-25.38
2	0.24384	10.06	28.47	16.64	38.53	26.70	61.96	51.96	-23.43	-25.26
3	0.34159	10.10	26.15	17.92	36.25	28.02	59.16	49.16	-22.91	-21.14
4	0.50972	10.14	26.82	13.40	36.96	23.54	56.00	46.00	-19.04	-22.46
5	0.71695	10.17	29.50	16.97	39.67	27.14	56.00	46.00	-16.33	-18.86
6	0.94373	10.20	30.74	21.31	40.94	31.51	56.00	46.00	-15.06	-14.49

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



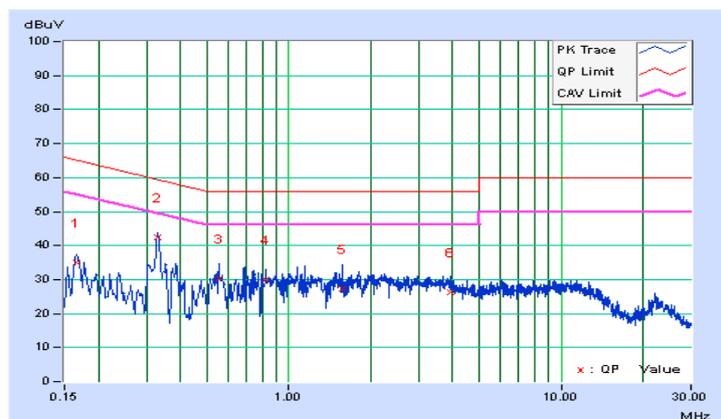
**Mode B**

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	Toby Tian	Test Date	2016/6/28

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	0.16569	10.02	25.08	13.09	35.10	23.11	65.17	55.17	-30.07	-32.06
2	0.32986	10.09	32.36	31.23	42.45	41.32	59.45	49.45	-17.00	-8.13
3	0.55273	10.14	20.23	13.24	30.37	23.38	56.00	46.00	-25.63	-22.62
4	0.82252	10.18	19.76	12.73	29.94	22.91	56.00	46.00	-26.06	-23.09
5	1.56933	10.24	16.90	10.07	27.14	20.31	56.00	46.00	-28.86	-25.69
6	3.91142	10.40	15.91	9.14	26.31	19.54	56.00	46.00	-29.69	-26.46

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

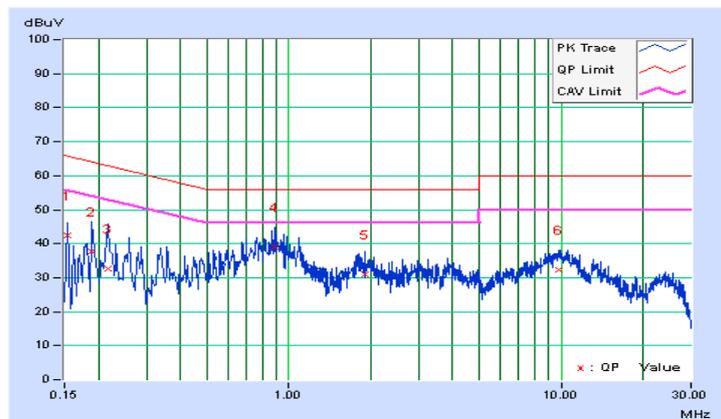


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Toby Tian	Test Date	2016/6/28

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	0.15391	10.03	32.46	18.92	42.49	28.95	65.79	55.79	-23.30	-26.84
2	0.18910	10.04	27.61	14.29	37.65	24.33	64.08	54.08	-26.43	-29.75
3	0.21621	10.05	22.48	10.68	32.53	20.73	62.96	52.96	-30.43	-32.23
4	0.89290	10.20	28.84	17.10	39.04	27.30	56.00	46.00	-16.96	-18.70
5	1.90559	10.27	20.73	13.62	31.00	23.89	56.00	46.00	-25.00	-22.11
6	9.84680	10.79	21.45	14.67	32.24	25.46	60.00	50.00	-27.76	-24.54

Remarks:

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

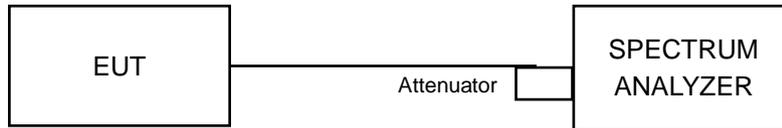


### 4.3 6 dB Bandwidth Measurement

#### 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	10.03	0.5	Pass
6	2437	10.09	0.5	Pass
11	2462	10.04	0.5	Pass

##### 802.11g

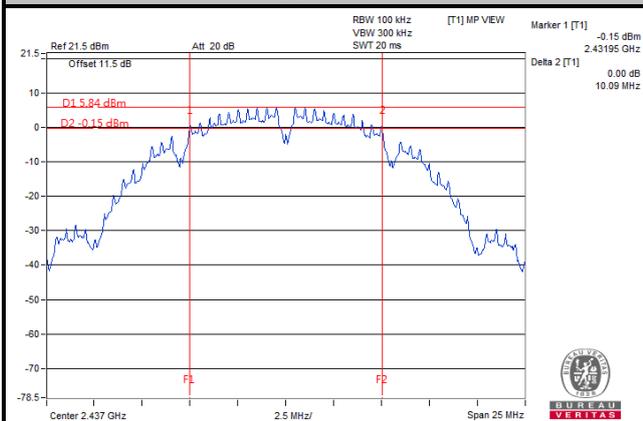
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	16.39	0.5	Pass
6	2437	16.39	0.5	Pass
11	2462	16.44	0.5	Pass

##### 802.11n (HT20)

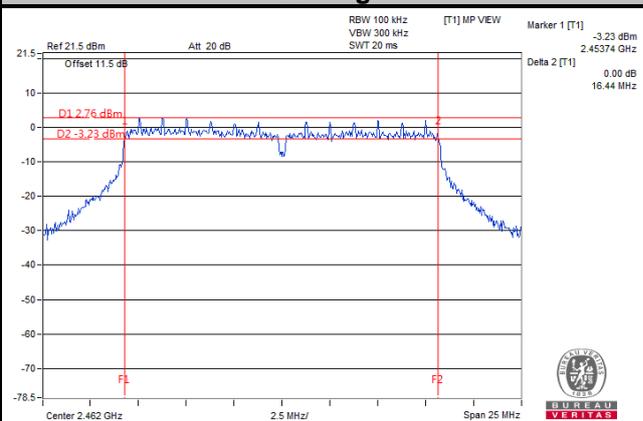
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.62	0.5	Pass
6	2437	17.61	0.5	Pass
11	2462	17.61	0.5	Pass

### Spectrum Plot of Worst Value

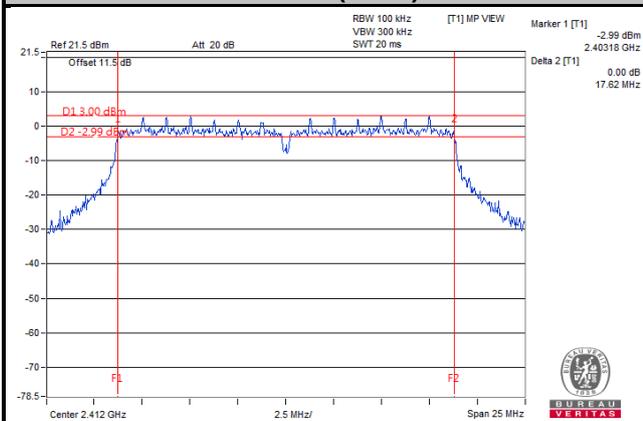
#### 802.11b



#### 802.11g



#### 802.11n (HT20)

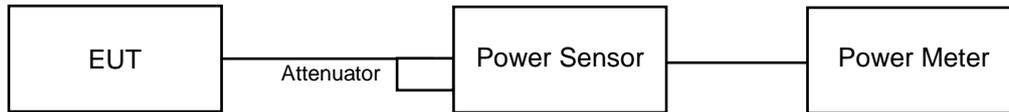


#### 4.4 Conducted Output Power Measurement

##### 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	71.45	18.54	30	Pass
6	2437	58.61	17.68	30	Pass
11	2462	48.42	16.85	30	Pass

##### 802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	178.65	22.52	30	Pass
6	2437	159.96	22.04	30	Pass
11	2462	144.88	21.61	30	Pass

##### 802.11n (HT20)

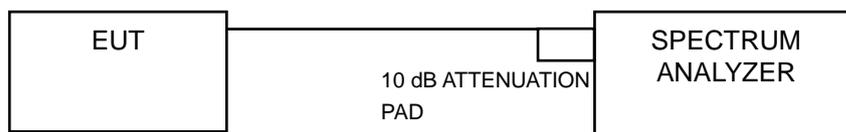
Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	167.11	22.23	30	Pass
6	2437	153.11	21.85	30	Pass
11	2462	138.36	21.41	30	Pass

## 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

- 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.

### 4.5.5 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	-8.31	8	Pass
6	2437	-8.22	8	Pass
11	2462	-8.92	8	Pass

##### 802.11g

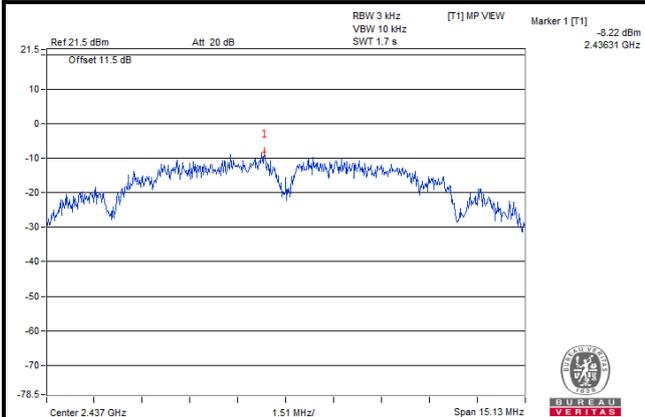
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-11.00	8	Pass
6	2437	-10.79	8	Pass
11	2462	-10.73	8	Pass

##### 802.11n (HT20)

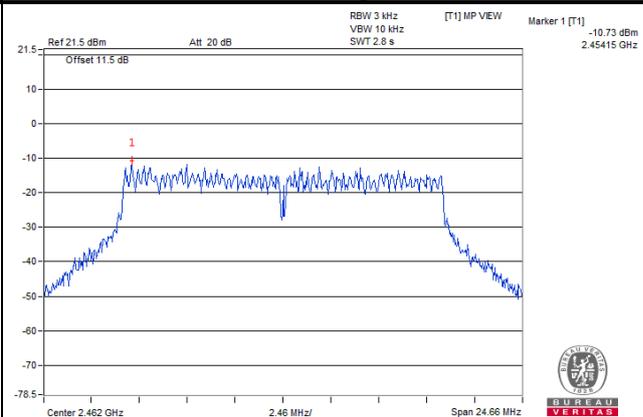
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-11.19	8	Pass
6	2437	-11.16	8	Pass
11	2462	-12.11	8	Pass

### Spectrum Plot of Worst Value

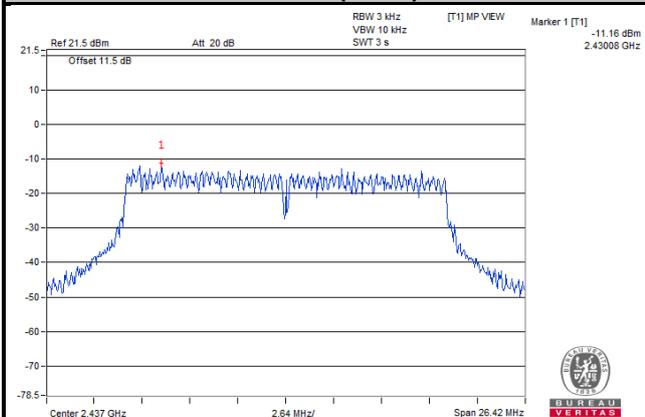
#### 802.11b



#### 802.11g



#### 802.11n (HT20)

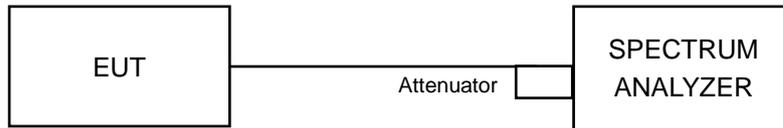


## 4.6 Conducted Out of Band Emission Measurement

### 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.

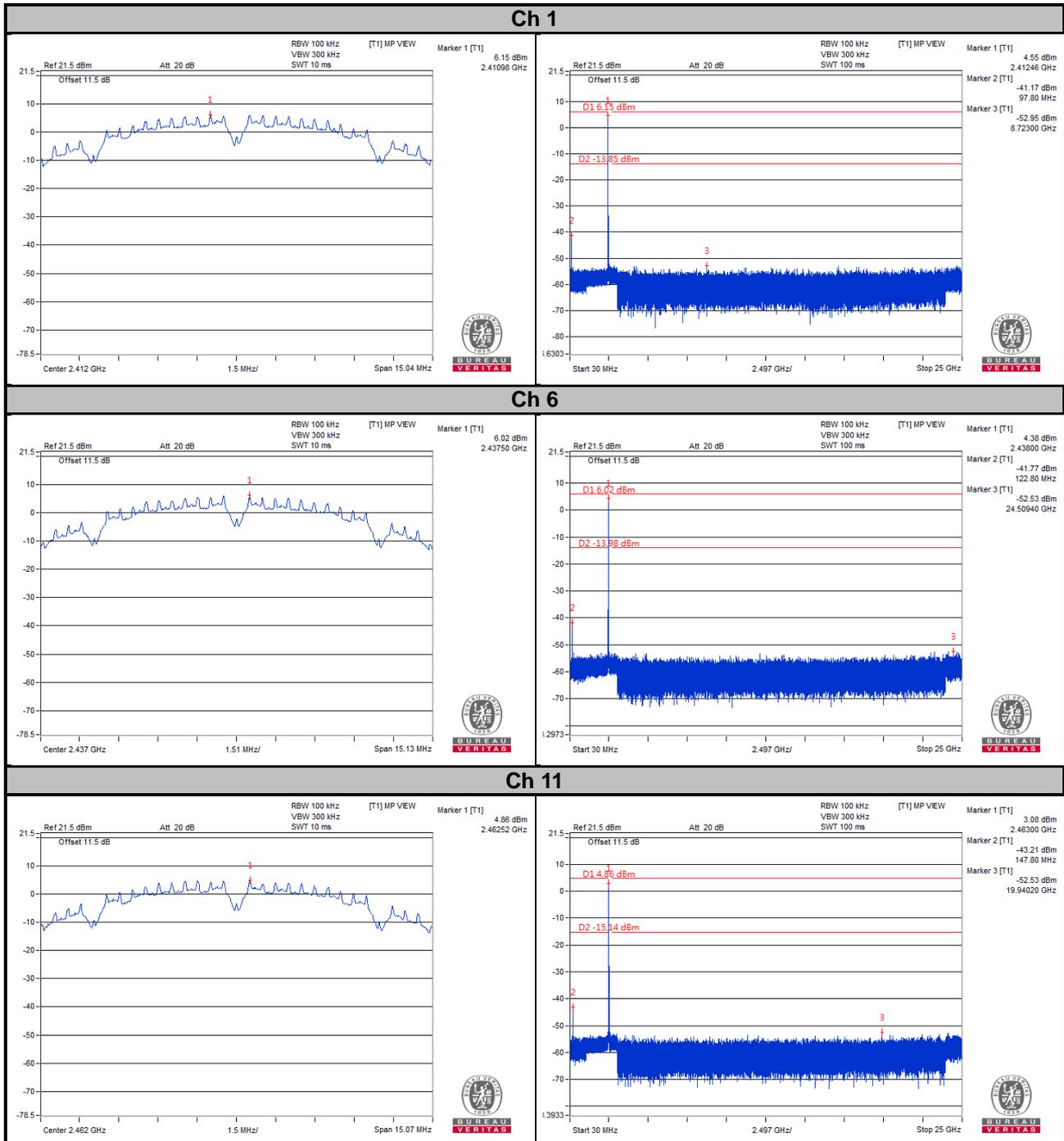
### 4.6.6 EUT Operating Condition

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

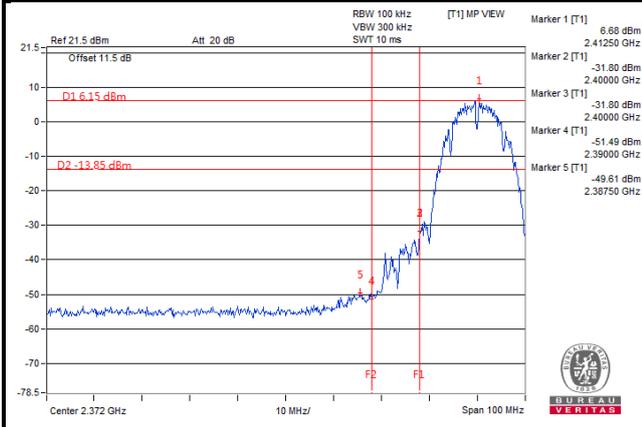
### 4.6.7 Test Results

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.

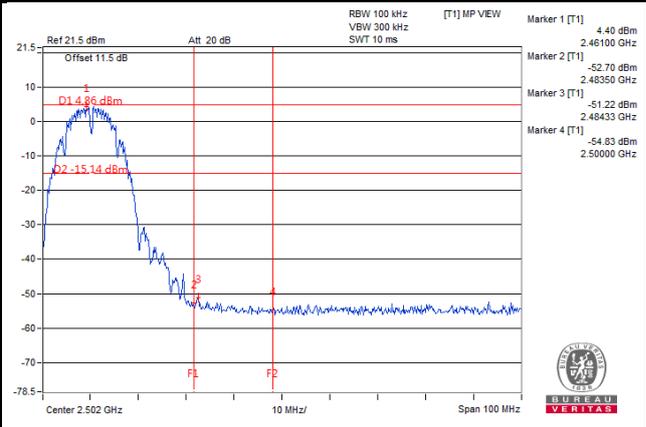
#### 802.11b



### Ch 1 Band Edge

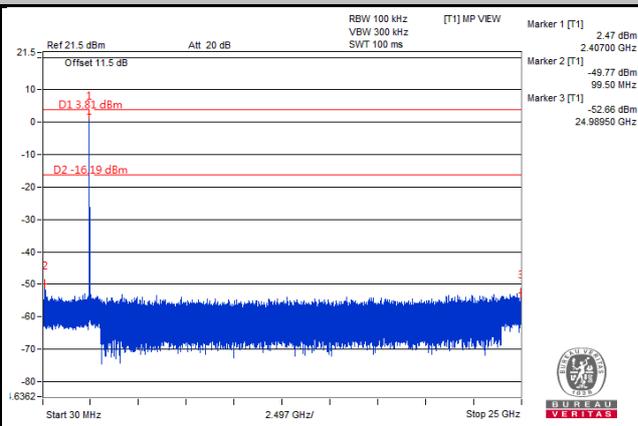
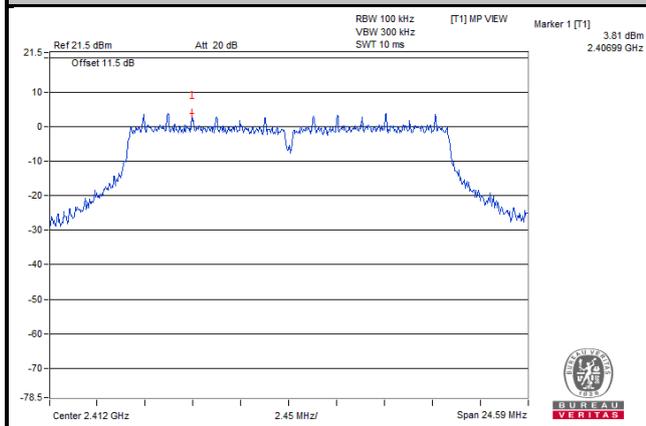


### Ch 11 Band Edge

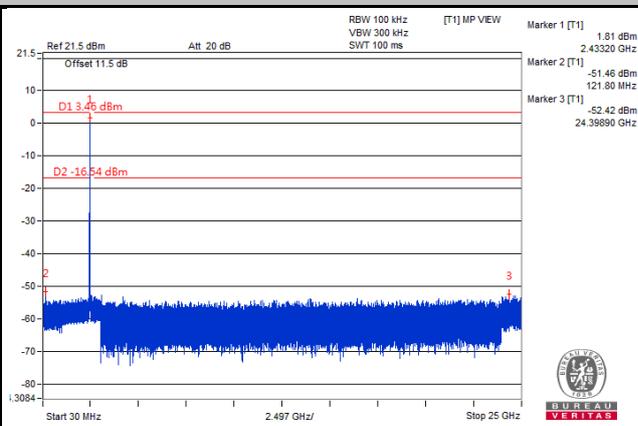
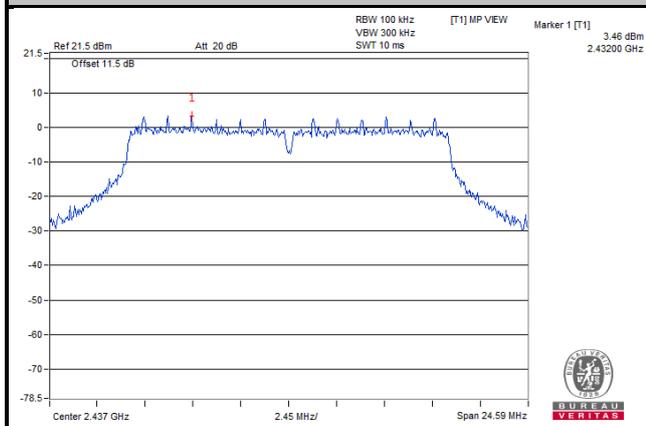


# 802.11g

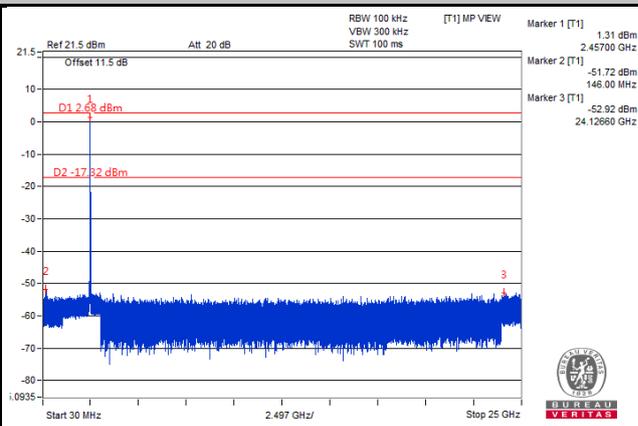
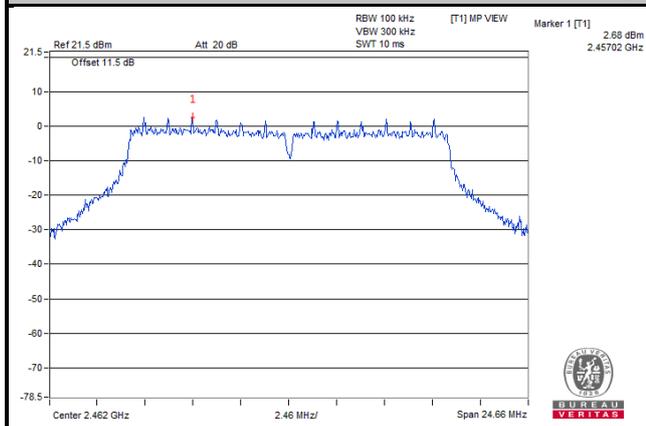
## Ch 1



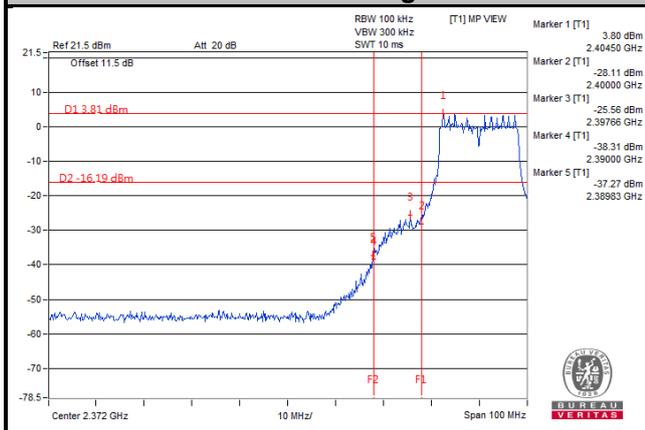
## Ch 6



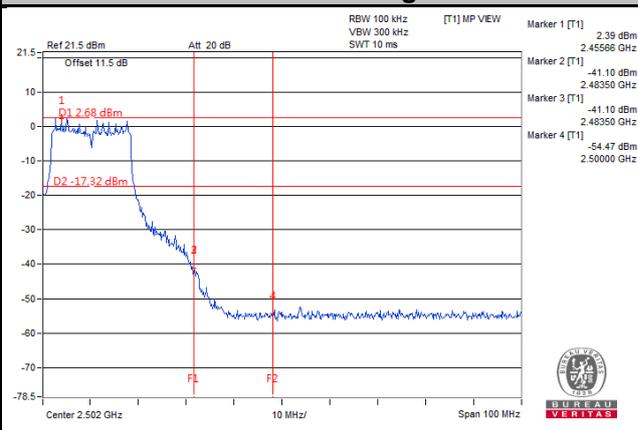
## Ch 11



### Ch 1 Band Edge

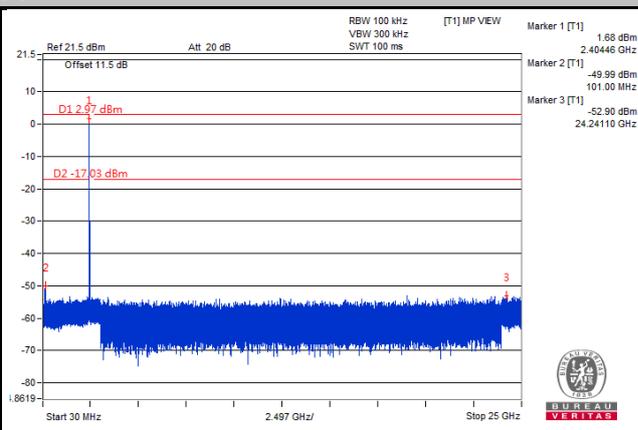
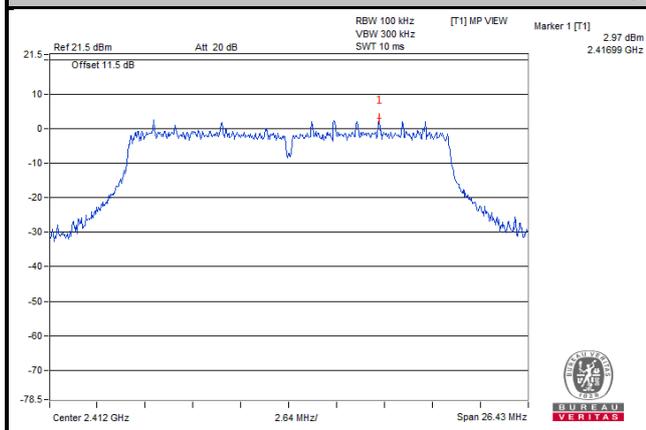


### Ch 11 Band Edge

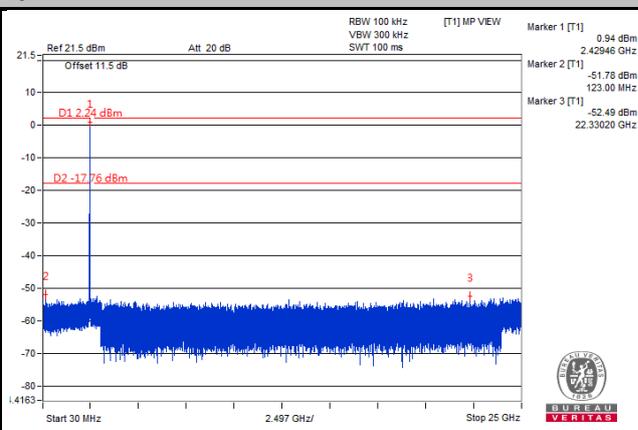
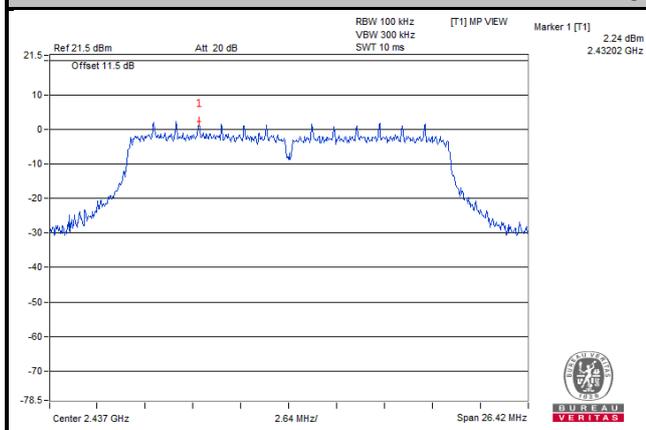


# 802.11n (HT20)

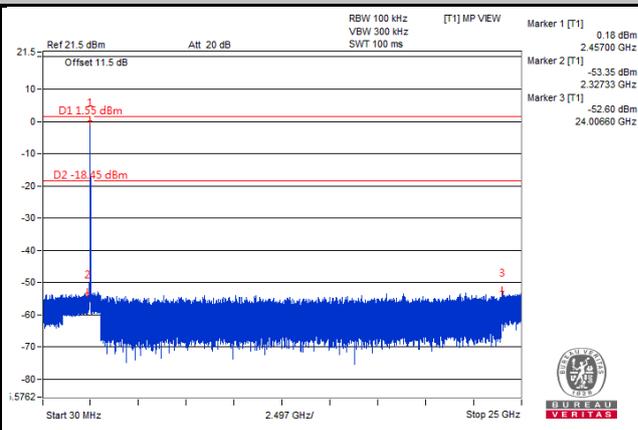
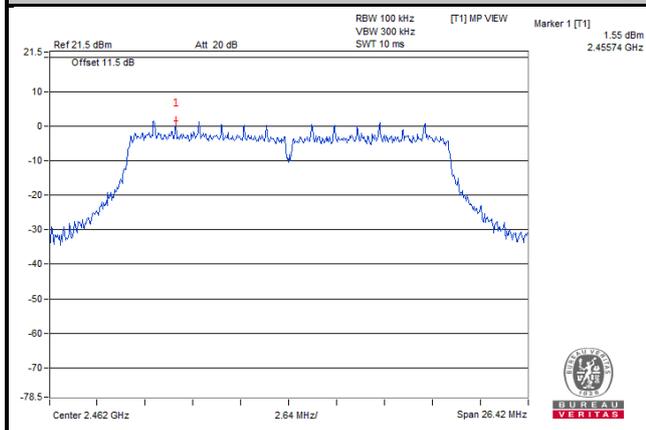
## Ch 1

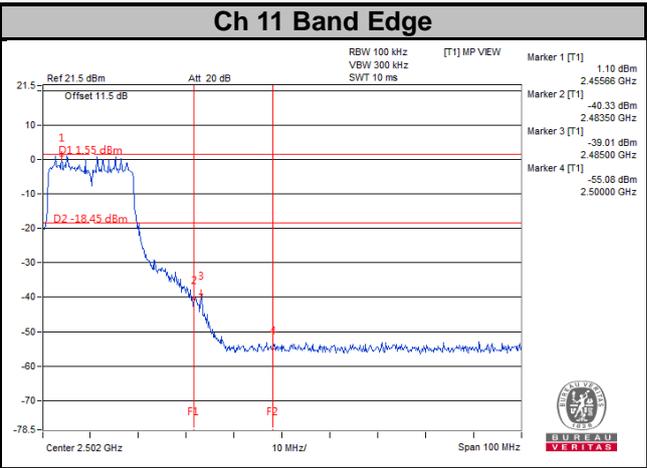
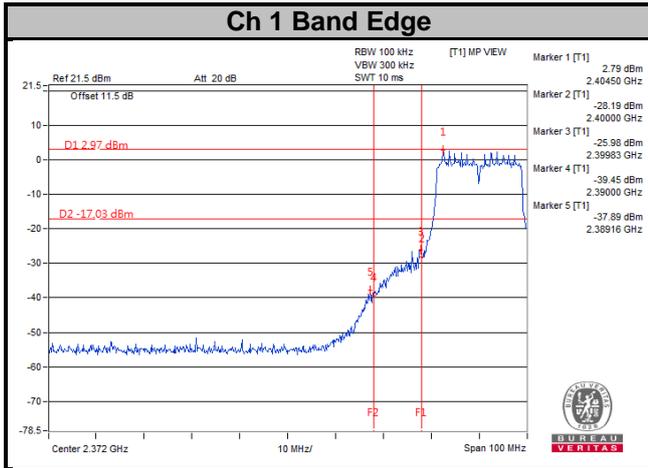


## Ch 6



## Ch 11





## 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**

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Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

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**Hwa Ya EMC/RF/Safety Lab**

Tel: 886-3-3183232

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**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

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

--- END ---