

FCC Test Report

Report No.: RF160829C09-2

FCC ID: NM82PYB200

Test Model: 2PYB200

Received Date: Aug. 29, 2016

Test Date: Sep. 05, 2016 ~ Sep. 12, 2016

Issued Date: Sep. 30, 2016

Applicant: HTC Corporation

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

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R.O.C



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Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results.....	6
2.1 Measurement Uncertainty.....	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes.....	8
3.2.1 Test Mode Applicability and Tested Channel Detail.....	9
3.3 Duty Cycle of Test Signal	11
3.4 Description of Support Units	12
3.4.1 Configuration of System under Test	12
3.5 General Description of Applied Standards.....	12
4 Test Types and Results	13
4.1 Radiated Emission and Bandedge Measurement	13
4.1.1 Limits of Radiated Emission and Bandedge Measurement	13
4.1.2 Test Instruments	14
4.1.3 Test Procedures.....	15
4.1.4 Deviation from Test Standard	15
4.1.5 Test Set Up	16
4.1.6 EUT Operating Conditions.....	16
4.1.7 Test Results	17
4.2 Conducted Emission Measurement.....	32
4.2.1 Limits of Conducted Emission Measurement	32
4.2.2 Test Instruments	32
4.2.3 Test Procedures.....	33
4.2.4 Deviation from Test Standard	33
4.2.5 Test Setup.....	33
4.2.6 EUT Operating Conditions.....	33
4.2.7 Test Results	34
4.3 6dB Bandwidth Measurement.....	38
4.3.1 Limits of 6dB Bandwidth Measurement.....	38
4.3.2 Test Setup.....	38
4.3.3 Test Instruments	38
4.3.4 Test Procedure	38
4.3.5 Deviation from Test Standard	38
4.3.6 EUT Operating Conditions.....	38
4.3.7 Test Result	39
4.4 Conducted Output Power Measurement	41
4.4.1 Limits of Conducted Output Power Measurement.....	41
4.4.2 Test Setup.....	41
4.4.3 Test Instruments	41
4.4.4 Test Procedures.....	41
4.4.5 Deviation from Test Standard	41
4.4.6 EUT Operating Conditions.....	41
4.4.7 Test Results	42
4.5 Power Spectral Density Measurement	43
4.5.1 Limits of Power Spectral Density Measurement.....	43
4.5.2 Test Setup.....	43
4.5.3 Test Instruments	43
4.5.4 Test Procedure	43
4.5.5 Deviation from Test Standard	43
4.5.6 EUT Operating Condition	43

4.5.7 Test Results	44
4.6 Conducted Out of Band Emission Measurement	46
4.6.1 Limits of Conducted Out of Band Emission Measurement.....	46
4.6.2 Test Setup.....	46
4.6.3 Test Instruments	46
4.6.4 Test Procedure	46
4.6.5 Deviation from Test Standard	46
4.6.6 EUT Operating Condition	46
4.6.7 Test Results	47
5 Pictures of Test Arrangements.....	55
Appendix – Information on the Testing Laboratories	56

Release Control Record

Issue No.	Description	Date Issued
RF160829C09-2	Original Release	Sep. 30, 2016

1 Certificate of Conformity

Product: Smartphone

Brand: HTC

Test Model: 2PYB200

Sample Status: Production Unit

Applicant: HTC Corporation

Test Date: Sep. 05, 2016 ~ Sep. 12, 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 :

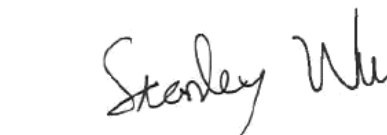


Date:

Sep. 30, 2016

Ivonne Wu / Supervisor

Approved by :



Date:

Sep. 30, 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 -15.91 dB at 0.58792 MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.17 dB at 2485.24 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) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 200 MHz	2.0153 dB
	200 MHz ~1000 MHz	2.0224 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	1.0121 dB
	18 GHz ~ 40 GHz	1.1508 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smartphone
Brand	HTC
Test Model	2PYB200
Status of EUT	Production Unit
Power Supply Rating	5.0 Vdc or 9 Vdc or 12 Vdc (Adapter) 5.0 Vdc (Host equipment) 3.85 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	200.91 mW
Antenna Type	PCB antenna with -1.7 dBi gain
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

- There're 2 configurations for the EUT listed as below.
Main Sample: EUT + Battery 1 + LCM 1
2nd Sample: EUT + Battery 2 + LCM 2
✧ Only the worst test data was presented in the report.
- The EUT provides one completed transmitter and receiver.

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

- The EUT's accessories list refers to Ext. Pho.
- 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	
A	√	√	√	√	Main Sample
B	√	√	√	-	2 nd 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 **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)
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
	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	MCS0
B	802.11n (HT40)	1 to 11	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)
A, B	802.11n (HT40)	1 to 11	9	OFDM	BPSK	MCS0

Power Line Conducted Emission Test:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A, B	802.11n (HT40)	1 to 11	9	OFDM	BPSK	MCS0

Bandedge Measurement:

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

EUT Configure Mode	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	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)
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
	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	Karl Lee
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Karl Lee
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

Duty cycle of test signal is 100 %

Duty cycle of test signal is > 98 %

Duty cycle of test signal is < 98 %

802.11b: Duty cycle of test signal is 100 %

802.11g: Duty cycle = $2.064/2.168 = 0.952$, Duty factor = $10 * \log(1/0.952) = 0.21$

802.11n (HT20): Duty cycle = $1.892/2.020 = 0.937$, Duty factor = $10 * \log(1/0.937) = 0.28$

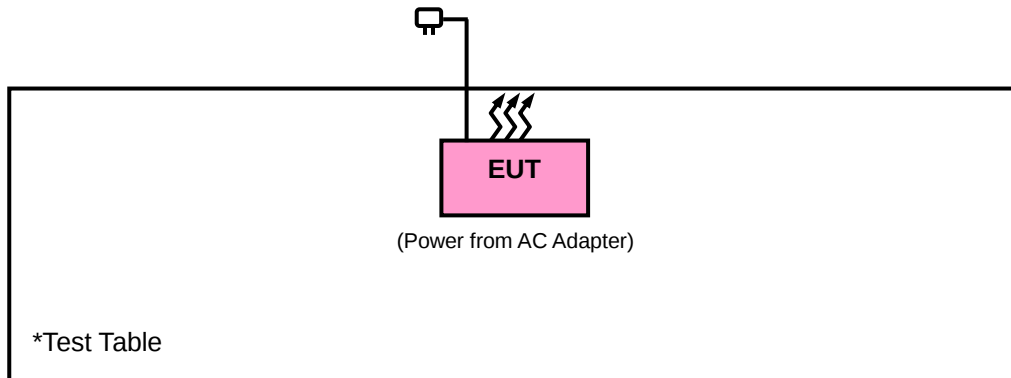
802.11n (HT40): Duty cycle = $941.67/1045.83 = 0.900$, Duty factor = $10 * \log(1/0.900) = 0.46$



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 Technologies	N9038A	MY52260177	Jun. 21, 2016	Jun. 20, 2017
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 ETS-Lindgren	3117	00143293	Jan. 04, 2016	Jan. 03, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 04, 2016	Jan. 03, 2017
Bluetooth Tester	CBT	100980	Apr. 27, 2015	Apr. 26, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
Preamplifier Agilent	310N	187226	Jun. 24, 2016	Jun. 23, 2017
Preamplifier Agilent	83017A	MY39501357	Jun. 24, 2016	Jun. 23, 2017
Power Meter Anritsu	ML2495A	1012010	Aug. 11, 2016	Aug. 10, 2017
Power Sensor Anritsu	MA2411B	1315050	Aug. 11, 2016	Aug. 10, 2017
RF signal cable ETS-LINDGREN	5D-FB	Cable-CH1-01(R FC-SMS-100-SM S-120+RFC-SMS -100-SMS-400)	Jun. 24, 2016	Jun. 23, 2017
RF signal cable ETS-LINDGREN	8D-FB	Cable-CH1-02(R FC-SMS-100-SM S-24)	Jun. 24, 2016	Jun. 23, 2017
Software BV ADT	E3 8.130425b	NA	NA	NA
Antenna Tower MF	NA	NA	NA	NA
Turn Table MF	NA	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 HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC Site Registration No. is 149147.
5. The IC Site Registration No. is IC7450I-1.

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:

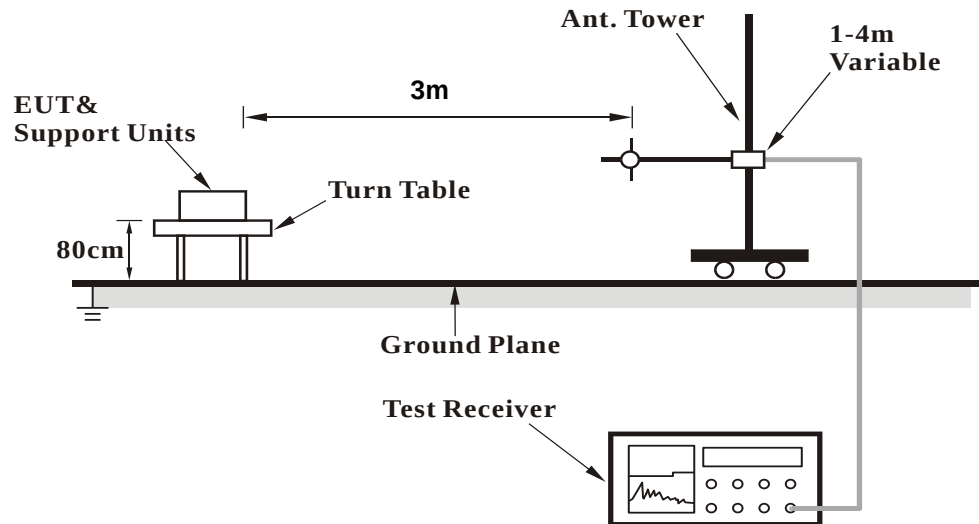
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 KHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency 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

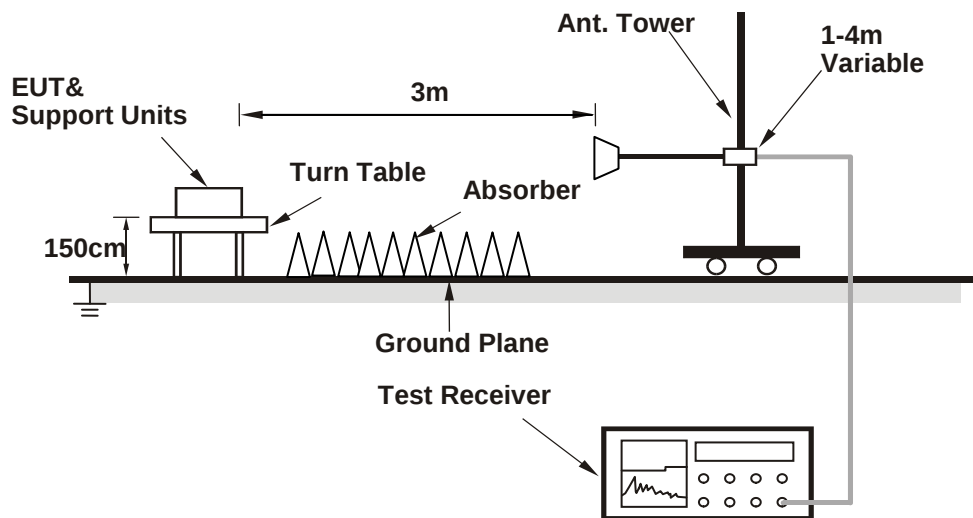
No deviation.

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 :

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	Karl Lee

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
2385.96	56.35	54.64	74	-17.65	31.8	5.4	35.49	109	350	Peak
2387.13	50.09	48.38	54	-3.91	31.8	5.4	35.49	109	350	Average
2412	104.81	103.04			31.81	5.43	35.47	109	350	Average
2412	107.52	105.75			31.81	5.43	35.47	109	350	Peak
4824	39.25	31.12	54	-14.75	33.97	8.26	34.1	163	284	Average
4824	48.34	40.21	74	-25.66	33.97	8.26	34.1	163	284	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
2385.96	53.54	51.83	74	-20.46	31.8	5.4	35.49	218	0	Peak
2387.22	44.65	42.94	54	-9.35	31.8	5.4	35.49	218	0	Average
2412	99.5	97.73			31.81	5.43	35.47	218	0	Average
2412	102.26	100.49			31.81	5.43	35.47	218	0	Peak
4824	38.29	30.16	54	-15.71	33.97	8.26	34.1	114	164	Average
4824	47.74	39.61	74	-26.26	33.97	8.26	34.1	114	164	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	Karl Lee

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
2384.34	51.73	50.04	74	-22.27	31.78	5.4	35.49	108	357	Peak
2389.11	40.94	39.23	54	-13.06	31.8	5.4	35.49	108	357	Average
2437	104.74	102.89			31.85	5.46	35.46	108	357	Average
2437	107.36	105.51			31.85	5.46	35.46	108	357	Peak
2484.16	41.65	39.69	54	-12.35	31.88	5.5	35.42	108	357	Average
2499.52	52.71	50.69	74	-21.29	31.9	5.53	35.41	108	357	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
2388.21	40.62	38.91	54	-13.38	31.8	5.4	35.49	214	0	Average
2388.84	51.56	49.85	74	-22.44	31.8	5.4	35.49	214	0	Peak
2437	100.25	98.4			31.85	5.46	35.46	214	0	Average
2437	102.93	101.08			31.85	5.46	35.46	214	0	Peak
2486.84	41.18	39.19	54	-12.82	31.88	5.53	35.42	214	0	Average
2496.12	53.12	51.1	74	-20.88	31.9	5.53	35.41	214	0	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	Karl Lee

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	102.84	100.91			31.87	5.5	35.44	107	357	Average
2462	105.6	103.67			31.87	5.5	35.44	107	357	Peak
2483.52	50.55	48.59	54	-3.45	31.88	5.5	35.42	107	357	Average
2485.84	56.71	54.72	74	-17.29	31.88	5.53	35.42	107	357	Peak
4924	39.21	30.96	54	-14.79	33.99	8.28	34.02	154	213	Average
4924	48.78	40.53	74	-25.22	33.99	8.28	34.02	154	213	Peak
Antennal Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
2462	97.89	95.96			31.87	5.5	35.44	232	0	Average
2462	100.52	98.59			31.87	5.5	35.44	232	0	Peak
2483.52	44.47	42.51	54	-9.53	31.88	5.5	35.42	232	0	Average
2486.48	54	52.01	74	-20	31.88	5.53	35.42	232	0	Peak
4924	38.54	30.29	54	-15.46	33.99	8.28	34.02	174	116	Average
4924	48.08	39.83	74	-25.92	33.99	8.28	34.02	174	116	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	Karl Lee

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	64.54	62.83	74	-9.46	31.8	5.4	35.49	109	350	Peak
2389.92	53.38	51.65	54	-0.62	31.8	5.4	35.47	109	350	Average
2412	100.51	98.74			31.81	5.43	35.47	109	350	Average
2412	108.35	106.58			31.81	5.43	35.47	109	350	Peak
4824	38.27	30.14	54	-15.73	33.97	8.26	34.1	175	114	Average
4824	47.55	39.42	74	-26.45	33.97	8.26	34.1	175	114	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
2389.29	57.74	56.03	74	-16.26	31.8	5.4	35.49	218	0	Peak
2389.92	46.98	45.25	54	-7.02	31.8	5.4	35.47	218	0	Average
2412	95.64	93.87			31.81	5.43	35.47	218	0	Average
2412	103.52	101.75			31.81	5.43	35.47	218	0	Peak
4824	38.63	30.5	54	-15.37	33.97	8.26	34.1	164	112	Average
4824	48.07	39.94	74	-25.93	33.97	8.26	34.1	164	112	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	Karl Lee

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
2386.5	52.6	50.89	74	-21.4	31.8	5.4	35.49	108	357	Peak
2389.74	42.22	40.51	54	-11.78	31.8	5.4	35.49	108	357	Average
2437	99.87	98.02			31.85	5.46	35.46	108	357	Average
2437	108.14	106.29			31.85	5.46	35.46	108	357	Peak
2484.76	43.35	41.36	54	-10.65	31.88	5.53	35.42	108	357	Average
2486.32	54.2	52.21	74	-19.8	31.88	5.53	35.42	108	357	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
2382.63	52.64	50.95	74	-21.36	31.78	5.4	35.49	214	0	Peak
2388.84	40.92	39.21	54	-13.08	31.8	5.4	35.49	214	0	Average
2437	94.95	93.1			31.85	5.46	35.46	214	0	Average
2437	103.02	101.17			31.85	5.46	35.46	214	0	Peak
2483.52	41.27	39.31	54	-12.73	31.88	5.5	35.42	214	0	Average
2487.16	52.16	50.17	74	-21.84	31.88	5.53	35.42	214	0	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	Karl Lee

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	97.92	95.99			31.87	5.5	35.44	107	357	Average
2462	106	104.07			31.87	5.5	35.44	107	357	Peak
2483.52	51.51	49.55	54	-2.49	31.88	5.5	35.42	107	357	Average
2483.68	64.25	62.29	74	-9.75	31.88	5.5	35.42	107	357	Peak
4924	39.1	30.85	54	-14.9	33.99	8.28	34.02	147	252	Average
4924	47.3	39.05	74	-26.7	33.99	8.28	34.02	147	252	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	92.78	90.85			31.87	5.5	35.44	232	0	Average
2462	100.64	98.71			31.87	5.5	35.44	232	0	Peak
2483.56	45.23	43.27	54	-8.77	31.88	5.5	35.42	232	0	Average
2483.6	57.08	55.12	74	-16.92	31.88	5.5	35.42	232	0	Peak
4924	38.48	30.23	54	-15.52	33.99	8.28	34.02	185	114	Average
4924	48.71	40.46	74	-25.29	33.99	8.28	34.02	185	114	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	Karl Lee

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
2389.83	52.86	51.13	54	-1.14	31.8	5.4	35.47	109	350	Average
2389.83	67.73	66	74	-6.27	31.8	5.4	35.47	109	350	Peak
2412	100.2	98.43			31.81	5.43	35.47	109	350	Average
2412	108.24	106.47			31.81	5.43	35.47	109	350	Peak
4824	38.96	30.83	54	-15.04	33.97	8.26	34.1	169	51	Average
4824	48.09	39.96	74	-25.91	33.97	8.26	34.1	169	51	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
2389.92	47.5	45.77	54	-6.5	31.8	5.4	35.47	218	0	Average
2389.92	61.09	59.36	74	-12.91	31.8	5.4	35.47	218	0	Peak
2412	94.34	92.57			31.81	5.43	35.47	218	0	Average
2412	102.38	100.61			31.81	5.43	35.47	218	0	Peak
4824	39.23	31.1	54	-14.77	33.97	8.26	34.1	135	116	Average
4824	48.02	39.89	74	-25.98	33.97	8.26	34.1	135	116	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	Karl Lee

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
2386.77	53.53	51.82	74	-20.47	31.8	5.4	35.49	108	357	Peak
2389.92	42.25	40.52	54	-11.75	31.8	5.4	35.47	108	357	Average
2437	99.72	97.87			31.85	5.46	35.46	108	357	Average
2437	108.58	106.73			31.85	5.46	35.46	108	357	Peak
2485.72	53.73	51.74	74	-20.27	31.88	5.53	35.42	108	357	Peak
2485.88	43.23	41.24	54	-10.77	31.88	5.53	35.42	108	357	Average
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
2338.98	52.82	51.25	74	-21.18	31.74	5.33	35.5	214	0	Peak
2389.02	40.73	39.02	54	-13.27	31.8	5.4	35.49	214	0	Average
2437	95.27	93.42			31.85	5.46	35.46	214	0	Average
2437	104.11	102.26			31.85	5.46	35.46	214	0	Peak
2485.12	41.58	39.59	54	-12.42	31.88	5.53	35.42	214	0	Average
2499.08	53.17	51.15	74	-20.83	31.9	5.53	35.41	214	0	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	Karl Lee

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	94.01	92.08			31.87	5.5	35.44	270	312	Average
2462	101.76	99.83			31.87	5.5	35.44	270	312	Peak
2483.56	51.41	49.45	54	-2.59	31.88	5.5	35.42	270	312	Average
2484.16	65.73	63.77	74	-8.27	31.88	5.5	35.42	270	312	Peak
4924	38.54	30.29	54	-15.46	33.99	8.28	34.02	152	262	Average
4924	47.01	38.76	74	-26.99	33.99	8.28	34.02	152	262	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	88.76	86.83			31.87	5.5	35.44	271	326	Average
2462	96.65	94.72			31.87	5.5	35.44	271	326	Peak
2483.56	47.13	45.17	54	-6.87	31.88	5.5	35.42	271	326	Average
2485.04	60.78	58.79	74	-13.22	31.88	5.53	35.42	271	326	Peak
4924	39.51	31.26	54	-14.49	33.99	8.28	34.02	147	154	Average
4924	47.33	39.08	74	-26.67	33.99	8.28	34.02	147	154	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	Karl Lee

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
2389.83	61.28	59.55	74	-12.72	31.8	5.4	35.47	278	314	Peak
2389.912	51.11	49.38	54	-2.89	31.8	5.4	35.47	278	314	Average
2422	91.52	89.72			31.83	5.43	35.46	278	314	Average
2422	99.46	97.66			31.83	5.43	35.46	278	314	Peak
2484.08	41.23	39.27	54	-12.77	31.88	5.5	35.42	278	314	Average
2499.36	52.01	49.99	74	-21.99	31.9	5.53	35.41	278	314	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
2389.74	44.68	42.97	54	-9.32	31.8	5.4	35.49	287	326	Average
2389.92	55.05	53.32	74	-18.95	31.8	5.4	35.47	287	326	Peak
2422	84.46	82.66			31.83	5.43	35.46	287	326	Average
2422	93.07	91.27			31.83	5.43	35.46	287	326	Peak
2494.96	40.88	38.86	54	-13.12	31.9	5.53	35.41	287	326	Average
2495.72	51.93	49.91	74	-22.07	31.9	5.53	35.41	287	326	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	Karl Lee

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
2389.47	64.37	62.66	74	-9.63	31.8	5.4	35.49	108	357	Peak
2389.92	51.94	50.21	54	-2.06	31.8	5.4	35.47	108	357	Average
2437	98.57	96.72			31.85	5.46	35.46	108	357	Average
2437	107.14	105.29			31.85	5.46	35.46	108	357	Peak
2483.6	60.76	58.8	74	-13.24	31.88	5.5	35.42	108	357	Peak
2484.04	48.25	46.29	54	-5.75	31.88	5.5	35.42	108	357	Average
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	58.34	56.61	74	-15.66	31.8	5.4	35.47	214	0	Peak
2389.92	45.82	44.09	54	-8.18	31.8	5.4	35.47	214	0	Average
2437	93.72	91.87			31.85	5.46	35.46	214	0	Average
2437	102.27	100.42			31.85	5.46	35.46	214	0	Peak
2482.04	48.21	46.25	54	-5.79	31.88	5.5	35.42	214	0	Average
2484.48	59.64	57.65	74	-14.36	31.88	5.53	35.42	214	0	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	Karl Lee

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
2381.46	51.35	49.66	74	-22.65	31.78	5.4	35.49	270	312	Peak
2389.29	40.75	39.04	54	-13.25	31.8	5.4	35.49	270	312	Average
2452	91.6	89.73			31.85	5.46	35.44	270	312	Average
2452	100.42	98.55			31.85	5.46	35.44	270	312	Peak
2484.36	66.59	64.6	74	-7.41	31.88	5.53	35.42	270	312	Peak
2485.24	53.83	51.84	54	-0.17	31.88	5.53	35.42	270	312	Average
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
2378.13	51.19	49.53	74	-22.81	31.78	5.37	35.49	271	326	Peak
2385.24	40.32	38.63	54	-13.68	31.78	5.4	35.49	271	326	Average
2452	85.87	84			31.85	5.46	35.44	271	326	Average
2452	93.66	91.79			31.85	5.46	35.44	271	326	Peak
2483.8	49.46	47.5	54	-4.54	31.88	5.5	35.42	271	326	Average
2484.12	60.84	58.88	74	-13.16	31.88	5.5	35.42	271	326	Peak

Remarks:

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

Mode B

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	Karl Lee

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
2386.05	52.75	51.04	74	-21.25	31.8	5.4	35.49	122	348	Peak
2389.92	42.88	41.15	54	-11.12	31.8	5.4	35.47	122	348	Average
2452	95.9	94.03			31.85	5.46	35.44	122	348	Average
2452	103.77	101.9			31.85	5.46	35.44	122	348	Peak
2483.56	52.55	50.59	54	-1.45	31.88	5.5	35.42	122	348	Average
2483.56	66.61	64.65	74	-7.39	31.88	5.5	35.42	122	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
2335.74	51.12	49.57	74	-22.88	31.74	5.33	35.52	271	20	Peak
2388.75	40.44	38.73	54	-13.56	31.8	5.4	35.49	271	20	Average
2452	90.79	88.92			31.85	5.46	35.44	271	20	Average
2452	98.32	96.45			31.85	5.46	35.44	271	20	Peak
2483.52	50.63	48.67	54	-3.37	31.88	5.5	35.42	271	20	Average
2483.88	61.92	59.96	74	-12.08	31.88	5.5	35.42	271	20	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:

Mode A

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 9	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	Karl Lee

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
84.81	21.82	44.03	40	-18.18	8.64	1.11	31.96	141	156	Peak
169.86	32.87	53.59	43.5	-10.63	10	1.52	32.24	136	117	Peak
218.19	30.03	48.97	46	-15.97	11.63	1.65	32.22	191	178	Peak
453.3	17.99	29.55	46	-28.01	18.09	2.49	32.14	151	184	Peak
596.1	22.11	30.45	46	-23.89	20.98	2.87	32.19	102	136	Peak
799.8	25.99	30.13	46	-20.01	24.6	3.32	32.06	124	155	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
68.07	19.36	42.81	40	-20.64	7.87	0.9	32.22	136	221	Peak
159.87	23.69	43.64	43.5	-19.81	10.8	1.52	32.27	125	166	Peak
242.76	26.33	43.9	46	-19.67	12.71	1.85	32.13	158	114	Peak
393.8	17.65	29.87	46	-28.35	17.65	2.34	32.21	166	142	Peak
677.3	24.27	29.98	46	-21.73	23.36	3.05	32.12	102	114	Peak
800.5	26.23	30.37	46	-19.77	24.6	3.32	32.06	114	174	Peak

Remarks:

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

Mode B

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 9	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	Karl Lee

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
149.07	26.87	47.58	43.5	-16.63	10.04	1.52	32.27	107	349	Peak
164.46	28.46	48.76	43.5	-15.04	10.44	1.52	32.26	185	227	Peak
257.61	24.8	41.75	46	-21.2	13.21	1.94	32.1	150	340	Peak
552	22.27	31.44	46	-23.73	20.27	2.76	32.2	199	73	Peak
687.8	25.02	30.84	46	-20.98	23.23	3.05	32.1	122	248	Peak
776.7	25.42	30.75	46	-20.58	23.5	3.27	32.1	175	341	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
156.63	26.17	46.35	43.5	-17.33	10.57	1.52	32.27	172	113	Peak
164.73	27.97	48.27	43.5	-15.53	10.44	1.52	32.26	160	130	Peak
254.37	20.09	37.13	46	-25.91	13.12	1.94	32.1	124	200	Peak
544.3	20.81	29.85	46	-25.19	20.39	2.76	32.19	154	208	Peak
673.8	24.41	30.08	46	-21.59	23.4	3.05	32.12	140	46	Peak
804.7	26.06	30.39	46	-19.94	24.38	3.32	32.03	131	114	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 ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
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

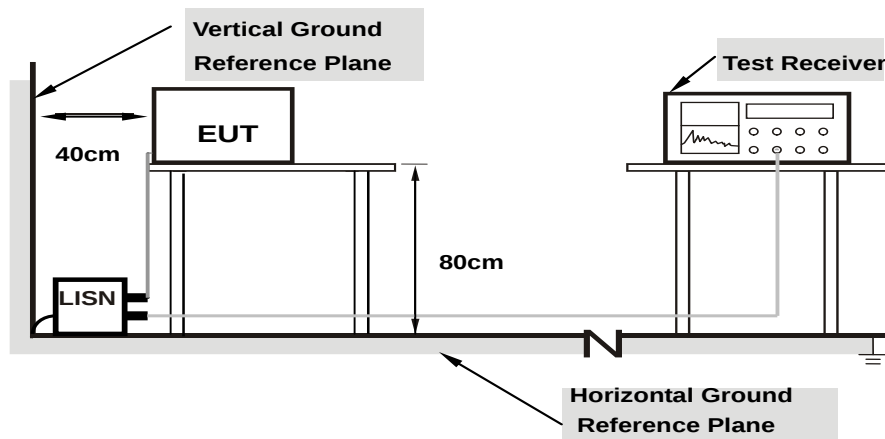
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance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

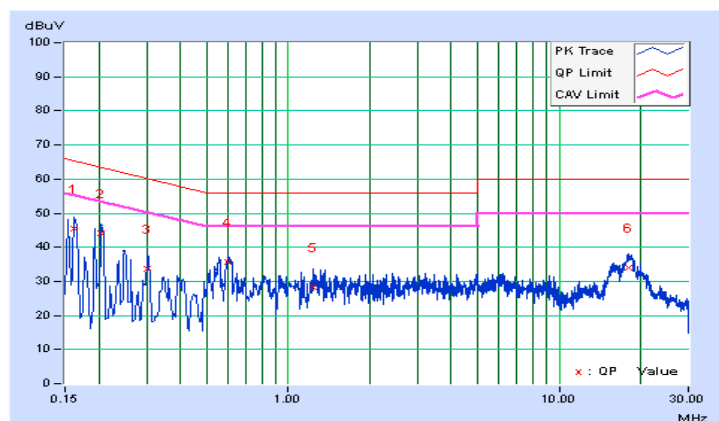
Mode A

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	2016/9/6

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	0.16181	10.02	35.59	20.56	45.61	30.58	65.37	55.37	-19.76	-24.79
2	0.20474	10.03	34.17	20.84	44.20	30.87	63.42	53.42	-19.22	-22.55
3	0.30294	10.08	23.68	14.59	33.76	24.67	60.16	50.16	-26.40	-25.49
4	0.59965	10.15	25.65	17.47	35.80	27.62	56.00	46.00	-20.20	-18.38
5	1.23307	10.22	18.17	8.73	28.39	18.95	56.00	46.00	-27.61	-27.05
6	17.94441	11.22	22.82	15.71	34.04	26.93	60.00	50.00	-25.96	-23.07

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

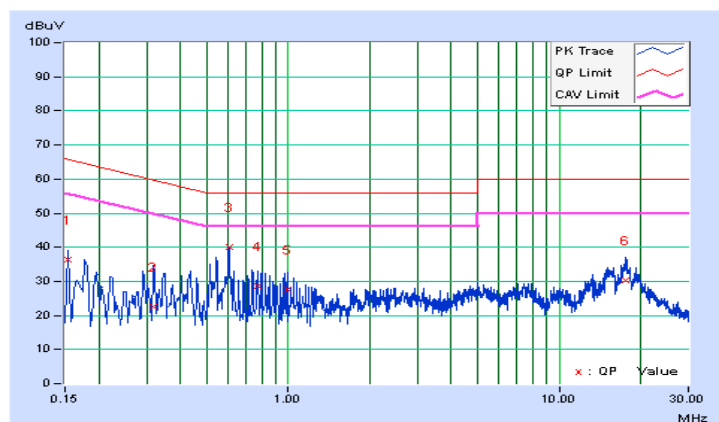


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Toby Tian	Test Date	2016/9/6

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	26.50	13.51	36.53	23.54	65.79	55.79	-29.26	-32.25
2	0.31849	10.09	12.46	3.45	22.55	13.54	59.75	49.75	-37.20	-36.21
3	0.60356	10.16	29.74	13.38	39.90	23.54	56.00	46.00	-16.10	-22.46
4	0.76789	10.18	18.31	5.10	28.49	15.28	56.00	46.00	-27.51	-30.72
5	0.99065	10.21	17.36	3.85	27.57	14.06	56.00	46.00	-28.43	-31.94
6	17.51040	11.30	19.10	13.25	30.40	24.55	60.00	50.00	-29.60	-25.45

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



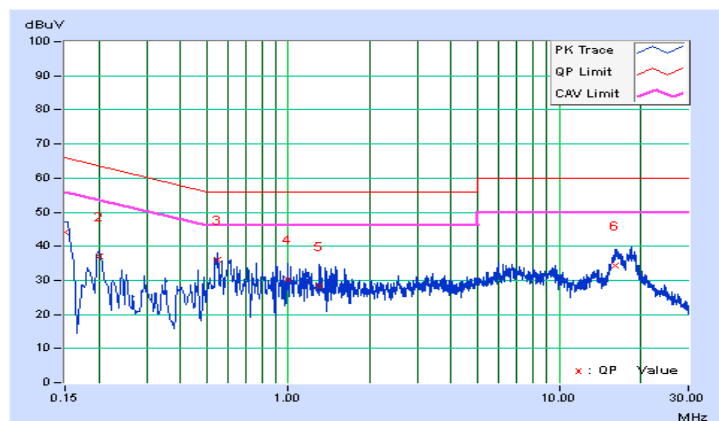
Mode B

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	2016/9/10

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.01	33.93	21.40	43.94	31.41	66.00	56.00	-22.06	-24.59
2	0.20031	10.03	26.90	17.34	36.93	27.37	63.60	53.60	-26.67	-26.23
3	0.54882	10.14	25.91	16.41	36.05	26.55	56.00	46.00	-19.95	-19.45
4	0.99847	10.20	19.95	6.31	30.15	16.51	56.00	46.00	-25.85	-29.49
5	1.30345	10.22	18.17	6.60	28.39	16.82	56.00	46.00	-27.61	-29.18
6	16.09107	11.09	23.37	16.77	34.46	27.86	60.00	50.00	-25.54	-22.14

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

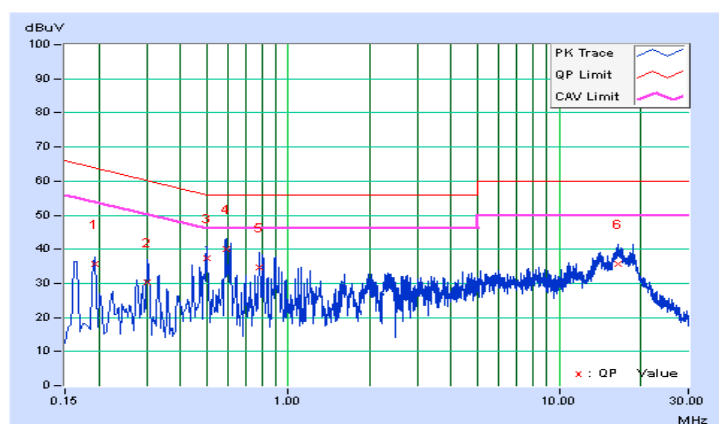


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Toby Tian	Test Date	2016/9/10

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	0.19305	10.04	25.60	9.65	35.64	19.69	63.90	53.90	-28.26	-34.21
2	0.30294	10.09	20.17	15.45	30.26	25.54	60.16	50.16	-29.90	-24.62
3	0.49846	10.14	27.19	16.35	37.33	26.49	56.03	46.03	-18.70	-19.54
4	0.58792	10.16	29.93	19.66	40.09	29.82	56.00	46.00	-15.91	-16.18
5	0.78013	10.18	24.66	7.29	34.84	17.47	56.00	46.00	-21.16	-28.53
6	16.41951	11.22	24.44	18.33	35.66	29.55	60.00	50.00	-24.34	-20.45

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

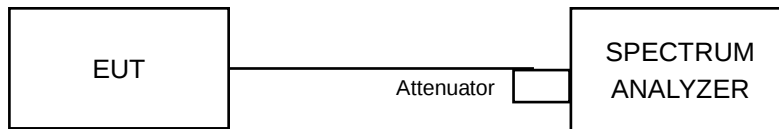


4.3 6 dB Bandwidth Measurement

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	8.08	0.5	Pass
6	2437	7.59	0.5	Pass
11	2462	8.55	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	16.36	0.5	Pass
11	2462	15.75	0.5	Pass

802.11n (HT20)

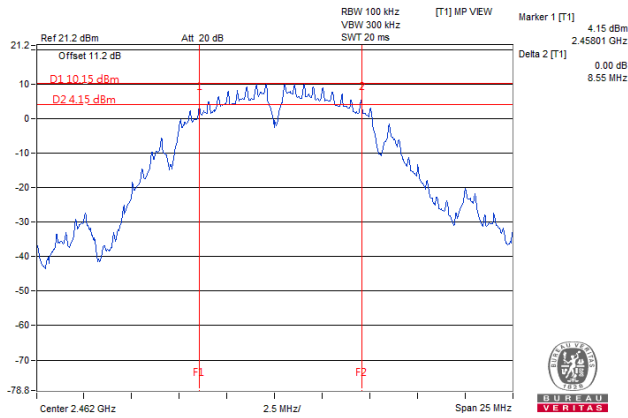
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
1	2412	17.64	0.5	Pass
6	2437	17.59	0.5	Pass
11	2462	16.40	0.5	Pass

802.11n (HT40)

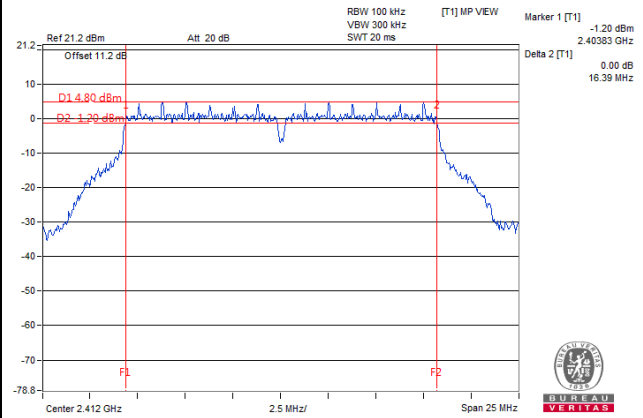
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
3	2422	35.99	0.5	Pass
6	2437	35.50	0.5	Pass
9	2452	36.10	0.5	Pass

Spectrum Plot of Worst Value

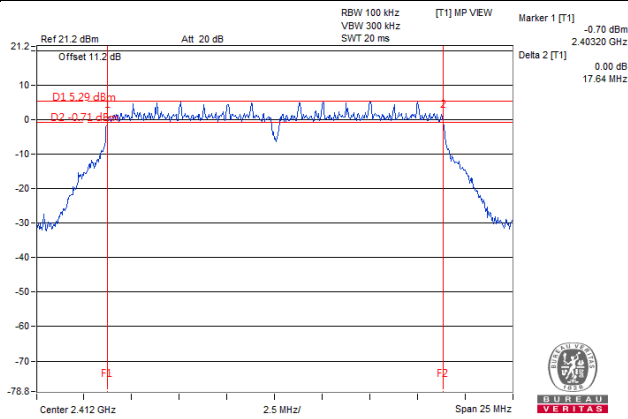
802.11b



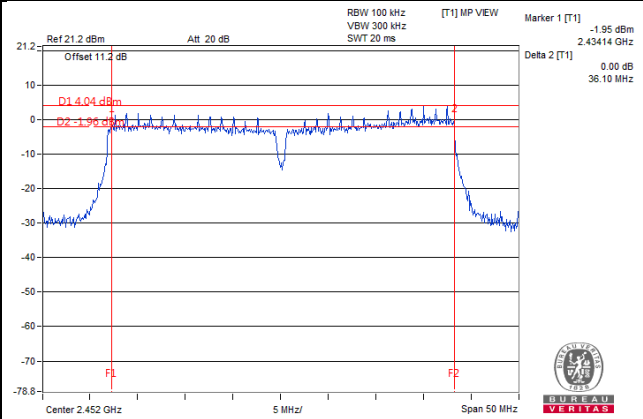
802.11g



802.11n (HT20)



802.11n (HT40)

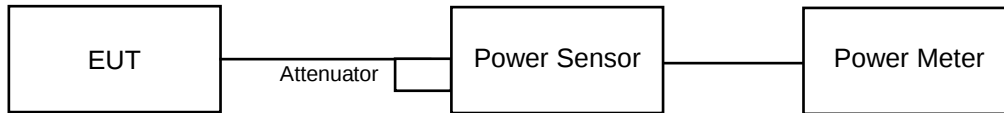


4.4 Conducted Output Power Measurement

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	129.72	21.13	30	Pass
6	2437	140.60	21.48	30	Pass
11	2462	131.52	21.19	30	Pass

802.11g

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	168.66	22.27	30	Pass
6	2437	191.87	22.83	30	Pass
11	2462	187.07	22.72	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
1	2412	187.93	22.74	30	Pass
6	2437	179.89	22.55	30	Pass
11	2462	190.99	22.81	30	Pass

802.11n (HT40)

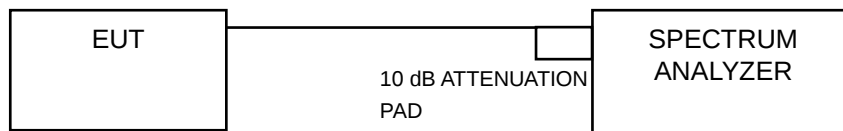
Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass / Fail
3	2422	198.15	22.97	30	Pass
6	2437	188.36	22.75	30	Pass
9	2452	200.91	23.03	30	Pass

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	-3.65	8	Pass
6	2437	-3.34	8	Pass
11	2462	-3.72	8	Pass

802.11g

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-9.62	8	Pass
6	2437	-8.87	8	Pass
11	2462	-9.52	8	Pass

802.11n (HT20)

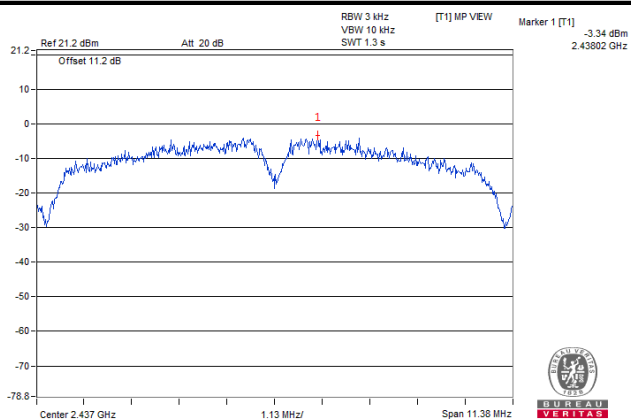
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
1	2412	-10.15	8	Pass
6	2437	-9.50	8	Pass
11	2462	-9.29	8	Pass

802.11n (HT40)

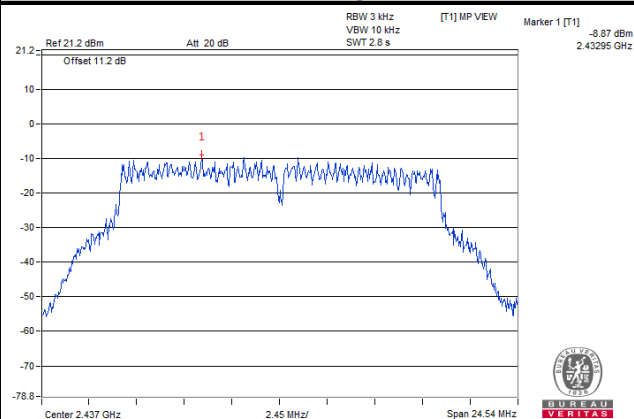
Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Pass / Fail
3	2422	-12.07	8	Pass
6	2437	-12.14	8	Pass
9	2452	-12.56	8	Pass

Spectrum Plot of Worst Value

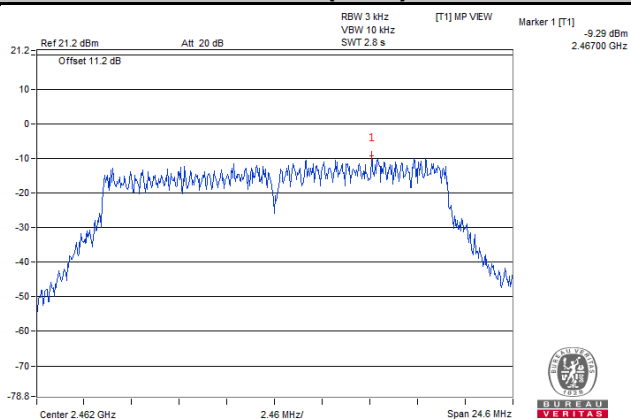
802.11b



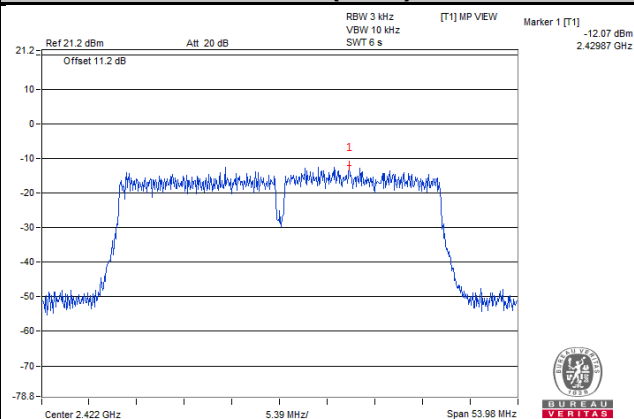
802.11g



802.11n (HT20)



802.11n (HT40)

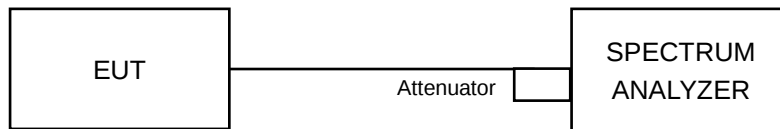


4.6 Conducted Out of Band Emission Measurement

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.

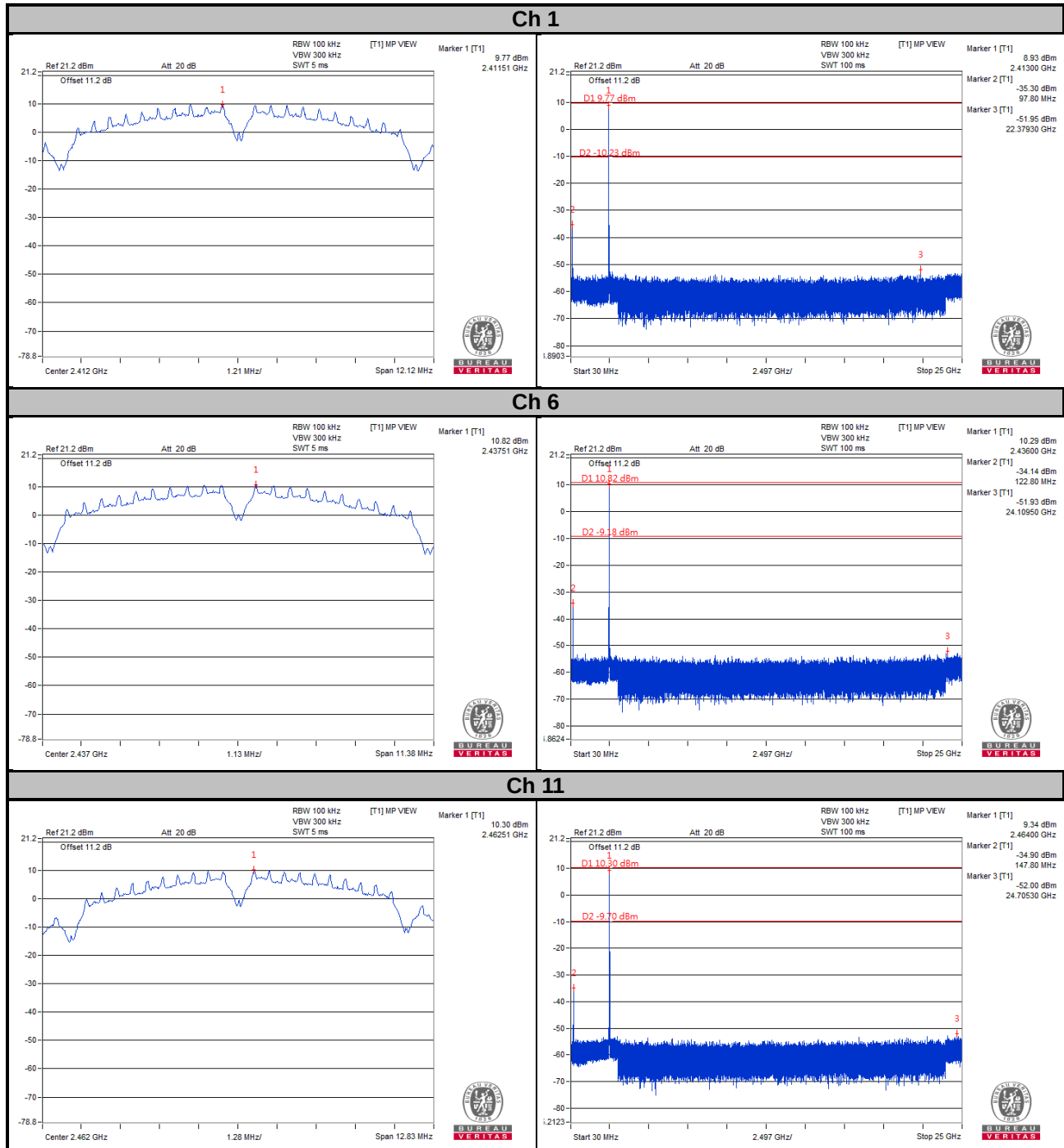
4.6.6 EUT Operating Condition

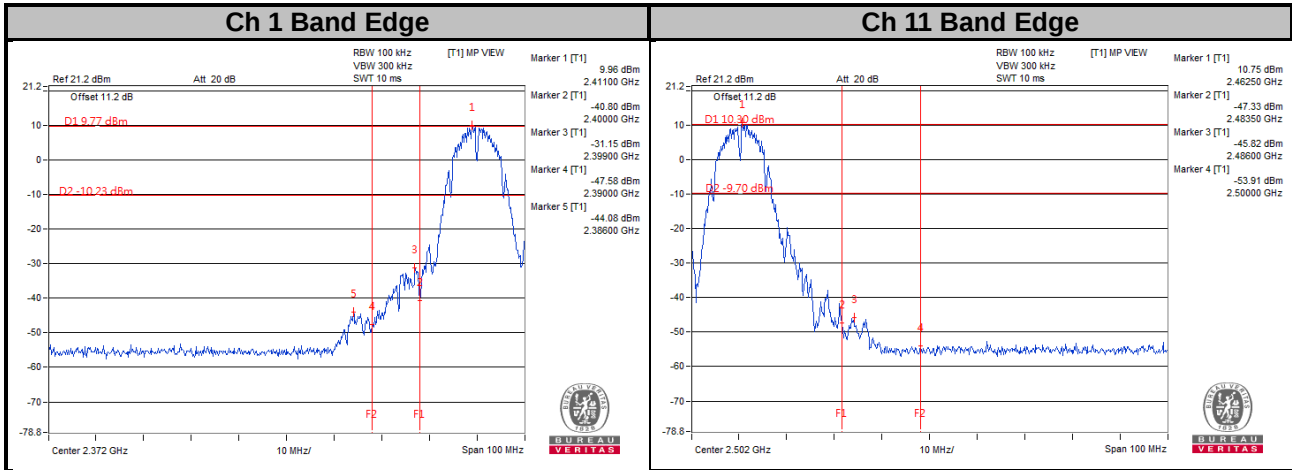
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

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.

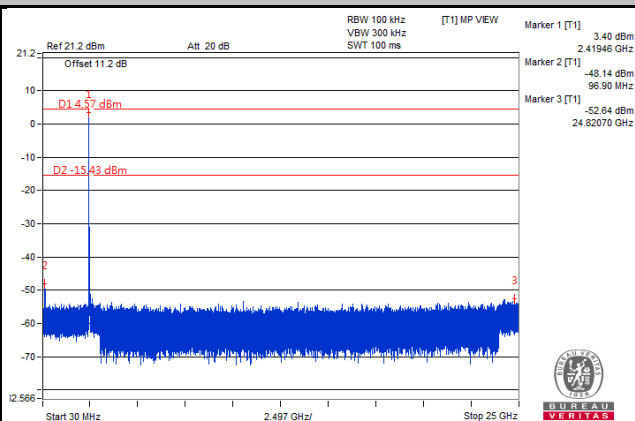
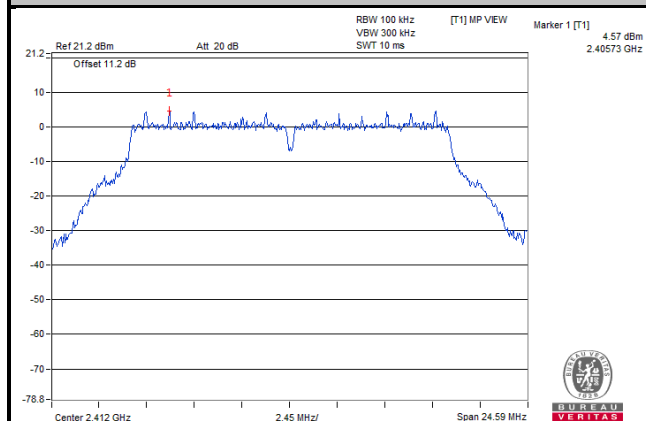
802.11b



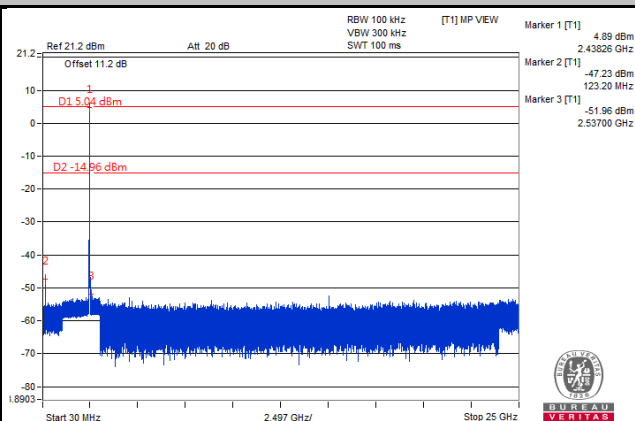
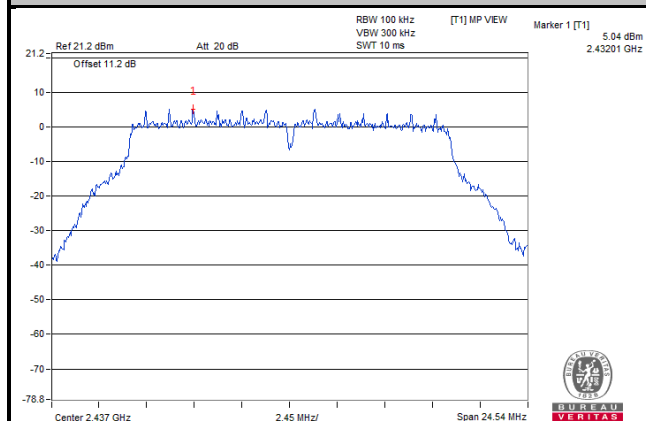


802.11g

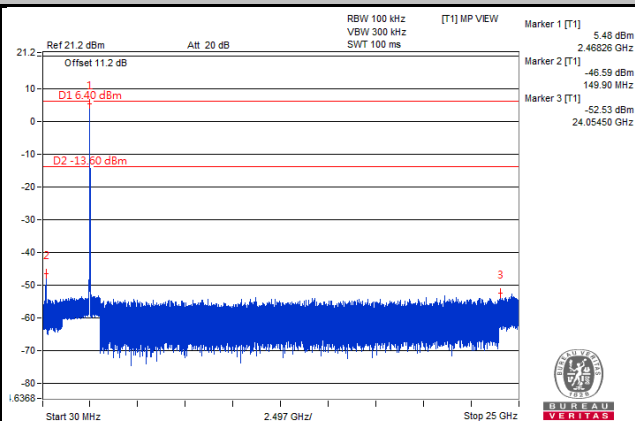
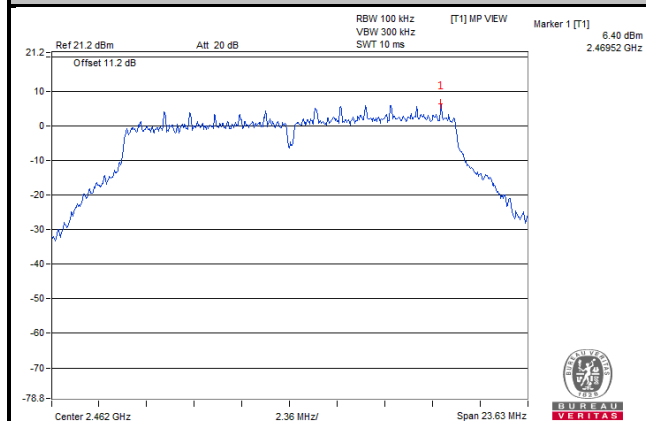
Ch 1

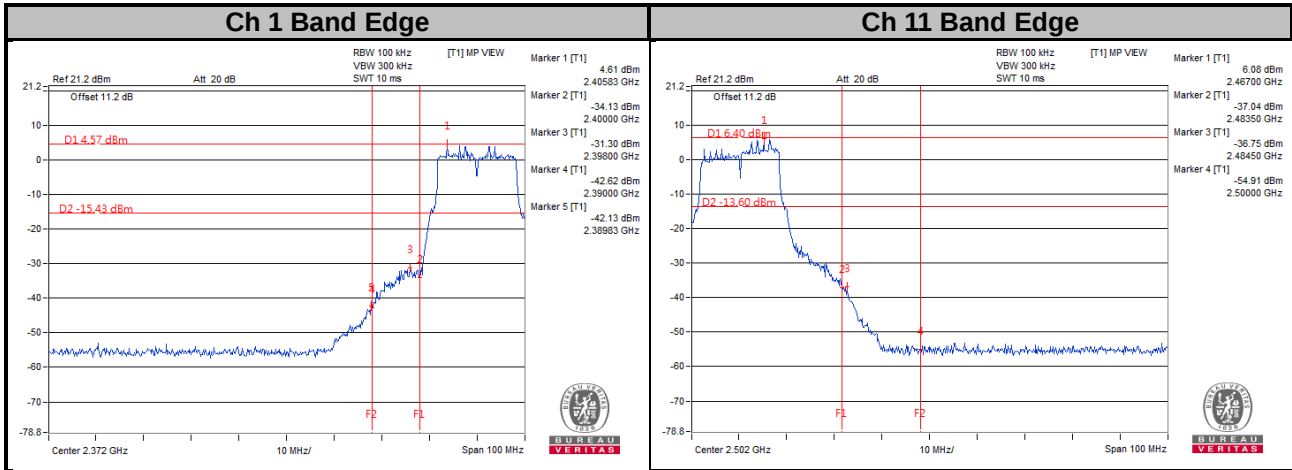


Ch 6



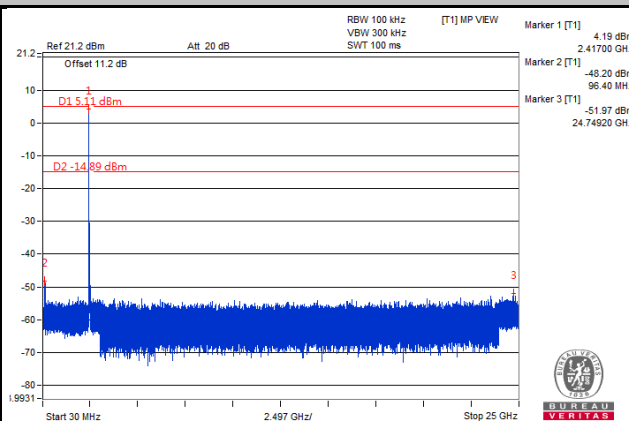
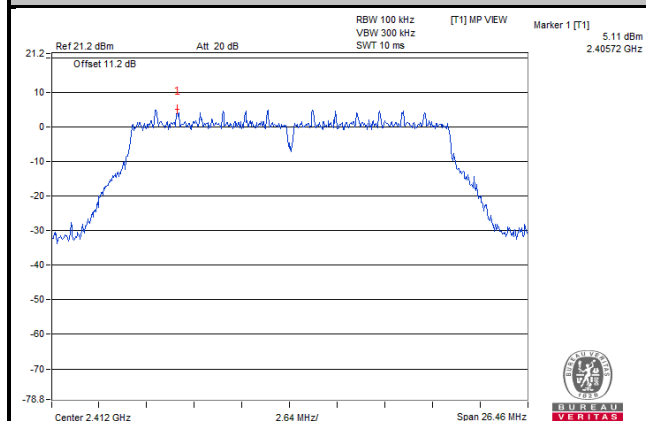
Ch 11



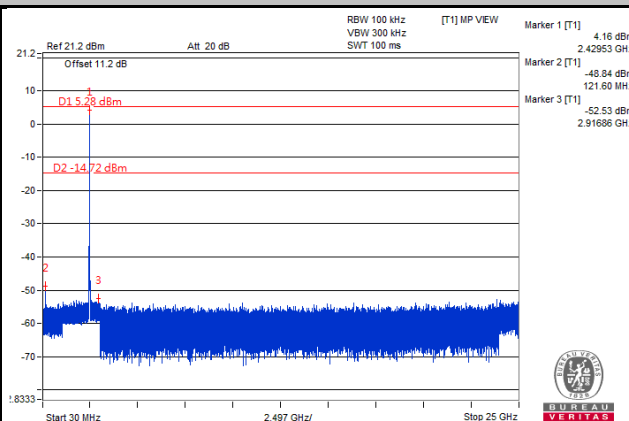
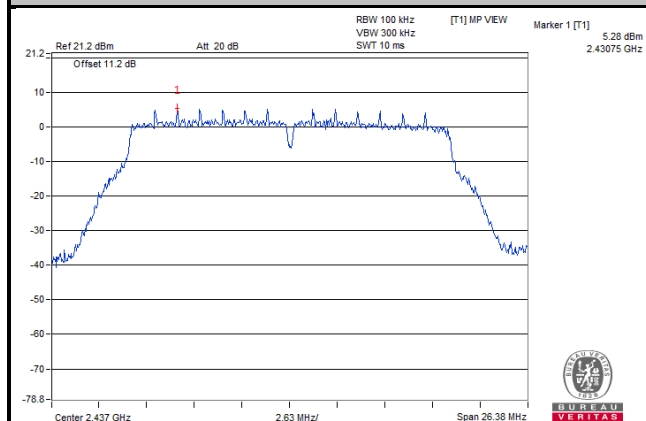


802.11n (HT20)

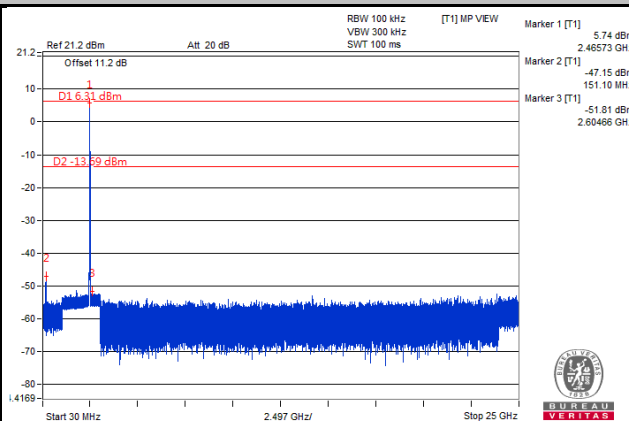
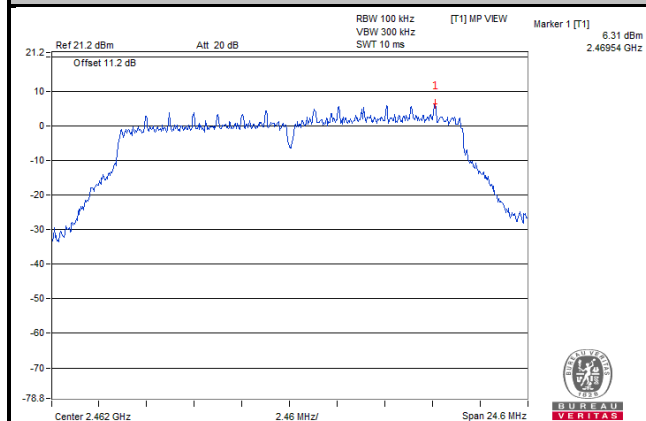
Ch 1

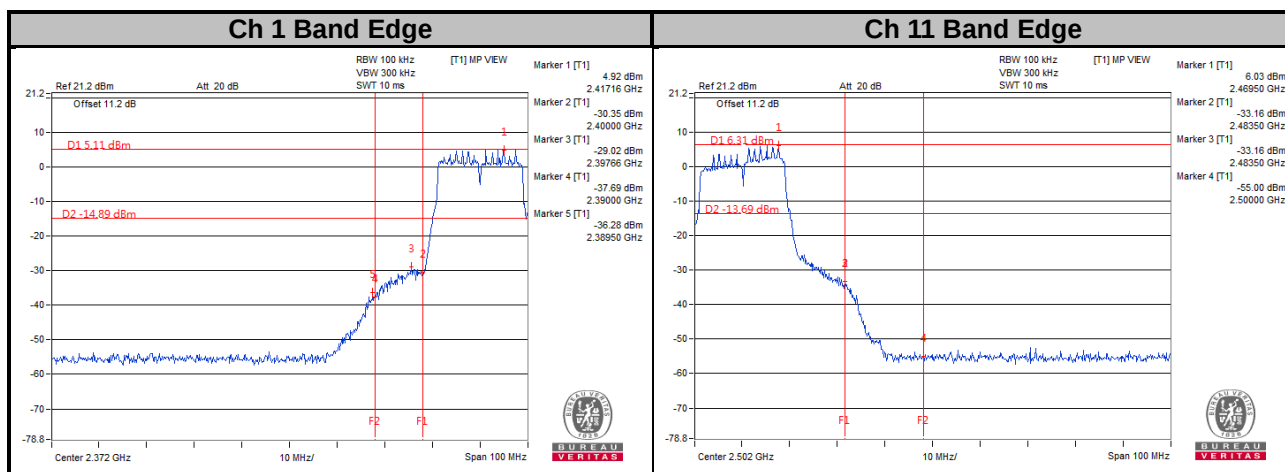


Ch 6



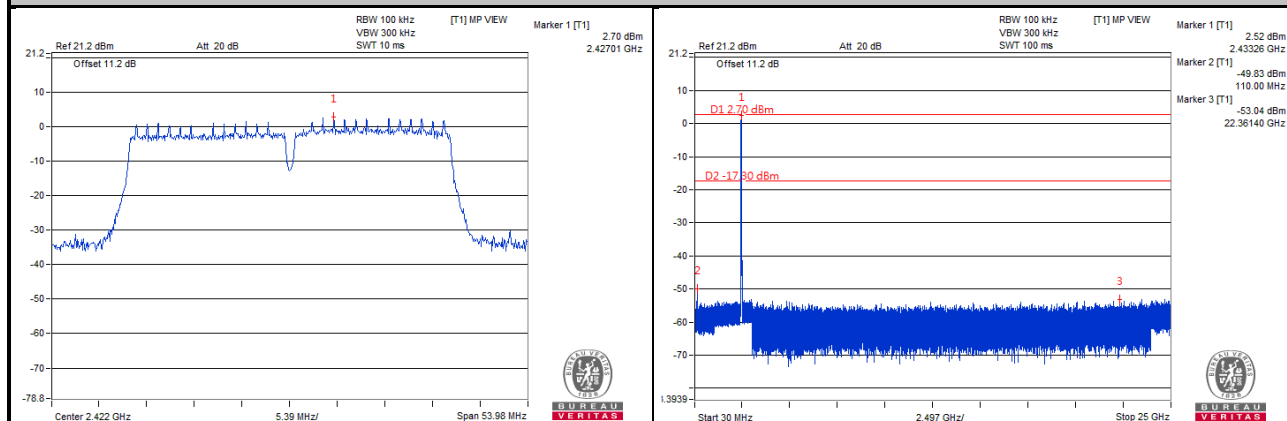
Ch 11



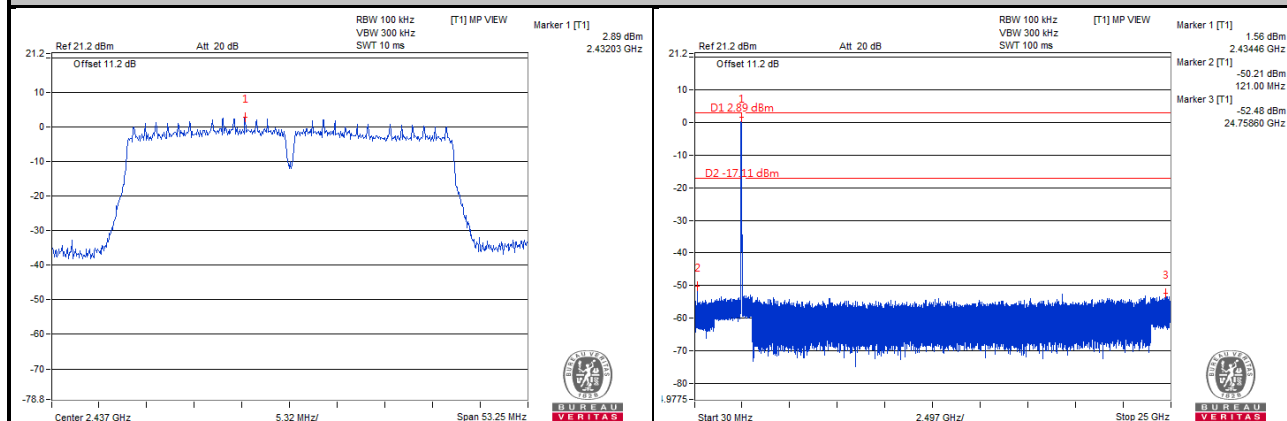


802.11n (HT40)

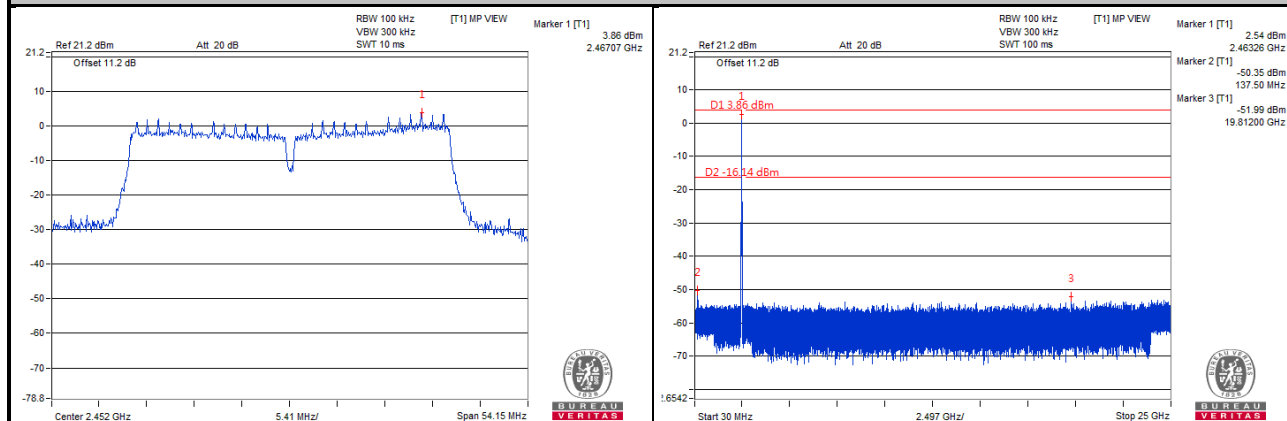
Ch 3

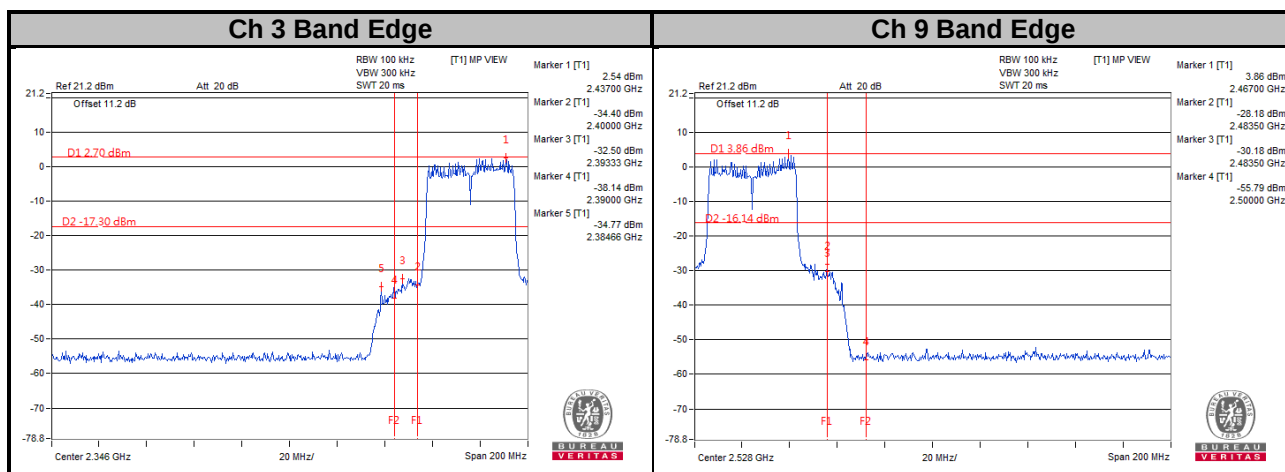


Ch 6



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.

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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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