

FCC TEST REPORT (15.247)

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MODEL NO.: 0P3P510
FCC ID: NM80P3P510
RECEIVED: Aug. 05, 2013
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ISSUED: Sep. 03, 2013

APPLICANT: HTC Corporation

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Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130805C29-4	Original release	Sep. 03, 2013

1. CERTIFICATION

PRODUCT: Smartphone

MODEL NO.: 0P3P510

BRAND: HTC

APPLICANT: HTC Corporation

TESTED: Aug. 29, 2013 ~ Aug. 31, 2013

TEST SAMPLE: Production Unit

STANDARDS: FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10-2009

The above equipment (model: 0P3P510) 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 : Vera Huang , **DATE** : Sep. 03, 2013
Vera Huang / Specialist

APPROVED BY : Sam chen , **DATE** : Sep. 03, 2013
Sam Chen / Assistant Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -5.26dB at 13.56250MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1dB at 2390MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	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 as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Smartphone
MODEL NO.	0P3P510
POWER SUPPLY	5.0Vdc (adapter or host equipment) 3.8Vdc (Li-ion battery)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7 802.11ac: up to V9
OPERATING FREQUENCY	2.4GHz: 2412 ~ 2462MHz 5.0GHz: 5745 ~ 5805MHz
NUMBER OF CHANNEL	2.4GHz: 11 for 802.11b, 802.11g, 802.11n (20MHz) 5.0GHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz)
OUTPUT POWER	232.274mW for 2412 ~ 2462MHz 304.789mW for 5745 ~ 5805MHz
ANTENNA TYPE	2.4GHz: PIFA antenna with -3.9dBi gain 5.0GHz: PIFA antenna with -6.3dBi gain
ANTENNA CONNECTOR	NA
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

NOTE:

1. The EUT's accessories list refers to Ext. Pho.
2. The above EUT information is declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

FOR 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

FOR 5.0GHz (5745 ~ 5805MHz):

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	157	5785MHz
153	5765MHz	161	5805MHz

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY
155	5775MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

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.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0

RADIATED EMISSION TEST (BELOW 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (20MHz)	1 to 11	11	OFDM	BPSK	MCS0

POWER LINE CONDUCTED EMISSION TEST:

The EUT was tested with the following mode.

TEST CONDITION
BT Link + WLAN (2.4G) Link + NFC Link + USB Cable + Adapter + Earphone

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
802.11n (20MHz)	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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	MCS0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
PLC	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao

FOR 5.0GHz (5745 ~ 5805MHz):

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

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 Y-plane.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 161	149, 157, 161	OFDM	BPSK	6.0
802.11n (20MHz)	149 to 161	149, 157, 161	OFDM	BPSK	MCS0
802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	MCS0
802.11ac (80MHz)	155	155	OFDM	BPSK	V0

RADIATED EMISSION TEST (BELOW 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (20MHz)	149 to 161	157	OFDM	BPSK	MCS0

POWER LINE CONDUCTED EMISSION TEST:

The EUT was tested with the following mode.

TEST CONDITION
BT Link + WLAN (5G) Link + NFC Link + USB Cable + Adapter + Earphone

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 161	149, 161	OFDM	BPSK	6.0
802.11n (20MHz)	149 to 161	149, 161	OFDM	BPSK	MCS0
802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	MCS0
802.11ac (80MHz)	155	155	OFDM	BPSK	V0

ANTENNA PORT CONDUCTED 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	149 to 161	149, 157, 161	OFDM	BPSK	6.0
802.11n (20MHz)	149 to 161	149, 157, 161	OFDM	BPSK	MCS0
802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	MCS0
802.11ac (80MHz)	155	155	OFDM	BPSK	V0

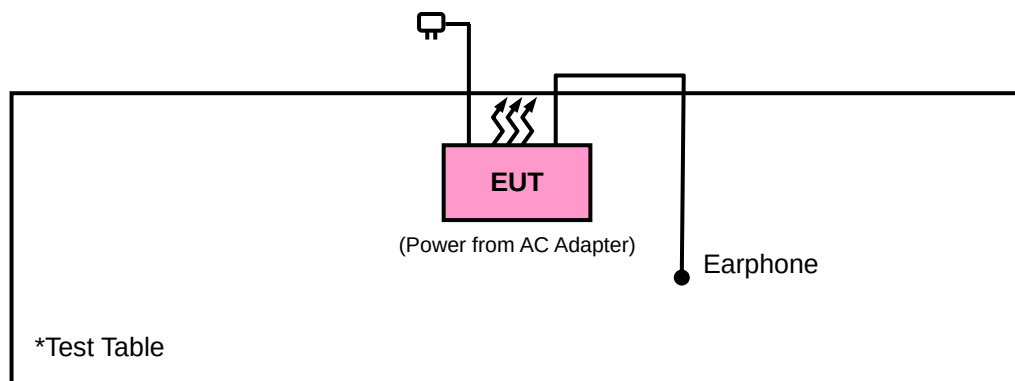
TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
PLC	25deg. C, 65%RH	120Vac, 60Hz	Johnson Liao
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao

3.3 DESCRIPTION OF SUPPORT UNITS

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

3.3.1 CONFIGURATION OF SYSTEM UNDER TEST



3.4 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)

ANSI C63.10-2009

KDB 558074 D01 DTS Meas Guidance v02

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It 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 (FOR 2.4GHz BAND)

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100744	Apr. 15, 2013	Apr. 14, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2012	Dec. 16, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 07, 2013	Jan. 06, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 25, 2012	Dec. 24, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 184045	980116	Dec. 28, 2012	Dec. 27, 2013
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2012	Dec. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 19, 2012	Oct. 18, 2013
RF signal cable Worken	RG-213	NA	Dec. 29, 2012	Dec. 28, 2013
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
Power Meter	ML2495A	1012010	Jul. 31, 2013	Jul. 30, 2014
Power Sensor	MA2411B	1315050	Jul. 31, 2013	Jul. 30, 2014

- 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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 10.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 690701.
6. The IC Site Registration No. is IC 7450F-10.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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. Height of receiving 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

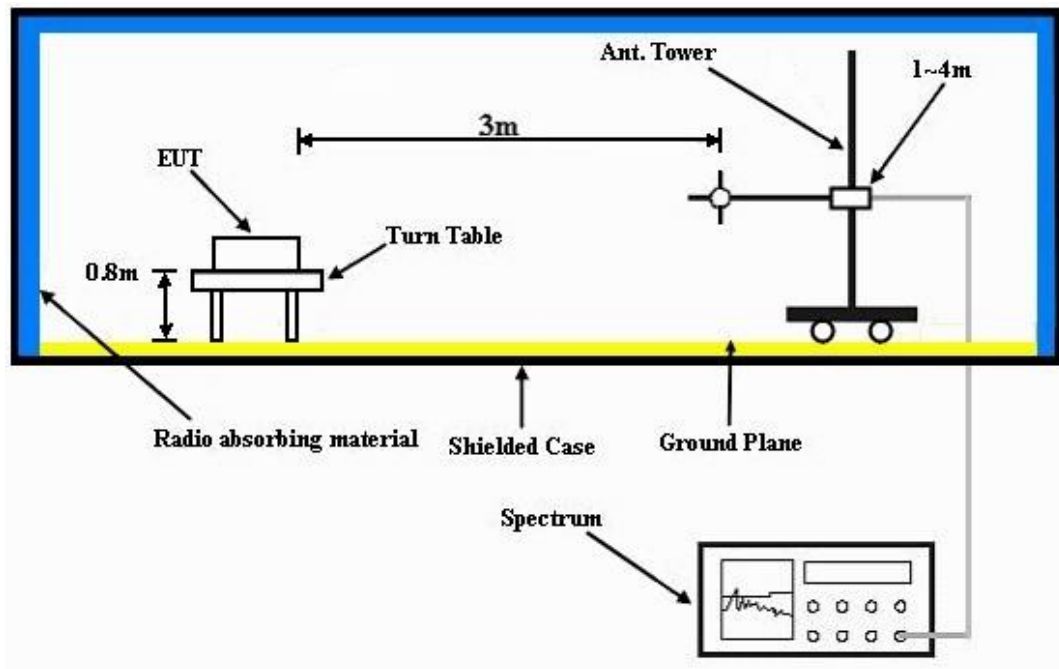
NOTE:

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



For 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 1GHz WORST-CASE DATA

802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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	50.13	57.2	54	-3.87	26.91	3.54	37.52	107	35	Average
2390	57.5	64.57	74	-16.5	26.91	3.54	37.52	107	35	Peak
2412	102.08	109.1			26.96	3.54	37.52	107	35	Average
2412	105.44	112.46			26.96	3.54	37.52	107	35	Peak
2494	34.97	41.4	54	-19.03	27.2	3.62	37.25	107	35	Average
2494	50.95	57.38	74	-23.05	27.2	3.62	37.25	107	35	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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	43.53	50.6	54	-10.47	26.91	3.54	37.52	119	313	Average
2390	53.46	60.53	74	-20.54	26.91	3.54	37.52	119	313	Peak
2412	94.95	101.97			26.96	3.54	37.52	119	313	Average
2412	98.12	105.14			26.96	3.54	37.52	119	313	Peak
2496	34.38	40.81	54	-19.62	27.2	3.62	37.25	119	313	Average
2496	50.6	57.03	74	-23.4	27.2	3.62	37.25	119	313	Peak

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
2380	39.38	46.5	54	-14.62	26.86	3.52	37.5	105	38	Average
2380	52.58	59.7	74	-21.42	26.86	3.52	37.5	105	38	Peak
2437	100.12	106.96			27.06	3.56	37.46	105	38	Average
2437	103.83	110.67			27.06	3.56	37.46	105	38	Peak
2494	37.59	44.02	54	-16.41	27.2	3.62	37.25	105	38	Average
2494	51.37	57.8	74	-22.63	27.2	3.62	37.25	105	38	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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	35.8	42.92	54	-18.2	26.86	3.52	37.5	100	313	Average
2382	50.52	57.64	74	-23.48	26.86	3.52	37.5	100	313	Peak
2437	92.83	99.67			27.06	3.56	37.46	100	313	Average
2437	96.48	103.32			27.06	3.56	37.46	100	313	Peak
2486	34.92	41.49	54	-19.08	27.15	3.6	37.32	100	313	Average
2486	50.87	57.44	74	-23.13	27.15	3.6	37.32	100	313	Peak

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
2376	34.77	41.89	54	-19.23	26.86	3.52	37.5	103	37	Average
2376	50.22	57.34	74	-23.78	26.86	3.52	37.5	103	37	Peak
2462	98.95	105.66			27.1	3.58	37.39	103	37	Average
2462	102.54	109.25			27.1	3.58	37.39	103	37	Peak
2498	40.11	46.54	54	-13.89	27.2	3.62	37.25	103	37	Average
2498	51.98	58.41	74	-22.02	27.2	3.62	37.25	103	37	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
2368	33.95	41.12	54	-20.05	26.81	3.52	37.5	100	314	Average
2368	50.53	57.7	74	-23.47	26.81	3.52	37.5	100	314	Peak
2462	93.81	100.52			27.1	3.58	37.39	100	314	Average
2462	97.42	104.13			27.1	3.58	37.39	100	314	Peak
2490	36.55	43.05	54	-17.45	27.2	3.62	37.32	100	314	Average
2490	51.24	57.74	74	-22.76	27.2	3.62	37.32	100	314	Peak

REMARKS:

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

802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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	47.26	54.33	54	-6.74	26.91	3.54	37.52	127	36	Average
2390	69.15	76.22	74	-4.85	26.91	3.54	37.52	127	36	Peak
2412	89.9	96.92			26.96	3.54	37.52	127	36	Average
2412	99.77	106.79			26.96	3.54	37.52	127	36	Peak
2490	34.8	41.3	54	-19.2	27.2	3.62	37.32	127	36	Average
2490	50.75	57.25	74	-23.25	27.2	3.62	37.32	127	36	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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	44.93	52	54	-9.07	26.91	3.54	37.52	130	2	Average
2390	66.27	73.34	74	-7.73	26.91	3.54	37.52	130	2	Peak
2412	87.44	94.46			26.96	3.54	37.52	130	2	Average
2412	97.23	104.25			26.96	3.54	37.52	130	2	Peak
2494	34.49	40.92	54	-19.51	27.2	3.62	37.25	130	2	Average
2494	50.74	57.17	74	-23.26	27.2	3.62	37.25	130	2	Peak

REMARKS:

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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	42.96	50.08	54	-11.04	26.86	3.52	37.5	103	38	Average
2384	54.55	61.67	74	-19.45	26.86	3.52	37.5	103	38	Peak
2437	93.43	100.27			27.06	3.56	37.46	103	38	Average
2437	103.51	110.35			27.06	3.56	37.46	103	38	Peak
2490	40.92	47.42	54	-13.08	27.2	3.62	37.32	103	38	Average
2490	54.32	60.82	74	-19.68	27.2	3.62	37.32	103	38	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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	38.2	45.32	54	-15.8	26.86	3.52	37.5	100	316	Average
2384	51.89	59.01	74	-22.11	26.86	3.52	37.5	100	316	Peak
2437	87.64	94.48			27.06	3.56	37.46	100	316	Average
2437	97.78	104.62			27.06	3.56	37.46	100	316	Peak
2490	36.66	43.16	54	-17.34	27.2	3.62	37.32	100	316	Average
2490	50.69	57.19	74	-23.31	27.2	3.62	37.32	100	316	Peak

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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	34.54	41.61	54	-19.46	26.91	3.54	37.52	104	26	Average
2390	49.46	56.53	74	-24.54	26.91	3.54	37.52	104	26	Peak
2462	91.53	98.24			27.1	3.58	37.39	104	26	Average
2462	102.14	108.85			27.1	3.58	37.39	104	26	Peak
2484	48.8	55.37	54	-5.2	27.15	3.6	37.32	104	26	Average
2484	68.43	75	74	-5.57	27.15	3.6	37.32	104	26	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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	33.73	40.8	54	-20.27	26.91	3.54	37.52	100	100	Average
2390	49.3	56.37	74	-24.7	26.91	3.54	37.52	100	100	Peak
2462	85.21	91.92			27.1	3.58	37.39	100	100	Average
2462	94.75	101.46			27.1	3.58	37.39	100	100	Peak
2484	42.13	48.7	54	-11.87	27.15	3.6	37.32	100	100	Average
2484	61.88	68.45	74	-12.12	27.15	3.6	37.32	100	100	Peak

REMARKS:

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

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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	53	60.07	54	-1	26.91	3.54	37.52	102	22	Average
2390	70.11	77.18	74	-3.89	26.91	3.54	37.52	102	22	Peak
2412	91.14	98.16			26.96	3.54	37.52	102	22	Average
2412	100.95	107.97			26.96	3.54	37.52	102	22	Peak
2484	34.54	41.11	54	-19.46	27.15	3.6	37.32	102	22	Average
2484	50.45	57.02	74	-23.55	27.15	3.6	37.32	102	22	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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	45.74	52.81	54	-8.26	26.91	3.54	37.52	116	144	Average
2390	66.68	73.75	74	-7.32	26.91	3.54	37.52	116	144	Peak
2412	84.79	91.81			26.96	3.54	37.52	116	144	Average
2412	94.76	101.78			26.96	3.54	37.52	116	144	Peak
2484	34.39	40.96	54	-19.61	27.15	3.6	37.32	116	144	Average
2484	48.68	55.25	74	-25.32	27.15	3.6	37.32	116	144	Peak

REMARKS:

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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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	39.67	46.79	54	-14.33	26.86	3.52	37.5	100	23	Average
2384	52.83	59.95	74	-21.17	26.86	3.52	37.5	100	23	Peak
2437	91.24	98.08			27.06	3.56	37.46	100	23	Average
2437	101.05	107.89			27.06	3.56	37.46	100	23	Peak
2490	40.06	46.56	54	-13.94	27.2	3.62	37.32	100	23	Average
2490	52.96	59.46	74	-21.04	27.2	3.62	37.32	100	23	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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	37.23	44.3	54	-16.77	26.91	3.54	37.52	110	228	Average
2390	50.64	57.71	74	-23.36	26.91	3.54	37.52	110	228	Peak
2437	84.1	90.94			27.06	3.56	37.46	110	228	Average
2437	95.23	102.07			27.06	3.56	37.46	110	228	Peak
2484	35.44	42.01	54	-18.56	27.15	3.6	37.32	110	228	Average
2484	51.59	58.16	74	-22.41	27.15	3.6	37.32	110	228	Peak

REMARKS:

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1GHz ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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	35.1	42.32	54	-18.9	26.77	3.5	37.49	102	32	Average
2340	51	58.22	74	-23	26.77	3.5	37.49	102	32	Peak
2462	92.27	98.98			27.1	3.58	37.39	102	32	Average
2462	102.04	108.75			27.1	3.58	37.39	102	32	Peak
2484	48.03	54.6	54	-5.97	27.15	3.6	37.32	102	32	Average
2484	71.81	78.38	74	-2.19	27.15	3.6	37.32	102	32	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
2376	33.88	41	54	-20.12	26.86	3.52	37.5	100	28	Average
2376	51.09	58.21	74	-22.91	26.86	3.52	37.5	100	28	Peak
2462	85.45	92.16			27.1	3.58	37.39	100	28	Average
2462	95.62	102.33			27.1	3.58	37.39	100	28	Peak
2484	41.26	47.83	54	-12.74	27.15	3.6	37.32	100	28	Average
2484	66.36	72.93	74	-7.64	27.15	3.6	37.32	100	28	Peak

REMARKS:

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



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BELOW 1GHz WORST-CASE DATA: 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) QP
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
55.65	25.23	43.31	40	-14.77	12.45	0.8	31.33	100	131	Peak
136.92	23.76	42.05	43.5	-19.74	12.14	1.28	31.71	100	195	Peak
276.24	16.09	33.8	46	-29.91	12.25	1.94	31.9	100	261	Peak
430.2	20.21	33.73	46	-25.79	15.95	2.54	32.01	100	310	Peak
654.2	24.41	32.87	46	-21.59	20.27	3.26	31.99	100	294	Peak
951.7	28.88	32.84	46	-17.12	23.8	4.08	31.84	100	128	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
35.13	21.54	39.22	40	-18.46	12.79	0.59	31.06	100	106	Peak
158.25	15.44	33.16	43.5	-28.06	12.73	1.38	31.83	100	188	Peak
253.29	13.15	31.64	46	-32.85	11.57	1.85	31.91	100	233	Peak
353.2	16.06	31.48	46	-29.94	14.22	2.24	31.88	100	155	Peak
617.1	22.66	31.85	46	-23.34	19.81	3.14	32.14	100	172	Peak
878.9	26.62	31.46	46	-19.38	23.24	3.9	31.98	100	268	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 OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Nov. 09, 2012	Nov. 08, 2013
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Dec. 21, 2012	Dec. 20, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2013	Jul. 01, 2014
Software ADT	BV ADT_Conf_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 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 TEST PROCEDURES

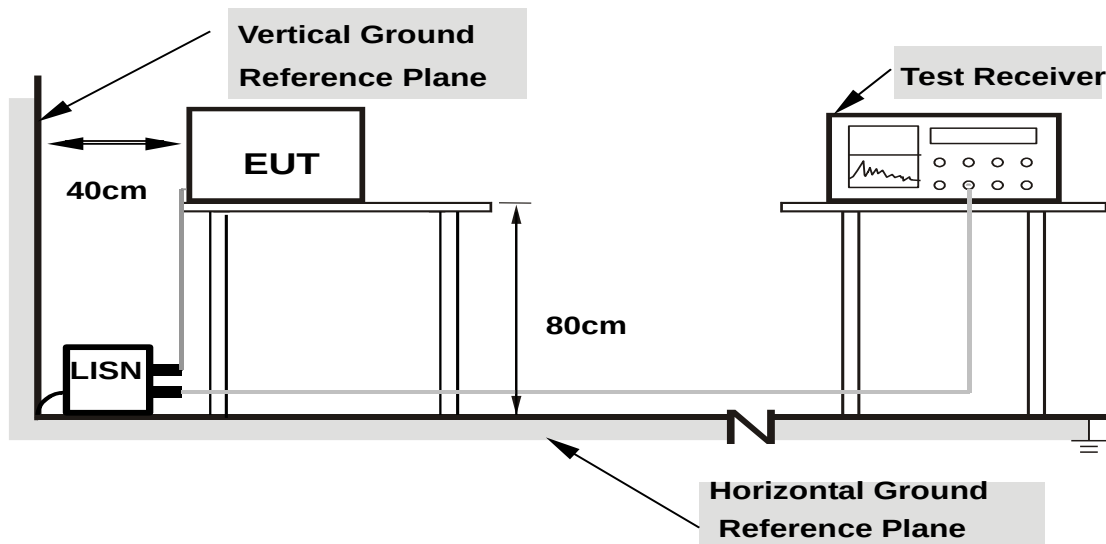
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) 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.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

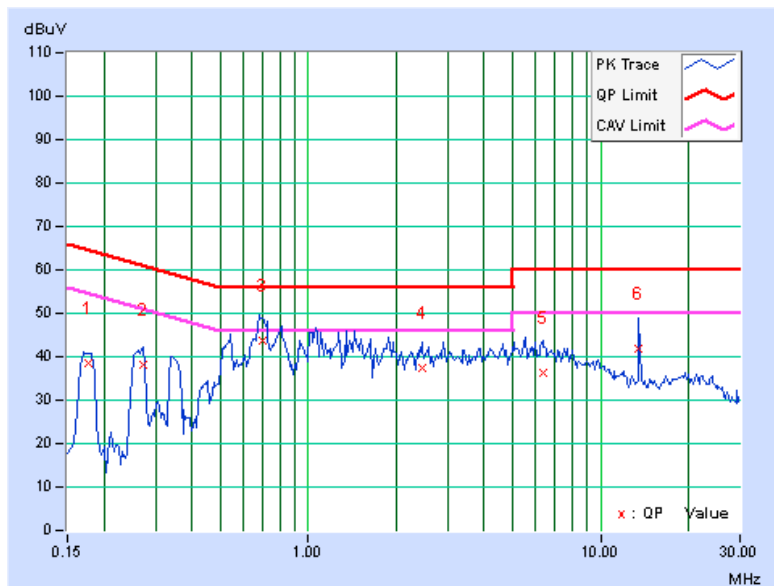
CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.17	38.19	31.88	38.36	32.05	64.61	54.61	-26.25	-22.56
2	0.27109	0.18	38.02	22.88	38.20	23.06	61.08	51.08	-22.88	-28.02
3	0.69688	0.24	43.61	32.66	43.85	32.90	56.00	46.00	-12.15	-13.10
4	2.44531	0.30	37.29	25.30	37.59	25.60	56.00	46.00	-18.41	-20.40
5	6.35156	0.39	35.94	25.57	36.33	25.96	60.00	50.00	-23.67	-24.04
6	13.55859	0.50	41.33	37.34	41.83	37.84	60.00	50.00	-18.17	-12.16

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

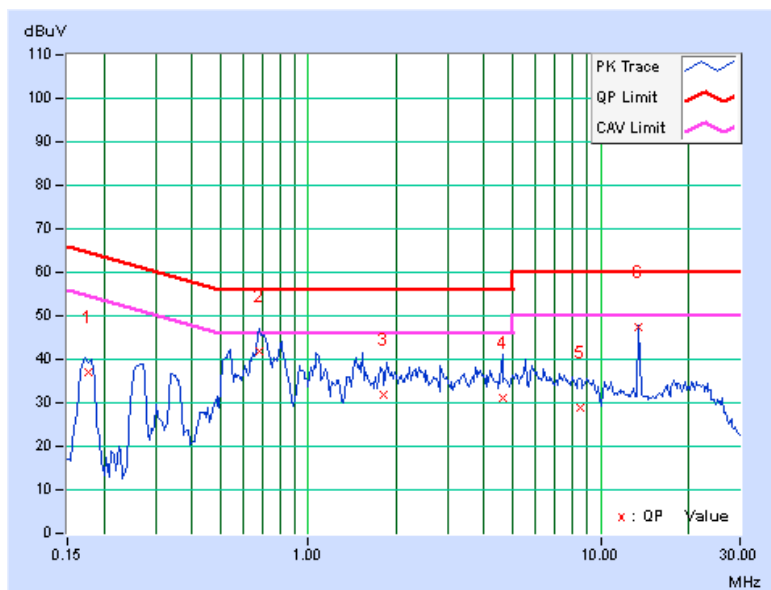


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.18	36.90	32.61	37.08	32.79	64.61	54.61	-27.53	-21.82
2	0.68125	0.24	41.66	31.06	41.90	31.30	56.00	46.00	-14.10	-14.70
3	1.80078	0.27	31.72	23.12	31.99	23.39	56.00	46.00	-24.01	-22.61
4	4.61328	0.40	30.67	24.21	31.07	24.61	56.00	46.00	-24.93	-21.39
5	8.52344	0.46	28.58	22.31	29.04	22.77	60.00	50.00	-30.96	-27.23
6	13.55859	0.57	46.86	42.63	47.43	43.20	60.00	50.00	-12.57	-6.80

REMARKS:

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

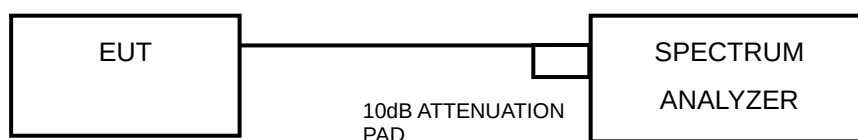


4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.3.4 TEST PROCEDURE

- Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
- 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 RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	9.00	0.5	PASS
6	2437	8.10	0.5	PASS
11	2462	8.61	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.37	0.5	PASS
6	2437	16.39	0.5	PASS
11	2462	16.41	0.5	PASS

802.11n (20MHz)

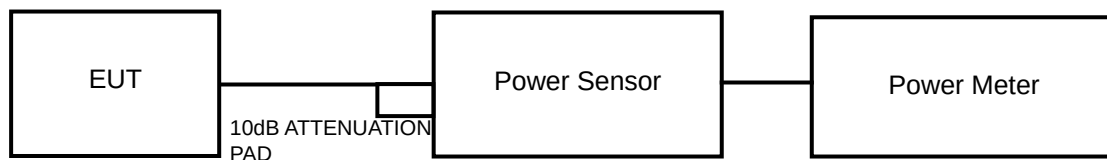
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.61	0.5	PASS
6	2437	17.18	0.5	PASS
11	2462	17.24	0.5	PASS

4.4 CONDUCTED OUTPUT POWER

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

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 peak power level.

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

4.4.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	106.414	20.27	30	PASS
6	2437	121.899	20.86	30	PASS
11	2462	110.917	20.45	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	212.324	23.27	30	PASS
6	2437	230.144	23.62	30	PASS
11	2462	228.034	23.58	30	PASS

802.11n (20MHz)

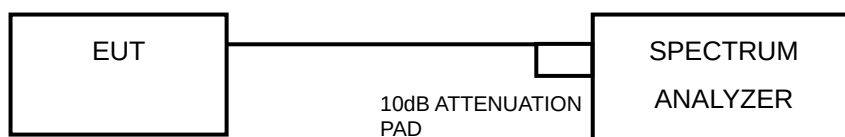
CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	207.014	23.16	30	PASS
6	2437	231.206	23.64	30	PASS
11	2462	232.274	23.66	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

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 the RBW = 3 kHz, VBW = 10 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-6.19	8	PASS
6	2437	-4.65	8	PASS
11	2462	-5.15	8	PASS

802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.30	8	PASS
6	2437	-8.29	8	PASS
11	2462	-10.19	8	PASS

802.11n (20MHz)

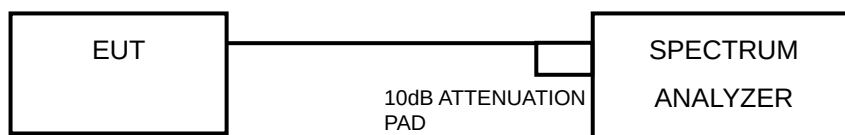
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.38	8	PASS
6	2437	-10.69	8	PASS
11	2462	-10.16	8	PASS

4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

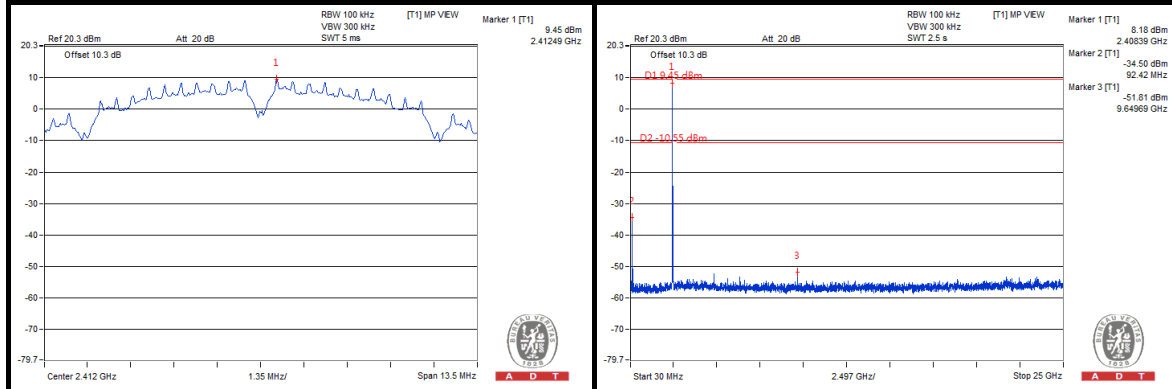
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



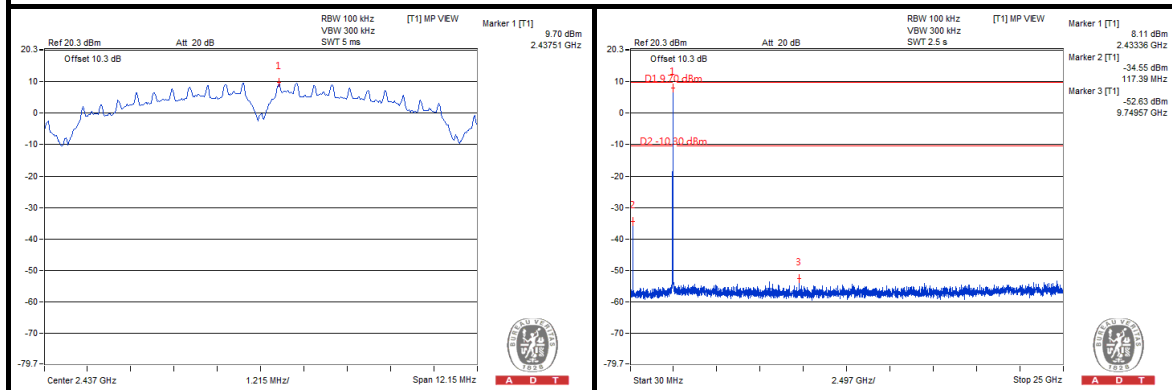
A D T

802.11b

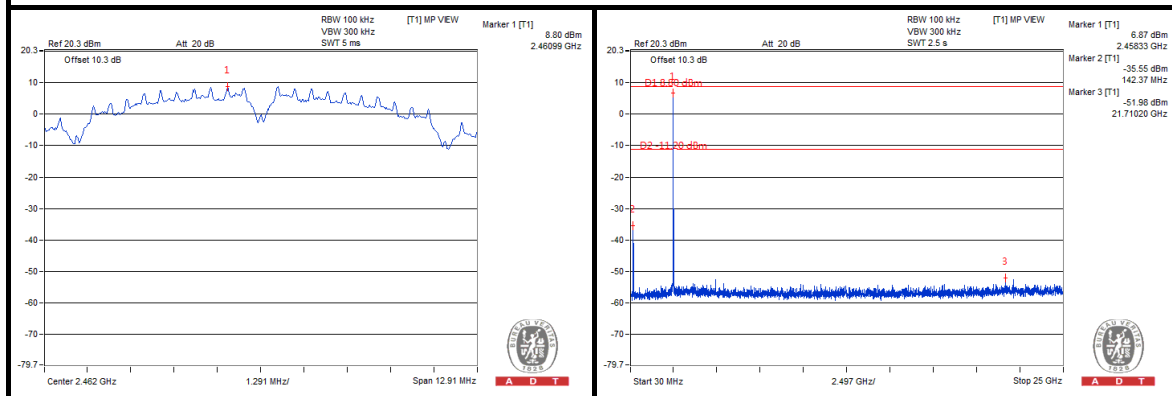
CH 1



CH 6



CH 11

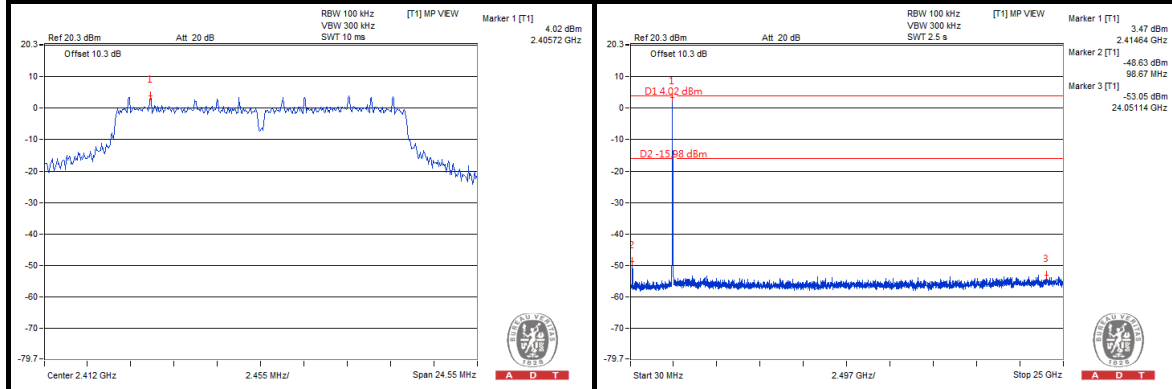




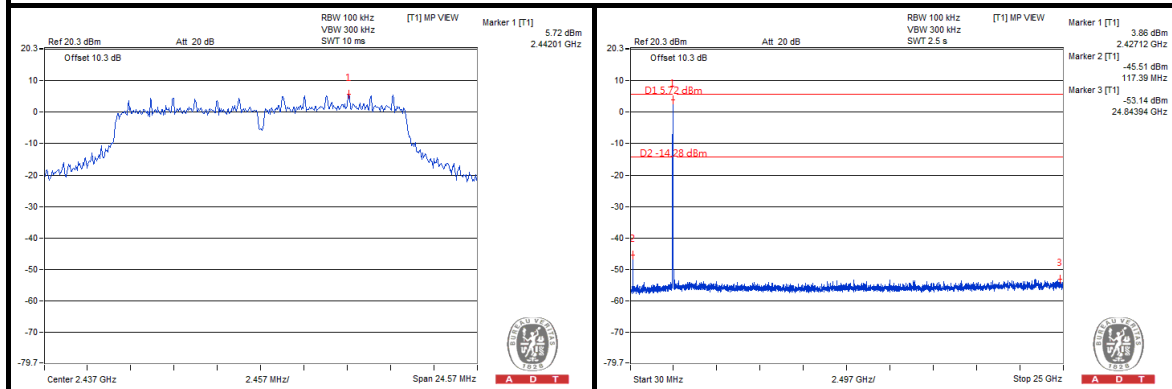
A D T

802.11g

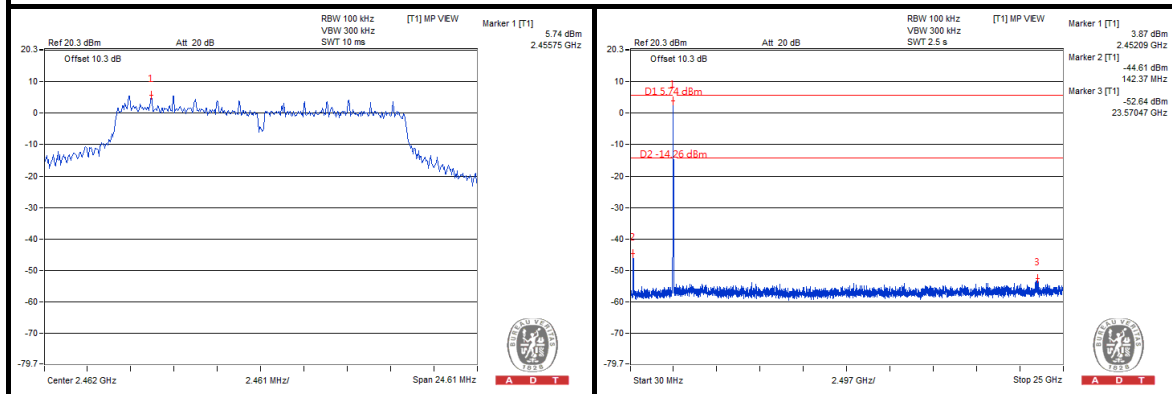
CH 1



CH 6



CH 11

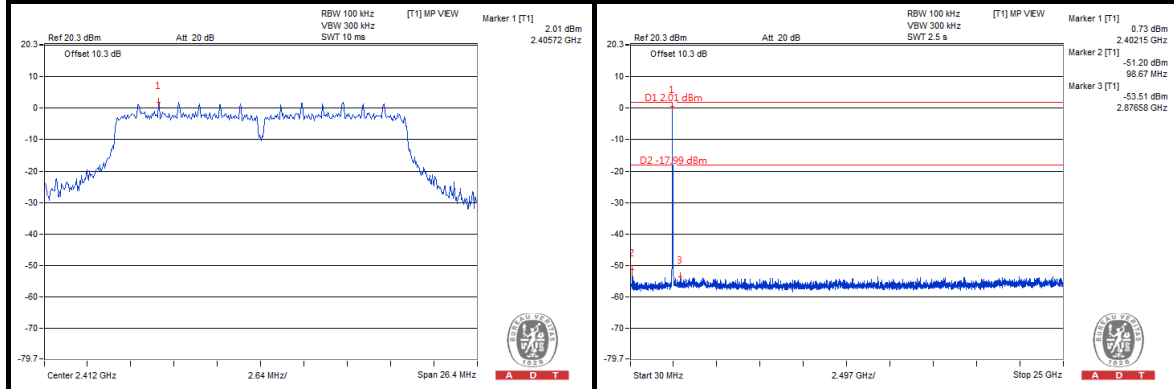




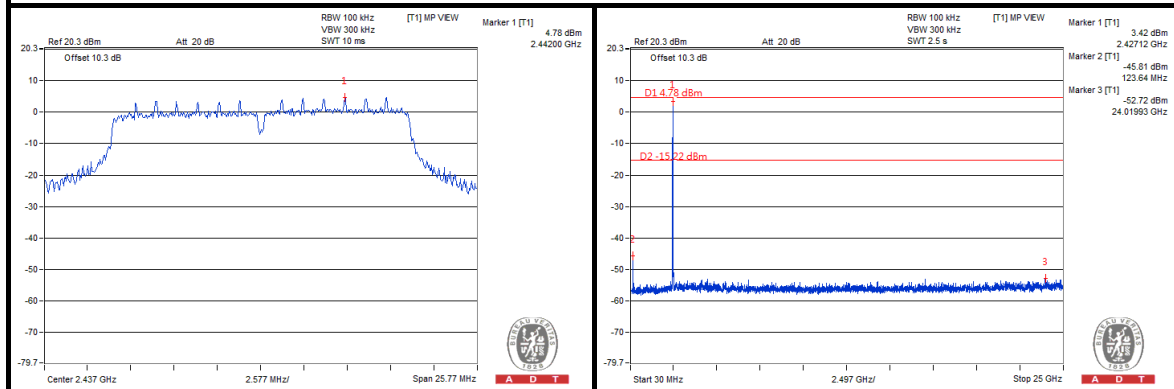
A D T

802.11n (20MHz)

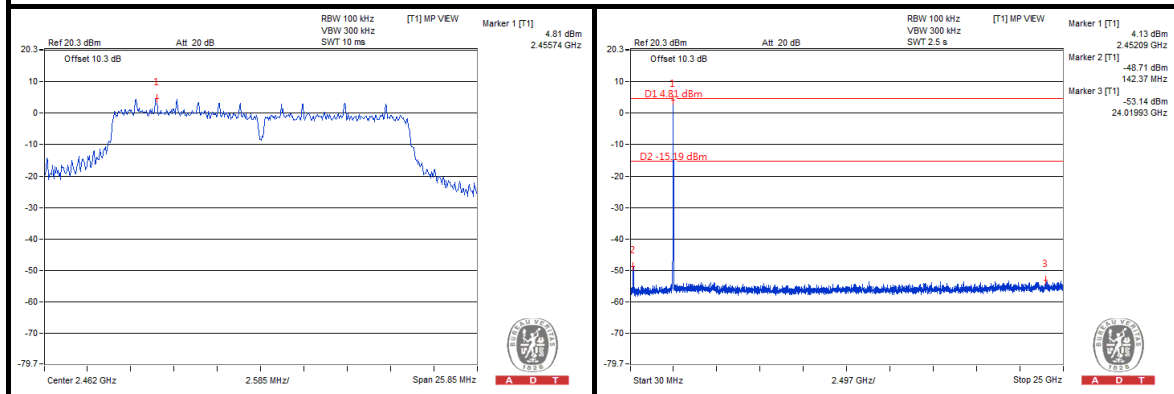
CH 1



CH 6



CH 11



5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

5.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

5.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

5.1.3 TEST PROCEDURES

Same as item 4.1.3.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

5.1.5 TEST SETUP

Same as item 4.1.5.

5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

5.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA : 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	44.06	43.94	72.67	-28.61	31.96	5.59	37.43	100	69	Average
5725	64.47	64.35	82.61	-18.14	31.96	5.59	37.43	100	69	Peak
5745	92.67	92.55			31.99	5.6	37.47	100	69	Average
5745	102.61	102.49			31.99	5.6	37.47	100	69	Peak
5825	38.3	38.07	72.67	-34.37	32.12	5.64	37.53	100	69	Average
5825	56.01	55.78	82.61	-26.6	32.12	5.64	37.53	100	69	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	42.89	42.77	70.12	-27.23	31.96	5.59	37.43	100	102	Average
5725	62.74	62.62	79.83	-17.09	31.96	5.59	37.43	100	102	Peak
5745	90.12	90			31.99	5.6	37.47	100	102	Average
5745	99.83	99.71			31.99	5.6	37.47	100	102	Peak
5825	38.18	37.95	70.12	-31.94	32.12	5.64	37.53	100	102	Average
5825	55.23	55	79.83	-24.6	32.12	5.64	37.53	100	102	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5745MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	38.14	38.02	73.47	-35.33	31.96	5.59	37.43	124	86	Average
5725	55.12	55	82.52	-27.4	31.96	5.59	37.43	124	86	Peak
5785	93.47	93.35			32.04	5.62	37.54	124	86	Average
5785	102.52	102.4			32.04	5.62	37.54	124	86	Peak
5825	38.74	38.51	73.47	-34.73	32.12	5.64	37.53	124	86	Average
5825	54.68	54.45	82.52	-27.84	32.12	5.64	37.53	124	86	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	37.99	37.87	69.44	-31.45	31.96	5.59	37.43	100	180	Average
5725	55.44	55.32	78.69	-23.25	31.96	5.59	37.43	100	180	Peak
5785	89.44	89.32			32.04	5.62	37.54	100	180	Average
5785	98.69	98.57			32.04	5.62	37.54	100	180	Peak
5825	38.35	38.12	69.44	-31.09	32.12	5.64	37.53	100	180	Average
5825	55.3	55.07	78.69	-23.39	32.12	5.64	37.53	100	180	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5785MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 161	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	38.17	38.05	74.04	-35.87	31.96	5.59	37.43	100	84	Average
5725	55.95	55.83	83.95	-28	31.96	5.59	37.43	100	84	Peak
5805	94.04	93.85			32.1	5.63	37.54	100	84	Average
5805	103.95	103.76			32.1	5.63	37.54	100	84	Peak
5825	43.72	43.49	74.04	-30.32	32.12	5.64	37.53	100	84	Average
5825	66.85	66.62	83.95	-17.1	32.12	5.64	37.53	100	84	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	38.08	37.96	69.65	-31.57	31.96	5.59	37.43	100	53	Average
5725	55.44	55.32	78.82	-23.38	31.96	5.59	37.43	100	53	Peak
5805	89.65	89.46			32.1	5.63	37.54	100	53	Average
5805	98.82	98.63			32.1	5.63	37.54	100	53	Peak
5825	38.08	37.85	69.65	-31.57	32.12	5.64	37.53	100	53	Average
5825	61.9	61.67	78.82	-16.92	32.12	5.64	37.53	100	53	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5805MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	45.87	45.75	73.34	-27.47	31.96	5.59	37.43	106	17	Average
5725	65.56	65.44	82.74	-17.18	31.96	5.59	37.43	106	17	Peak
5745	93.34	93.22			31.99	5.6	37.47	106	17	Average
5745	102.74	102.62			31.99	5.6	37.47	106	17	Peak
5850	38.03	37.73	73.34	-35.31	32.15	5.66	37.51	106	17	Average
5850	55.44	55.14	82.74	-27.3	32.15	5.66	37.51	106	17	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	43.78	43.66	70.22	-26.44	31.96	5.59	37.43	100	83	Average
5725	60.74	60.62	79.69	-18.95	31.96	5.59	37.43	100	83	Peak
5745	90.22	90.1			31.99	5.6	37.47	100	83	Average
5745	99.69	99.57			31.99	5.6	37.47	100	83	Peak
5850	37.97	37.67	70.22	-32.25	32.15	5.66	37.51	100	83	Average
5850	55.23	54.93	79.69	-24.46	32.15	5.66	37.51	100	83	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5745MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	38.07	37.95	73.36	-35.29	31.96	5.59	37.43	107	19	Average
5725	54.41	54.29	82.15	-27.74	31.96	5.59	37.43	107	19	Peak
5785	93.36	93.24			32.04	5.62	37.54	107	19	Average
5785	102.15	102.03			32.04	5.62	37.54	107	19	Peak
5850	38.43	38.13	73.36	-34.93	32.15	5.66	37.51	107	19	Average
5850	54.6	54.3	82.15	-27.55	32.15	5.66	37.51	107	19	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	37.91	37.79	70.94	-33.03	31.96	5.59	37.43	100	82	Average
5725	54.77	54.65	79.94	-25.17	31.96	5.59	37.43	100	82	Peak
5785	90.94	90.82			32.04	5.62	37.54	100	82	Average
5785	99.94	99.82			32.04	5.62	37.54	100	82	Peak
5850	38.29	37.99	70.94	-32.65	32.15	5.66	37.51	100	82	Average
5850	54.69	54.39	79.94	-25.25	32.15	5.66	37.51	100	82	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5785MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 161	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	37.95	37.83	72.82	-34.87	31.96	5.59	37.43	107	17	Average
5725	54.58	54.46	81.75	-27.17	31.96	5.59	37.43	107	17	Peak
5805	92.82	92.63			32.1	5.63	37.54	107	17	Average
5805	101.75	101.56			32.1	5.63	37.54	107	17	Peak
5825	43.82	43.59	72.82	-29	32.12	5.64	37.53	107	17	Average
5825	65.64	65.41	81.75	-16.11	32.12	5.64	37.53	107	17	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	37.88	37.76	70.44	-32.56	31.96	5.59	37.43	100	82	Average
5725	55.06	54.94	79.12	-24.06	31.96	5.59	37.43	100	82	Peak
5805	90.44	90.25			32.1	5.63	37.54	100	82	Average
5805	99.12	98.93			32.1	5.63	37.54	100	82	Peak
5825	42.48	42.25	70.44	-27.96	32.12	5.64	37.53	100	82	Average
5825	64.09	63.86	79.12	-15.03	32.12	5.64	37.53	100	82	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5805MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	40.58	40.46	67.25	-26.67	31.96	5.59	37.43	100	132	Average
5725	62.47	62.35	76.06	-13.59	31.96	5.59	37.43	100	132	Peak
5755	87.25	87.11			32.01	5.6	37.47	100	132	Average
5755	96.06	95.92			32.01	5.6	37.47	100	132	Peak
5850	38.38	38.08	67.25	-28.87	32.15	5.66	37.51	100	132	Average
5850	54.92	54.62	76.06	-21.14	32.15	5.66	37.51	100	132	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	39.92	39.8	66.04	-26.12	31.96	5.59	37.43	100	83	Average
5725	62.61	62.49	75.1	-12.49	31.96	5.59	37.43	100	83	Peak
5755	86.04	85.9			32.01	5.6	37.47	100	83	Average
5755	95.1	94.96			32.01	5.6	37.47	100	83	Peak
5850	38.34	38.04	66.04	-27.7	32.15	5.66	37.51	100	83	Average
5850	55.52	55.22	75.1	-19.58	32.15	5.66	37.51	100	83	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5755MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	38.58	38.46	67.36	-28.78	31.96	5.59	37.43	100	133	Average
5725	55.45	55.33	76.26	-20.81	31.96	5.59	37.43	100	133	Peak
5795	87.36	87.2			32.07	5.63	37.54	100	133	Average
5795	96.26	96.1			32.07	5.63	37.54	100	133	Peak
5825	39.55	39.32	67.36	-27.81	32.12	5.64	37.53	100	133	Average
5825	59.6	59.37	76.26	-16.66	32.12	5.64	37.53	100	133	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	38.47	38.35	66.23	-27.76	31.96	5.59	37.43	100	82	Average
5725	54.26	54.14	75.61	-21.35	31.96	5.59	37.43	100	82	Peak
5795	86.23	86.07			32.07	5.63	37.54	100	82	Average
5795	95.61	95.45			32.07	5.63	37.54	100	82	Peak
5825	39.55	39.32	66.23	-26.68	32.12	5.64	37.53	100	82	Average
5825	58.34	58.11	75.61	-17.27	32.12	5.64	37.53	100	82	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5795MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

802.11ac (80MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 155	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
5725	44.58	44.46	67.2	-22.62	31.96	5.59	37.43	104	76	Average
5725	61.9	61.78	76.04	-14.14	31.96	5.59	37.43	104	76	Peak
5775	87.2	87.04			32.04	5.62	37.5	104	76	Average
5775	96.04	95.88			32.04	5.62	37.5	104	76	Peak
5850	40	39.7	67.2	-27.2	32.15	5.66	37.51	104	76	Average
5850	54.21	53.91	76.04	-21.83	32.15	5.66	37.51	104	76	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
5725	43.68	43.56	65.99	-22.31	31.96	5.59	37.43	100	168	Average
5725	59.82	59.7	75.56	-15.74	31.96	5.59	37.43	100	168	Peak
5775	85.99	85.83			32.04	5.62	37.5	100	168	Average
5775	95.56	95.4			32.04	5.62	37.5	100	168	Peak
5850	39.81	39.51	65.99	-26.18	32.15	5.66	37.51	100	168	Average
5850	54.21	53.91	75.56	-21.35	32.15	5.66	37.51	100	168	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value
- 5775MHz: Fundamental frequency.
- 5725MHz & 5825MHz: Out of restricted band

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) QP
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Johnson Liao

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (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
55.38	23.6	41.68	40	-16.4	12.45	0.8	31.33	100	235	Peak
172.02	24.84	43.57	43.5	-18.66	11.57	1.45	31.75	100	194	Peak
277.59	15.96	33.61	46	-30.04	12.28	1.95	31.88	100	225	Peak
417.6	19.96	33.81	46	-26.04	15.7	2.49	32.04	100	154	Peak
661.9	24.3	32.58	46	-21.7	20.35	3.29	31.92	100	253	Peak
935.6	28.75	32.94	46	-17.25	23.71	4.05	31.95	100	115	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (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
42.42	24.5	41.3	40	-15.5	13.58	0.7	31.08	100	176	Peak
187.95	16.68	36.65	43.5	-26.82	10.19	1.54	31.7	100	119	Peak
271.38	15.18	33.14	46	-30.82	12.11	1.92	31.99	100	126	Peak
400.1	19.08	33.42	46	-26.92	15.35	2.43	32.12	100	153	Peak
626.9	23.55	32.6	46	-22.45	19.93	3.17	32.15	100	117	Peak
951	28.44	32.4	46	-17.56	23.79	4.08	31.83	100	186	Peak

REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin Value = Emission Level - Limit Value

5.2 CONDUCTED EMISSION MEASUREMENT

5.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

5.2.3 TEST PROCEDURES

Same as item 4.2.3.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

5.2.5 TEST SETUP

Same as item 4.2.5.

5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

5.2.7 TEST RESULTS

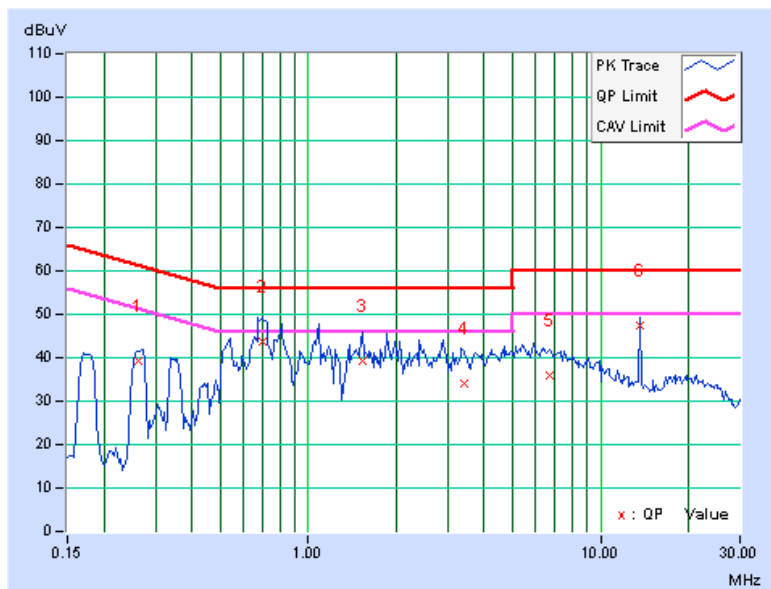
CONDUCTED WORST-CASE DATA :

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.26328	0.18	38.91	30.99	39.09	31.17	61.33	51.33	-22.23	-20.15
2	0.70078	0.24	43.47	32.50	43.71	32.74	56.00	46.00	-12.29	-13.26
3	1.53906	0.28	38.84	26.22	39.12	26.50	56.00	46.00	-16.88	-19.50
4	3.41016	0.34	33.89	22.77	34.23	23.11	56.00	46.00	-21.77	-22.89
5	6.69922	0.40	35.36	24.70	35.76	25.10	60.00	50.00	-24.24	-24.90
6	13.56250	0.50	46.78	44.24	47.28	44.74	60.00	50.00	-12.72	-5.26

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

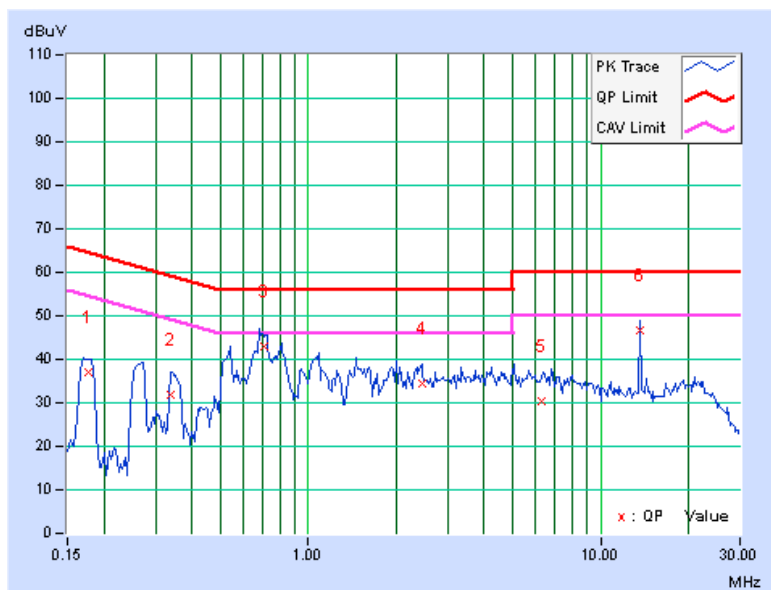


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17734	0.18	36.98	32.61	37.16	32.79	64.61	54.61	-27.45	-21.82
2	0.33750	0.23	31.58	18.83	31.81	19.06	59.26	49.26	-27.46	-30.21
3	0.70469	0.24	42.62	33.89	42.86	34.13	56.00	46.00	-13.14	-11.87
4	2.44141	0.30	34.11	25.96	34.41	26.26	56.00	46.00	-21.59	-19.74
5	6.26563	0.42	30.07	23.30	30.49	23.72	60.00	50.00	-29.51	-26.28
6	13.56250	0.57	45.99	42.49	46.56	43.06	60.00	50.00	-13.44	-6.94

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



5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

5.3.2 TEST SETUP

Same as item 4.3.2.

5.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.3.4 TEST PROCEDURE

Same as item 4.3.4.

5.3.5 DEVIATION FROM TEST STANDARD

No deviation.

5.3.6 EUT OPERATING CONDITIONS

Same as item 4.3.6.

5.3.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.36	0.5	PASS
157	5785	16.42	0.5	PASS
161	5805	16.44	0.5	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	17.63	0.5	PASS
157	5785	17.65	0.5	PASS
161	5805	17.65	0.5	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	35.38	0.5	PASS
159	5795	35.35	0.5	PASS

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
155	5775	75.23	0.5	PASS

5.4 MAXIMUM OUTPUT POWER

5.4.1 LIMITS OF MAXIMUM OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725–5850 MHz bands: 1 Watt (30dBm)

5.4.2 TEST SETUP

Same as Item 4.4.2.

5.4.3 INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.4.4 TEST PROCEDURES

Same as Item 4.4.4.

5.4.5 DEVIATION FROM TEST STANDARD

No deviation.

5.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

5.4.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	239.332	23.79	30	PASS
157	5785	248.313	23.95	30	PASS
161	5805	243.220	23.86	30	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	290.402	24.63	30	PASS
157	5785	304.789	24.84	30	PASS
161	5805	295.121	24.70	30	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
151	5755	205.116	23.12	30	PASS
159	5795	199.986	23.01	30	PASS

802.11ac (80MHz)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
155	5775	135.207	21.31	30	PASS

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST SETUP

Same as item 4.5.2.

5.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.5.4 TEST PROCEDURE.

Same as item 4.5.4.

5.5.5 DEVIATION FROM TEST STANDARD

No deviation.

5.5.6 EUT OPERATING CONDITION

Same as item 4.3.6.

5.5.7 TEST RESULTS

802.11a

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-11.80	8	PASS
157	5785	-10.96	8	PASS
161	5805	-11.16	8	PASS

802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-11.48	8	PASS
157	5785	-10.11	8	PASS
161	5805	-9.56	8	PASS

802.11n (40MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
151	5755	-16.31	8	PASS
159	5795	-15.40	8	PASS

802.11ac (80MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
155	5775	-19.09	8	PASS

5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

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

5.6.2 TEST SETUP

Same as Item 4.6.2

5.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

5.6.4 TEST PROCEDURE

Same as Item 4.6.4

5.6.5 DEVIATION FROM TEST STANDARD

No deviation.

5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

5.6.7 TEST RESULTS

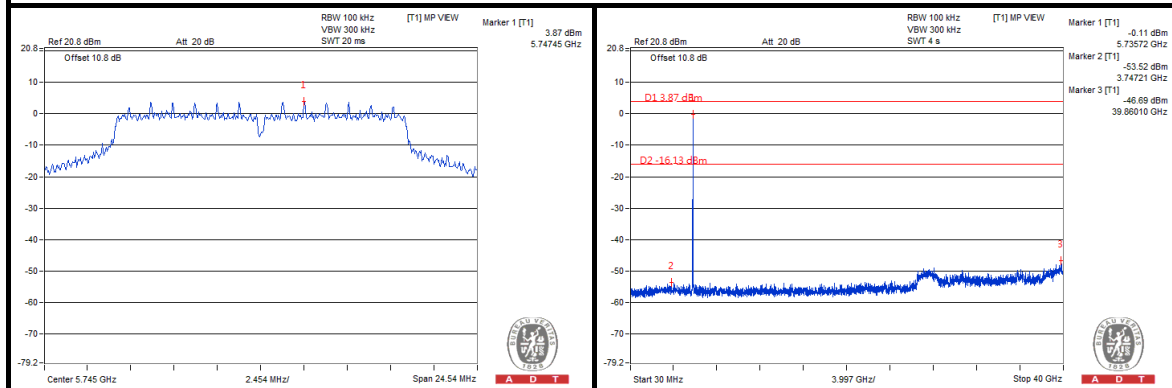
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



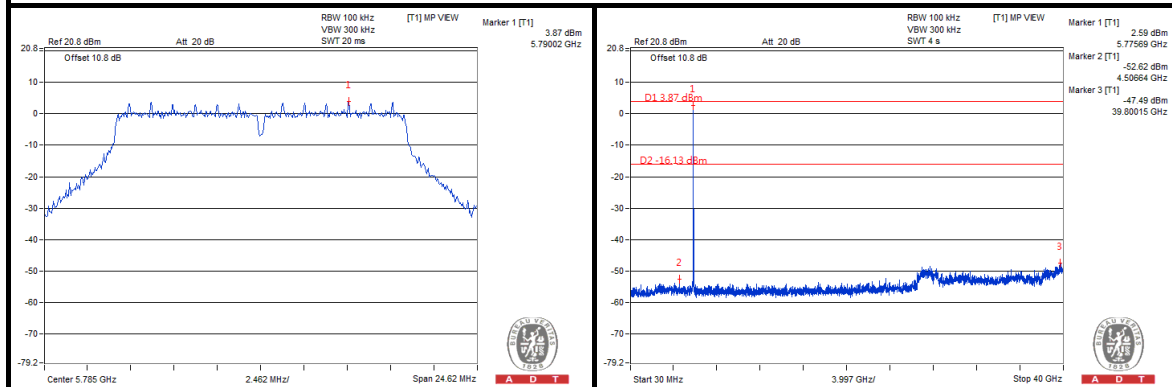
A D T

802.11a

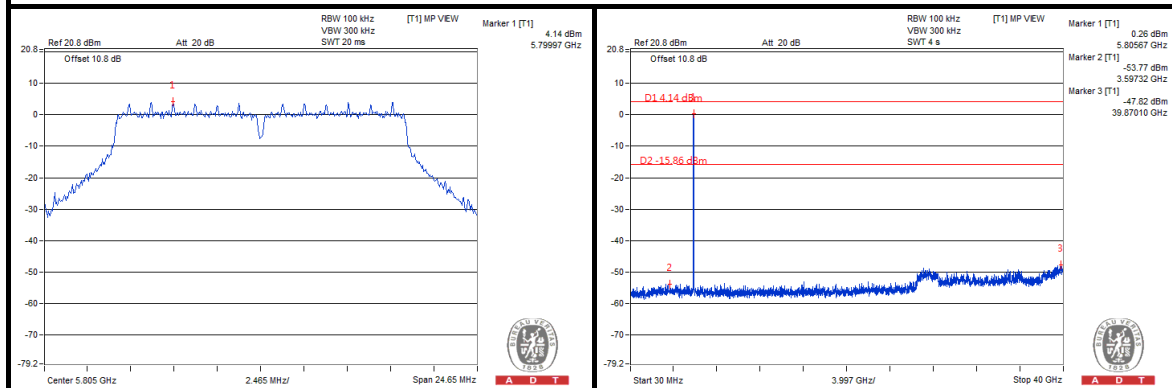
CH 149



CH 157



CH 161

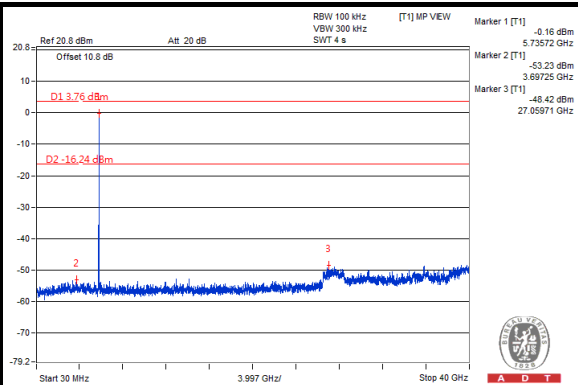
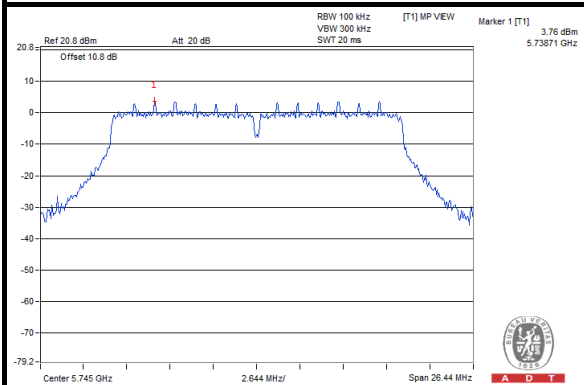




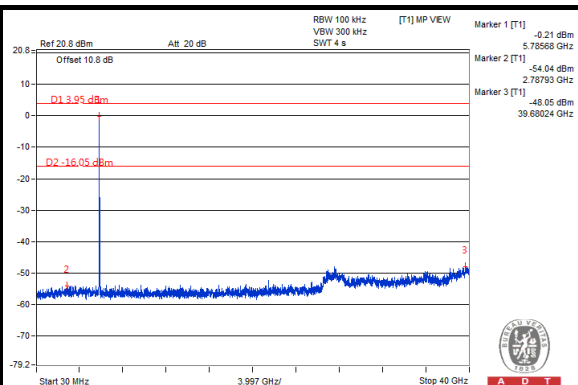
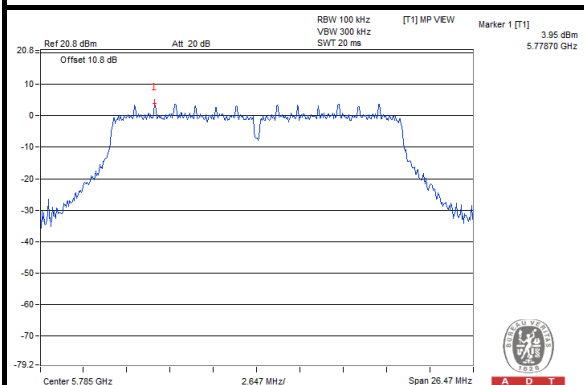
A D T

802.11n (20MHz)

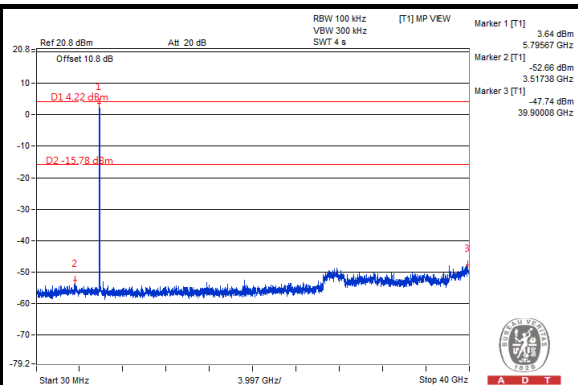
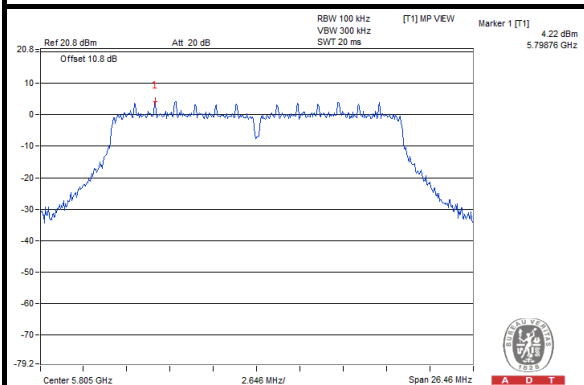
CH 149



CH 157



CH 161

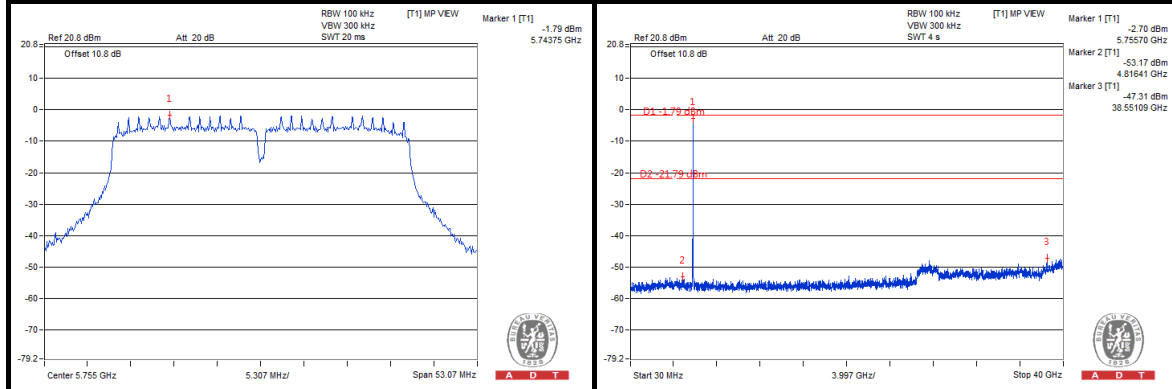




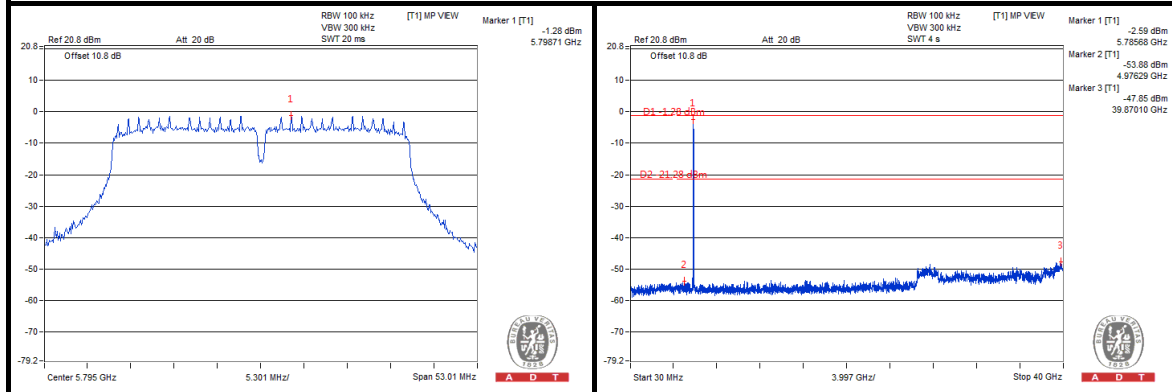
A D T

802.11n (40MHz)

CH 151

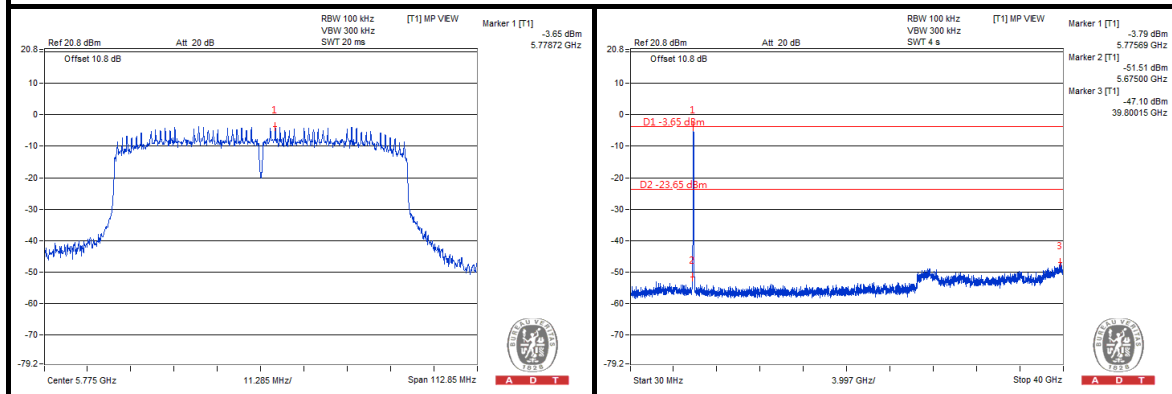


CH 159



802.11ac (80MHz)

CH 155



6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

7. 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:

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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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8. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---