



FCC TEST REPORT

(15.407)

REPORT NO.: RF141112C35-1
MODEL NO.: ENH710EXT
FCC ID: A8J-ENH710EXT
RECEIVED: Nov. 12, 2014
TESTED: Dec. 01 ~ Dec. 15, 2014
ISSUED: Dec. 19, 2014

APPLICANT: EnGenius Technologies

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141112C35-1	Original release	Dec. 19, 2014



1. CERTIFICATION

PRODUCT: N600 2T2R Base Station

MODEL: ENH710EXT

BRAND: EnGenius

APPLICANT: EnGenius Technologies

TESTED: Dec. 01 ~ Dec. 15, 2014

TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart E (Section 15.407)

The above equipment (model: ENH710EXT) 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 :** Dec. 19, 2014
Pettie Chen / Senior Specialist

APPROVED BY :  , **DATE :** Dec. 19, 2014
Ken Liu / Senior Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407 Under New Rule)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.20dB at 0.50341MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5440.00MHz.
15.407(b)(1/2/3/4/6)	Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -6.3dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(e)	6dB bandwidth	PASS	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is N-Type. (The device is professionally installed).

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	3.86 dB
	200MHz ~1000MHz	3.87 dB
	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 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	N600 2T2R Base Station
MODEL NO.	ENH710EXT
POWER SUPPLY	48Vdc from PoE
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz & 5745 ~ 5825MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	24.753mW for 5180 ~ 5240MHz 147.957mW for 5745 ~ 5825MHz
ANTENNA TYPE	Dipole antenna with 7.0dBi gain
ANTENNA CONNECTOR	N-Type
POWER CORD	Refer to NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	PoE, Adapter of PoE, 1.8m non-shielded ground cable

NOTE:

- The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

MODULATION MODE	TX FUNCTION
802.11a	2TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

- The EUT use following adapter and PoE.

PoE	
Brand:	EnGenius
Model:	EPE-4818G
Rating:	48Vdc, 0.5A, 24W Max

Adapter of PoE	
Brand:	Powertron Electronics Corp.
Model:	PA1024-480DUB050
Input:	100-240V~50-60Hz 0.6A
Output:	48Vdc, 0.5A 24W Max
Power Cord:	1.55m cable without core

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

3.2 DESCRIPTION OF TEST MODES

FOR 5180 ~ 5240MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

FOR 5745 ~ 5825MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **RE \geq 1G**: Radiated Emission above 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 **Z-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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	15.0

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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320, 5745-5825	36 to 64, 149 to 165	149	OFDM	BPSK	6.0

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320, 5745-5825	36 to 64, 149 to 165	149	OFDM	BPSK	6.0

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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	15.0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	21deg. C, 71%RH	120Vac, 60Hz	Jones Chang
RE<1G	22deg. C, 65%RH	120Vac, 60Hz	Jones Chang
PLC	23deg. C, 70%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Ted Chang

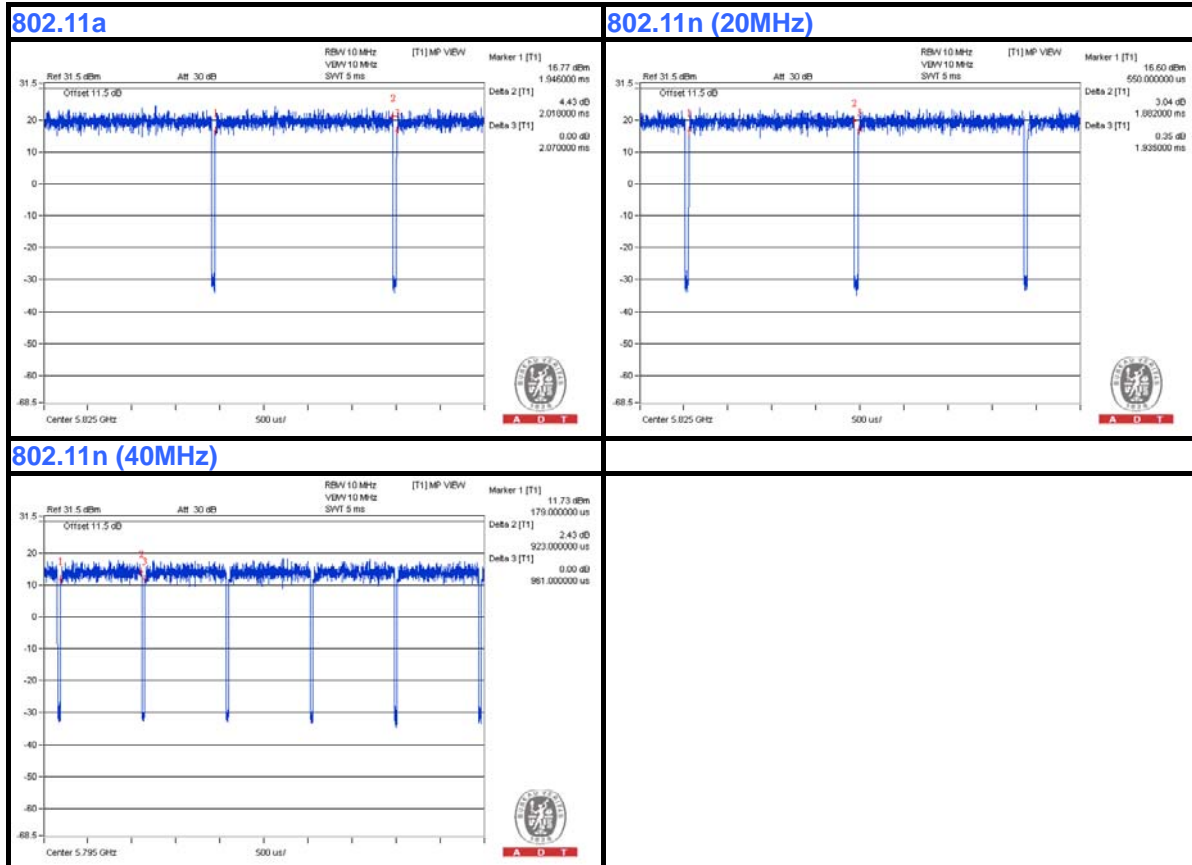
3.3 DUTY CYCLE OF TEST SIGNAL

Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 2.018/2.07 = 0.975, Duty factor = $10 * \log(1/0.975) = 0.11$

802.11n (20MHz): Duty cycle = 1.882/1.935 = 0.973, Duty factor = $10 * \log(1/0.973) = 0.12$

802.11n (40MHz): Duty cycle = 0.923/0.961 = 0.96, Duty factor = $10 * \log(1/0.96) = 0.18$



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

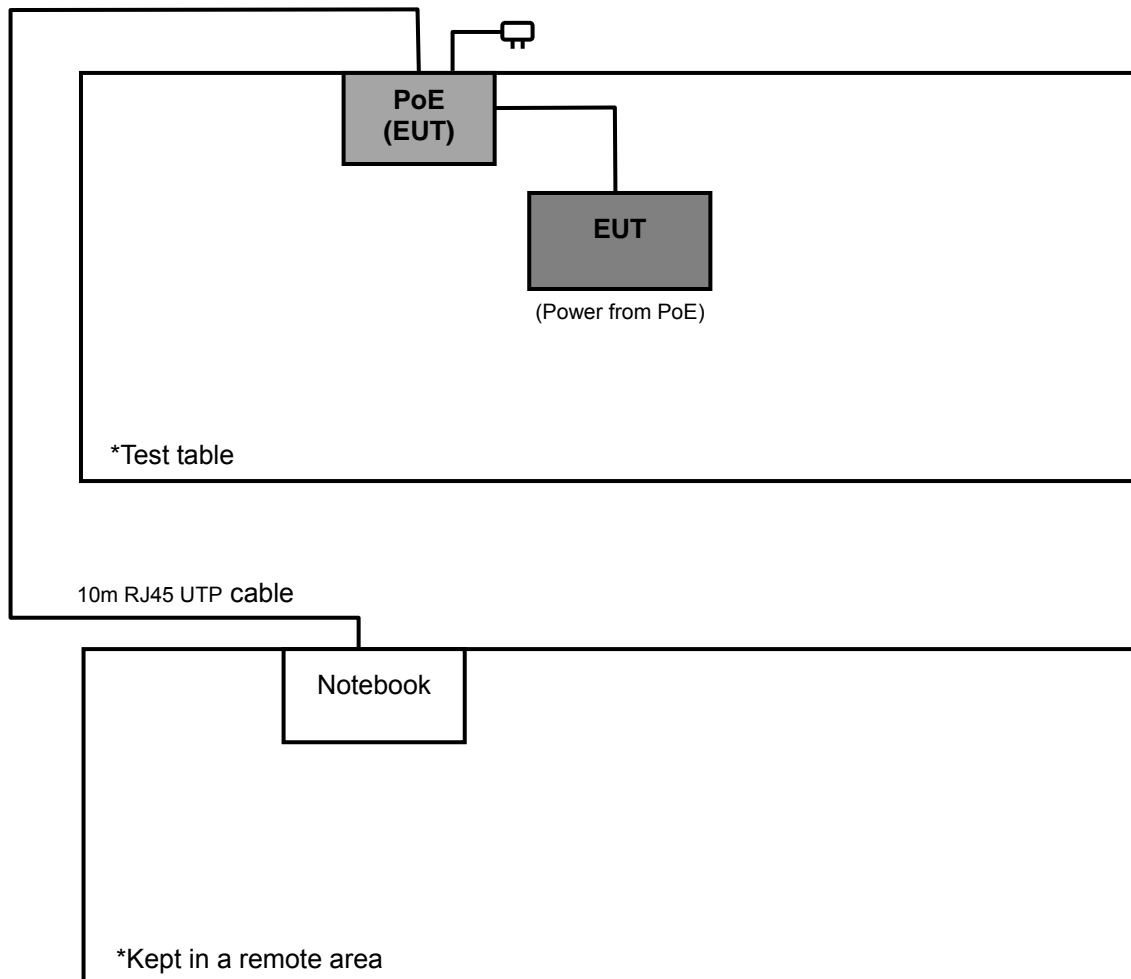
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m RJ45 UTP cable

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 acted as communication partners to transfer data.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v01

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

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

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:

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 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01	FIELD STRENGTH AT 3m	
	PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK: -27 (dBm/MHz) ^{*1} PK: -17 (dBm/MHz) ^{*2}	PK: 68.2 (dBµV/m) ^{*1} PK: 78.2 (dBµV/m) ^{*2}

NOTE: ^{*1} beyond 10MHz of the band edge ^{*2} within 10 MHz of band edge

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Jan. 02, 2014	Jan. 01, 2015
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Mar. 03, 2014	Mar. 02, 2015
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Feb. 26, 2014	Feb. 25, 2015
HORN Antenna SCHWARZBECK	9120D	209	Aug. 25, 2014	Aug. 24, 2015
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Feb. 17, 2014	Feb. 16, 2015
Preamplifier Agilent	8447D	2944A10738	Oct.18, 2014	Oct. 17, 2015
Preamplifier Agilent	8449B	3008A01964	Aug. 22, 2014	Aug. 21, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	214378/4	Aug. 22, 2014	Aug. 21, 2015
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6 +309224/4	Aug. 22, 2014	Aug. 21, 2015
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2014	Oct. 17, 2015
High Speed Peak Power Meter	ML2495A	0824011	Jul. 26, 2014	Jul. 25, 2015
Power Sensor	MA2411B	0738171	Jul. 26, 2014	Jul. 25, 2015
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 09, 2014	Jun. 08, 2015

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 988962.
5. The IC Site Registration No. is IC 7450F-3.

4.1.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter 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. The antenna is a broadband antenna, and its height 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 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

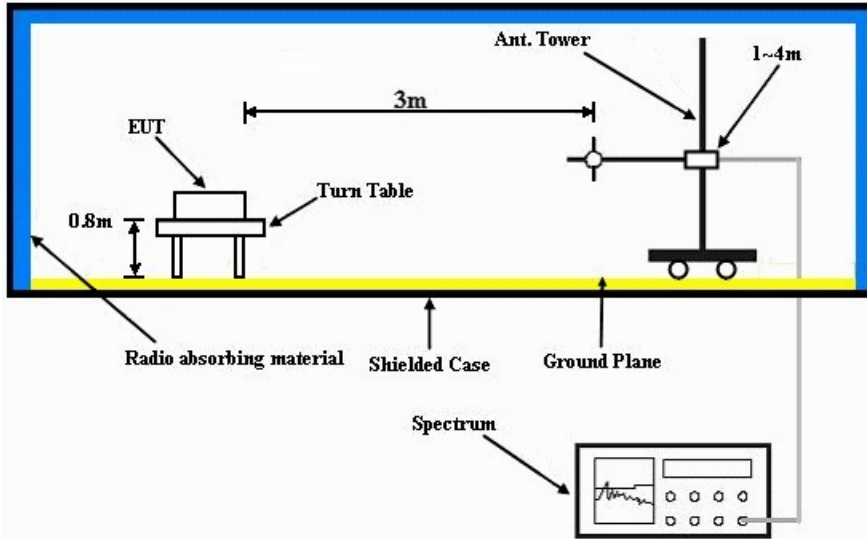
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.5 DEVIATION FROM TEST STANDARD

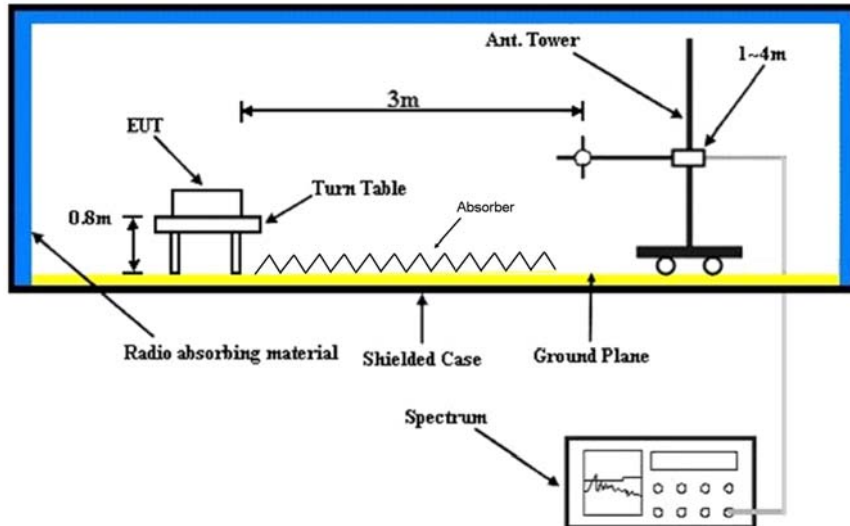
No deviation.

4.1.6 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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

4.1.7 EUT OPERATING CONDITION

- a. Placed the EUT on the testing table.
- b. Prepared a notebook to act as communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".
- e. The necessary accessories enable the system in full functions.

4.1.8 TEST RESULTS

ABOVE 1GHz DATA

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.7 PK	74.0	-16.3	1.41 H	117	51.30	6.40
2	5150.00	46.3 AV	54.0	-7.7	1.41 H	117	39.90	6.40
3	*5180.00	96.5 PK			1.41 H	117	56.60	39.90
4	*5180.00	86.7 AV			1.41 H	117	46.80	39.90
5	5440.00	58.6 PK	74.0	-15.4	1.23 H	255	52.00	6.60
6	5440.00	46.7 AV	54.0	-7.3	1.23 H	255	40.10	6.60
7	#10360.00	60.9 PK	74.0	-13.1	1.20 H	282	42.20	18.70
8	#10360.00	47.2 AV	54.0	-6.8	1.20 H	282	28.50	18.70
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.7 PK	74.0	-15.3	1.00 V	350	52.30	6.40
2	5150.00	46.6 AV	54.0	-7.4	1.00 V	350	40.20	6.40
3	*5180.00	108.9 PK			1.00 V	350	69.00	39.90
4	*5180.00	99.1 AV			1.00 V	350	59.20	39.90
5	5440.00	63.4 PK	74.0	-10.6	1.05 V	200	56.80	6.60
6	5440.00	51.7 AV	54.0	-2.3	1.05 V	200	45.10	6.60
7	#10360.00	61.4 PK	74.0	-12.6	1.10 V	57	42.70	18.70
8	#10360.00	48.2 AV	54.0	-5.8	1.10 V	57	29.50	18.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	96.4 PK			1.40 H	118	56.40	40.00
2	*5200.00	86.5 AV			1.40 H	118	46.50	40.00
3	5440.00	58.0 PK	74.0	-16.0	1.39 H	168	51.40	6.60
4	5440.00	47.5 AV	54.0	-6.5	1.39 H	168	40.90	6.60
5	#10400.00	61.2 PK	74.0	-12.8	1.15 H	19	42.20	19.00
6	#10400.00	48.0 AV	54.0	-6.0	1.15 H	19	29.00	19.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	109.2 PK			1.00 V	354	69.20	40.00
2	*5200.00	99.4 AV			1.00 V	354	59.40	40.00
3	5440.00	62.8 PK	74.0	-11.2	1.01 V	357	56.20	6.60
4	5440.00	52.1 AV	54.0	-1.9	1.01 V	357	45.50	6.60
5	#10400.00	61.6 PK	74.0	-12.4	1.05 V	269	42.60	19.00
6	#10400.00	48.6 AV	54.0	-5.4	1.05 V	269	29.60	19.00

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	94.8 PK			1.38 H	158	54.80	40.00
2	*5240.00	85.6 AV			1.38 H	158	45.60	40.00
3	5440.00	57.9 PK	74.0	-16.1	1.30 H	194	51.30	6.60
4	5440.00	47.0 AV	54.0	-7.0	1.30 H	194	40.40	6.60
5	#10480.00	61.0 PK	74.0	-13.0	1.14 H	286	41.80	19.20
6	#10480.00	47.7 AV	54.0	-6.3	1.14 H	286	28.50	19.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	110.8 PK			1.10 V	357	70.80	40.00
2	*5240.00	100.8 AV			1.10 V	357	60.80	40.00
3	5440.00	63.1 PK	74.0	-10.9	1.06 V	357	56.50	6.60
4	5440.00	52.0 AV	54.0	-2.0	1.06 V	357	45.40	6.60
5	#10480.00	61.7 PK	74.0	-12.3	1.11 V	350	42.50	19.20
6	#10480.00	48.5 AV	54.0	-5.5	1.11 V	350	29.30	19.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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802.11n (20MHz)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.2 PK	74.0	-16.8	1.34 H	122	50.80	6.40
2	5150.00	45.7 AV	54.0	-8.3	1.34 H	122	39.30	6.40
3	*5180.00	95.7 PK			1.41 H	118	55.80	39.90
4	*5180.00	85.5 AV			1.41 H	118	45.60	39.90
5	5440.00	57.2 PK	74.0	-16.8	1.00 H	211	50.60	6.60
6	5440.00	45.9 AV	54.0	-8.1	1.00 H	211	39.30	6.60
7	#10360.00	60.5 PK	74.0	-13.5	1.29 H	344	41.80	18.70
8	#10360.00	47.0 AV	54.0	-7.0	1.29 H	344	28.30	18.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.0 PK	74.0	-16.0	1.00 V	66	51.60	6.40
2	5150.00	46.7 AV	54.0	-7.3	1.00 V	66	40.30	6.40
3	*5180.00	107.7 PK			1.00 V	325	67.80	39.90
4	*5180.00	97.9 AV			1.00 V	325	58.00	39.90
5	5440.00	63.3 PK	74.0	-10.7	1.39 V	45	56.70	6.60
6	5440.00	51.9 AV	54.0	-2.1	1.39 V	45	45.30	6.60
7	#10360.00	61.1 PK	74.0	-12.9	1.18 V	121	42.40	18.70
8	#10360.00	47.7 AV	54.0	-6.3	1.18 V	121	29.00	18.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	96.6 PK			1.40 H	117	56.60	40.00
2	*5200.00	86.4 AV			1.40 H	117	46.40	40.00
3	5440.00	57.9 PK	74.0	-16.1	1.11 H	222	51.30	6.60
4	5440.00	47.1 AV	54.0	-6.9	1.11 H	222	40.50	6.60
5	#10400.00	60.9 PK	74.0	-13.1	1.32 H	25	41.90	19.00
6	#10400.00	47.4 AV	54.0	-6.6	1.32 H	25	28.40	19.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	108.9 PK			1.02 V	348	68.90	40.00
2	*5200.00	99.1 AV			1.02 V	348	59.10	40.00
3	5440.00	64.4 PK	74.0	-9.6	1.36 V	41	57.80	6.60
4	5440.00	52.7 AV	54.0	-1.3	1.36 V	41	46.10	6.60
5	#10400.00	62.0 PK	74.0	-12.0	1.22 V	105	43.00	19.00
6	#10400.00	48.7 AV	54.0	-5.3	1.22 V	105	29.70	19.00

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	95.9 PK			1.42 H	118	55.90	40.00
2	*5240.00	85.6 AV			1.42 H	118	45.60	40.00
3	5440.00	57.1 PK	74.0	-16.9	1.40 H	333	50.50	6.60
4	5440.00	46.5 AV	54.0	-7.5	1.40 H	333	39.90	6.60
5	#10480.00	60.9 PK	74.0	-13.1	1.22 H	94	41.70	19.20
6	#10480.00	47.7 AV	54.0	-6.3	1.22 H	94	28.50	19.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	110.3 PK			1.10 V	353	70.30	40.00
2	*5240.00	100.0 AV			1.10 V	353	60.00	40.00
3	5440.00	62.6 PK	74.0	-11.4	1.14 V	44	56.00	6.60
4	5440.00	52.3 AV	54.0	-1.7	1.14 V	44	45.70	6.60
5	#10480.00	62.0 PK	74.0	-12.0	1.20 V	96	42.80	19.20
6	#10480.00	48.2 AV	54.0	-5.8	1.20 V	96	29.00	19.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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802.11n (40MHz)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.0 PK	74.0	-17.0	1.34 H	17	50.60	6.40
2	5150.00	45.9 AV	54.0	-8.1	1.34 H	17	39.50	6.40
3	*5190.00	93.2 PK			1.42 H	118	53.30	39.90
4	*5190.00	83.5 AV			1.42 H	118	43.60	39.90
5	5440.00	57.8 PK	74.0	-16.2	1.30 H	107	51.20	6.60
6	5440.00	46.9 AV	54.0	-7.1	1.30 H	107	40.30	6.60
7	#10380.00	59.9 PK	74.0	-14.1	1.24 H	254	41.10	18.80
8	#10380.00	47.0 AV	54.0	-7.0	1.24 H	254	28.20	18.80

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	61.8 PK	74.0	-12.2	1.00 V	145	55.40	6.40
2	5150.00	47.7 AV	54.0	-6.3	1.00 V	145	41.30	6.40
3	*5190.00	104.7 PK			1.00 V	332	64.80	39.90
4	*5190.00	95.5 AV			1.00 V	332	55.60	39.90
5	5440.00	62.8 PK	74.0	-11.2	1.40 V	39	56.20	6.60
6	5440.00	51.2 AV	54.0	-2.8	1.40 V	39	44.60	6.60
7	#10380.00	60.6 PK	74.0	-13.4	1.19 V	192	41.80	18.80
8	#10380.00	47.6 AV	54.0	-6.4	1.19 V	192	28.80	18.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	93.7 PK			1.40 H	119	53.70	40.00
2	*5230.00	83.9 AV			1.40 H	119	43.90	40.00
3	5440.00	58.0 PK	74.0	-16.0	1.23 H	260	51.40	6.60
4	5440.00	46.8 AV	54.0	-7.2	1.23 H	260	40.20	6.60
5	#10460.00	60.2 PK	74.0	-13.8	1.19 H	293	41.10	19.10
6	#10460.00	47.1 AV	54.0	-6.9	1.19 H	293	28.00	19.10

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	106.8 PK			1.00 V	186	66.80	40.00
2	*5230.00	97.1 AV			1.00 V	186	57.10	40.00
3	5440.00	63.3 PK	74.0	-10.7	1.37 V	352	56.70	6.60
4	5440.00	49.7 AV	54.0	-4.3	1.37 V	352	43.10	6.60
5	#10460.00	60.5 PK	74.0	-13.5	1.10 V	112	41.40	19.10
6	#10460.00	47.3 AV	54.0	-6.7	1.10 V	112	28.20	19.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



A D T

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	59.1 PK	74.0	-14.9	1.23 H	161	52.50	6.60
2	5440.00	48.5 AV	54.0	-5.5	1.23 H	161	41.90	6.60
3	#5714.00	60.8 PK	74.0	-13.2	1.29 H	249	53.80	7.00
4	#5714.00	49.6 AV	54.0	-4.4	1.29 H	249	42.60	7.00
5	#5722.00	61.0 PK	78.2	-17.2	1.10 H	226	54.00	7.00
6	#5725.00	61.4 PK	78.2	-16.8	1.10 H	226	54.30	7.10
7	*5745.00	105.1 PK			1.00 H	209	64.50	40.60
8	*5745.00	95.8 AV			1.00 H	209	55.20	40.60
9	11490.00	61.5 PK	74.0	-12.5	1.13 H	130	42.80	18.70
10	11490.00	49.3 AV	54.0	-4.7	1.13 H	130	30.60	18.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	63.9 PK	74.0	-10.1	1.18 V	306	57.30	6.60
2	5440.00	53.0 AV	54.0	-1.0	1.18 V	306	46.40	6.60
3	#5714.00	72.1 PK	74.0	-1.9	1.15 V	331	65.10	7.00
4	#5714.00	52.6 AV	54.0	-1.4	1.15 V	331	45.60	7.00
5	#5722.00	75.4 PK	78.2	-2.8	1.00 V	330	68.40	7.00
6	#5725.00	75.9 PK	78.2	-2.3	1.00 V	330	68.80	7.10
7	*5745.00	120.5 PK			1.41 V	129	79.90	40.60
8	*5745.00	110.7 AV			1.41 V	129	70.10	40.60
9	11490.00	67.0 PK	74.0	-7.0	1.00 V	120	48.30	18.70
10	11490.00	52.1 AV	54.0	-1.9	1.00 V	120	33.40	18.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	57.7 PK	74.0	-16.3	1.09 H	103	51.10	6.60
2	5440.00	47.1 AV	54.0	-6.9	1.09 H	103	40.50	6.60
3	*5785.00	105.1 PK			1.00 H	208	64.40	40.70
4	*5785.00	96.0 AV			1.00 H	208	55.30	40.70
5	11570.00	61.5 PK	74.0	-12.5	1.41 H	308	42.70	18.80
6	11570.00	48.1 AV	54.0	-5.9	1.41 H	308	29.30	18.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	63.7 PK	74.0	-10.3	1.00 V	1	57.10	6.60
2	5440.00	50.5 AV	54.0	-3.5	1.00 V	1	43.90	6.60
3	*5785.00	118.7 PK			1.16 V	167	78.00	40.70
4	*5785.00	109.4 AV			1.16 V	167	68.70	40.70
5	11570.00	69.7 PK	74.0	-4.3	1.00 V	0	50.90	18.80
6	11570.00	52.5 AV	54.0	-1.5	1.00 V	0	33.70	18.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	58.0 PK	74.0	-16.0	1.11 H	295	51.40	6.60
2	5440.00	46.9 AV	54.0	-7.1	1.11 H	295	40.30	6.60
3	*5825.00	105.9 PK			1.01 H	208	65.20	40.70
4	*5825.00	96.0 AV			1.01 H	208	55.30	40.70
5	#5850.00	62.2 PK	78.2	-16.0	1.24 H	217	55.20	7.00
6	#5855.00	62.8 PK	78.2	-15.4	1.24 H	217	55.70	7.10
7	#5861.00	58.0 PK	74.0	-16.0	1.19 H	35	50.90	7.10
8	#5861.00	46.6 AV	54.0	-7.4	1.19 H	35	39.50	7.10
9	11650.00	62.4 PK	74.0	-11.6	1.16 H	266	43.20	19.20
10	11650.00	49.9 AV	54.0	-4.1	1.16 H	266	30.70	19.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	64.4 PK	74.0	-9.6	1.04 V	214	57.80	6.60
2	5440.00	51.4 AV	54.0	-2.6	1.04 V	214	44.80	6.60
3	*5825.00	118.9 PK			1.17 V	247	78.20	40.70
4	*5825.00	109.0 AV			1.17 V	247	68.30	40.70
5	#5850.00	70.9 PK	78.2	-7.3	1.04 V	350	63.90	7.00
6	#5855.00	70.7 PK	78.2	-7.5	1.04 V	350	63.60	7.10
7	#5861.00	64.9 PK	74.0	-9.1	1.00 V	19	57.80	7.10
8	#5861.00	50.4 AV	54.0	-3.6	1.00 V	19	43.30	7.10
9	11650.00	70.3 PK	74.0	-3.7	1.00 V	236	51.10	19.20
10	11650.00	52.2 AV	54.0	-1.8	1.00 V	236	33.00	19.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



A D T

802.11n (20MHz)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	48.9 PK	74.0	-25.1	1.00 H	212	42.30	6.60
2	5440.00	47.7 AV	54.0	-6.3	1.00 H	212	41.10	6.60
3	#5714.00	48.9 PK	74.0	-25.1	1.20 H	245	41.90	7.00
4	#5714.00	47.5 AV	54.0	-6.5	1.20 H	245	40.50	7.00
5	#5722.00	62.0 PK	78.2	-16.2	1.28 H	232	55.00	7.00
6	#5725.00	61.7 PK	78.2	-16.5	1.28 H	232	54.60	7.10
7	*5745.00	105.2 PK			1.00 H	208	64.60	40.60
8	*5745.00	94.8 AV			1.00 H	208	54.20	40.60
9	11490.00	60.8 PK	74.0	-13.2	1.12 H	137	42.10	18.70
10	11490.00	47.6 AV	54.0	-6.4	1.12 H	137	28.90	18.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	63.2 PK	74.0	-10.8	1.18 V	305	56.60	6.60
2	5440.00	51.0 AV	54.0	-3.0	1.18 V	305	44.40	6.60
3	#5714.00	68.6 PK	74.0	-5.4	1.15 V	310	61.60	7.00
4	#5714.00	51.0 AV	54.0	-3.0	1.15 V	310	44.00	7.00
5	#5722.00	76.7 PK	78.2	-1.5	1.26 V	336	69.70	7.00
6	#5725.00	64.6 PK	78.2	-13.6	1.26 V	336	57.50	7.10
7	*5745.00	120.1 PK			1.43 V	129	79.50	40.60
8	*5745.00	109.5 AV			1.43 V	129	68.90	40.60
9	11490.00	69.2 PK	74.0	-4.8	1.05 V	172	50.50	18.70
10	11490.00	52.3 AV	54.0	-1.7	1.05 V	172	33.60	18.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	58.9 PK	74.0	-15.1	1.00 H	111	52.30	6.60
2	5440.00	47.7 AV	54.0	-6.3	1.00 H	111	41.10	6.60
3	*5785.00	104.5 PK			1.14 H	233	63.80	40.70
4	*5785.00	94.9 AV			1.14 H	233	54.20	40.70
5	11570.00	61.4 PK	74.0	-12.6	1.34 H	300	42.60	18.80
6	11570.00	47.8 AV	54.0	-6.2	1.34 H	300	29.00	18.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	63.1 PK	74.0	-10.9	1.00 V	2	56.50	6.60
2	5440.00	49.9 AV	54.0	-4.1	1.00 V	2	43.30	6.60
3	*5785.00	118.9 PK			1.14 V	187	78.20	40.70
4	*5785.00	108.6 AV			1.14 V	187	67.90	40.70
5	11570.00	69.5 PK	74.0	-4.5	1.04 V	151	50.70	18.80
6	11570.00	52.2 AV	54.0	-1.8	1.04 V	151	33.40	18.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	56.7 PK	74.0	-17.3	1.06 H	22	50.10	6.60
2	5440.00	47.0 AV	54.0	-7.0	1.06 H	22	40.40	6.60
3	*5825.00	106.2 PK			1.00 H	208	65.50	40.70
4	*5825.00	95.9 AV			1.00 H	208	55.20	40.70
5	#5850.00	64.3 PK	78.2	-13.9	1.23 H	44	57.30	7.00
6	#5853.00	65.1 PK	78.2	-13.1	1.23 H	44	58.00	7.10
7	#5861.00	60.1 PK	74.0	-13.9	1.20 H	222	53.00	7.10
8	#5861.00	49.9 AV	54.0	-4.1	1.20 H	222	42.80	7.10
9	11650.00	61.9 PK	74.0	-12.1	1.19 H	128	42.70	19.20
10	11650.00	49.0 AV	54.0	-5.0	1.19 H	128	29.80	19.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	62.6 PK	74.0	-11.4	1.06 V	218	56.00	6.60
2	5440.00	51.3 AV	54.0	-2.7	1.06 V	218	44.70	6.60
3	*5825.00	119.1 PK			1.18 V	246	78.40	40.70
4	*5825.00	108.5 AV			1.18 V	246	67.80	40.70
5	#5850.00	71.6 PK	78.2	-6.6	1.25 V	314	64.60	7.00
6	#5853.00	73.1 PK	78.2	-5.1	1.25 V	314	66.00	7.10
7	#5861.00	62.7 PK	74.0	-11.3	1.00 V	19	55.60	7.10
8	#5861.00	49.4 AV	54.0	-4.6	1.00 V	19	42.30	7.10
9	11650.00	67.7 PK	74.0	-6.3	1.00 V	232	48.50	19.20
10	11650.00	52.2 AV	54.0	-1.8	1.00 V	232	33.00	19.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



A D T

802.11n (40MHz)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	59.7 PK	74.0	-14.3	1.06 H	301	53.10	6.60
2	5440.00	48.6 AV	54.0	-5.4	1.06 H	301	42.00	6.60
3	#5714.00	57.9 PK	74.0	-16.1	1.12 H	88	50.90	7.00
4	#5714.00	46.9 AV	54.0	-7.1	1.12 H	88	39.90	7.00
5	#5722.00	61.7 PK	78.2	-16.5	1.19 H	221	54.70	7.00
6	#5725.00	62.2 PK	78.2	-16.0	1.19 H	221	55.10	7.10
7	*5755.00	99.0 PK			1.02 H	208	58.30	40.70
8	*5755.00	89.0 AV			1.02 H	208	48.30	40.70
9	11510.00	60.7 PK	74.0	-13.3	1.11 H	334	42.00	18.70
10	11510.00	47.5 AV	54.0	-6.5	1.11 H	334	28.80	18.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	62.3 PK	74.0	-11.7	1.18 V	309	55.70	6.60
2	5440.00	52.1 AV	54.0	-1.9	1.18 V	309	45.50	6.60
3	#5714.00	67.3 PK	74.0	-6.7	1.25 V	157	60.30	7.00
4	#5714.00	52.8 AV	54.0	-1.2	1.25 V	157	45.80	7.00
5	#5722.00	74.5 PK	78.2	-3.7	1.24 V	160	67.50	7.00
6	#5725.00	75.1 PK	78.2	-3.1	1.24 V	160	68.00	7.10
7	*5755.00	112.5 PK			1.18 V	192	71.80	40.70
8	*5755.00	102.2 AV			1.18 V	192	61.50	40.70
9	11510.00	61.2 PK	74.0	-12.8	1.00 V	303	42.50	18.70
10	11510.00	47.9 AV	54.0	-6.1	1.00 V	303	29.20	18.70

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	57.0 PK	74.0	-17.0	1.22 H	334	50.40	6.60
2	5440.00	45.9 AV	54.0	-8.1	1.22 H	334	39.30	6.60
3	*5795.00	101.6 PK			1.00 H	207	60.90	40.70
4	*5795.00	91.0 AV			1.00 H	207	50.30	40.70
5	#5850.00	59.5 PK	78.2	-18.7	1.19 H	281	52.50	7.00
6	#5853.00	59.0 PK	78.2	-19.2	1.19 H	281	51.90	7.10
7	#5861.00	58.3 PK	74.0	-15.7	1.00 H	19	51.20	7.10
8	#5861.00	47.5 AV	54.0	-6.5	1.00 H	19	40.40	7.10
9	11590.00	60.7 PK	74.0	-13.3	1.00 H	77	41.80	18.90
10	11590.00	47.5 AV	54.0	-6.5	1.00 H	77	28.60	18.90

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5440.00	63.4 PK	74.0	-10.6	1.25 V	52	56.80	6.60
2	5440.00	52.3 AV	54.0	-1.7	1.25 V	52	45.70	6.60
3	*5795.00	114.7 PK			1.18 V	214	74.00	40.70
4	*5795.00	104.3 AV			1.18 V	214	63.60	40.70
5	#5850.00	64.3 PK	78.2	-13.9	1.28 V	337	57.30	7.00
6	#5853.00	65.7 PK	78.2	-12.5	1.28 V	337	58.60	7.10
7	#5861.00	64.2 PK	74.0	-9.8	1.25 V	71	57.10	7.10
8	#5861.00	50.0 AV	54.0	-4.0	1.25 V	71	42.90	7.10
9	11590.00	61.9 PK	74.0	-12.1	1.13 V	222	43.00	18.90
10	11590.00	48.6 AV	54.0	-5.4	1.13 V	222	29.70	18.90

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	57.12	33.5 QP	40.0	-6.5	1.99 H	343	48.20	-14.70
2	99.89	35.3 QP	43.5	-8.2	1.99 H	106	54.20	-18.90
3	158.22	37.4 QP	43.5	-6.1	1.49 H	103	51.30	-13.90
4	500.42	40.0 QP	46.0	-6.0	1.49 H	217	48.40	-8.40
5	751.23	32.6 QP	46.0	-13.4	1.00 H	209	35.70	-3.10
6	900.94	31.7 QP	46.0	-14.3	1.00 H	198	32.20	-0.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	47.40	36.5 QP	40.0	-3.5	1.01 V	42	51.20	-14.70
2	101.84	38.8 QP	43.5	-4.7	1.01 V	45	57.20	-18.40
3	148.50	34.9 QP	43.5	-8.6	1.01 V	236	48.90	-14.00
4	286.55	33.4 QP	46.0	-12.6	1.50 V	213	46.10	-12.70
5	500.42	37.7 QP	46.0	-8.3	1.01 V	264	46.10	-8.40
6	776.51	31.2 QP	46.0	-14.8	1.50 V	173	33.60	-2.40

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
3. The other emission levels were very low against the limit.
4. 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 (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.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100612	Sep. 30, 2014	Sep. 29, 2015
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 13, 2014	Feb. 12, 2015
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 21, 2014	Jul. 20, 2015
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 TEST PROCEDURES

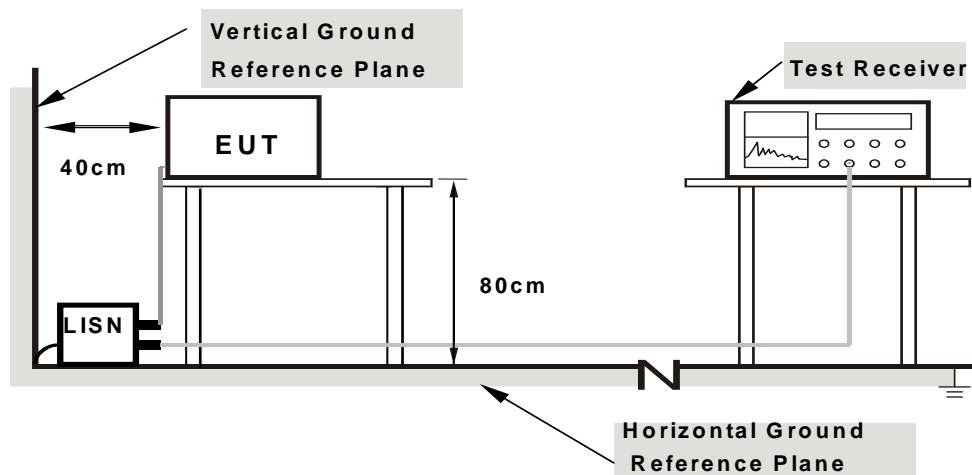
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

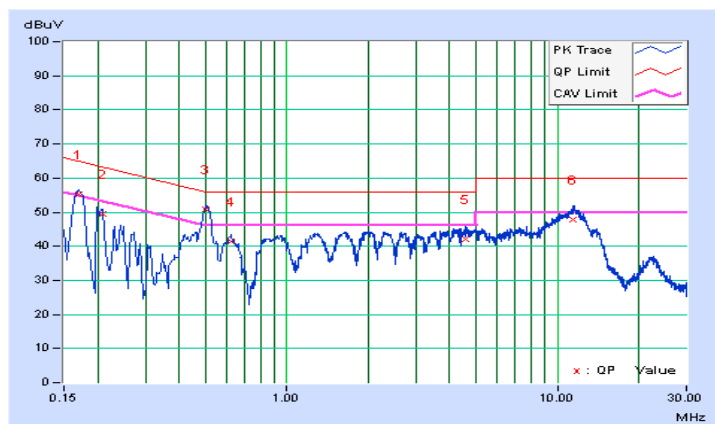
CONDUCTED WORST-CASE DATA: 802.11a

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	0.16932	0.10	55.15	41.32	55.25	41.42	64.99	54.99	-9.74	-13.57
2	0.21000	0.09	49.39	37.58	49.48	37.67	63.21	53.21	-13.72	-15.53
3	0.50439	0.13	50.83	42.00	50.96	42.13	56.00	46.00	-5.04	-3.87
4	0.62550	0.15	41.35	31.45	41.50	31.60	56.00	46.00	-14.50	-14.40
5	4.57800	0.29	41.90	34.90	42.19	35.19	56.00	46.00	-13.81	-10.81
6	11.37000	0.63	47.06	41.22	47.69	41.85	60.00	50.00	-12.31	-8.15

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



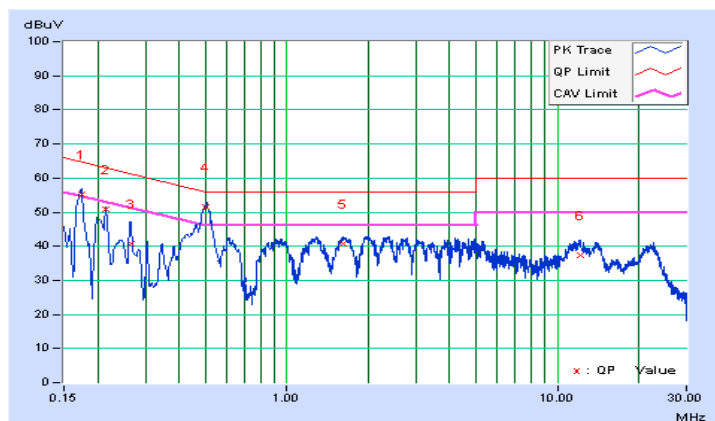


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17384	0.07	55.20	43.94	55.27	44.01	64.77	54.77	-9.51	-10.77
2	0.21406	0.10	50.63	36.40	50.73	36.50	63.05	53.05	-12.32	-16.55
3	0.26429	0.12	40.72	24.92	40.84	25.04	61.30	51.30	-20.46	-26.26
4	0.50341	0.18	51.43	42.62	51.61	42.80	56.00	46.00	-4.39	-3.20
5	1.60637	0.22	40.62	33.11	40.84	33.33	56.00	46.00	-15.16	-12.67
6	12.19400	0.65	36.81	30.15	37.46	30.80	60.00	50.00	-22.54	-19.20

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 TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1	√	Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≤ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
		Mobile and Portable client device	250mW (24 dBm)
U-NII-2A		---	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C		---	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√	---	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 D01 Multiple Transmitter Output v02r01 Method of conducted output power measurement on IEEE 802.11 devices,

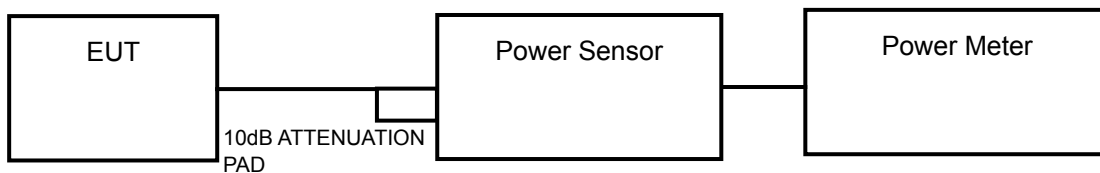
Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

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 specific channel frequencies individually.

4.3.7 TEST RESULTS

For U-NII-1 Band (Outdoor Access Point)

802.11a

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	GAIN (dBi)	EIRP (dBm)	EIRP LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1							
36	5180	10.12	11.39	24.052	13.81	29	7	20.81	21	PASS
40	5200	10.37	11.24	24.194	13.84	29	7	20.84	21	PASS
48	5240	10.33	11.45	24.753	13.94	29	7	20.94	21	PASS

NOTE: Gain = 7dBi > 6dBi, so the conducted power limit shall be reduced to $30-(7-6) = 29$ dBm.

802.11n (HT20)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	GAIN (dBi)	EIRP (dBm)	EIRP LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1							
36	5180	10.11	11.36	23.934	13.79	29	7	20.79	21	PASS
40	5200	10.21	11.31	24.016	13.81	29	7	20.81	21	PASS
48	5240	10.72	11.12	24.745	13.93	29	7	20.93	21	PASS

NOTE: Gain = 7dBi > 6dBi, so the conducted power limit shall be reduced to $30-(7-6) = 29$ dBm.

802.11n (HT40)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	GAIN (dBi)	EIRP (dBm)	EIRP LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1							
38	5190	10.46	11.23	24.391	13.87	29	7	20.87	21	PASS
46	5230	10.41	11.01	23.608	13.73	29	7	20.73	21	PASS

NOTE: Gain = 7dBi > 6dBi, so the conducted power limit shall be reduced to $30-(7-6) = 29$ dBm.

For U-NII-3 Band

POWER OUTPUT:

802.11a

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	19.18	18.14	147.957	21.70	29	PASS
157	5785	18.50	18.13	135.808	21.33	29	PASS
165	5825	18.55	17.77	131.455	21.19	29	PASS

NOTE: Gain = 7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm.

802.11n (20MHz)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	18.55	17.49	127.719	21.06	29	PASS
157	5785	18.31	17.88	129.140	21.11	29	PASS
165	5825	18.25	17.57	123.982	20.93	29	PASS

NOTE: Gain = 7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm.

802.11n (40MHz)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
151	5755	14.68	13.63	52.443	17.20	29	PASS
159	5795	17.21	16.81	100.575	20.02	29	PASS

NOTE: Gain = 7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm.

4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1	√	Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
		Mobile and Portable client device	
U-NII-2A		---	11dBm/ MHz
U-NII-2C		---	11dBm/ MHz
U-NII-3	√	---	30dBm/ MHz

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

For U-NII-1 band:

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 kHz, Set VBW \geq 1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 500 kHz, Set VBW \geq 3 RBW, Detector = RMS
- 3) Sweep time = auto, trigger set to "free run".
- 4) Trace average at least 100 traces in power averaging mode.
- 5) Record the max value and add 10 log (1/duty cycle)
- 6) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where
$$BWCF = 10\log(500 \text{ kHz}/300\text{kHz})$$

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

4.4.7 TEST RESULTS

802.11a

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	-3.80	-1.58	0.46	0.11	0.57	12.99	PASS
40	5200	-3.40	-2.12	0.30	0.11	0.41	12.99	PASS
48	5240	-3.55	-2.64	-0.06	0.11	0.05	12.99	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = 7dBi + 10log(2) = 10.01dBi > 6dBi , so the power density limit shall be reduced to 17-(10.01-6) = 12.99dBm.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (20MHz)

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
36	5180	-3.81	-1.94	0.23	0.12	0.35	12.99	PASS
40	5200	-3.66	-2.04	0.23	0.12	0.35	12.99	PASS
48	5240	-3.32	-1.89	0.46	0.12	0.58	12.99	PASS

NOTE:

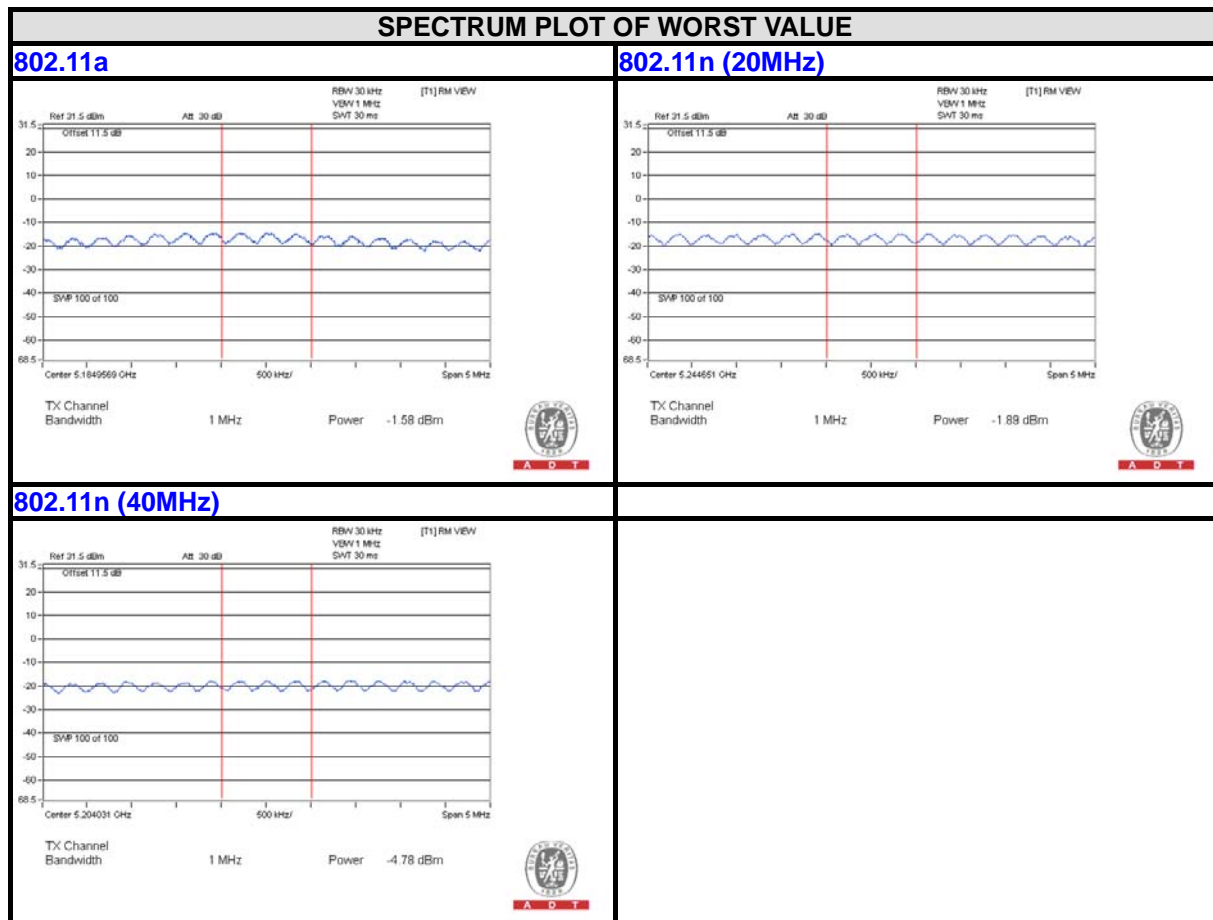
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
Directional gain = 7dBi + 10log(2) = 10.01dBi > 6dBi , so the power density limit shall be reduced to 17-(10.01-6) = 12.99dBm.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (40MHz)

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	-6.30	-4.78	-2.46	0.18	-2.29	12.99	PASS
46	5230	-7.15	-5.29	-3.11	0.18	-2.93	12.99	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 Band:**
 Directional gain = 7dBi + 10log(2) = 10.01dBi > 6dBi , so the power density limit shall be reduced to 17-(10.01-6) = 12.99dBm.
- Refer to section 3.3 for duty cycle spectrum plot.



For U-NII-3 Band

802.11a

TX chain	Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	1.93	4.15	3.01	7.27	25.99	PASS
	157	5785	1.12	3.34	3.01	6.46	25.99	PASS
	165	5825	0.38	2.60	3.01	5.72	25.99	PASS
1	149	5745	0.24	2.46	3.01	5.58	25.99	PASS
	157	5785	1.19	3.41	3.01	6.53	25.99	PASS
	165	5825	2.24	4.46	3.01	7.58	25.99	PASS

NOTE: Directional gain = 7dBi + 10log(2) = 10.01dBi > 6dBi , so the power density limit shall be reduced to 30-(10.01-6) = 25.99dBm.

802.11n (20MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	0.51	2.73	3.01	5.86	25.99	PASS
	157	5785	0.97	3.19	3.01	6.32	25.99	PASS
	165	5825	0.18	2.40	3.01	5.53	25.99	PASS
1	149	5745	-0.68	1.54	3.01	4.67	25.99	PASS
	157	5785	0.51	2.73	3.01	5.86	25.99	PASS
	165	5825	1.96	4.18	3.01	7.31	25.99	PASS

NOTE: Directional gain = 7dBi + 10log(2) = 10.01dBi > 6dBi , so the power density limit shall be reduced to 30-(10.01-6) = 25.99dBm.

802.11n (40MHz)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	151	5755	-6.44	-4.22	3.01	-1.03	25.99	PASS
	159	5795	-4.20	-1.98	3.01	1.21	25.99	PASS
1	151	5755	-6.98	-4.76	3.01	-1.57	25.99	PASS
	159	5795	-4.17	-1.95	3.01	1.24	25.99	PASS

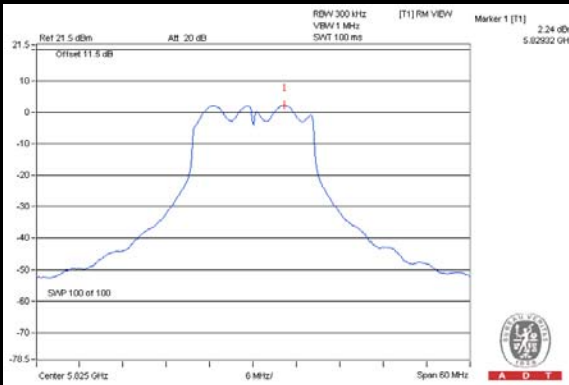
NOTE: Directional gain = 7dBi + 10log(2) = 10.01dBi > 6dBi , so the power density limit shall be reduced to 30-(10.01-6) = 25.99dBm.



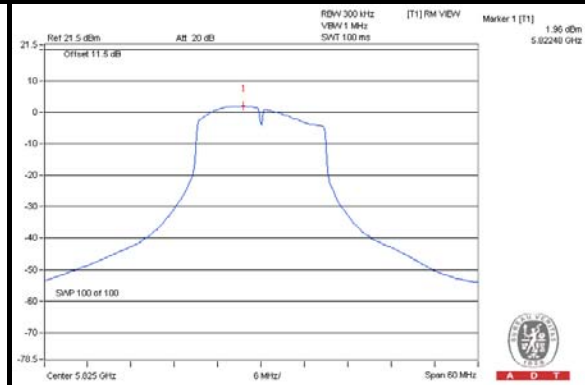
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SPECTRUM PLOT OF WORST VALUE

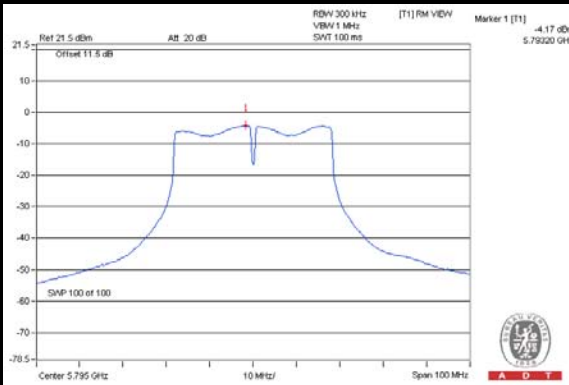
802.11a



802.11n (20MHz)



802.11n (40MHz)

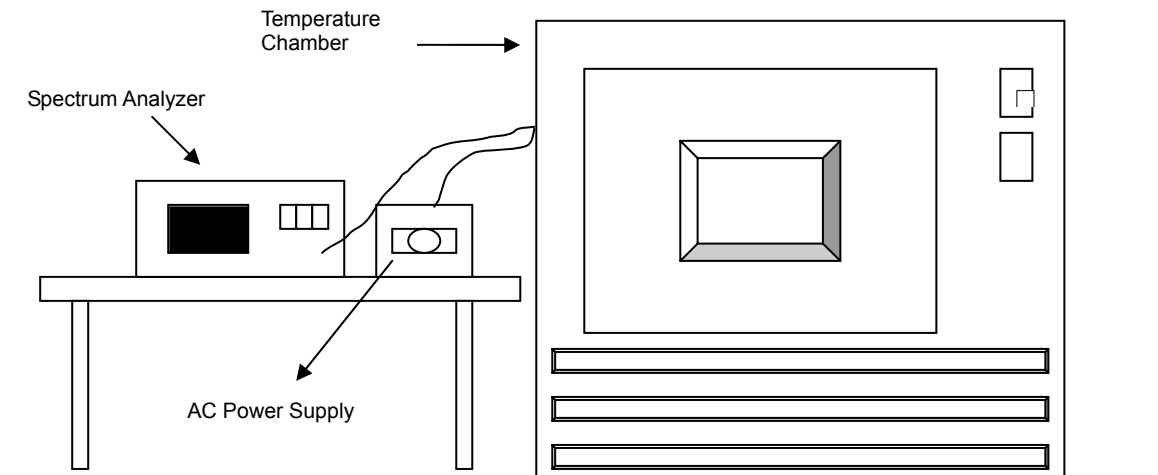


4.5 FREQUENCY STABILITY

4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.5.4 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

4.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5240.0194	0.00037	5240.0224	0.00043	5240.0207	0.00040	5240.0187	0.00036
40	120	5239.9912	-0.00017	5239.9953	-0.00009	5239.9924	-0.00015	5239.9935	-0.00012
30	120	5239.9980	-0.00004	5239.9967	-0.00006	5239.9993	-0.00001	5239.9962	-0.00007
20	120	5240.0159	0.00030	5240.0192	0.00037	5240.0195	0.00037	5240.0164	0.00031
10	120	5240.0177	0.00034	5240.0173	0.00033	5240.0179	0.00034	5240.0214	0.00041
0	120	5240.0096	0.00018	5240.0085	0.00016	5240.0129	0.00025	5240.0121	0.00023
-10	120	5239.9903	-0.00019	5239.9878	-0.00023	5239.9910	-0.00017	5239.9897	-0.00020
-20	120	5239.9810	-0.00036	5239.9785	-0.00041	5239.9788	-0.00040	5239.9809	-0.00036
-30	120	5240.0122	0.00023	5240.0100	0.00019	5240.0106	0.00020	5240.0142	0.00027

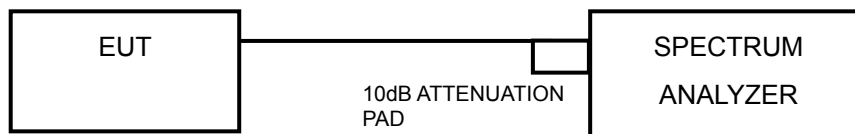
FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5240.0160	0.00031	5240.0192	0.00037	5240.0203	0.00039	5240.0170	0.00032
	120	5240.0159	0.00030	5240.0192	0.00037	5240.0195	0.00037	5240.0164	0.00031
	102	5240.0163	0.00031	5240.0184	0.00035	5240.0198	0.00038	5240.0154	0.00029

4.6 6dB BANDWIDTH MEASUREMENT

4.6.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

- a. Set resolution bandwidth (RBW) = 100kHz
- b. Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. 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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITIONS

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

4.6.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.38	15.75	0.5	PASS
157	5785	15.79	16.42	0.5	PASS
165	5825	16.40	15.73	0.5	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.59	16.03	0.5	PASS
157	5785	16.63	15.33	0.5	PASS
165	5825	16.67	15.36	0.5	PASS

802.11n (40MHz)

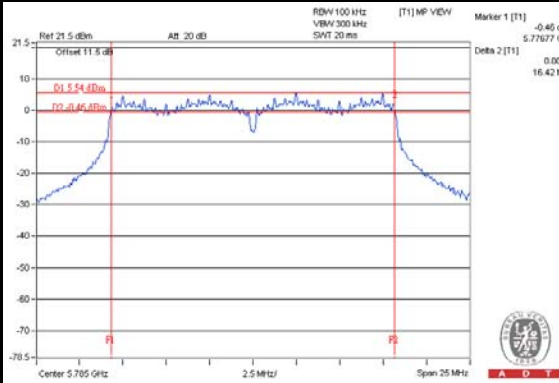
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	35.81	36.02	0.5	PASS
159	5795	35.75	36.10	0.5	PASS



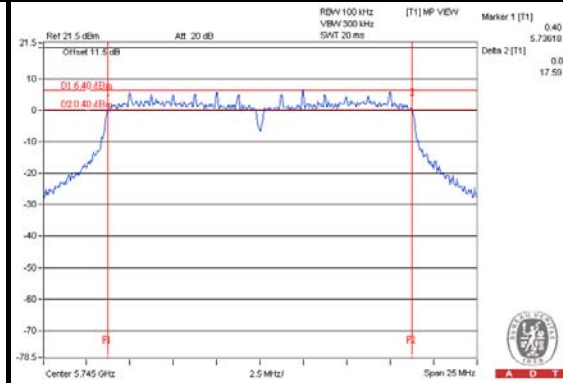
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SPECTRUM PLOT OF WORST VALUE

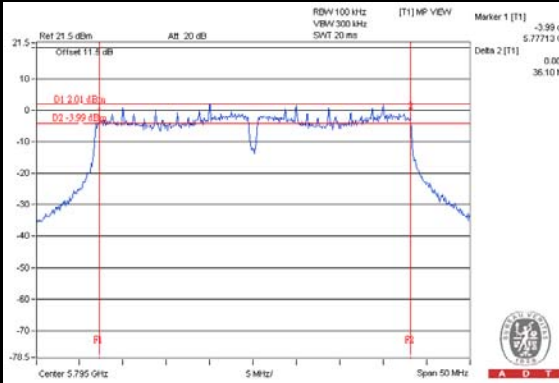
802.11a



802.11n (20MHz)



802.11n (40MHz)



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



6. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Lab:

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---