

FCC TEST REPORT

(WALN 15.407)

REPORT NO.: RF141124D08-1

MODEL NO.: EA2750

FCC ID: Q87-EA2750

RECEIVED: Nov. 24, 2014

TESTED: Jan. 9 ~ 20, 2015

ISSUED: Feb. 12, 2015

APPLICANT: Linksys LLC

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ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141124D08-1	Original release.	Feb. 12, 2015

1. CERTIFICATION

PRODUCT: Wireless Network
BRAND NAME: Linksys
MODEL: EA2750
APPLICANT: Linksys LLC
TESTED: Jan. 9 ~ 20, 2015
TEST SAMPLE: ENGINEERING SAMPLE
STANDARDS: **FCC Part 15, Subpart E (Section 15.407)**
ANSI C63.10-2009

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

PREPARED BY : Annie Chang , **DATE:** Feb. 12, 2015
(Annie Chang / Supervisor)

APPROVED BY : Rex Lai , **DATE:** Feb. 12, 2015
(Rex Lai / Assistant 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 -7.02dB at 0.35313MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -6.0dB at 10480.00MHz.
15.407(b)(1/2/3/4/6)	Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB 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	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	150kHz~30MHz	3.43 dB
Radiated emissions	30MHz ~ 1GHz	4.00 dB
	Above 1GHz	3.36 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	Wireless Network
MODEL NO.	EA2750
POWER SUPPLY	12V, 1A
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6Mbps 802.11n: up to 300Mbps
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	5180 ~ 5240MHz: 232.9mW 5745 ~ 5825MHz: 135.7mW
ANTENNA TYPE	Dipole antenna with 2.94dBi gain
ANTENNA CONNECTOR	N/A
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Adapter
DRIVE VERSION	1.1.5.165608

NOTE:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx Function
802.11a	1TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

2. Both of the 2.4GHz & 5GHz can transmit simultaneously.

3. The EUT uses following adapter.

Adapter	Brand	Model	AC I/P Power	DC O/P Power	Plug Type	Power Line
1	DVE	DSA-12G-12 FUS 120120	100-240V, 50/60Hz, 0.3A	+12V, 1A	US	Non-shielded DC cable (1.0m)
2	DVE	DSA-12G-12 FEU 120120	100-240V, 50/60Hz, 0.3A	+12V, 1A	EU	
3	DVE	DSA-12G-12 FUK 120120	100-240V, 50/60Hz, 0.3A	+12V, 1A	UK	
4	DVE	DSA-12G-12 FAU 120120	100-240V, 50/60Hz, 0.3A	+12V, 1A	AUS	
5	DVE	DSA-12PFE-12BUS	100-240V, 50/60Hz, 0.3A	+12V, 1A	US	
6	DVE	DSA-12CA-12 120100	100-240V, 50/60Hz, 0.3A	+12V, 1A	US	
7					EU	
8					UK	
9	LEI	MU12AB120100-A1	100-240V, 50/60Hz, 0.4A	+12V, 1A	US	
10	LEI	IU18-2120100-WP	100-240V, 50/60Hz, 0.6A	+12V, 1A	US	
11					EU	
12					UK	

After pre-tested, **Adapter 6** was the worst case, therefore, only its test data was recorded in this report.

4. 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 (40 MHz)

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≥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 X, Y 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.

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
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	13
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	27
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	13
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	27

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	5180-5240	36 to 48	36	OFDM	BPSK	6
-	802.11a	5745-5825	149 to 165	149	OFDM	BPSK	6

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	5180-5240	36 to 48	36	OFDM	BPSK	6

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
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	13
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	27
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
-	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	13
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	27

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	23deg. C, 75% RH	120Vac, 60Hz	Aaron You
RE<1G	23deg. C, 75% RH	120Vac, 60Hz	Aaron You
PLC	26deg. C, 74% RH	120Vac, 60Hz	Justin Liu
APCM	25deg. C, 60% RH	120Vac, 60Hz	Saxon Lee

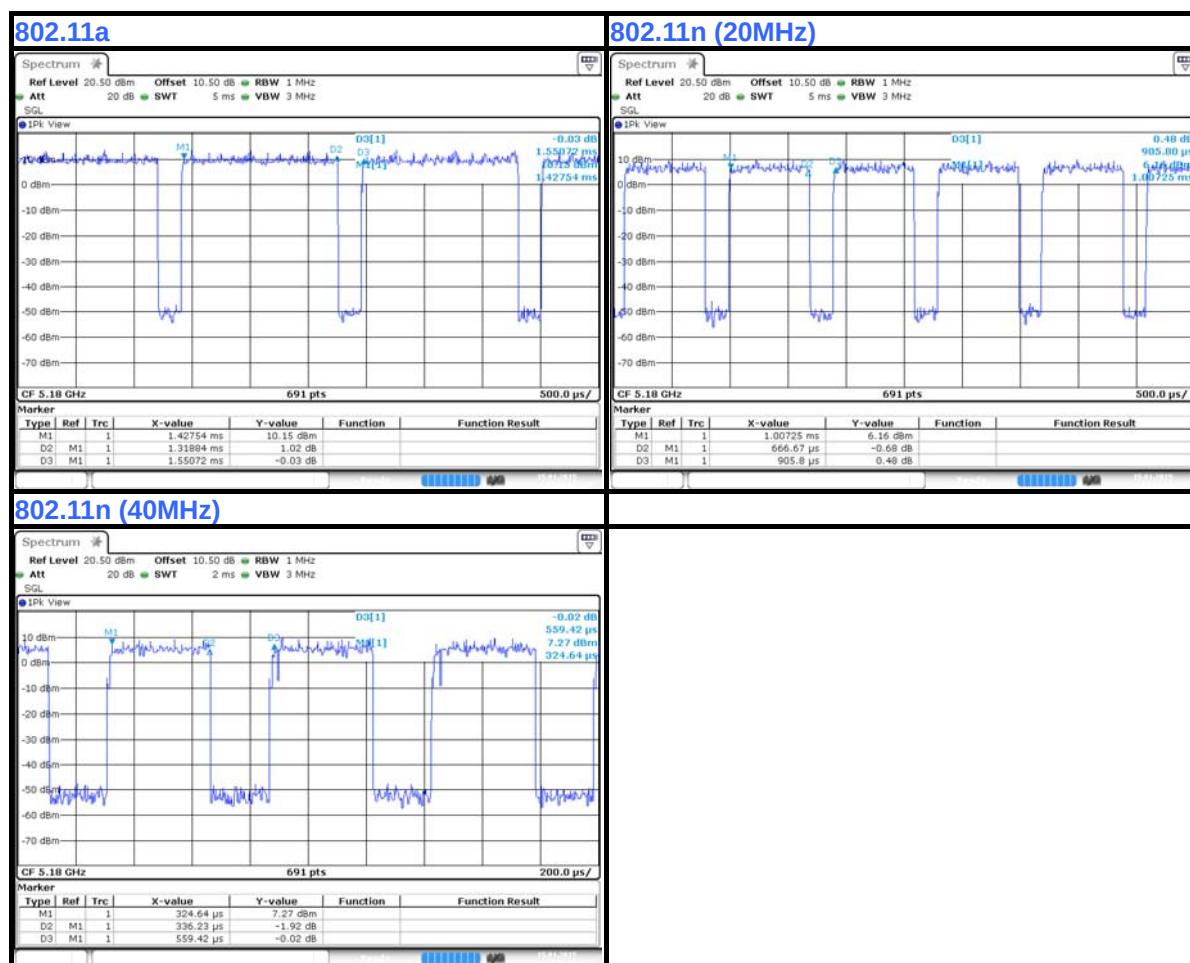
3.3 DUTY CYCLE OF TEST SIGNAL

Duty cycle is < 98%, duty factor shall be considered.

802.11a: Duty cycle = $1.318/1.550 = 0.850$, Duty factor = $10 * \log(1/0.850) = 0.70$

802.11n (20MHz): Duty cycle = $0.666/0.905 = 0.736$, Duty factor = $10 * \log(1/0.736) = 1.33$

802.11n (40MHz): Duty cycle = $0.336/0.559 = 0.601$, Duty factor = $10 * \log(1/0.601) = 2.21$



3.4 DESCRIPTION OF SUPPORT UNITS

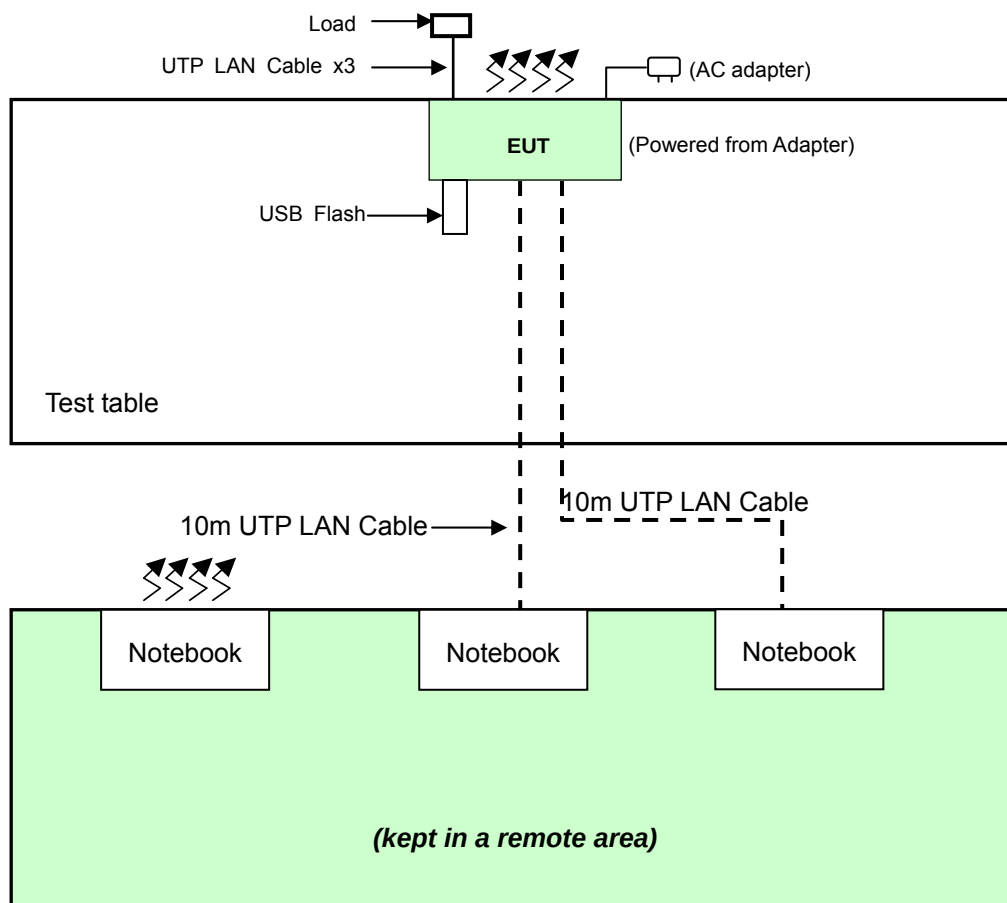
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	USB 3.0 Flash Drive	HP	v250w	N/A	FCC DoC Approved
2	NOTEBOOK COMPUTER	DELL	PP04X	1W9ZZ1S	FCC DoC Approved
3	NOTEBOOK COMPUTER	DELL	PP27L	9SNZ12S	FCC DoC Approved
4	NOTEBOOK COMPUTER	DELL	PP04X	6C1VY1S	FCC DoC Approved
5	LAN Load	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A
2	10m UTP LAN cable
3	10m UTP LAN cable
4	Wireless transmission
5	1.8m UTP LAN cable x3

NOTE: All power cords of the above support units are non shielded (1.8m).

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 product 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 (dBuV/m)	AV: 54 (dBuV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBuV/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 (dBuV/m) ^{*1} PK: 78.2 (dBuV/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.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 26, 2014	Feb. 25, 2015
HP Preamplifier	8449B	3008A01201	Feb. 26, 2014	Feb. 25, 2015
MITEQ Preamplifier	AMF-6F-260400-3 3-8P	892164	Mar. 01, 2014	Feb. 28, 2015
Agilent Spectrum	E4446A	MY51100050	Oct. 24, 2014	Oct. 23, 2015
Agilent TEST RECEIVER	N9038A	MY51210129	Jan. 20, 2015	Jan. 19, 2016
Schwarzbeck Antenna	VULB 9168	139	Feb. 24, 2014	Feb. 23, 2015
Schwarzbeck Antenna	VHBA 9123	480	May 29, 2013	May 28, 2015
Schwarzbeck Horn Antenna	BBHA-9170	212	Aug. 26, 2014	Aug. 25, 2015
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Aug. 26, 2014	Aug. 25, 2015
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	ADT_Radiated_V7. 6.15.9.4	NA	NA	NA
SUHNER RF cable	SF104	CABLE-CH6	Aug. 15, 2014	Aug. 14, 2015
SUHNER RF cable	SF102	Cable-CH8-3.6m	Aug. 15, 2014	Aug. 14, 2015
EMCO Horn Antenna	3115	00028257	Aug. 28, 2014	Aug. 27, 2015
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 29, 2014	Sep. 28, 2015
Anritsu Power Sensor	MA2411B	0738404	Apr. 21, 2014	Apr. 20, 2015
Anritsu Power Meter	ML2495A	0842014	Apr. 21, 2014	Apr. 20, 2015

- NOTE:** 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.
4. The Industry Canada Reference No. IC 7450E-6.
5. The FCC Site Registration No. is 447212.

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:

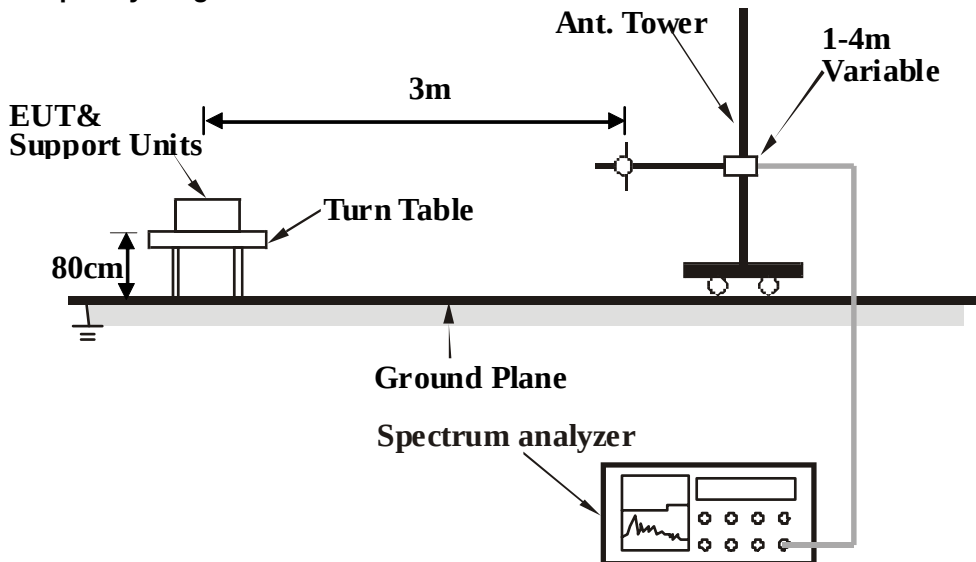
1. For emission measurements above 1 GHz, the EUT shall be placed at a height of 1.5 m above the ground at 3 meter chamber room for test
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
4. 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.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

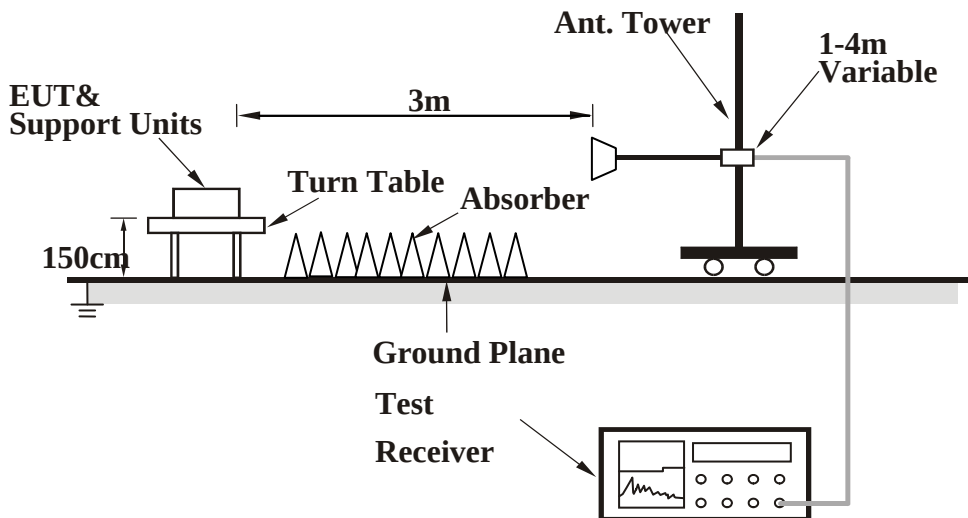
No deviation.

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. Turned on the power of all equipment.
- b. Notebook PC ran a test program to enable all functions.
- c. EUT sent and received messages from Notebook PC (kept in a remote area) via a wireless transmission.
- d. EUT sent and received messages to/ from Notebook PCs (kept in a remote area) via two UTP LAN cables (10m each).
- e. Notebook PCs (kept in a remote area) sent and received messages to/ from USB flash via EUT with an UTP LAN cable (10m).
- f. Repeated steps c-e.

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	68.9 PK	74.0	-5.1	1.00 H	76	65.60	3.27
2	#5150.00	49.9 AV	54.0	-4.1	1.00 H	76	46.62	3.27
3	*5180.00	108.5 PK			1.00 H	76	105.20	3.25
4	*5180.00	97.3 AV			1.00 H	76	94.01	3.25
5	#10360.00	56.9 PK	74.0	-17.1	1.00 H	133	43.10	13.83
6	#10360.00	44.3 AV	54.0	-9.7	1.00 H	133	30.44	13.83
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	69.6 PK	74.0	-4.4	1.20 V	119	66.32	3.27
2	#5150.00	52.3 AV	54.0	-1.8	1.20 V	119	48.98	3.27
3	*5180.00	112.6 PK			1.20 V	119	109.33	3.25
4	*5180.00	102.3 AV			1.20 V	119	99.01	3.25
5	#10360.00	59.4 PK	74.0	-14.6	1.07 V	228	45.61	13.83
6	#10360.00	44.9 AV	54.0	-9.2	1.07 V	228	31.02	13.83

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) – Pre-Amplifier 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	106.4 PK			1.00 H	54	103.22	3.22
2	*5200.00	95.6 AV			1.00 H	54	92.33	3.22
3	#10400.00	57.0 PK	74.0	-17.0	1.00 H	115	43.17	13.80
4	#10400.00	44.2 AV	54.0	-9.8	1.00 H	115	30.42	13.80
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	*5200.00	109.7 PK			1.35 V	120	106.52	3.22
2	*5200.00	98.5 AV			1.35 V	120	95.25	3.22
3	#10400.00	59.4 PK	74.0	-14.6	1.03 V	192	45.60	13.80
4	#10400.00	44.9 AV	54.0	-9.1	1.03 V	192	31.12	13.80

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) – Pre-Amplifier 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	114.3 PK			1.00 H	313	111.01	3.29
2	*5240.00	104.3 AV			1.00 H	313	101.02	3.29
3	#5350.00	58.2 PK	74.0	-15.8	1.00 H	313	54.75	3.48
4	#5350.00	45.8 AV	54.0	-8.2	1.00 H	313	42.28	3.48
5	#10480.00	58.6 PK	74.0	-15.4	1.05 H	226	44.15	14.45
6	#10480.00	46.7 AV	54.0	-7.3	1.05 H	226	32.27	14.45
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	118.4 PK			1.00 V	240	115.08	3.29
2	*5240.00	107.9 AV			1.00 V	240	104.58	3.29
3	#5350.00	68.0 PK	74.0	-6.0	1.00 V	240	64.48	3.48
4	#5350.00	50.4 AV	54.0	-3.6	1.00 V	240	46.93	3.48
5	#10480.00	62.1 PK	74.0	-12.0	1.03 V	22	47.60	14.45
6	#10480.00	48.0 AV	54.0	-6.0	1.03 V	22	33.54	14.45

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) – Pre-Amplifier 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 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	#5725.00	71.4 PK	78.2	-6.8	1.12 H	46	67.05	4.35
2	*5745.00	107.2 PK			1.12 H	46	102.71	4.46
3	*5745.00	96.0 AV			1.12 H	46	91.54	4.46
4	#11490.00	59.9 PK	74.0	-14.1	1.00 H	193	43.56	16.33
5	#11490.00	46.2 AV	54.0	-7.8	1.00 H	193	29.87	16.33
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	#5725.00	75.7 PK	78.2	-2.5	1.00 V	164	71.31	4.35
2	*5745.00	111.3 PK			1.00 V	164	106.87	4.46
3	*5745.00	100.7 AV			1.00 V	164	96.24	4.46
4	#11490.00	60.6 PK	74.0	-13.4	1.08 V	127	44.27	16.33
5	#11490.00	47.9 AV	54.0	-6.1	1.08 V	127	31.58	16.33

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) – Pre-Amplifier 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	*5785.00	105.9 PK			1.12 H	61	101.17	4.68
2	*5785.00	95.5 AV			1.12 H	61	90.84	4.68
3	#11570.00	58.0 PK	74.0	-16.0	1.18 H	110	42.60	15.36
4	#11570.00	46.9 AV	54.0	-7.1	1.18 H	110	31.58	15.36
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	*5785.00	116.9 PK			1.13 V	129	111.96	4.91
2	*5785.00	106.2 AV			1.13 V	129	101.28	4.91
3	#11570.00	67.0 PK	74.0	-7.0	1.48 V	45	50.59	16.37
4	#11570.00	47.7 AV	54.0	-6.3	1.48 V	45	31.33	16.37

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) – Pre-Amplifier 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 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	*5825.00	106.2 PK			1.24 H	47	101.35	4.80
2	*5825.00	95.1 AV			1.24 H	47	90.28	4.80
3	#5850.00	64.9 PK	78.2	-13.3	1.24 H	47	60.07	4.85
4	#11650.00	57.8 PK	74.0	-16.2	1.01 H	56	42.60	15.24
5	#11650.00	45.5 AV	54.0	-8.5	1.01 H	56	30.25	15.24
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	*5825.00	112.5 PK			1.00 V	317	107.66	4.80
2	*5825.00	101.3 AV			1.00 V	317	96.52	4.80
3	#5850.00	76.1 PK	78.2	-2.2	1.00 V	317	71.20	4.85
4	#11650.00	58.1 PK	74.0	-15.9	1.00 V	307	42.88	15.24
5	#11650.00	47.4 AV	54.0	-6.6	1.00 V	307	32.17	15.24

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) – Pre-Amplifier 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.

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	71.6 PK	74.0	-2.4	1.00 H	75	68.36	3.27
2	#5150.00	52.0 AV	54.0	-2.0	1.00 H	75	48.72	3.27
3	*5180.00	111.4 PK			1.00 H	75	108.11	3.25
4	*5180.00	99.9 AV			1.00 H	75	96.62	3.25
5	#10360.00	57.7 PK	74.0	-16.3	1.02 H	188	43.83	13.83
6	#10360.00	44.0 AV	54.0	-10.0	1.02 H	188	30.17	13.83
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	72.0 PK	74.0	-2.0	1.25 V	311	68.73	3.27
2	#5150.00	53.0 AV	54.0	-1.0	1.25 V	311	49.70	3.27
3	*5180.00	114.3 PK			1.25 V	311	111.09	3.25
4	*5180.00	102.0 AV			1.25 V	311	98.76	3.25
5	#10360.00	60.1 PK	74.0	-13.9	1.05 V	224	46.25	13.83
6	#10360.00	46.1 AV	54.0	-7.9	1.05 V	224	32.28	13.83

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) – Pre-Amplifier 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	108.7 PK			1.00 H	72	105.44	3.22
2	*5200.00	97.9 AV			1.00 H	72	94.64	3.22
3	#10400.00	56.7 PK	74.0	-17.3	1.10 H	197	42.89	13.80
4	#10400.00	43.9 AV	54.0	-10.2	1.10 H	197	30.05	13.80
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	*5200.00	113.8 PK			1.36 V	169	110.61	3.22
2	*5200.00	101.3 AV			1.36 V	169	98.12	3.22
3	#10400.00	58.8 PK	74.0	-15.2	1.01 V	119	44.97	13.80
4	#10400.00	45.9 AV	54.0	-8.2	1.01 V	119	32.05	13.80

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) – Pre-Amplifier 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	113.6 PK			1.00 H	73	110.34	3.29
2	*5240.00	101.9 AV			1.00 H	73	98.56	3.29
3	#5350.00	56.8 PK	74.0	-17.2	1.00 H	73	53.28	3.48
4	#5350.00	44.5 AV	54.0	-9.5	1.00 H	73	41.04	3.48
5	#10480.00	58.7 PK	74.0	-15.3	1.17 H	254	44.27	14.45
6	#10480.00	45.5 AV	54.0	-8.5	1.17 H	254	31.02	14.45
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	118.4 PK			1.26 V	0	115.09	3.29
2	*5240.00	106.5 AV			1.26 V	0	103.17	3.29
3	#5350.00	60.9 PK	74.0	-13.1	1.26 V	0	57.46	3.48
4	#5350.00	48.5 AV	54.0	-5.5	1.26 V	0	44.98	3.48
5	#10480.00	59.8 PK	74.0	-14.2	1.69 V	202	45.32	14.45
6	#10480.00	47.3 AV	54.0	-6.7	1.69 V	202	32.87	14.45

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) – Pre-Amplifier 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 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	#5725.00	62.6 PK	78.2	-15.6	1.00 H	303	58.22	4.35
2	*5745.00	106.0 PK			1.00 H	303	101.56	4.46
3	*5745.00	94.1 AV			1.00 H	303	89.67	4.46
4	#11490.00	59.3 PK	74.0	-14.7	1.10 H	237	42.93	16.33
5	#11490.00	46.8 AV	54.0	-7.2	1.10 H	237	30.51	16.33
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	#5725.00	76.7 PK	78.2	-1.5	1.33 V	303	72.33	4.35
2	*5745.00	112.5 PK			1.33 V	303	108.07	4.46
3	*5745.00	99.8 AV			1.33 V	303	95.33	4.46
4	#11490.00	60.2 PK	74.0	-13.8	1.08 V	205	43.89	16.33
5	#11490.00	47.6 AV	54.0	-6.4	1.08 V	205	31.28	16.33

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) – Pre-Amplifier 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	*5785.00	107.6 PK			1.00 H	302	102.94	4.68
2	*5785.00	96.3 AV			1.00 H	302	91.64	4.68
3	#11570.00	58.2 PK	74.0	-15.8	1.24 H	192	42.83	15.36
4	#11570.00	45.5 AV	54.0	-8.5	1.24 H	192	30.11	15.36
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	*5785.00	112.9 PK			1.23 V	310	107.97	4.91
2	*5785.00	101.2 AV			1.23 V	310	96.31	4.91
3	#11570.00	66.5 PK	74.0	-7.6	1.00 V	48	50.08	16.37
4	#11570.00	47.7 AV	54.0	-6.3	1.00 V	48	31.36	16.37

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) – Pre-Amplifier 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 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	*5825.00	105.5 PK			1.00 H	311	100.65	4.80
2	*5825.00	94.9 AV			1.00 H	311	90.10	4.80
3	#5850.00	70.2 PK	78.2	-8.0	1.00 H	311	65.34	4.85
4	#11650.00	58.4 PK	74.0	-15.7	1.30 H	208	43.11	15.24
5	#11650.00	45.1 AV	54.0	-8.9	1.30 H	208	29.85	15.24
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	*5825.00	112.5 PK			1.34 V	311	107.67	4.80
2	*5825.00	99.9 AV			1.34 V	311	95.06	4.80
3	#5850.00	77.0 PK	78.2	-1.2	1.34 V	311	72.12	4.85
4	#11650.00	60.9 PK	74.0	-13.1	1.03 V	261	45.63	15.24
5	#11650.00	47.0 AV	54.0	-7.0	1.03 V	261	31.72	15.24

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) – Pre-Amplifier 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.

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	64.2 PK	74.0	-9.8	1.00 H	316	60.93	3.27
2	#5150.00	47.3 AV	54.0	-6.7	1.00 H	316	44.04	3.27
3	*5190.00	103.8 PK			1.00 H	316	100.58	3.23
4	*5190.00	88.2 AV			1.00 H	316	84.99	3.23
5	#10380.00	57.4 PK	74.0	-16.6	1.57 H	224	43.58	13.81
6	#10380.00	44.0 AV	54.0	-10.0	1.57 H	224	30.20	13.81
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	68.3 PK	74.0	-5.7	1.00 V	234	65.03	3.27
2	#5150.00	51.8 AV	54.0	-2.2	1.00 V	234	48.49	3.27
3	*5190.00	106.6 PK			1.00 V	234	103.39	3.23
4	*5190.00	92.0 AV			1.00 V	234	88.77	3.23
5	#10380.00	58.6 PK	74.0	-15.4	1.27 V	154	44.75	13.81
6	#10380.00	45.0 AV	54.0	-9.0	1.27 V	154	31.21	13.81

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) – Pre-Amplifier 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 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	108.0 PK			1.00 H	315	104.71	3.27
2	*5230.00	92.9 AV			1.00 H	315	89.58	3.27
3	#5350.00	67.2 PK	74.0	-6.8	1.00 H	315	63.74	3.48
4	#5350.00	49.4 AV	54.0	-4.6	1.00 H	315	45.89	3.48
5	#10460.00	59.2 PK	74.0	-14.8	1.31 H	146	44.93	14.28
6	#10460.00	45.6 AV	54.0	-8.5	1.31 H	146	31.27	14.28
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	112.3 PK			1.00 V	215	109.06	3.27
2	*5230.00	96.6 AV			1.00 V	215	93.31	3.27
3	#5350.00	72.1 PK	74.0	-2.0	1.00 V	215	68.57	3.48
4	#5350.00	51.4 AV	54.0	-2.6	1.00 V	215	47.93	3.48
5	#10460.00	61.2 PK	74.0	-12.9	1.00 V	119	46.87	14.28
6	#10460.00	46.9 AV	54.0	-7.1	1.00 V	119	32.58	14.28

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) – Pre-Amplifier 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 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	#5725.00	67.4 PK	78.2	-10.8	1.00 H	331	63.08	4.35
2	*5755.00	103.6 PK			1.00 H	331	99.08	4.52
3	*5755.00	88.7 AV			1.00 H	331	84.22	4.52
4	#11510.00	59.4 PK	74.0	-14.6	1.02 H	258	43.15	16.21
5	#11510.00	46.0 AV	54.0	-8.0	1.02 H	258	29.83	16.21
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	#5725.00	77.1 PK	78.2	-1.1	1.30 V	194	72.76	4.35
2	*5755.00	109.4 PK			1.30 V	194	104.85	4.52
3	*5755.00	93.5 AV			1.30 V	194	88.94	4.52
4	#11510.00	61.0 PK	74.0	-13.0	1.00 V	122	44.82	16.21
5	#11510.00	47.3 AV	54.0	-6.7	1.00 V	122	31.05	16.21

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) – Pre-Amplifier 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	*5795.00	104.9 PK			1.00 H	311	100.19	4.73
2	*5795.00	90.6 AV			1.00 H	311	85.91	4.73
3	#5850.00	70.3 PK	78.2	-7.9	1.00 H	311	65.44	4.85
4	#11590.00	58.9 PK	74.0	-15.1	1.28 H	101	43.79	15.08
5	#11590.00	45.0 AV	54.0	-9.0	1.28 H	101	29.88	15.08
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	*5795.00	110.5 PK			1.00 V	304	105.74	4.73
2	*5795.00	95.8 AV			1.00 V	304	91.02	4.73
3	#5850.00	77.1 PK	78.2	-1.1	1.00 V	304	72.27	4.85
4	#11590.00	61.0 PK	74.0	-13.1	1.05 V	195	45.87	15.08
5	#11590.00	46.2 AV	54.0	-7.8	1.05 V	195	31.08	15.08

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) – Pre-Amplifier 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 36	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	193.39	33.3 QP	43.5	-10.2	2.28 H	92	49.55	-16.24
2	300.00	33.1 QP	46.0	-12.9	2.06 H	255	45.15	-12.09
3	500.02	31.8 QP	46.0	-14.2	1.87 H	306	40.17	-8.35
4	750.01	32.5 QP	46.0	-13.5	1.00 H	211	36.16	-3.68
5	846.17	37.9 QP	46.0	-8.1	1.00 H	73	40.21	-2.32
6	874.95	38.5 QP	46.0	-7.5	1.00 H	207	40.39	-1.92
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	35.33	32.0 QP	40.0	-8.0	1.32 V	218	47.17	-15.13
2	68.01	31.6 QP	40.0	-8.4	1.56 V	354	46.96	-15.38
3	500.02	34.1 QP	46.0	-11.9	2.29 V	228	42.47	-8.35
4	624.96	34.9 QP	46.0	-11.1	2.97 V	243	40.68	-5.79
5	739.23	33.0 QP	46.0	-13.0	2.65 V	220	36.99	-4.00
6	874.95	32.8 QP	46.0	-13.2	1.97 V	143	34.70	-1.92

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) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

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	154.94	24.9 QP	43.5	-18.6	2.34 H	234	38.23	-13.31
2	321.20	27.2 QP	46.0	-18.8	1.98 H	291	38.75	-11.54
3	624.96	29.3 QP	46.0	-16.7	1.31 H	161	35.08	-5.79
4	765.05	32.5 QP	46.0	-13.5	1.05 H	282	35.91	-3.37
5	846.17	37.6 QP	46.0	-8.4	1.00 H	72	39.93	-2.32
6	910.12	33.8 QP	46.0	-12.2	1.00 H	73	34.97	-1.14
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	66.47	32.2 QP	40.0	-7.9	1.35 V	5	47.15	-15.00
2	299.99	27.5 QP	46.0	-18.5	1.69 V	68	39.58	-12.09
3	500.02	32.8 QP	46.0	-13.2	2.46 V	203	41.19	-8.35
4	580.07	33.0 QP	46.0	-13.0	2.43 V	267	39.73	-6.76
5	750.01	33.1 QP	46.0	-12.9	2.51 V	219	36.79	-3.68
6	874.95	33.2 QP	46.0	-12.8	1.99 V	142	35.11	-1.92

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) – Pre-Amplifier 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.	Cal. Date	Cal. Due
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	100292	Dec. 18, 2014	Dec. 17, 2015
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	100104	Dec. 04, 2014	Dec. 03, 2015
LISN With Adapter (for EUT)	AD10	C09Ada-001	Dec. 04, 2014	Dec. 03, 2015
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	847265/023	Oct. 21, 2014	Oct. 20, 2015
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 08, 2014	May 07, 2015
Software	ADT_Cond_V7.3.7	NA	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C09.01	Feb. 20, 2014	Feb. 19, 2015
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010789	May 20, 2014	May 19, 2015
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 20, 2014	Nov. 19, 2015
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 20, 2014	Nov. 19, 2015

Notes: 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 Shielded Room No. 9.
3. The VCCI Site Registration No. C-1312.

4.2.3 TEST PROCEDURES

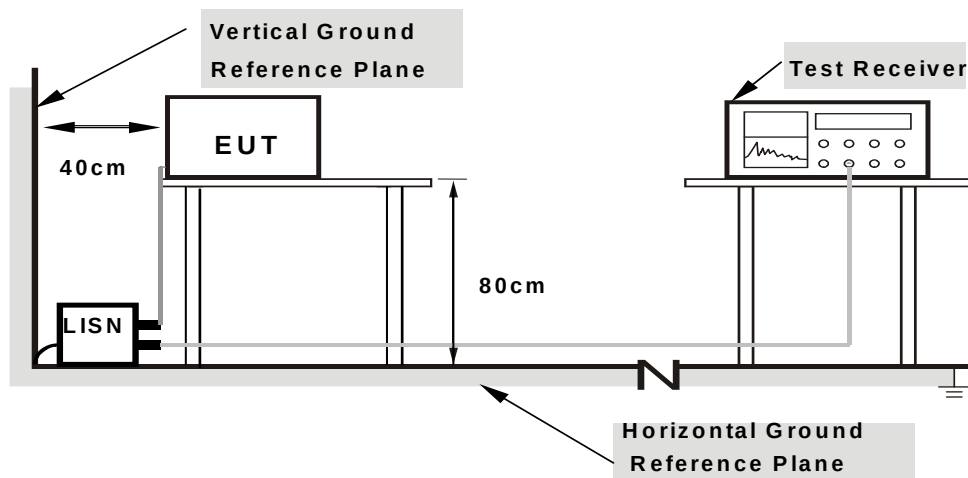
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 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 cm 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 item 4.1.6.

4.2.7 TEST RESULTS

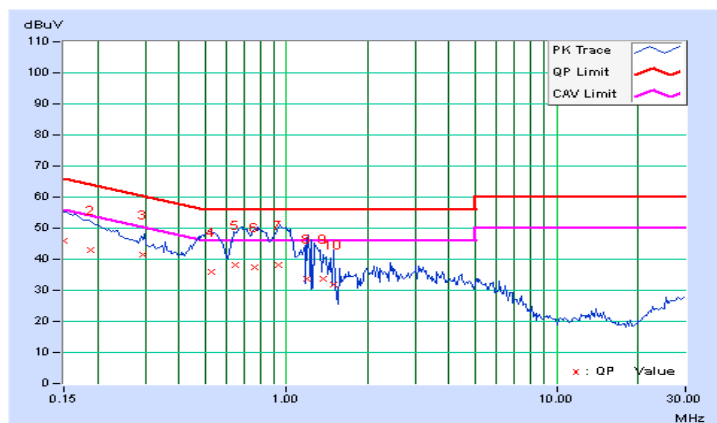
CONDUCTED WORST-CASE DATA

PHASE	Line 1	6dB BANDWIDTH	9kHz
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Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.21	45.75	24.86	45.96	25.07	66.00	56.00	-20.04	-30.93
2	0.18915	0.23	42.65	21.93	42.88	22.16	64.07	54.07	-21.20	-31.92
3	0.29463	0.25	41.33	38.80	41.58	39.05	60.39	50.39	-18.81	-11.34
4	0.52736	0.28	35.49	24.97	35.77	25.25	56.00	46.00	-20.23	-20.75
5	0.64832	0.30	37.96	28.71	38.26	29.01	56.00	46.00	-17.74	-16.99
6	0.76739	0.31	37.13	27.35	37.44	27.66	56.00	46.00	-18.56	-18.34
7	0.93911	0.33	37.76	32.39	38.09	32.72	56.00	46.00	-17.91	-13.28
8	1.18933	0.36	33.25	21.27	33.61	21.63	56.00	46.00	-22.39	-24.37
9	1.36358	0.38	33.34	23.70	33.72	24.08	56.00	46.00	-22.28	-21.92
10	1.49609	0.39	31.64	17.52	32.03	17.91	56.00	46.00	-23.97	-28.09

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

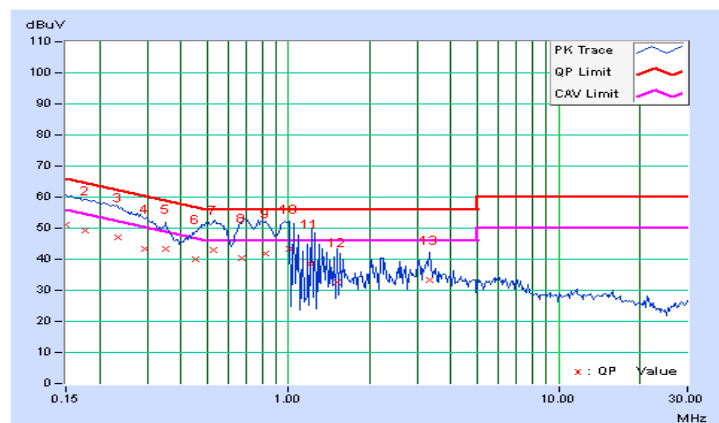


PHASE	Line 2	6dB BANDWIDTH	9kHz
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Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBUV)		Emission Level (dBUV)		Limit (dBUV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.21	50.89	28.74	51.10	28.95	66.00	56.00	-14.90	-27.05
2	0.17800	0.22	48.99	33.83	49.21	34.05	64.58	54.58	-15.37	-20.53
3	0.23445	0.24	46.76	36.55	47.00	36.79	62.29	52.29	-15.29	-15.50
4	0.29367	0.25	43.01	38.05	43.26	38.30	60.42	50.42	-17.16	-12.12
5	0.35313	0.27	42.88	41.60	43.15	41.87	58.89	48.89	-15.74	-7.02
6	0.45431	0.29	39.69	20.96	39.98	21.25	56.80	46.80	-16.82	-25.55
7	0.52899	0.30	42.81	33.83	43.11	34.13	56.00	46.00	-12.89	-11.87
8	0.67314	0.31	39.97	35.96	40.28	36.27	56.00	46.00	-15.72	-9.73
9	0.82571	0.33	41.59	27.84	41.92	28.17	56.00	46.00	-14.08	-17.83
10	1.00593	0.35	42.96	18.42	43.31	18.77	56.00	46.00	-12.69	-27.23
11	1.20704	0.37	38.09	15.52	38.46	15.89	56.00	46.00	-17.54	-30.11
12	1.51953	0.39	32.29	21.93	32.68	22.32	56.00	46.00	-23.32	-23.68
13	3.31641	0.49	32.70	23.59	33.19	24.08	56.00	46.00	-22.81	-21.92

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

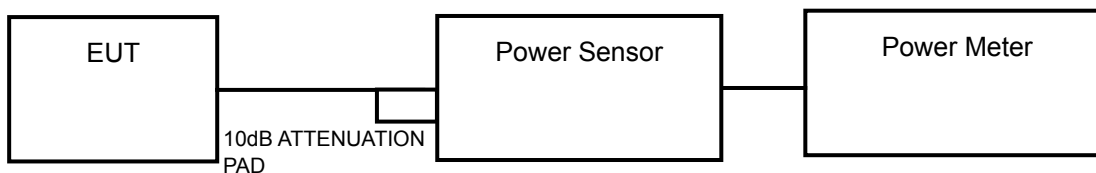


4.3 TRANSMIT POWER MEASUREMENT

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 $\leq$ 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-3	√	---	1 Watt (30 dBm)

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

For 802.11a, 802.11n (HT20), 802.11n (HT40)

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.

FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

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

POWER OUTPUT:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	MAXIMUM CONDUCTED POWER (dBm)	MAXIMUM CONDUCTED POWER (mW)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	15.87	38.6	30	PASS
40	5200	16.28	42.5	30	PASS
48	5240	23.63	230.7	30	PASS
149	5745	14.89	30.8	30	PASS
157	5785	19.81	95.7	30	PASS
165	5825	15.62	36.5	30	PASS

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				
36	5180	18.73	18.52	145.8	21.64	30	PASS
40	5200	19.82	19.42	183.4	22.63	30	PASS
48	5240	20.35	20.57	222.4	23.47	30	PASS
149	5745	14.49	14.07	53.6	17.30	30	PASS
157	5785	18.34	18.29	135.7	21.33	30	PASS
165	5825	15.63	16.01	76.5	18.83	30	PASS

802.11n (40 MHz)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	14.62	15.15	61.7	17.90	30	PASS
46	5230	20.54	20.78	232.9	23.67	30	PASS
151	5755	12.12	13.20	37.2	15.70	30	PASS
159	5795	17.34	17.28	107.7	20.32	30	PASS

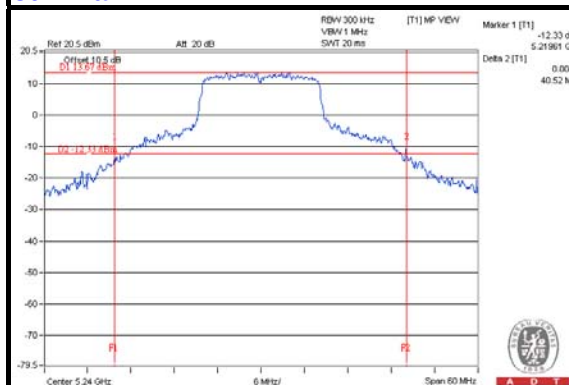
26dB BANDWIDTH:

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
802.11a			
36	5180	22.61	PASS
40	5200	22.48	PASS
48	5240	40.52	PASS

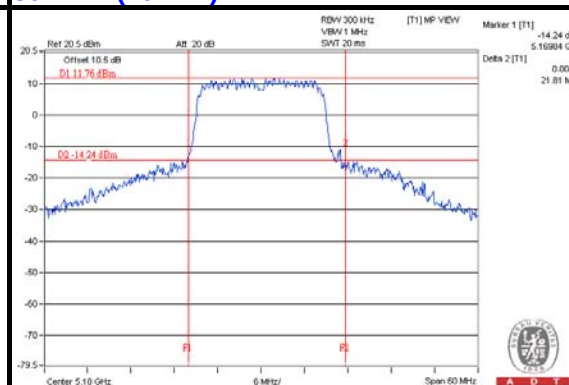
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
802.11n (20MHz)				
36	5180	20.32	21.81	PASS
40	5200	20.34	21.14	PASS
48	5240	20.33	21.09	PASS
802.11n (40MHz)				
38	5190	50.69	56.46	PASS
46	5230	50.78	49.60	PASS

SPECTRUM PLOT OF WORST VALUE

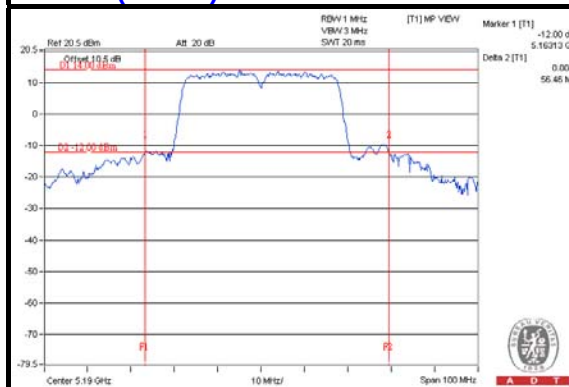
802.11a



802.11n (20MHz)



802.11n (40MHz)



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	11dBm/ MHz
U-NII-3	√	---	30dBm/ 500kHz

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)

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

For U-NII-1 Band

802.11a

CHANNEL	FREQUENCY (MHz)	PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	PSD WITH DUTY FACTOR (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	-0.28	0.70	0.43	17	PASS
40	5200	-0.37	0.70	0.34	17	PASS
48	5240	4.94	0.70	5.65	17	PASS

Note: 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	-3.56	-2.24	1.49	1.33	2.82	17	PASS
40	5200	-3.70	-3.03	0.99	1.33	2.32	17	PASS
48	5240	-3.84	-2.34	1.32	1.33	2.65	17	PASS

Note: 1. Refer to section 3.3 for duty cycle spectrum plot.

2. Directional gain = $2.94\text{dBi} + 10\log(2) = 5.95\text{dBi} < 6\text{dBi}$, so the power spectral density limit is not reduced.

802.11n (40MHz)

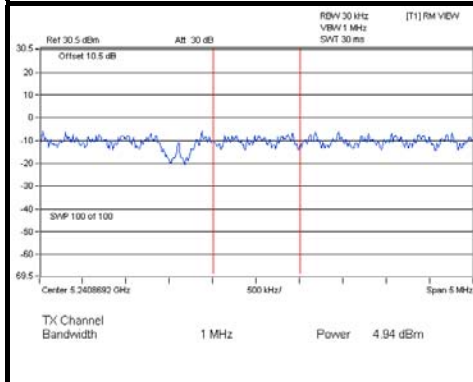
CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	-14.44	-14.82	-9.40	2.21	-7.19	17	PASS
46	5230	-14.07	-15.04	-9.31	2.21	-7.10	17	PASS

Note: 1. Refer to section 3.3 for duty cycle spectrum plot.

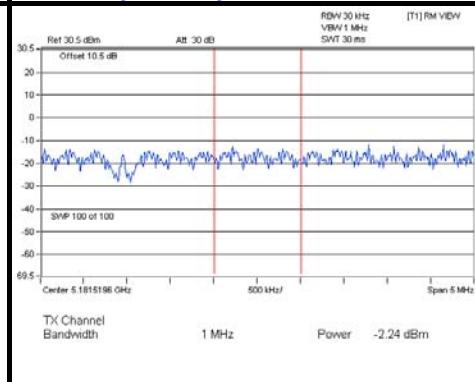
2. Directional gain = $2.94\text{dBi} + 10\log(2) = 5.95\text{dBi} < 6\text{dBi}$, so the power spectral density limit is not reduced.

SPECTRUM PLOT OF WORST VALUE

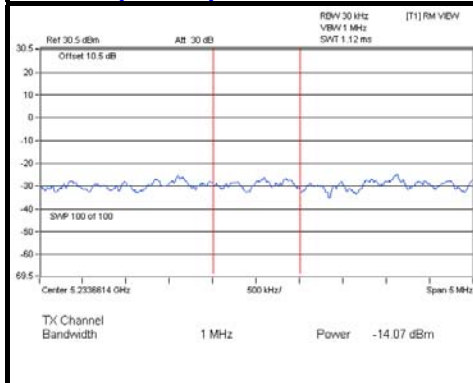
802.11a



802.11n (20 MHz)



802.11n (40MHz)



For U-NII-3 Band

802.11a

Channel	Freq. (MHz)	PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
149	5745	11.78	30	PASS
157	5785	15.33	30	PASS
165	5825	11.17	30	PASS

802.11n (20MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	11.61	3.01	15.95	30	PASS
	157	5785	15.41	3.01	19.75	30	PASS
	165	5825	11.11	3.01	15.45	30	PASS
1	149	5745	14.37	3.01	18.71	30	PASS
	157	5785	13.91	3.01	18.25	30	PASS
	165	5825	13.80	3.01	18.14	30	PASS

NOTE: Directional gain = $2.94\text{dBi} + 10\log(2) = 5.95\text{dBi} < 6\text{dBi}$, so the power spectral density limit is not reduced.

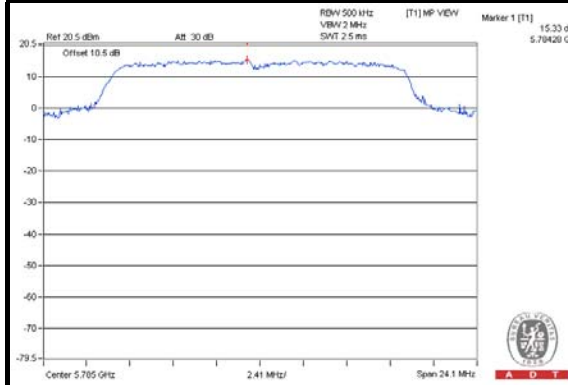
802.11n (40MHz)

TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	151	5755	9.41	3.01	14.63	30	PASS
	159	5795	8.31	3.01	13.53	30	PASS
1	151	5755	11.88	3.01	17.10	30	PASS
	159	5795	11.27	3.01	16.49	30	PASS

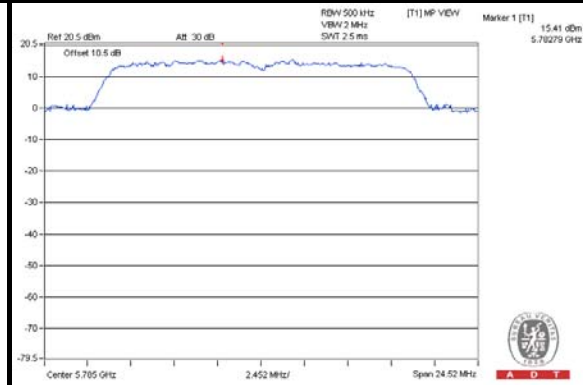
NOTE: Directional gain = $2.94\text{dBi} + 10\log(2) = 5.95\text{dBi} < 6\text{dBi}$, so the power spectral density limit is not reduced.

SPECTRUM PLOT OF WORST VALUE

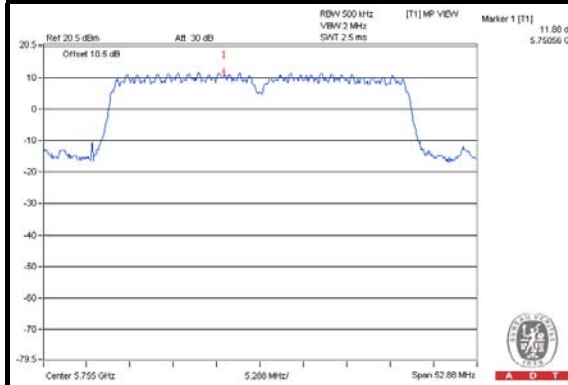
802.11a



802.11n (20MHz)



802.11n (40MHz)

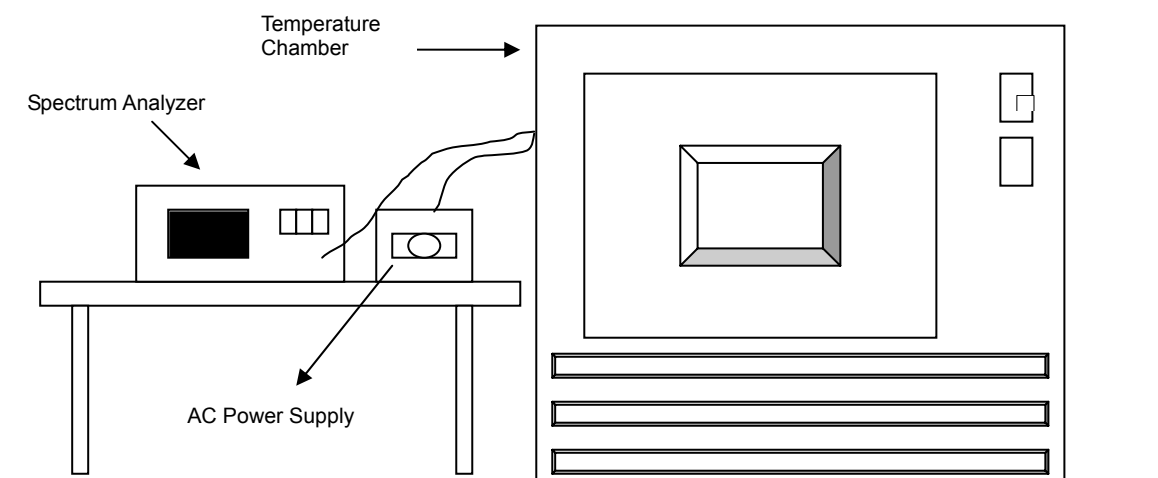


4.5 FREQUENCY STABILITY

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: 5180MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	120	5180.042892	8.2803089	5180.042855	8.2731660	5180.042715	8.2461390	5180.042502	8.2050193
40	120	5180.0429	8.2818533	5180.042689	8.2411197	5180.043051	8.3110039	5180.042867	8.2754826
30	120	5180.042901	8.2820463	5180.04291	8.2837838	5180.042956	8.2926641	5180.042939	8.2893822
20	120	5180.04331	8.3610039	5180.043377	8.3739382	5180.043327	8.3642857	5180.043636	8.4239382
10	120	5180.042959	8.2932432	5180.042929	8.2874517	5180.042727	8.2484556	5180.04281	8.2644788
0	120	5180.042516	8.2077220	5180.042621	8.2279923	5180.042415	8.1882239	5180.042613	8.2264479
-10	120	5180.043173	8.3345560	5180.043145	8.3291506	5180.043205	8.3407336	5180.04325	8.3494208
-20	120	5180.0432	8.3396903	5180.043336	8.3661122	5180.043053	8.3113116	5180.043199	8.3395445

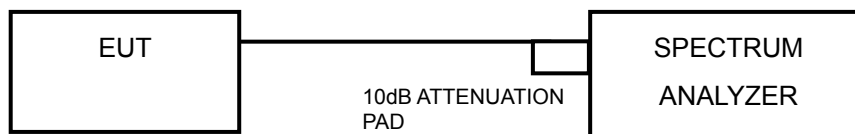
FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5180MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	138	5180.042962	8.2938224	5180.043103	8.3210425	5180.043096	8.3196911	5180.042704	8.2440154
	120	5180.04331	8.3610039	5180.043377	8.3739382	5180.043327	8.3642857	5180.043636	8.4239382
	102	5180.042753	8.2534749	5180.042392	8.1837838	5180.042419	8.1889961	5180.042674	8.2382239

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

- Set resolution bandwidth (RBW) = 100kHz
- 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

4.6.5 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
149	5745	16.33	0.5	PASS
157	5785	16.07	0.5	PASS
165	5825	16.34	0.5	PASS

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	

802.11n (20MHz)

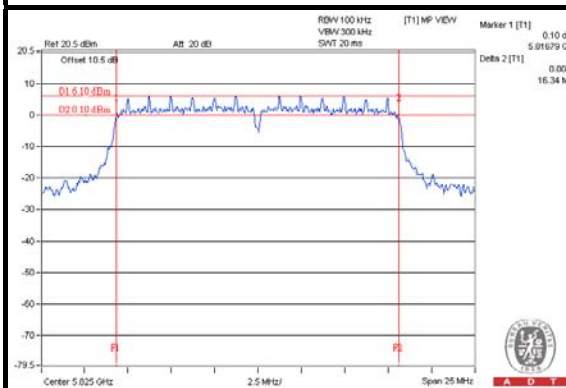
149	5745	16.36	16.57	PASS
157	5785	16.35	16.37	PASS
165	5825	16.34	16.56	PASS

802.11n (40MHz)

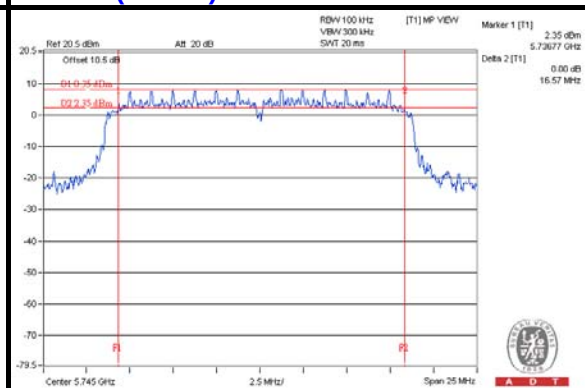
151	5775	35.41	35.26	PASS
159	5795	35.45	35.26	PASS

SPECTRUM PLOT OF WORST VALUE

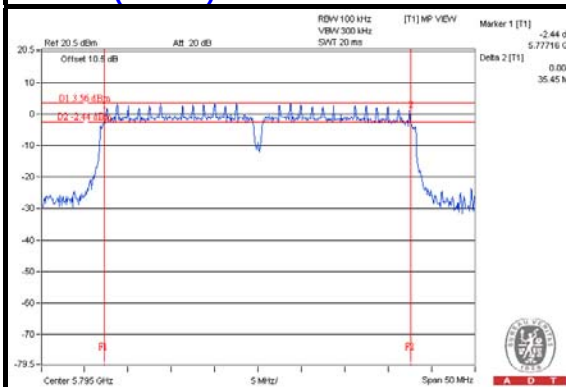
802.11a



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

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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---