FCC TEST REPORT (15.407)

REPORT NO.:	RF130207E02D-1
MODEL NO.:	DAP-1650
FCC ID:	KA2AP1650A1
RECEIVED:	Feb. 07, 2013
TESTED:	Feb. 08 to 19, 2013 and June 04 to 21, 2013
ISSUED:	July 26, 2013
APPLICANT:	D-Link Corporation
ADDRESS:	No.289, Sinhu 3rd Rd., Neihu District, Taipei City 114, Taiwan, R.O.C.
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS :	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (1):	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130207E02D-1	Original release	July 26, 2013

1. CERTIFICATION

PRODUCT:	Wireless AC1200 Dual Band Gigabit Range Extender
BRAND NAME:	D-Link
MODEL NO.:	DAP-1650
TEST SAMPLE:	R&D SAMPLE
APPLICANT:	D-Link Corporation
TESTED:	Feb. 08 to 19, 2013 and June 04 to 21, 2013
STANDARDS:	FCC Part 15, Subpart E (Section 15.407) ANSI C63.10-2009

The above equipment (Model: DAP-1650) 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:** *July 26, 2013*
(Elsie Hsu, Specialist)

APPROVED BY : _____ , **DATE:** *July 26, 2013*
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 5GHz, 5150~5250MHz

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -1395dB at 0.16562MHz
15.407(b/1/2/3) (b)(5)	Spurious Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB at 5150.00MHz
15.407(a/1/2/3)	Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX not a standard connector.

NOTE: The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 5.15~5.25GHz. For the 2.400 ~ 2.4835GHz and 5.725~5.850GHz RF parameters was recorded in another test report.

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:

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

Measurement	Value
Conducted emissions	2.98 dB
Radiated emissions (30MHz-1GHz)	5.63 dB
Radiated emissions (1GHz -6GHz)	3.73 dB
Radiated emissions (6GHz -18GHz)	3.90 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Wireless AC1200 Dual Band Gigabit Range Extender
MODEL NO.	DAP-1650
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only.
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 866.7Mbps
OPERATING FREQUENCY	**For 15.407** 802.11a/n/ac: 5.18 ~ 5.24GHz
	For 15.247 802.11b/g/n: 2.412 ~ 2.462GHz 802.11a/n/ac: 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	**For 15.407** 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
	For 15.247 (2.4GHz) 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) **For 15.247 (5GHz)** 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)

MAXIMUM OUTPUT POWER	**For 15.407** 802.11a: 46.351mW 802.11n (HT20): 45.296mW 802.11n (HT40): 43.767mW 802.11ac (VHT80): 28.749mW **For 15.247 (2.4GHz)** 802.11b: 372.812mW 802.11g: 178.250mW 802.11n (HT20): 174.239mW 802.11n (HT40): 70.155mW **For 15.247 (5GHz)** 802.11a: 146.575mW 802.11n (HT20): 144.926mW 802.11n (HT40): 113.778mW 802.11ac (VHT80): 193.951mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x1

NOTE:

1. The EUT is a 2.4GHz & 5GHz WLAN device.
2. The EUT must be supplied with a power adapter and following three different model names could be chosen:

No	Brand	Model No.	Spec.
1	D-Link	SAG024F 4 US	Input: 100-240V, 0.8A, 47-63Hz Output: 12V, 2A DC output cable (Unshielded, 1.5m)
2	D-Link	AMS4-1202000FU	Input: 100-240V, 0.8A, 50-60Hz Output: 12V, 2A DC output cable (Unshielded, 1.5m)
3	D-Link	AMS3-1202000FU	Input: 100-240V, 0.8A/65VA, 50/60Hz Output: 12V, 2A DC output cable (Unshielded, 1.5m)

From above adapters, for radiated emission test the worst case was found in adapter 1. Therefore only the test data of the adapter was recorded in this report.

3. The antenna provided to the EUT, please refer to the following table:

For 2.4GHz								
Transmitter Circuit	Brand	Model	Antenna Type	Peak Gain (dBi) (Include cable loss)	Frequency range (MHz to MHz)	Connecter Type	Cable Loss (dB)	Cable Length (cm)
Chain (1)	MAG.LAYERS	PCA-5010-2G4C1-A1	PCB Dipole	2.67	2400~2500	NA	NA	6.5
Chain (0)	Alpha	NA	Printed	2.94	2400~2500	NA	NA	5
For 5GHz								
Transmitter Circuit	Brand	Model	Antenna Type	Peak Gain (dBi) (Include cable loss)	Frequency range (MHz to MHz)	Connecter Type	Cable Loss (dB)	Cable Length (cm)
Chain (1)	MAG.LAYERS	PCA-2010-5G0C1-A4	PCB Dipole	2.25	4900~5825	IPEX	NA	11
Chain (0)	MAG.LAYERS	PCA-2010-5G0C1-A4	PCB Dipole	2.25	4900~5825	IPEX	NA	11

4. The EUT incorporates a MIMO function without beam forming.

MODULATION MODE	TX/RX FUNCTION
802.11b	2Tx/2Rx
802.11g	2Tx/2Rx
802.11n (HT20)<2.4GHz>	2Tx/2Rx
802.11n (HT40) <2.4GHz>	2Tx/2Rx
802.11a	2Tx/2Rx
802.11n (HT20) <5GHz>	2Tx/2Rx
802.11n (HT40) <5GHz>	2Tx/2Rx
802.11ac (VHT20)	2Tx/2Rx
802.11ac (VHT40)	2Tx/2Rx
802.11ac (VHT80)	2Tx/2Rx

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

5. Conducted emission and radiated emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.

6. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.

7. When the EUT operating in 802.11ac, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 9.

8. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Operated in 5150 ~ 5250MHz band:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

CHANNEL	FREQUENCY
38	5190 MHz
46	5230 MHz

1 channels are provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
42	5210 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	PLC	RE < 1G	RE ³ 1G	APCM	
1	√	√	√	√	Adapter 1
2	√	-	-	-	Adapter 2
3	√	-	-	-	Adapter 3

Where **PLC:** Power Line Conducted Emission **RE < 1G:** Radiated Emission below 1GHz

RE ³ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (MBPS)
802.11a	36 to 48	36	OFDM	BPSK	6

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48	36	OFDM	BPSK	6

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)	42	42	OFDM	BPSK	58.5

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11a	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11n (HT20)	36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)	42	42	OFDM	BPSK	58.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	25deg. C,65%RH	120Vac, 60Hz	Anderson Chen
	21deg. C,60%RH	120Vac, 60Hz	Scott Chen
	22deg. C,66%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE≥1G	23deg. C, 69%RH	120Vac, 60Hz	Amos Chuang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Amos Chuang

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)

789033 D01 General UNII Test Procedures v01 r03

662911 D01 Multiple Transmitter Output v01 r02

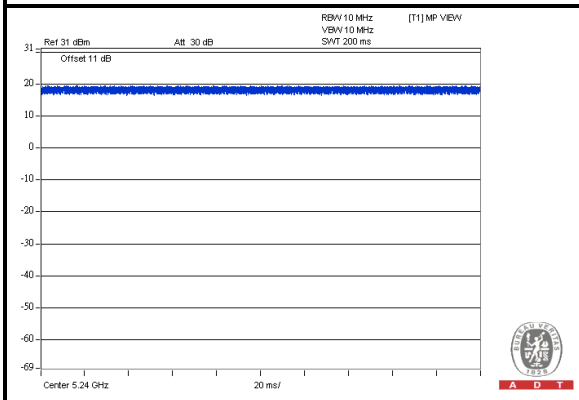
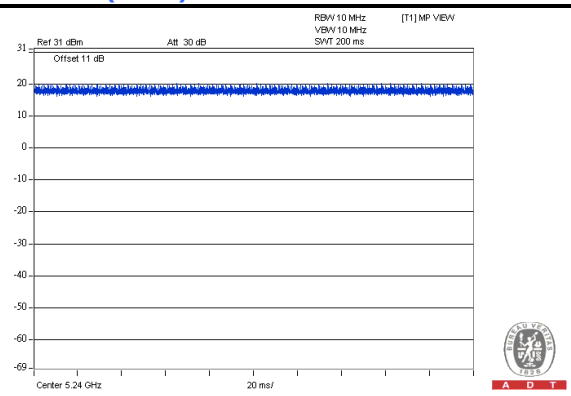
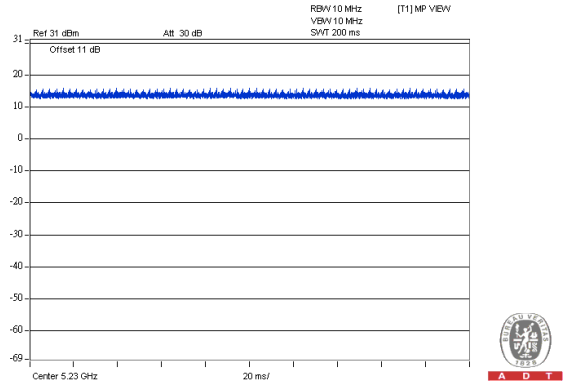
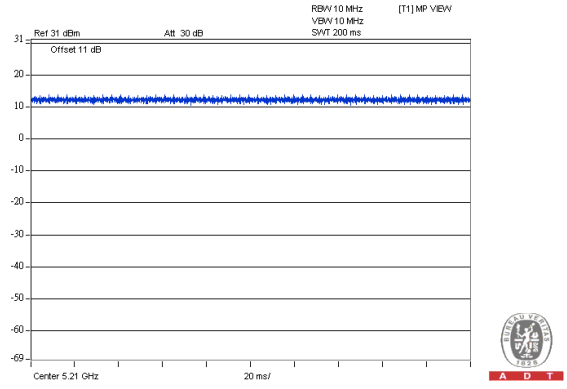
ANSI C63.10-2009

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

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DUTY CYCLE OF TEST SIGNAL

Duty cycle of test signal is 100 %, duty factor is not required.

802.11a	802.11n (HT20)
	
802.11n (HT40)	**802.11ac (VHT80)**
	

3.5 DESCRIPTION OF SUPPORT UNITS

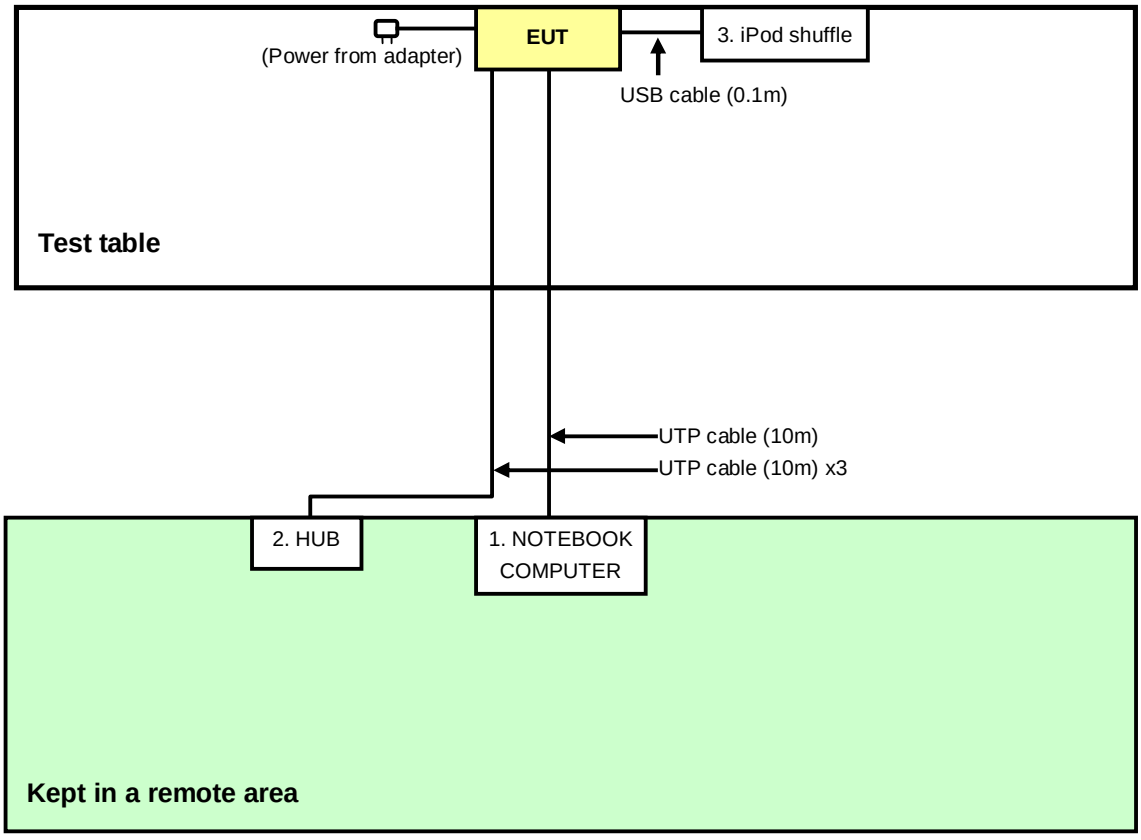
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC
3	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable, 10m
2	UTP cable, 10m
3	USB cable, 0.1m

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

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

NOTE: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2 TEST INSTRUMENTS

For Mode 1

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 07,2013	June 06,2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
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 Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: June 21, 2013

For Mode 2

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 12, 2012	Mar.11, 2013
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 08,2012	June 07,2013
RF Cable (JYEBAO)	5DFB	COCCAB-001	Aug. 28, 2012	Aug. 27, 2013
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
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 Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Feb. 08, 2013

For Mode 3

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 08, 2013	Mar.07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 08,2012	June 07,2013
RF Cable (JYEBAO)	5DFB	COCCAB-001	Aug. 28, 2012	Aug. 27, 2013
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
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 Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: June 04, 2013

4.1.3 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.

b. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

d. The frequency range from 150kHz to 30MHz was searched. Emission level under (Limit – 20dB) was not recorded.

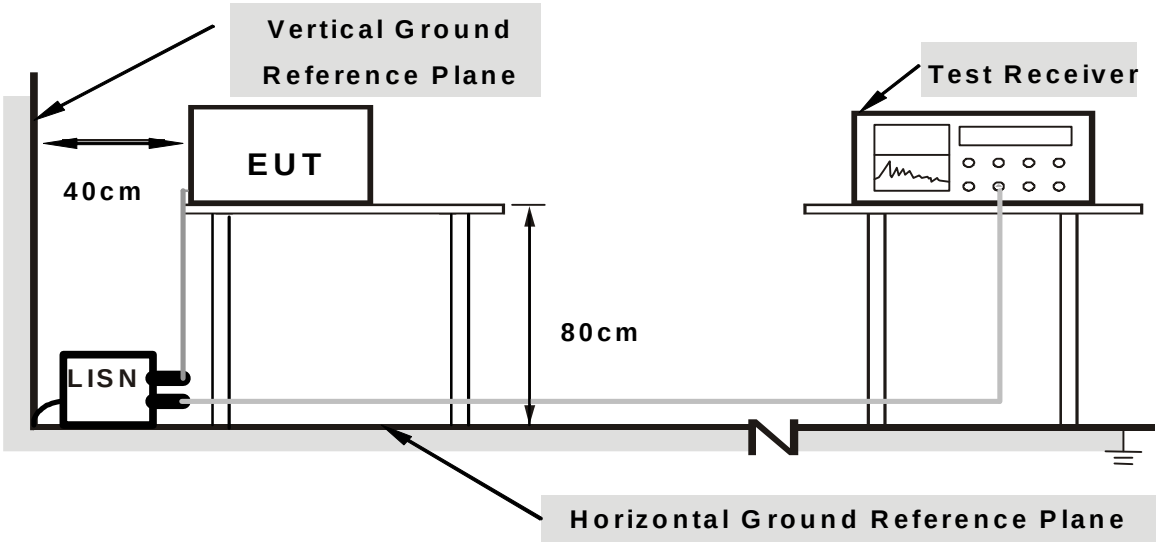
NOTE:

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support unit 1 (Notebook Computer) which is placed on a table in control room.
2. The communication partner run test program “MP TEST.exe (RTL819x 2.2.5)” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

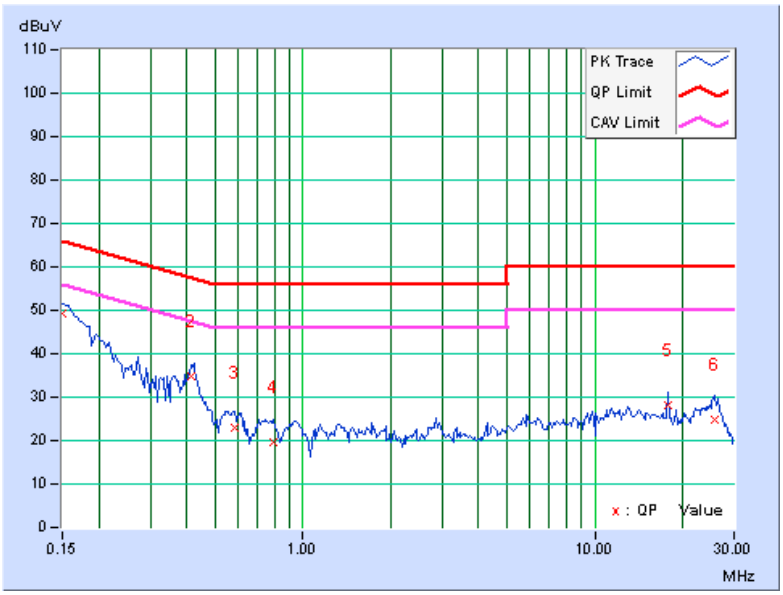
4.1.7 TEST RESULTS (MODE 1)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.12	49.29	35.18	49.41	35.30	66.00	56.00	-16.59	-20.70
2	0.41563	0.18	34.58	29.77	34.76	29.95	57.54	47.54	-22.77	-17.58
3	0.58359	0.19	22.77	15.07	22.96	15.26	56.00	46.00	-33.04	-30.74
4	0.79063	0.21	19.43	12.49	19.64	12.70	56.00	46.00	-36.36	-33.30
5	17.72656	0.96	27.22	24.34	28.18	25.30	60.00	50.00	-31.82	-24.70
6	25.69531	1.21	23.55	19.06	24.76	20.27	60.00	50.00	-35.24	-29.73

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

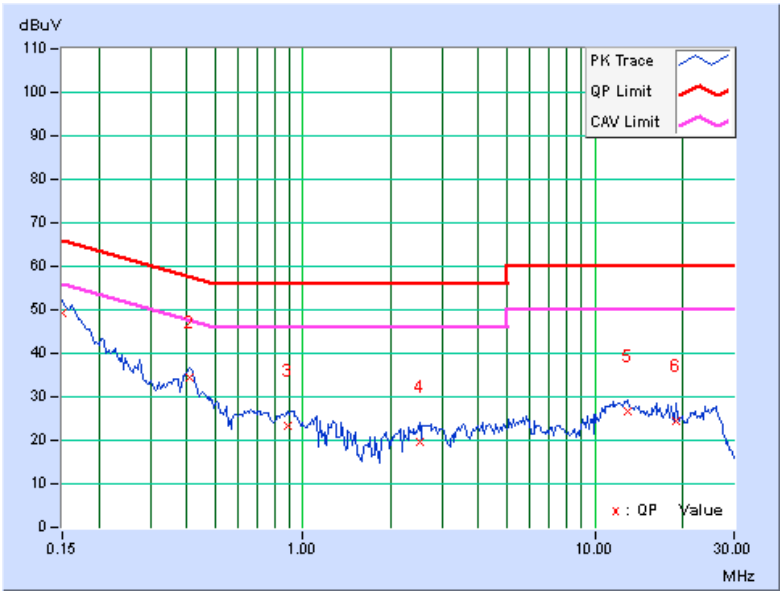


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.10	49.29	35.04	49.39	35.14	66.00	56.00	-16.61	-20.86
2	0.40781	0.17	34.18	27.07	34.35	27.24	57.69	47.69	-23.34	-20.45
3	0.88438	0.19	22.98	17.76	23.17	17.95	56.00	46.00	-32.83	-28.05
4	2.51563	0.28	19.51	13.53	19.79	13.81	56.00	46.00	-36.21	-32.19
5	13.00391	0.60	25.97	21.53	26.57	22.13	60.00	50.00	-33.43	-27.87
6	18.91016	0.70	23.85	20.59	24.55	21.29	60.00	50.00	-35.45	-28.71

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



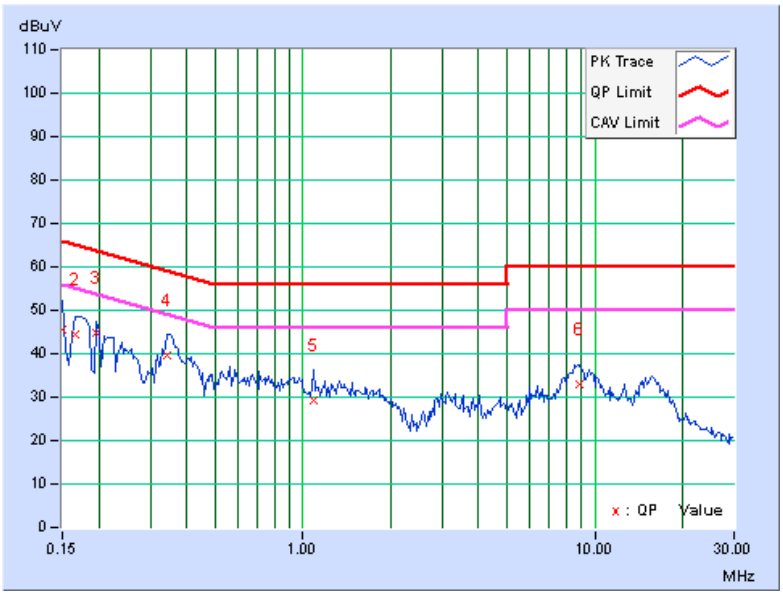
4.1.8 TEST RESULTS (MODE 2)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.11	45.62	23.39	45.73	23.50	66.00	56.00	-20.27	-32.50
2	0.16562	0.11	44.31	32.56	44.42	32.67	65.18	55.18	-20.76	-22.51
3	0.19687	0.12	44.73	24.75	44.85	24.87	63.74	53.74	-18.89	-28.87
4	0.34141	0.15	39.61	28.08	39.76	28.23	59.17	49.17	-19.41	-20.94
5	1.08984	0.19	29.00	22.58	29.19	22.77	56.00	46.00	-26.81	-23.23
6	8.80469	0.50	32.33	26.80	32.83	27.30	60.00	50.00	-27.17	-22.70

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

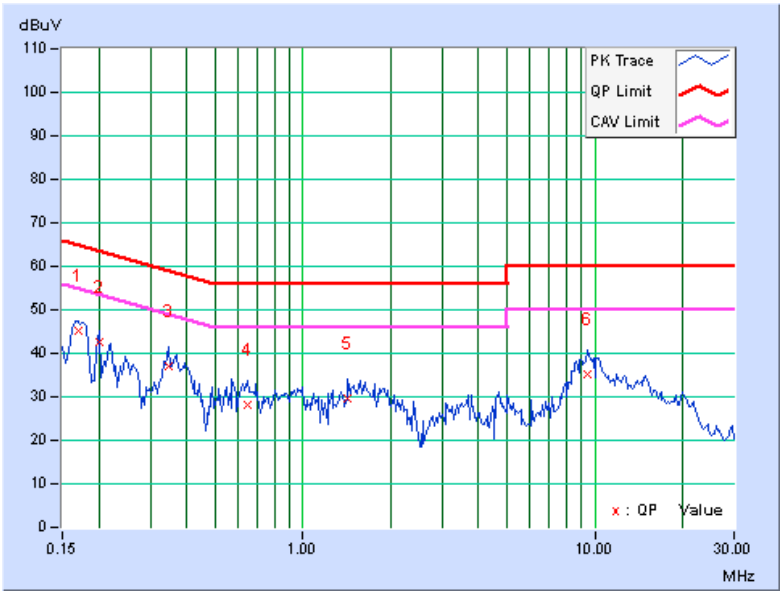


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.09	45.08	34.44	45.17	34.53	64.98	54.98	-19.81	-20.45
2	0.20078	0.10	42.62	25.45	42.72	25.55	63.58	53.58	-20.86	-28.03
3	0.34531	0.14	37.07	25.82	37.21	25.96	59.07	49.07	-21.87	-23.12
4	0.65000	0.16	28.05	18.54	28.21	18.70	56.00	46.00	-27.79	-27.30
5	1.42578	0.19	29.56	23.43	29.75	23.62	56.00	46.00	-26.25	-22.38
6	9.46484	0.40	34.93	30.15	35.33	30.55	60.00	50.00	-24.67	-19.45

REMARKS:

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



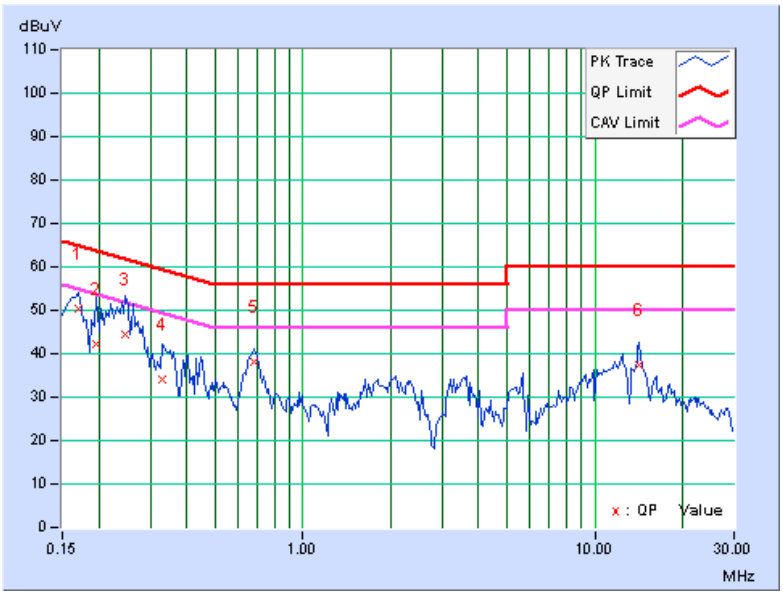
4.1.9 TEST RESULTS (MODE 3)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.13	50.08	37.86	50.21	37.99	64.98	54.98	-14.77	-16.99
2	0.19687	0.15	42.25	25.68	42.40	25.83	63.74	53.74	-21.34	-27.91
3	0.24766	0.16	44.18	25.53	44.34	25.69	61.84	51.84	-17.49	-26.14
4	0.32969	0.18	33.73	23.00	33.91	23.18	59.46	49.46	-25.55	-26.28
5	0.68125	0.22	38.06	29.11	38.28	29.33	56.00	46.00	-17.72	-16.67
6	14.16406	1.11	36.19	30.73	37.30	31.84	60.00	50.00	-22.70	-18.16

REMARKS:

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

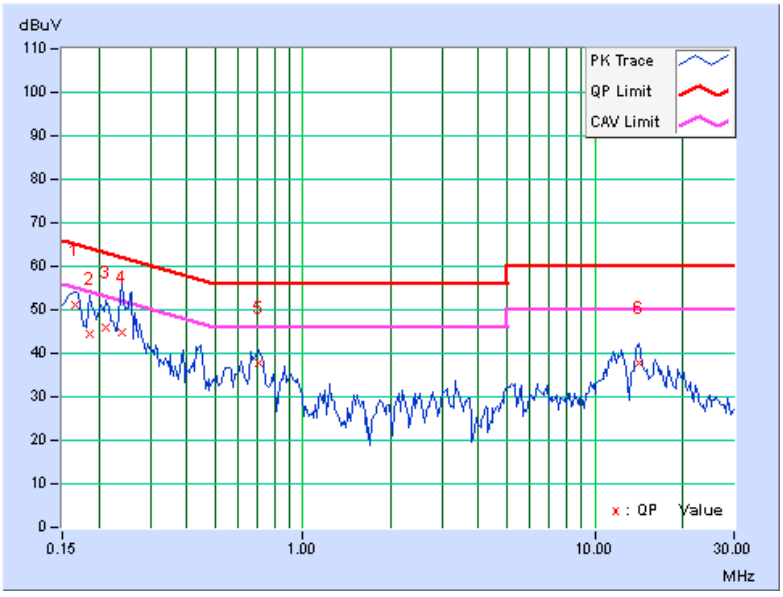


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.16562**	**0.12**	**51.11**	**40.67**	**51.23**	**40.79**	**65.18**	**55.18**	**-13.95**	**-14.39**
2	0.18516	0.13	44.33	29.25	44.46	29.38	64.25	54.25	-19.79	-24.87
3	0.21250	0.14	45.90	31.34	46.04	31.48	63.11	53.11	-17.06	-21.62
4	0.23984	0.15	44.85	25.25	45.00	25.40	62.10	52.10	-17.10	-26.70
5	0.70469	0.21	37.52	29.68	37.73	29.89	56.00	46.00	-18.27	-16.11
6	14.11328	0.92	36.84	30.95	37.76	31.87	60.00	50.00	-22.24	-18.13

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



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 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.

4.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
-	FIELD STRENGTH AT 3m (dBµV/m)	
	PK	AV
	74	54
√	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBµV/m)
	PK	PK
	-27	68.3

NOTE:

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

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

4.2.3 TEST INSTRUMENTS

For below 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E9038A	MY50010125	Feb. 01, 2013	Jan. 31, 2014
	E9038A	MY50010132	Dec. 27, 2012	Dec. 26, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-01	Nov. 14, 2012	Nov. 13, 2013
	ZFL-1000VH2B	AMP-ZFL-02	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Mini-Circuits	ZVA-183-S+	AMP-ZVA-01	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-359	Mar. 22, 2013	Mar. 21, 2014
	VULB 9168	9168-358	Mar. 20, 2013	Mar. 19, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2012	Aug. 27, 2013
Horn Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
Pre-Amplifier Agilent	8449B	3008A01975	Mar. 02, 2013	Mar. 01, 2014
Horn Antenna SCHWARZBECK	BBHA 9120	9120D-783	Sep. 20, 2012	Sep. 19, 2013
RF Cable	NA	RF104-110 RF104-206 RF104-209	Dec. 21, 2012	Dec.20, 2013
RF Cable	8DFB	CHFCAB-001 CHFCAB-002 CHFCAB-003	Nov. 14, 2012	Nov. 13, 2013
Software	ADT_Radiated_V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 10m Chamber No. F.
3 The FCC Site Registration No. is 928149.
4. The VCCI Site Registration No. is R-3252 & G-136.
5 The CANADA Site Registration No. is IC 7450H-1.
6 Tested Date: June 20, 2013

For above 1GHz test

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250254	July 09, 2012	July 08, 2013
Pre-Selector Agilent	N9039A	MY46520311	July 09, 2012	July 08, 2013
Signal Generator Agilent	N5181A	MY49060517	July 09, 2012	July 08, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Software	ADT_Radiated _V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5 The VCCI Site Registration No. is G-137.
6 The CANADA Site Registration No. is IC 7450H-2.
7 Tested Date: Feb. 19, 2013

4.2.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

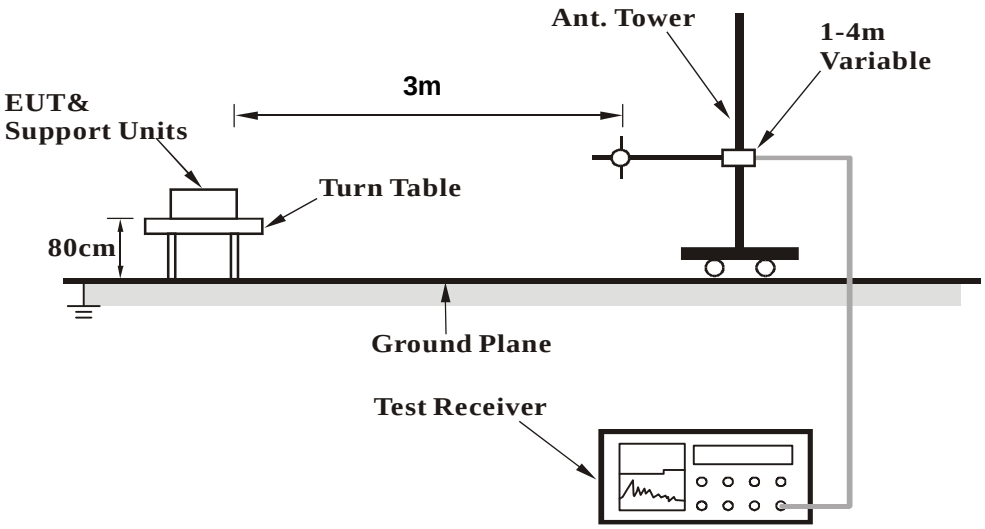
NOTE:

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

4.2.5 DEVIATION FROM TEST STANDARD

No deviation

4.2.6 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

4.2.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 36	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 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	139.89	34.1 QP	43.5	-9.4	1.22 H	243	48.08	-13.98
2	180.71	34.3 QP	43.5	-9.2	1.75 H	94	49.32	-15.04
3	250.41	32.4 QP	46.0	-13.6	1.25 H	222	46.85	-14.45
4	374.46	29.1 QP	46.0	-16.9	1.25 H	13	39.94	-10.80
5	500.06	30.2 QP	46.0	-15.8	1.00 H	40	38.00	-7.76
6	625.05	32.3 QP	46.0	-13.8	1.75 H	360	37.03	-4.78
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	180.70	39.5 QP	43.5	-4.0	1.00 V	8	54.50	-15.04
2	250.11	31.4 QP	46.0	-14.6	1.00 V	245	45.87	-14.44
3	375.00	28.3 QP	46.0	-17.8	1.00 V	17	39.02	-10.77
4	500.23	32.9 QP	46.0	-13.1	1.50 V	243	40.63	-7.76
5	625.10	34.7 QP	46.0	-11.3	1.15 V	250	39.49	-4.78
6	875.25	30.4 QP	46.0	-15.6	1.50 V	156	31.38	-0.94

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

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	58.5 PK	74.0	-15.5	1.24 H	177	15.93	42.57
2	5150.00	47.1 AV	54.0	-6.9	1.24 H	177	4.53	42.57
3	*5180.00	103.1 PK			1.24 H	177	60.43	42.67
4	*5180.00	94.7 AV			1.24 H	177	52.03	42.67
5	#10360.00	56.4 PK	68.3	-11.9	1.00 H	155	6.99	49.41
6	15540.00	61.8 PK	74.0	-12.2	1.00 H	312	6.35	55.45
7	15540.00	50.5 AV	54.0	-3.5	1.00 H	312	-4.95	55.45
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	5150.00	70.4 PK	74.0	-3.6	1.38 V	101	27.83	42.57
2	**5150.00**	**53.5 AV**	**54.0**	**-0.5**	**1.38 V**	**101**	**10.93**	**42.57**
3	*5180.00	108.3 PK			1.38 V	101	65.63	42.67
4	*5180.00	99.6 AV			1.38 V	101	56.93	42.67
5	#10360.00	56.6 PK	68.3	-11.7	1.00 V	18	7.19	49.41
6	15540.00	61.3 PK	74.0	-12.7	1.00 V	251	5.85	55.45
7	15540.00	50.4 AV	54.0	-3.6	1.00 V	251	-5.05	55.45

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 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	5119.00	58.0 PK	74.0	-16.0	1.28 H	166	15.53	42.47
2	5119.00	46.7 AV	54.0	-7.3	1.28 H	166	4.23	42.47
3	*5200.00	104.2 PK			1.24 H	179	61.47	42.73
4	*5200.00	94.9 AV			1.24 H	179	52.17	42.73
5	#10400.00	56.3 PK	68.3	-12.0	1.00 H	153	7.27	49.03
6	15600.00	62.0 PK	74.0	-12.0	1.00 H	312	6.75	55.25
7	15600.00	50.6 AV	54.0	-3.4	1.00 H	312	-4.65	55.25
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	5119.00	58.2 PK	74.0	-15.8	1.00 V	166	15.73	42.47
2	5119.00	48.3 AV	54.0	-5.7	1.00 V	166	5.83	42.47
3	*5200.00	106.3 PK			1.43 V	92	63.57	42.73
4	*5200.00	98.3 AV			1.43 V	92	55.57	42.73
5	#10400.00	56.8 PK	68.3	-11.5	1.00 V	21	7.77	49.03
6	15600.00	61.0 PK	74.0	-13.0	1.00 V	253	5.75	55.25
7	15600.00	50.5 AV	54.0	-3.5	1.00 V	253	-4.75	55.25

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	103.4 PK			1.21 H	164	60.63	42.77
2	*5240.00	95.1 AV			1.21 H	164	52.33	42.77
3	5350.00	57.2 PK	74.0	-16.8	1.21 H	164	14.37	42.83
4	5350.00	45.1 AV	54.0	-8.9	1.21 H	164	2.27	42.83
5	#10480.00	56.1 PK	68.3	-12.2	1.03 H	152	6.51	49.59
6	15720.00	61.9 PK	74.0	-12.1	1.06 H	311	7.06	54.84
7	15720.00	50.7 AV	54.0	-3.3	1.06 H	311	-4.14	54.84
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	108.2 PK			1.30 V	90	65.43	42.77
2	*5240.00	99.9 AV			1.30 V	90	57.13	42.77
3	5350.00	57.9 PK	74.0	-16.1	1.30 V	90	15.07	42.83
4	5350.00	45.9 AV	54.0	-8.1	1.30 V	90	3.07	42.83
5	#10480.00	56.1 PK	68.3	-12.2	1.00 V	25	6.51	49.59
6	15720.00	61.8 PK	74.0	-12.2	1.00 V	249	6.96	54.84
7	15720.00	50.8 AV	54.0	-3.2	1.00 V	249	-4.04	54.84

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 (HT20)

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	59.0 PK	74.0	-15.0	1.29 H	179	16.43	42.57
2	5150.00	47.4 AV	54.0	-6.6	1.29 H	179	4.83	42.57
3	*5180.00	102.2 PK			1.29 H	179	59.53	42.67
4	*5180.00	93.1 AV			1.29 H	179	50.43	42.67
5	#10360.00	56.5 PK	68.3	-11.8	1.00 H	160	7.09	49.41
6	15540.00	61.6 PK	74.0	-12.4	1.05 H	312	6.15	55.45
7	15540.00	50.5 AV	54.0	-3.5	1.05 H	312	-4.95	55.45
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	5150.00	71.1 PK	74.0	-2.9	1.37 V	101	28.53	42.57
2	5150.00	53.0 AV	54.0	-1.0	1.37 V	101	10.43	42.57
3	*5180.00	106.8 PK			1.30 V	78	64.13	42.67
4	*5180.00	97.1 AV			1.30 V	78	54.43	42.67
5	#10360.00	56.4 PK	68.3	-11.9	1.00 V	22	6.99	49.41
6	15540.00	61.0 PK	74.0	-13.0	1.01 V	251	5.55	55.45
7	15540.00	50.3 AV	54.0	-3.7	1.01 V	251	-5.15	55.45

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 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	5119.00	56.2 PK	74.0	-17.8	1.24 H	165	13.73	42.47
2	5119.00	45.4 AV	54.0	-8.6	1.24 H	165	2.93	42.47
3	*5200.00	102.5 PK			1.24 H	165	59.77	42.73
4	*5200.00	93.4 AV			1.24 H	165	50.67	42.73
5	#10400.00	55.9 PK	68.3	-12.4	1.00 H	161	6.87	49.03
6	15600.00	61.6 PK	74.0	-12.4	1.10 H	300	6.35	55.25
7	15600.00	50.3 AV	54.0	-3.7	1.10 H	300	-4.95	55.25
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	5119.00	57.9 PK	74.0	-16.1	1.00 V	166	15.43	42.47
2	5119.00	48.6 AV	54.0	-5.4	1.00 V	166	6.13	42.47
3	*5200.00	106.3 PK			1.31 V	98	63.57	42.73
4	*5200.00	97.6 AV			1.31 V	98	54.87	42.73
5	#10400.00	56.2 PK	68.3	-12.1	1.00 V	23	7.17	49.03
6	15600.00	61.3 PK	74.0	-12.7	1.00 V	255	6.05	55.25
7	15600.00	50.3 AV	54.0	-3.7	1.00 V	255	-4.95	55.25

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	103.2 PK			1.24 H	169	60.43	42.77
2	*5240.00	94.1 AV			1.24 H	169	51.33	42.77
3	5350.00	56.6 PK	74.0	-17.4	1.29 H	167	13.77	42.83
4	5350.00	45.6 AV	54.0	-8.4	1.29 H	167	2.77	42.83
5	#10480.00	56.2 PK	68.3	-12.1	1.00 H	149	6.61	49.59
6	15720.00	61.9 PK	74.0	-12.1	1.10 H	291	7.06	54.84
7	15720.00	50.5 AV	54.0	-3.5	1.10 H	291	-4.34	54.84
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	107.8 PK			1.30 V	90	65.03	42.77
2	*5240.00	98.9 AV			1.30 V	90	56.13	42.77
3	5350.00	58.5 PK	74.0	-15.5	1.30 V	90	15.67	42.83
4	5350.00	46.2 AV	54.0	-7.8	1.30 V	90	3.37	42.83
5	#10480.00	56.8 PK	68.3	-11.5	1.00 V	22	7.21	49.59
6	15720.00	61.5 PK	74.0	-12.5	1.00 V	253	6.66	54.84
7	15720.00	50.6 AV	54.0	-3.4	1.00 V	253	-4.24	54.84

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 (HT40)

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	57.8 PK	74.0	-16.2	1.32 H	162	15.23	42.57
2	5150.00	47.2 AV	54.0	-6.8	1.32 H	162	4.63	42.57
3	*5190.00	97.9 PK			1.23 H	162	55.20	42.70
4	*5190.00	88.1 AV			1.23 H	162	45.40	42.70
5	#10380.00	56.6 PK	68.3	-11.7	1.00 H	151	7.38	49.22
6	15570.00	61.9 PK	74.0	-12.1	1.15 H	301	6.55	55.35
7	15570.00	50.5 AV	54.0	-3.5	1.15 H	301	-4.85	55.35
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	66.2 PK	74.0	-7.8	1.39 V	93	23.63	42.57
2	5150.00	52.8 AV	54.0	-1.2	1.39 V	93	10.23	42.57
3	*5190.00	102.2 PK			1.39 V	93	59.50	42.70
4	*5190.00	92.1 AV			1.39 V	93	49.40	42.70
5	#10380.00	57.0 PK	68.3	-11.3	1.03 V	34	7.78	49.22
6	15570.00	61.5 PK	74.0	-12.5	1.00 V	246	6.15	55.35
7	15570.00	50.8 AV	54.0	-3.2	1.00 V	246	-4.55	55.35

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	5119.00	56.9 PK	74.0	-17.1	1.35 H	177	14.43	42.47
2	5119.00	44.8 AV	54.0	-9.2	1.35 H	177	2.33	42.47
3	*5230.00	101.6 PK			1.23 H	178	58.84	42.76
4	*5230.00	91.9 AV			1.23 H	178	49.14	42.76
5	5350.00	57.2 PK	74.0	-16.8	1.38 H	177	14.37	42.83
6	5350.00	45.1 AV	54.0	-8.9	1.38 H	177	2.27	42.83
7	#10460.00	56.9 PK	68.3	-11.4	1.00 H	160	7.45	49.45
8	15690.00	62.2 PK	74.0	-11.8	1.17 H	300	7.36	54.84
9	15690.00	50.8 AV	54.0	-3.2	1.17 H	300	-4.04	54.84
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	5119.00	56.8 PK	74.0	-17.2	1.00 V	161	14.33	42.47
2	5119.00	47.3 AV	54.0	-6.7	1.00 V	161	4.83	42.47
3	*5230.00	105.6 PK			1.36 V	99	62.84	42.76
4	*5230.00	96.5 AV			1.36 V	99	53.74	42.76
5	5350.00	58.7 PK	74.0	-15.3	1.39 V	93	15.87	42.83
6	5350.00	46.6 AV	54.0	-7.4	1.39 V	93	3.77	42.83
7	#10460.00	57.3 PK	68.3	-11.0	1.08 V	36	7.85	49.45
8	15690.00	61.4 PK	74.0	-12.6	1.04 V	237	6.56	54.84
9	15690.00	50.9 AV	54.0	-3.1	1.04 V	237	-3.94	54.84

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.

802.11ac (VHT80)

CHANNEL	TX Channel 42	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	56.8 PK	74.0	-17.2	1.32 H	180	14.23	42.57
2	5150.00	44.9 AV	54.0	-9.1	1.32 H	180	2.33	42.57
3	*5210.00	92.1 PK			1.19 H	187	49.36	42.74
4	*5210.00	82.7 AV			1.19 H	187	39.96	42.74
5	5350.00	57.3 PK	74.0	-16.7	1.42 H	183	14.47	42.83
6	5350.00	45.3 AV	54.0	-8.7	1.42 H	183	2.47	42.83
7	#10420.00	57.0 PK	68.3	-11.3	1.00 H	167	7.83	49.17
8	15630.00	62.4 PK	74.0	-11.6	1.14 H	288	7.29	55.11
9	15630.00	50.7 AV	54.0	-3.3	1.14 H	288	-4.41	55.11
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	66.5 PK	74.0	-7.5	1.39 V	94	23.93	42.57
2	**5150.00**	**53.5 AV**	**54.0**	**-0.5**	**1.39 V**	**94**	**10.93**	**42.57**
3	*5210.00	96.6 PK			1.39 V	94	53.86	42.74
4	*5210.00	87.8 AV			1.39 V	94	45.06	42.74
5	5350.00	58.9 PK	74.0	-15.1	1.39 V	94	16.07	42.83
6	5350.00	46.4 AV	54.0	-7.6	1.39 V	94	3.57	42.83
7	#10420.00	57.2 PK	68.3	-11.1	1.09 V	51	8.03	49.17
8	15630.00	61.0 PK	74.0	-13.0	1.01 V	248	5.89	55.11
9	15630.00	50.7 AV	54.0	-3.3	1.01 V	248	-4.41	55.11

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.

4.3 TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.47 – 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

NOTE: Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output v01r02 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 INSTRUMENTS

FOR POWER OUTPUT MEASUREMENT (802.11a, 802.11n (HT20), 802.11n (HT40))

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 10, 2012	May 09, 2013
Power Sensor	MA2411B	0738172	May 10, 2012	May 09, 2013

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. Tested date : Feb. 18, 2013

FOR POWER OUTPUT MEASUREMENT (802.11ac (VHT80))

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

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. Tested date : Feb. 18, 2013

FOR 99% OCCUPIED BANDWIDTH

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

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. Tested date : Feb. 18, 2013

4.3.3 TEST PROCEDURE

FOR POWER OUTPUT MEASUREMENT (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 POWER OUTPUT MEASUREMENT (802.11ac (VHT80))

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW =1MHz.
3. Set the VBW ≥ 3 x RBW.
4. Number of points in sweep ≥ 2 Span / RBW.
5. Sweep time = auto.
6. Set trigger to free run (duty cycle ≥ 98 percent) ; Set video trigger (duty cycle < 98 percent)
7. Detector = RMS.
8. Trace average at least 100 traces in power averaging mode
9. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

FOR 99% OCCUPIED BANDWIDTH

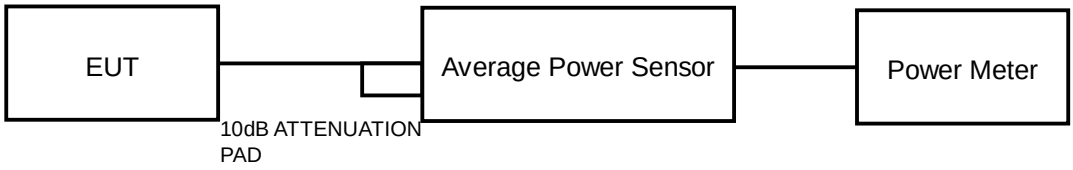
1. Set RBW ≥ 1% of the emission bandwidth.
2. Set the VBW ≥ 3 × RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Record the 99% emission bandwidth.

4.3.4 DEVIATION FROM TEST STANDARD

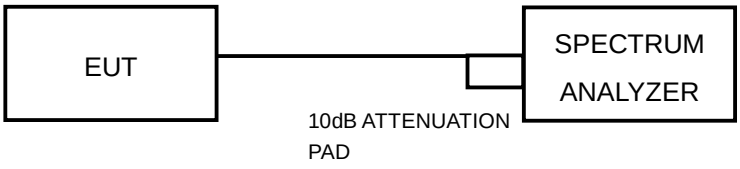
No deviation

4.3.5 TEST SETUP

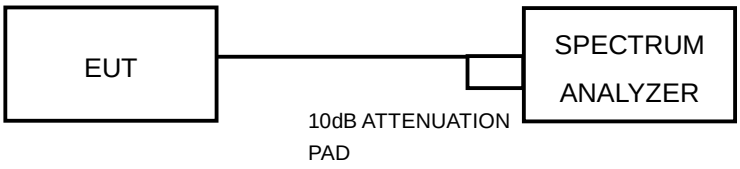
FOR POWER OUTPUT MEASUREMENT (802.11a, 802.11n (HT20), 802.11n (HT40))



FOR POWER OUTPUT MEASUREMENT (802.11ac (VHT80))



FOR 99% OCCUPIED BANDWIDTH



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

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	13.60	13.70	46.351	16.66	17	PASS
40	5200	13.40	13.50	44.265	16.46	17	PASS
48	5240	13.60	13.50	45.296	16.56	17	PASS

802.11n (HT20)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	13.60	13.50	45.296	16.56	17	PASS
40	5200	13.30	13.50	43.767	16.41	17	PASS
48	5240	13.40	13.40	43.756	16.41	17	PASS

802.11n (HT40)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	13.50	13.30	43.767	16.41	17	PASS
46	5230	13.30	13.50	43.767	16.41	17	PASS

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
42	5210	11.48	11.67	28.749	14.59	17	PASS

26dB OCCUPIED BANDWIDTH:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
36	5180	19.53	19.55
40	5200	19.40	19.53
48	5240	19.37	19.29

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
36	5180	19.97	19.95
40	5200	20.01	20.01
48	5240	20.01	19.95

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
38	5190	43.19	43.33
46	5230	43.24	43.33

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	
		CHAIN 0	CHAIN 1
42	5210	83.89	83.97

4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 ~ 5.25GHz	4dBm
5.25 ~ 5.35GHz	11dBm
5.47 – 5.725GHz	11dBm
5.725 ~ 5.825GHz	17dBm

4.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

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. Tested date : Feb. 18, 2013

4.4.3 TEST PROCEDURES

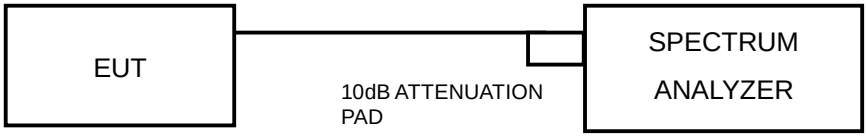
Using method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, 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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6

4.4.7 TEST RESULTS

802.11a

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	1.12	0.27	3.73	4	PASS
40	5200	0.83	0.18	3.53	4	PASS
48	5240	0.70	0.12	3.43	4	PASS

NOTE:

1. 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.
2. Directional gain = 2dBi + 10log(2) = 5.26dBi < 6dBi , so the power density limit shall not be reduced.

802.11n (HT20)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	0.14	0.58	3.38	4	PASS
40	5200	-0.16	0.24	3.05	4	PASS
48	5240	0.06	-0.57	2.77	4	PASS

NOTE:

1. 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.
2. Directional gain = 2dBi + 10log(2) = 5.26dBi < 6dBi , so the power density limit shall not be reduced.

802.11n (HT40)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
38	5190	-4.74	-3.75	-1.21	4	PASS
46	5230	-3.87	-3.82	-0.83	4	PASS

NOTE:

1. 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.
2. Directional gain = 2dBi + 10log(2) = 5.26dBi < 6dBi , so the power density limit shall not be reduced.

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
42	5210	-4.99	-4.72	-1.84	4	PASS

NOTE:

1. 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.
2. Directional gain = 2dBi + 10log(2) = 5.26dBi < 6dBi , so the power density limit shall not be reduced.

4.5 PEAK POWER EXCURSION MEASUREMENT

4.5.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Shall not exceed 13 dB

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

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. Tested date : Feb. 18, 2013

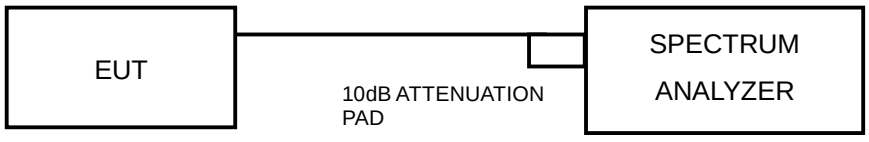
4.5.3 TEST PROCEDURE

1. Set RBW = 1 MHz, VBW ≥ 3 MHz, Detector = peak.
2. Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
3. Use the peak search function to find the peak of the spectrum.
4. Measure the PPSD.
5. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.5.7 TEST RESULTS

802.11a

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
36	5180	8.76	8.02	1.12	0.27	7.64	7.75	13	PASS
40	5200	8.51	8.12	0.83	0.18	7.68	7.94	13	PASS
48	5240	8.36	7.90	0.70	0.12	7.66	7.78	13	PASS

802.11n (HT20)

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
36	5180	7.89	8.30	0.14	0.58	7.75	7.72	13	PASS
40	5200	7.59	7.94	-0.16	0.24	7.75	7.70	13	PASS
48	5240	7.92	7.34	0.06	-0.57	7.86	7.91	13	PASS

802.11n (HT40)

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
38	5190	3.27	4.20	-4.74	-3.75	8.01	7.95	13	PASS
46	5230	4.20	4.26	-3.87	-3.82	8.07	8.08	13	PASS

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)		PPSD (dBm)		PEAK EXCURSION (dB)		LIMIT (dB)	PASS/FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
42	5210	3.32	3.48	-4.99	-4.72	8.31	8.20	13	PASS

4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

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. Tested date : Feb. 18, 2013

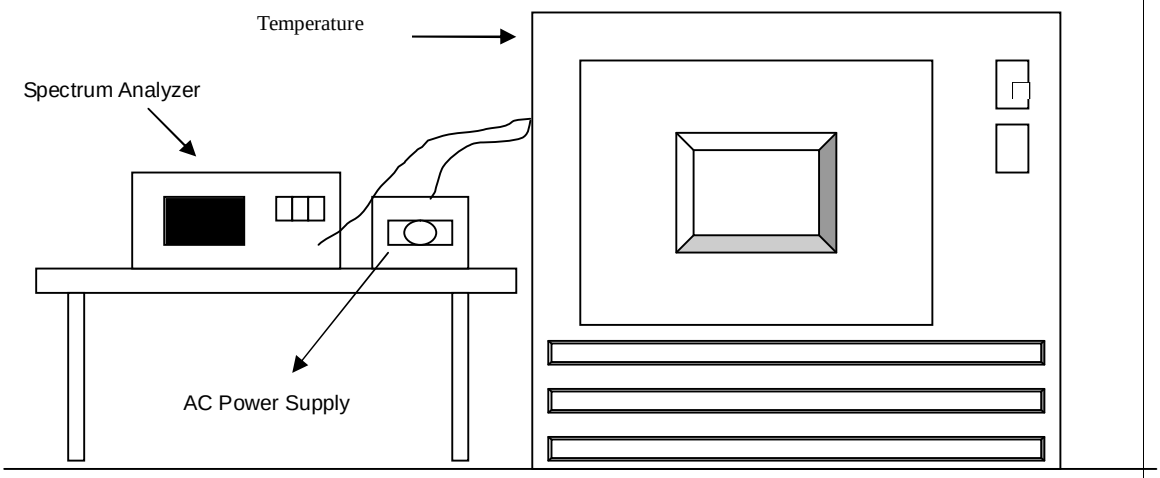
4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. 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.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. 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.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

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

4.6.7 TEST RESULTS

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5200MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	ppm	(MHz)	ppm	(MHz)	ppm	(MHz)	ppm
50	120	5200.007	1.3462	5200.0096	1.8462	5200.0029	0.5577	5200.009	1.7308
40	120	5199.9938	-1.1923	5199.9964	-0.6923	5199.9979	-0.4038	5199.9899	-1.9423
30	120	5200.0086	1.6538	5200.01	1.9231	5200.0079	1.5192	5200.0077	1.4808
20	120	5200.022	4.2308	5200.0227	4.3654	5200.0249	4.7885	5200.0246	4.7308
10	120	5200.015	2.8846	5200.0112	2.1538	5200.0105	2.0192	5200.0135	2.5962
0	120	5200.0202	3.8846	5200.0204	3.9231	5200.0205	3.9423	5200.0167	3.2115
-10	120	5199.9927	-1.4038	5199.9958	-0.8077	5199.9927	-1.4038	5199.9965	-0.6731
-20	120	5200.0035	0.6731	5200.0053	1.0192	5200.004	0.7692	5200.004	0.7692
-30	120	5199.985	-2.8846	5199.9839	-3.0962	5199.9938	-1.1923	5199.9912	-1.6923

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5200MHz									
TEMP. (℃)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	ppm	(MHz)	ppm	(MHz)	ppm	(MHz)	ppm
20	138	5200.0225	4.3269	5200.0229	4.4038	5200.0238	4.5769	5200.0238	4.5769
	120	5200.022	4.2308	5200.0227	4.3654	5200.0249	4.7885	5200.0246	4.7308
	102	5200.0227	4.3654	5200.0239	4.5962	5200.0239	4.5962	5200.0247	4.7500

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:
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Web Site: www.bureauveritas-adt.com

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

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.

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