FCC TEST REPORT (15.247)

REPORT NO.:	RF130614E11
MODEL NO.:	DWA-171
FCC ID:	KA2WA171B1
RECEIVED:	June 14, 2013
TESTED:	June 22 to 25, 2013
ISSUED:	July 29, 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.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130614E11	Original release	July 29, 2013

1. CERTIFICATION

PRODUCT:	Wireless AC Dual Band USB Adapter
BRAND NAME:	D-Link
MODEL NO.:	DWA-171
TEST SAMPLE:	R&D SAMPLE
APPLICANT:	D-Link Corporation
TESTED:	June 22 to 25, 2013
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (Model: DWA-171) 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 29, 2013
(Midoli Peng, Specialist)

APPROVED BY : _____ , **DATE:** July 29, 2013
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 2.4GHz, 2400~2483.5MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is - 11.29dB at 0.150MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 2390.00MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

For 5GHz, 5725~5850MHz Band

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -23.34dB at 0.40391MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.5dB at 94.94MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is I-PEX not a standard connector.

NOTE:

The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.35GHz, 5.47~5.6GHz & 5.65~5.725GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2.400 ~ 2.4835GHz and 5.725~5.850GHz. For the 5.15~5.35GHz and 5.47~5.6GHz & 5.65~5.725GHz 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 AC Dual Band USB Adapter
MODEL NO.	DWA-171
POWER SUPPLY	DC 5V from host equipment
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 150Mbps 802.11ac: up to 433.3Mbps
OPERATING FREQUENCY	**For 15.407** **5GHz:**5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50 ~ 5.58GHz & 5.66GHz ~ 5.70GHz
	For 15.247 **2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	**For 15.407** 16 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 7 for 802.11n (HT40), 802.11ac (VHT40) 3 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: 29.376mW 802.11n (HT20): 28.379mW 802.11n (HT40): 28.314mW 802.11ac (VHT80): 21.979mW **For 15.247 (2.4GHz)** 802.11b: 120.226mW 802.11g: 146.893mW 802.11n (HT20): 132.739mW 802.11n (HT40): 255.859mW **For 15.247 (5GHz)** 802.11a: 73.621mW 802.11n (HT20): 78.705mW 802.11n (HT40): 74.989mW 802.11ac (VHT80): 71.779mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT is a 2.4GHz & 5GHz WLAN device.
2. 2.4GHz and 5GHz technology can't transmit at same time.
3. The antennas provided to the EUT, please refer to the following table:

Antenna Type	Connector	Antenna Gain (dB)	Frequency range (MHz to MHz)
Loop	NA	-0.13	2400~2500
Loop	NA	0.77	5150~5250
Loop	NA	1.33	5250~5350
Loop	NA	1.97	5470~5725
Loop	NA	2.06	5725~5850

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

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX/1RX
802.11g	1TX/1RX
802.11a	1TX/1RX
802.11n (HT20)	1TX/1RX
802.11n (HT40)	1TX/1RX
802.11ac (VHT20)	1TX/1RX
802.11ac (VHT40)	1TX/1RX
802.11ac (VHT80)	1TX/1RX

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

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

7. 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 2400 ~ 2483.5MHz band:

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20):

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

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

Operated in 5725 ~ 5850MHz band:

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

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

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

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
155	5775 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

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

OB: Conducted Out-Band Emission 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)
802.11g	1 to 11	6	OFDM	BPSK	6
802.11a	149 to 165	165	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)
802.11g	1 to 11	6	OFDM	BPSK	6
802.11a	149 to 165	165	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)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

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)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	27deg. C,68%RH	120Vac, 60Hz	Anderson Chen
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE≥1G	30deg. C, 70%RH	120Vac, 60Hz	Tim Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	James Chan
OB	25deg. C, 60%RH	120Vac, 60Hz	James Chan

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 C (15.247)

558074 D01 DTS Meas Guidance v03r01

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 DESCRIPTION OF SUPPORT UNITS

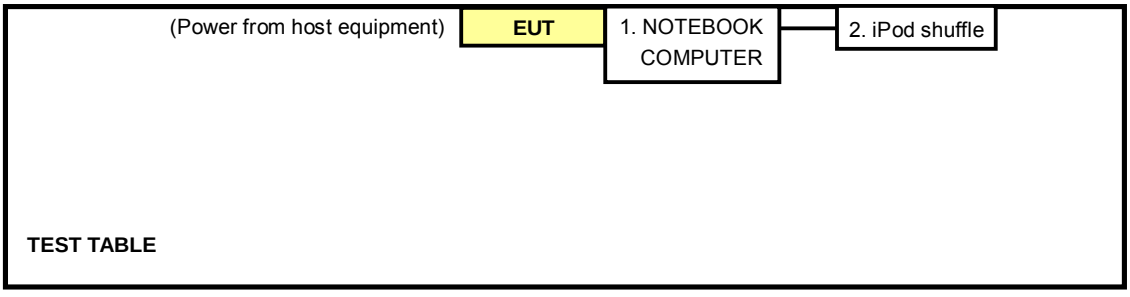
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	iPod shuffle	Apple	MC749TA/A	CC4DMFJUDFDM	NA

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

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

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2.400 ~ 2.4835GHz Band)

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

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 25, 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 levels under (Limit - 20dB) were not recorded.

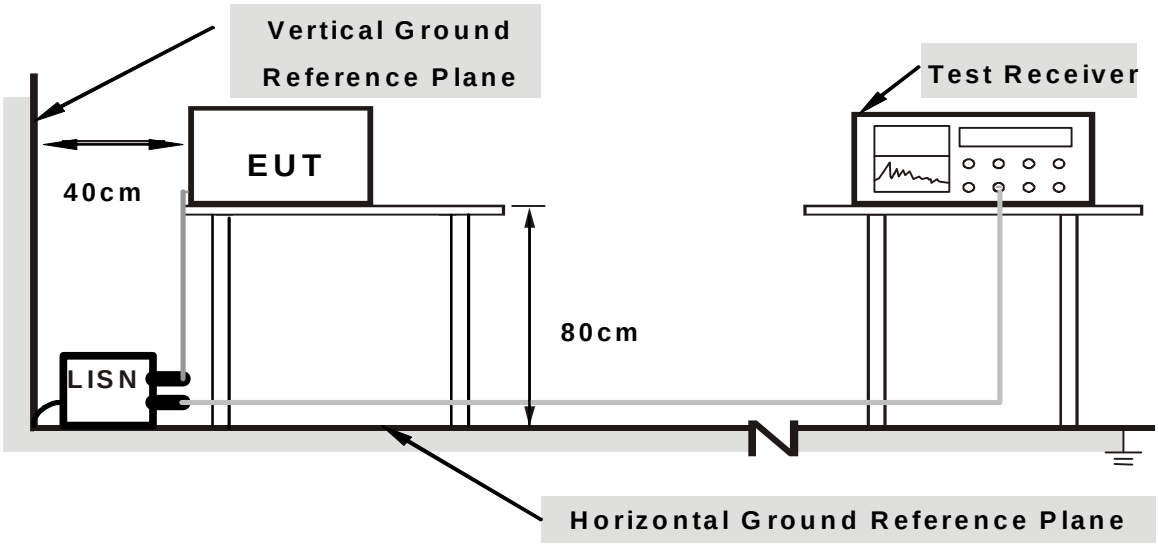
NOTE:

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 testing table.
2. The communication partner run test program “MT76xxU.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

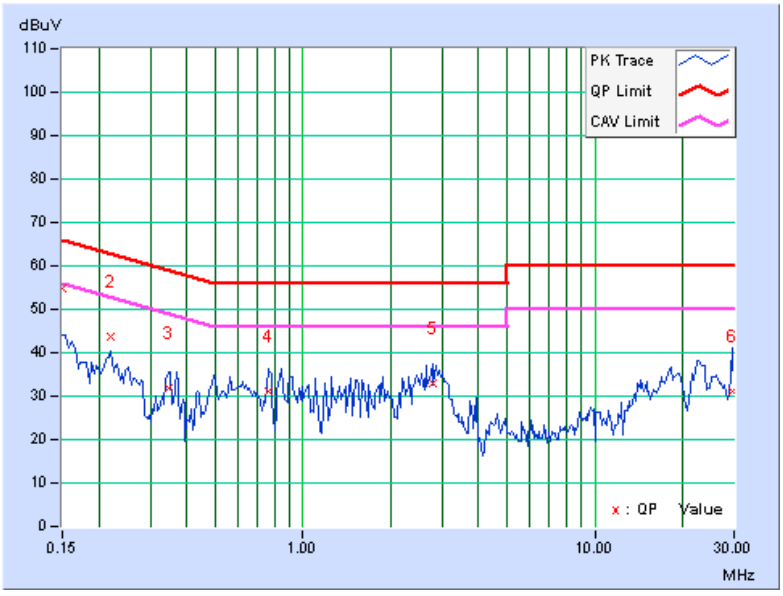
4.1.7 TEST RESULTS

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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**0.12**	**54.59**	**30.54**	**54.71**	**30.66**	**66.00**	**56.00**	**-11.29**	**-25.34**
2	0.22031	0.14	43.64	27.08	43.78	27.22	62.81	52.81	-19.02	-25.58
3	0.34531	0.17	31.85	24.97	32.02	25.14	59.07	49.07	-27.06	-23.94
4	0.76328	0.20	31.02	23.92	31.22	24.12	56.00	46.00	-24.78	-21.88
5	2.80078	0.31	32.81	27.07	33.12	27.38	56.00	46.00	-22.88	-18.62
6	29.48047	1.32	29.70	22.95	31.02	24.27	60.00	50.00	-28.98	-25.73

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

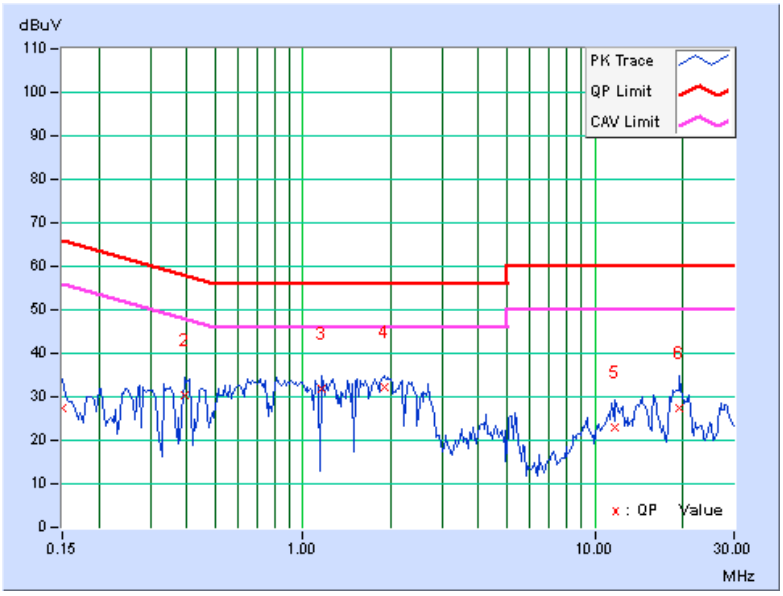


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.10	27.43	21.92	27.53	22.02	66.00	56.00	-38.47	-33.98
2	0.39609	0.17	30.20	21.29	30.37	21.46	57.93	47.93	-27.57	-26.48
3	1.16406	0.21	31.46	21.82	31.67	22.03	56.00	46.00	-24.33	-23.97
4	1.89844	0.25	32.02	22.58	32.27	22.83	56.00	46.00	-23.73	-23.17
5	11.73438	0.57	22.35	14.97	22.92	15.54	60.00	50.00	-37.08	-34.46
6	19.40234	0.71	26.82	20.46	27.53	21.17	60.00	50.00	-32.47	-28.83

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. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

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

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29,2013	Jan. 28,2014
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	Mar. 19, 2013	Mar. 18, 2014
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.
8 Tested Date: June 22 to 24, 2013

4.2.3 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.

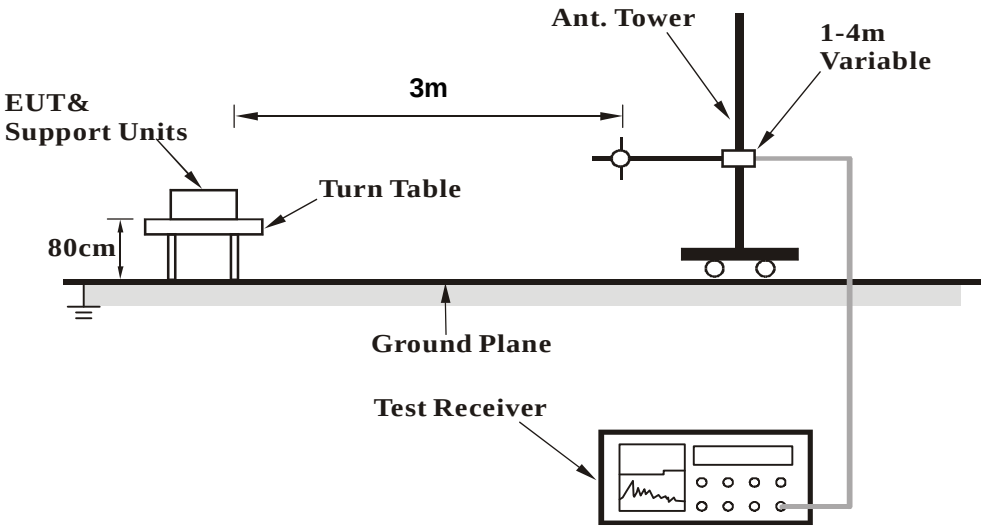
NOTE:

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.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 6	**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	181.76	32.7 QP	43.5	-10.8	2.00 H	257	48.02	-15.30
2	599.24	25.5 QP	46.0	-20.5	1.00 H	270	30.95	-5.47
3	720.01	31.2 QP	46.0	-14.8	1.25 H	12	34.90	-3.73
4	749.30	32.4 QP	46.0	-13.6	1.25 H	328	34.92	-2.51
5	849.89	36.4 QP	46.0	-9.6	1.00 H	151	37.76	-1.35
6	960.04	37.4 QP	54.0	-16.6	1.25 H	259	36.83	0.56
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	104.11	39.0 QP	43.5	-4.5	1.25 V	48	56.28	-17.31
2	179.53	31.3 QP	43.5	-12.2	1.25 V	272	46.09	-14.80
3	294.47	34.9 QP	46.0	-11.1	1.75 V	308	47.81	-12.93
4	424.94	26.0 QP	46.0	-20.0	1.50 V	28	35.46	-9.49
5	847.56	32.2 QP	46.0	-13.8	1.25 V	298	33.59	-1.35
6	948.20	32.8 QP	46.0	-13.2	1.00 V	302	32.25	0.53

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

802.11b

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2390.00	58.2 PK	74.0	-15.8	1.11 H	163	25.97	32.23
2	2390.00	51.4 AV	54.0	-2.6	1.11 H	163	19.17	32.23
3	*2412.00	108.4 PK			1.11 H	163	76.09	32.31
4	*2412.00	106.6 AV			1.11 H	163	74.29	32.31
5	4824.00	51.0 PK	74.0	-23.0	1.49 H	180	11.12	39.88
6	4824.00	47.4 AV	54.0	-6.6	1.49 H	180	7.52	39.88
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	2390.00	56.4 PK	74.0	-17.6	1.73 V	216	24.17	32.23
2	2390.00	49.2 AV	54.0	-4.8	1.73 V	216	16.97	32.23
3	*2412.00	106.2 PK			1.73 V	216	73.89	32.31
4	*2412.00	104.2 AV			1.73 V	216	71.89	32.31
5	4824.00	53.7 PK	74.0	-20.3	1.05 V	267	13.82	39.88
6	4824.00	51.0 AV	54.0	-3.0	1.05 V	267	11.12	39.88

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.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	55.0 PK	74.0	-19.0	1.11 H	162	22.77	32.23
2	2390.00	42.7 AV	54.0	-11.3	1.11 H	162	10.47	32.23
3	*2437.00	108.4 PK			1.11 H	162	76.01	32.39
4	*2437.00	106.7 AV			1.11 H	162	74.31	32.39
5	2483.50	54.8 PK	74.0	-19.2	1.11 H	162	22.27	32.53
6	2483.50	42.5 AV	54.0	-11.5	1.11 H	162	9.97	32.53
7	4874.00	53.3 PK	74.0	-20.7	1.10 H	182	13.30	40.00
8	4874.00	50.8 AV	54.0	-3.2	1.10 H	182	10.80	40.00
9	7311.00	55.4 PK	74.0	-18.6	1.48 H	7	7.42	47.98
10	7311.00	44.8 AV	54.0	-9.2	1.48 H	7	-3.18	47.98
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	*2437.00	107.0 PK			1.73 V	215	74.61	32.39
2	*2437.00	104.7 AV			1.73 V	215	72.31	32.39
3	4874.00	54.8 PK	74.0	-19.2	1.10 V	282	14.80	40.00
4	4874.00	52.7 AV	54.0	-1.3	1.10 V	282	12.70	40.00
5	7311.00	57.1 PK	74.0	-16.9	1.34 V	98	9.12	47.98
6	7311.00	49.6 AV	54.0	-4.4	1.34 V	98	1.62	47.98

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.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2462.00	107.1 PK			1.12 H	161	74.64	32.46
2	*2462.00	105.2 AV			1.12 H	161	72.74	32.46
3	2483.50	59.3 PK	74.0	-14.7	1.12 H	161	26.77	32.53
4	2483.50	49.4 AV	54.0	-4.6	1.12 H	161	16.87	32.53
5	4924.00	53.2 PK	74.0	-20.8	1.14 H	176	13.07	40.13
6	4924.00	50.9 AV	54.0	-3.1	1.14 H	176	10.77	40.13
7	7386.00	55.5 PK	74.0	-18.5	1.54 H	11	7.55	47.95
8	7386.00	44.6 AV	54.0	-9.4	1.54 H	11	-3.35	47.95
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	*2462.00	105.8 PK			1.69 V	218	73.34	32.46
2	*2462.00	103.7 AV			1.69 V	218	71.24	32.46
3	2483.50	54.5 PK	74.0	-19.5	1.69 V	218	21.97	32.53
4	2483.50	46.7 AV	54.0	-7.3	1.69 V	218	14.19	32.53
5	4924.00	55.7 PK	74.0	-18.3	1.67 V	267	15.57	40.13
6	4924.00	52.6 AV	54.0	-1.4	1.67 V	267	12.47	40.13
7	7386.00	57.0 PK	74.0	-17.0	1.38 V	96	9.05	47.95
8	7386.00	49.2 AV	54.0	-4.8	1.38 V	96	1.25	47.95

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.

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2390.00	70.2 PK	74.0	-3.8	1.12 H	162	37.97	32.23
2	2390.00	52.7 AV	54.0	-1.3	1.12 H	162	20.47	32.23
3	*2412.00	107.5 PK			1.12 H	162	75.19	32.31
4	*2412.00	97.6 AV			1.12 H	162	65.29	32.31
5	4824.00	56.0 PK	74.0	-18.0	1.13 H	169	16.12	39.88
6	4824.00	47.2 AV	54.0	-6.8	1.13 H	169	7.32	39.88
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	2390.00	67.6 PK	74.0	-6.4	1.73 V	216	35.37	32.23
2	2390.00	51.9 AV	54.0	-2.1	1.73 V	216	19.67	32.23
3	*2412.00	106.2 PK			1.73 V	216	73.89	32.31
4	*2412.00	96.1 AV			1.73 V	216	63.79	32.31
5	4824.00	56.0 PK	74.0	-18.0	1.61 V	248	16.12	39.88
6	4824.00	46.9 AV	54.0	-7.1	1.61 V	248	7.02	39.88

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.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	62.0 PK	74.0	-12.0	1.10 H	162	29.77	32.23
2	2390.00	47.8 AV	54.0	-6.2	1.10 H	162	15.57	32.23
3	*2437.00	111.1 PK			1.10 H	162	78.71	32.39
4	*2437.00	103.2 AV			1.10 H	162	70.81	32.39
5	2483.50	63.2 PK	74.0	-10.8	1.10 H	162	30.67	32.53
6	2483.50	48.3 AV	54.0	-5.7	1.10 H	162	15.77	32.53
7	4874.00	56.2 PK	74.0	-17.8	1.13 H	175	16.20	40.00
8	4874.00	47.5 AV	54.0	-6.5	1.13 H	175	7.50	40.00
9	7311.00	55.7 PK	74.0	-18.3	1.51 H	14	7.72	47.98
10	7311.00	45.2 AV	54.0	-8.8	1.51 H	14	-2.78	47.98
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	*2437.00	109.8 PK			1.70 V	218	77.41	32.39
2	*2437.00	100.2 AV			1.70 V	218	67.81	32.39
3	4874.00	55.9 PK	74.0	-18.1	1.64 V	260	15.90	40.00
4	4874.00	46.7 AV	54.0	-7.3	1.64 V	260	6.70	40.00
5	7311.00	57.2 PK	74.0	-16.8	1.37 V	106	9.22	47.98
6	7311.00	50.2 AV	54.0	-3.8	1.37 V	106	2.22	47.98

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.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2462.00	107.7 PK			1.11 H	165	75.24	32.46
2	*2462.00	97.5 AV			1.11 H	165	65.04	32.46
3	2483.50	70.8 PK	74.0	-3.2	1.11 H	165	38.27	32.53
4	2483.50	51.5 AV	54.0	-2.5	1.11 H	165	18.97	32.53
5	4924.00	56.2 PK	74.0	-17.8	1.14 H	164	16.07	40.13
6	4924.00	47.6 AV	54.0	-6.4	1.14 H	164	7.47	40.13
7	7386.00	55.7 PK	74.0	-18.3	1.50 H	28	7.75	47.95
8	7386.00	45.2 AV	54.0	-8.8	1.50 H	28	-2.75	47.95
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	*2462.00	106.4 PK			1.76 V	222	73.94	32.46
2	*2462.00	96.0 AV			1.76 V	222	63.54	32.46
3	2483.50	67.2 PK	74.0	-6.8	1.76 V	222	34.67	32.53
4	2483.50	51.4 AV	54.0	-2.6	1.76 V	222	18.87	32.53
5	4924.00	55.9 PK	74.0	-18.1	1.68 V	254	15.77	40.13
6	4924.00	46.7 AV	54.0	-7.3	1.68 V	254	6.57	40.13
7	7386.00	56.9 PK	74.0	-17.1	1.32 V	120	8.95	47.95
8	7386.00	49.9 AV	54.0	-4.1	1.32 V	120	1.95	47.95

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.

802.11n (HT20)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	72.8 PK	74.0	-1.2	1.13 H	152	40.57	32.23
2	2390.00	52.9 AV	54.0	-1.1	1.13 H	152	20.67	32.23
3	*2412.00	106.8 PK			1.13 H	152	74.49	32.31
4	*2412.00	96.4 AV			1.13 H	152	64.09	32.31
5	4824.00	55.8 PK	74.0	-18.2	1.14 H	180	15.92	39.88
6	4824.00	47.0 AV	54.0	-7.0	1.14 H	180	7.12	39.88
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	2390.00	69.9 PK	74.0	-4.1	1.70 V	214	37.67	32.23
2	2390.00	51.2 AV	54.0	-2.8	1.70 V	214	18.97	32.23
3	*2412.00	104.6 PK			1.70 V	214	72.29	32.31
4	*2412.00	94.5 AV			1.70 V	214	62.19	32.31
5	4824.00	55.8 PK	74.0	-18.2	1.60 V	258	15.92	39.88
6	4824.00	47.0 AV	54.0	-7.0	1.60 V	258	7.12	39.88

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.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	62.5 PK	74.0	-11.5	1.11 H	161	30.27	32.23
2	2390.00	46.7 AV	54.0	-7.3	1.11 H	161	14.47	32.23
3	*2437.00	110.4 PK			1.11 H	161	78.01	32.39
4	*2437.00	102.5 AV			1.11 H	161	70.11	32.39
5	2483.50	62.4 PK	74.0	-11.6	1.11 H	161	29.87	32.53
6	2483.50	46.6 AV	54.0	-7.4	1.11 H	161	14.07	32.53
7	4874.00	55.8 PK	74.0	-18.2	1.14 H	169	15.80	40.00
8	4874.00	47.1 AV	54.0	-6.9	1.14 H	169	7.10	40.00
9	7311.00	55.6 PK	74.0	-18.4	1.49 H	27	7.62	47.98
10	7311.00	44.8 AV	54.0	-9.2	1.49 H	27	-3.18	47.98
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	*2437.00	108.6 PK			1.69 V	217	76.21	32.39
2	*2437.00	98.7 AV			1.69 V	217	66.31	32.39
3	4874.00	55.3 PK	74.0	-18.7	1.64 V	249	15.30	40.00
4	4874.00	46.3 AV	54.0	-7.7	1.64 V	249	6.30	40.00
5	7311.00	57.1 PK	74.0	-16.9	1.29 V	110	9.12	47.98
6	7311.00	50.2 AV	54.0	-3.8	1.29 V	110	2.22	47.98

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.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2462.00	107.3 PK			1.11 H	163	74.84	32.46
2	*2462.00	97.1 AV			1.11 H	163	64.64	32.46
3	2483.50	71.4 PK	74.0	-2.6	1.11 H	163	38.87	32.53
4	2483.50	52.7 AV	54.0	-1.3	1.11 H	163	20.17	32.53
5	4924.00	56.1 PK	74.0	-17.9	1.14 H	162	15.97	40.13
6	4924.00	47.5 AV	54.0	-6.5	1.14 H	162	7.37	40.13
7	7386.00	55.4 PK	74.0	-18.6	1.49 H	8	7.45	47.95
8	7386.00	45.0 AV	54.0	-9.0	1.49 H	8	-2.95	47.95
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	*2462.00	105.4 PK			1.71 V	209	72.94	32.46
2	*2462.00	95.3 AV			1.71 V	209	62.84	32.46
3	2483.50	69.8 PK	74.0	-4.2	1.71 V	209	37.27	32.53
4	2483.50	51.2 AV	54.0	-2.8	1.71 V	209	18.67	32.53
5	4924.00	56.0 PK	74.0	-18.0	1.72 V	263	15.87	40.13
6	4924.00	46.7 AV	54.0	-7.3	1.72 V	263	6.57	40.13
7	7386.00	57.5 PK	74.0	-16.5	1.26 V	118	9.55	47.95
8	7386.00	50.3 AV	54.0	-3.7	1.26 V	118	2.35	47.95

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.

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	71.1 PK	74.0	-2.9	1.14 H	162	38.87	32.23
2	**2390.00**	**53.0 AV**	**54.0**	**-1.0**	**1.14 H**	**162**	**20.77**	**32.23**
3	*2422.00	100.1 PK			1.14 H	162	67.76	32.34
4	*2422.00	90.5 AV			1.14 H	162	58.16	32.34
5	4844.00	56.3 PK	74.0	-17.7	1.09 H	167	16.38	39.92
6	4844.00	47.4 AV	54.0	-6.6	1.09 H	167	7.48	39.92
7	7266.00	55.6 PK	74.0	-18.4	1.46 H	28	7.64	47.96
8	7266.00	45.3 AV	54.0	-8.7	1.46 H	28	-2.66	47.96
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	2390.00	64.2 PK	74.0	-9.8	1.72 V	212	31.97	32.23
2	2390.00	48.5 AV	54.0	-5.5	1.72 V	212	16.27	32.23
3	*2422.00	98.1 PK			1.72 V	212	65.76	32.34
4	*2422.00	88.4 AV			1.72 V	212	56.06	32.34
5	4844.00	55.5 PK	74.0	-18.5	1.70 V	259	15.58	39.92
6	4844.00	46.5 AV	54.0	-7.5	1.70 V	259	6.58	39.92
7	7266.00	57.0 PK	74.0	-17.0	1.29 V	120	9.04	47.96
8	7266.00	49.9 AV	54.0	-4.1	1.29 V	120	1.94	47.96

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.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	2390.00	68.6 PK	74.0	-5.4	1.11 H	226	36.37	32.23
2	2390.00	52.9 AV	54.0	-1.1	1.11 H	226	20.67	32.23
3	*2437.00	103.2 PK			1.11 H	226	70.81	32.39
4	*2437.00	95.1 AV			1.11 H	226	62.71	32.39
5	2483.50	66.2 PK	74.0	-7.8	1.11 H	226	33.67	32.53
6	2483.50	51.4 AV	54.0	-2.6	1.11 H	226	18.87	32.53
7	4874.00	56.8 PK	74.0	-17.2	1.10 H	180	16.80	40.00
8	4874.00	47.9 AV	54.0	-6.1	1.10 H	180	7.90	40.00
9	7311.00	56.2 PK	74.0	-17.8	1.54 H	11	8.22	47.98
10	7311.00	45.6 AV	54.0	-8.4	1.54 H	11	-2.38	47.98
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	*2437.00	102.5 PK			1.70 V	217	70.11	32.39
2	*2437.00	92.1 AV			1.70 V	217	59.71	32.39
3	4874.00	55.9 PK	74.0	-18.1	1.64 V	269	15.90	40.00
4	4874.00	46.8 AV	54.0	-7.2	1.64 V	269	6.80	40.00
5	7311.00	56.2 PK	74.0	-17.8	1.28 V	120	8.22	47.98
6	7311.00	49.4 AV	54.0	-4.6	1.28 V	120	1.42	47.98

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.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		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	*2452.00	102.2 PK			1.12 H	163	69.76	32.44
2	*2452.00	92.1 AV			1.12 H	163	59.66	32.44
3	2483.50	72.4 PK	74.0	-1.6	1.12 H	163	39.87	32.53
4	2483.50	52.5 AV	54.0	-1.5	1.12 H	163	19.97	32.53
5	4904.00	56.5 PK	74.0	-17.5	1.18 H	163	16.43	40.07
6	4904.00	47.7 AV	54.0	-6.3	1.18 H	163	7.63	40.07
7	7356.00	55.5 PK	74.0	-18.5	1.52 H	27	7.54	47.96
8	7356.00	44.7 AV	54.0	-9.3	1.52 H	27	-3.26	47.96
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	*2452.00	100.0 PK			1.70 V	219	67.56	32.44
2	*2452.00	90.2 AV			1.70 V	219	57.76	32.44
3	2483.50	69.5 PK	74.0	-4.5	1.70 V	219	36.97	32.53
4	2483.50	50.8 AV	54.0	-3.2	1.70 V	219	18.27	32.53
5	4904.00	55.9 PK	74.0	-18.1	1.67 V	255	15.83	40.07
6	4904.00	46.7 AV	54.0	-7.3	1.67 V	255	6.63	40.07
7	7356.00	57.4 PK	74.0	-16.6	1.32 V	135	9.44	47.96
8	7356.00	50.3 AV	54.0	-3.7	1.32 V	135	2.34	47.96

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.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST 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 : June 24, 2013

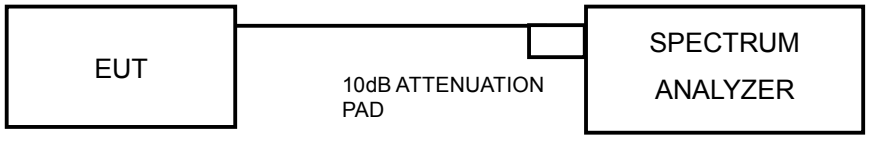
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.57	0.5	PASS
6	2437	9.08	0.5	PASS
11	2462	8.43	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.29	0.5	PASS
6	2437	16.48	0.5	PASS
11	2462	16.33	0.5	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.03	0.5	PASS
6	2437	17.01	0.5	PASS
11	2462	16.69	0.5	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.28	0.5	PASS
6	2437	35.47	0.5	PASS
9	2452	35.33	0.5	PASS

4.4 CONDUCTED OUTPUT POWER MEASUREMENT

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

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

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power Sensor	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : June 24, 2013

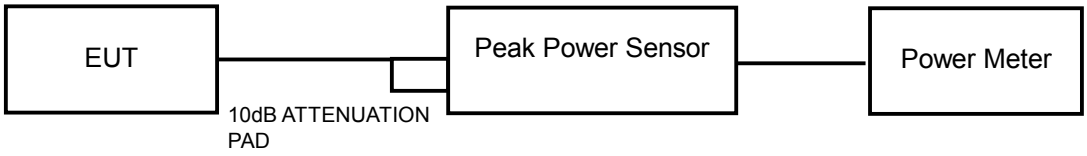
4.4.3 TEST PROCEDURES

The peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	120.226	20.80	30	PASS
6	2437	115.878	20.64	30	PASS
11	2462	105.196	20.22	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	132.130	21.21	30	PASS
6	2437	146.893	21.67	30	PASS
11	2462	119.399	20.77	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	113.501	20.55	30	PASS
6	2437	132.739	21.23	30	PASS
11	2462	122.462	20.88	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	68.234	18.34	30	PASS
6	2437	255.859	24.08	30	PASS
9	2452	82.985	19.19	30	PASS

4.5 AVERAGE OUTPUT POWER

4.5.1 FOR REFERENCE.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power Sensor	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014

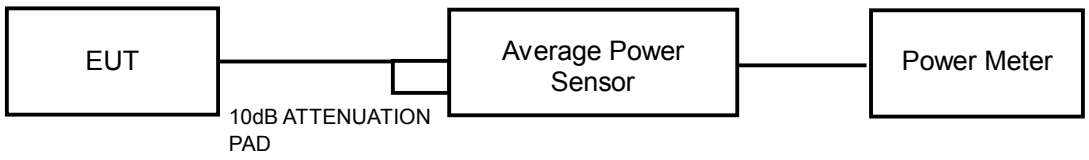
Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : June 24, 2013

4.5.3 TEST PROCEDURES

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.5.6 TEST RESULTS

802.11b

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	59.841	17.77
6	2437	55.335	17.43
11	2462	51.642	17.13

802.11g

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	32.434	15.11
6	2437	39.628	15.98
11	2462	27.606	14.41

802.11n (HT20)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	23.496	13.71
6	2437	36.224	15.59
11	2462	28.249	14.51

802.11n (HT40)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
3	2422	13.274	11.23
6	2437	27.416	14.38
9	2452	17.100	12.33

4.6 POWER SPECTRAL DENSITY MEASUREMENT

4.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

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 : June 24, 2013

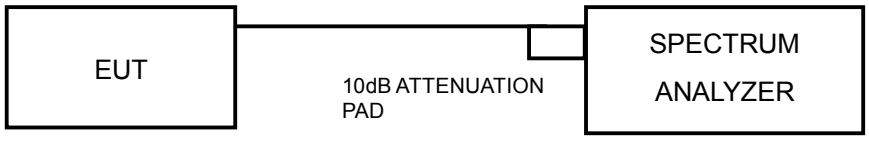
4.6.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

802.11b

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-3.73	8	PASS
6	2437	-3.93	8	PASS
11	2462	-4.21	8	PASS

802.11g

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.62	8	PASS
6	2437	-6.90	8	PASS
11	2462	-13.31	8	PASS

802.11n (HT20)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.63	8	PASS
6	2437	-7.14	8	PASS
11	2462	-13.04	8	PASS

802.11n (HT40)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-17.64	8	PASS
6	2437	-14.24	8	PASS
9	2452	-17.92	8	PASS

4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.7.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.7.2 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 : June 24, 2013

4.7.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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

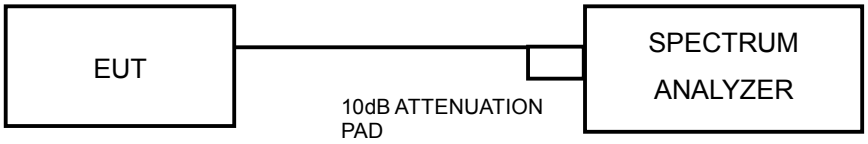
Measurement Procedure –Unwanted Emission Level

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

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



4.7.6 EUT OPERATING CONDITION

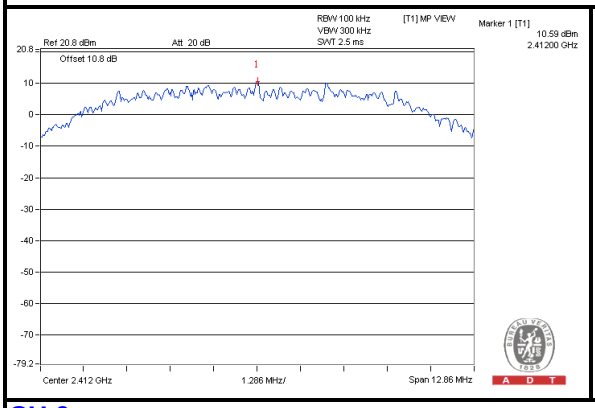
Same as Item 4.3.6

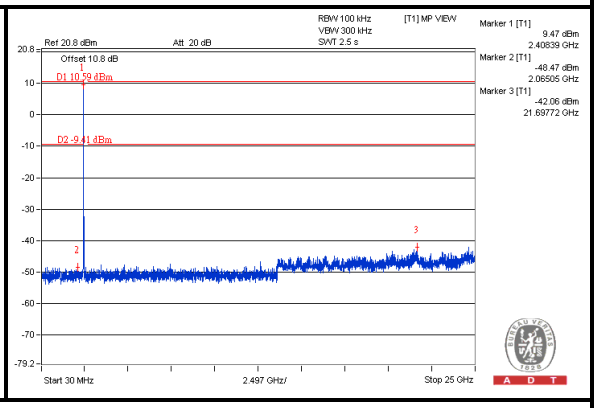
4.7.7 TEST RESULTS

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

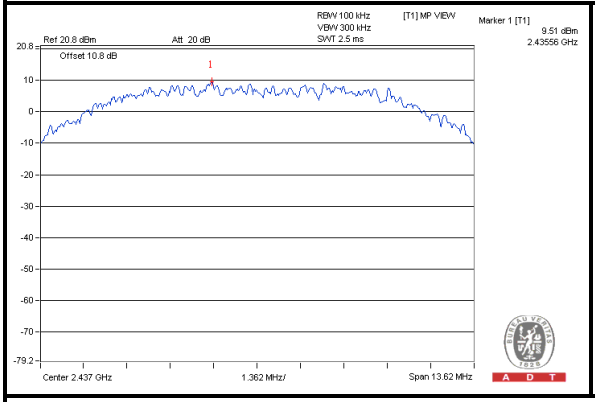
802.11b:

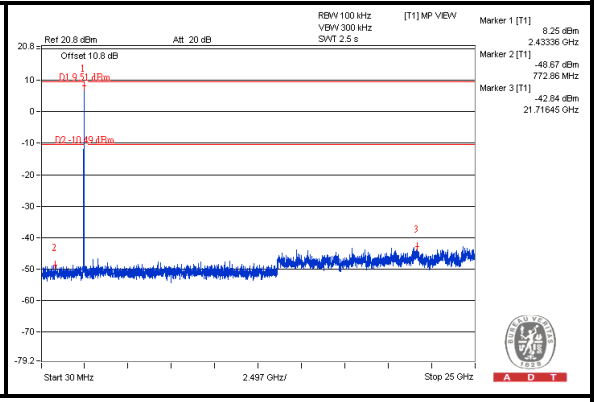
CH 1





CH 6





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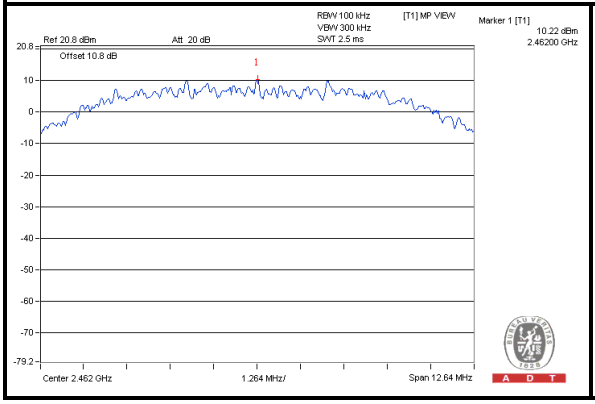
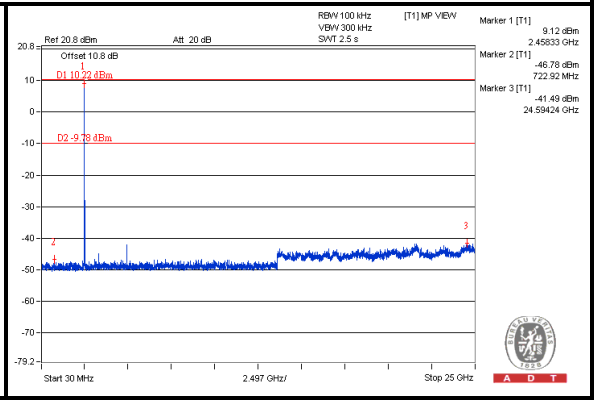
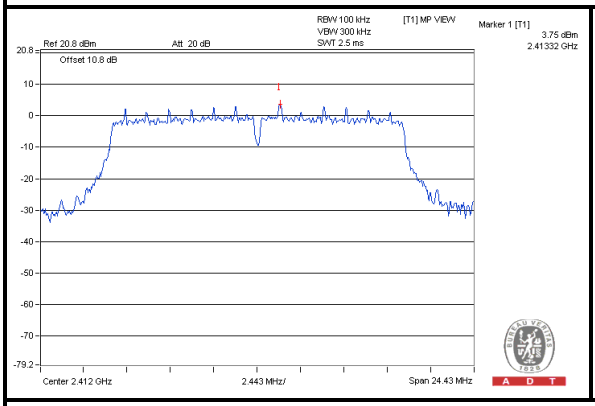
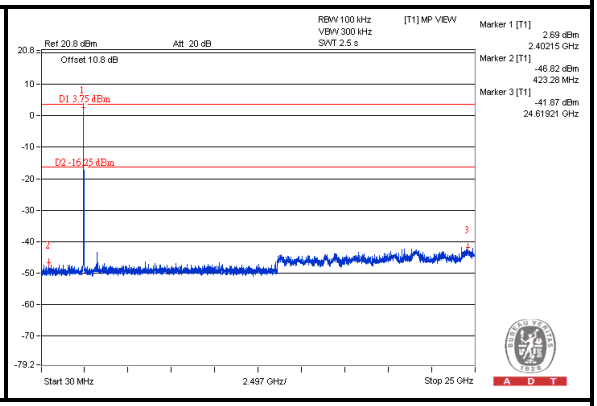




802.11g:

CH 1





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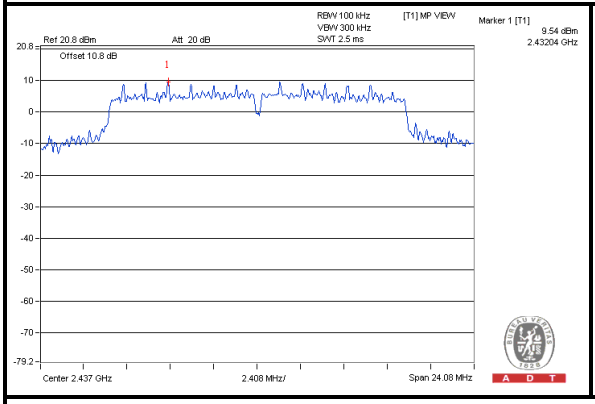

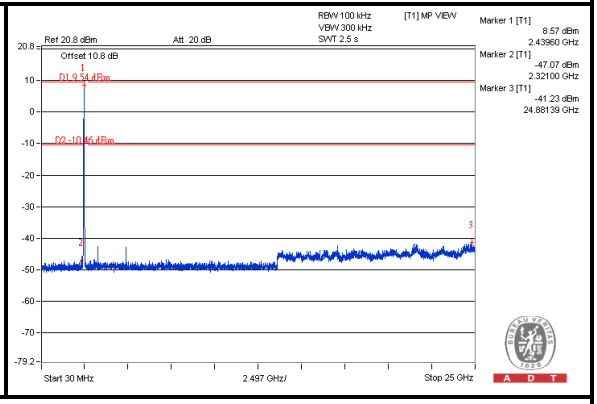

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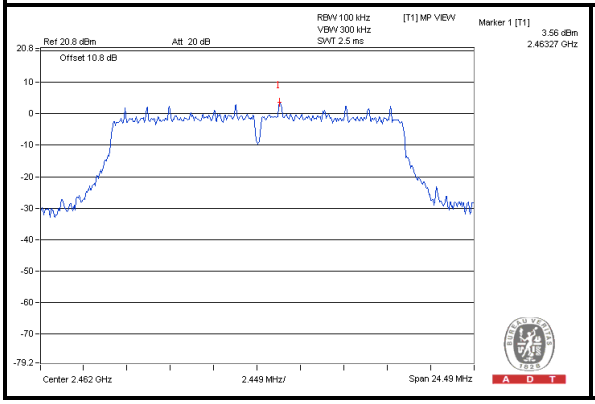
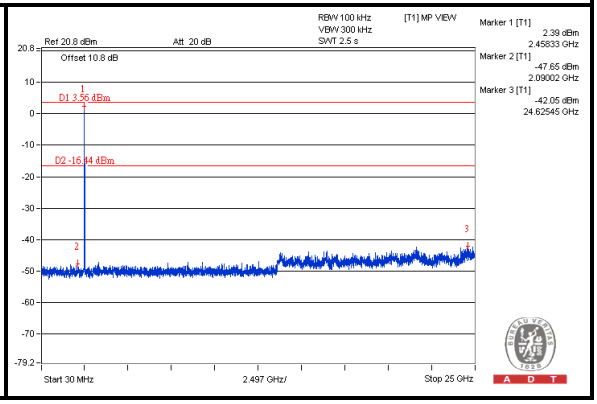
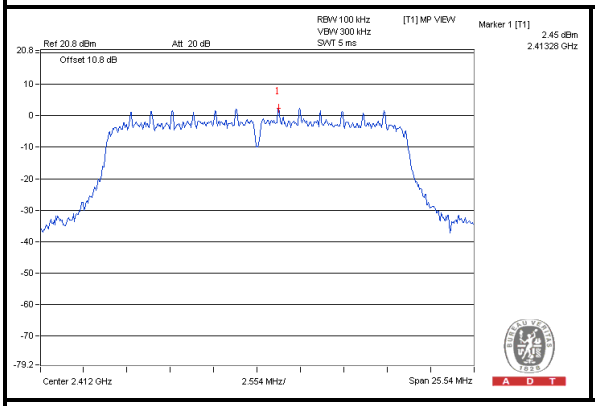
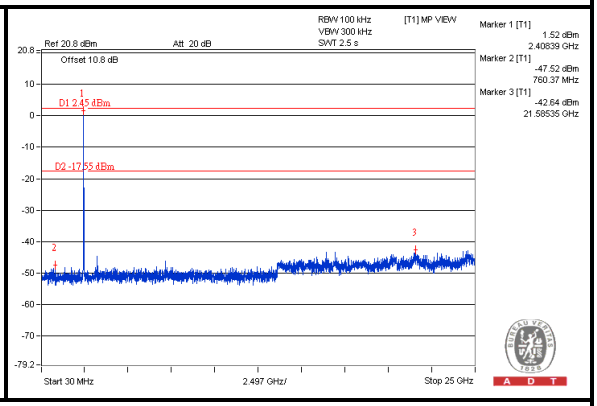




802.11n (HT20):

CH 1





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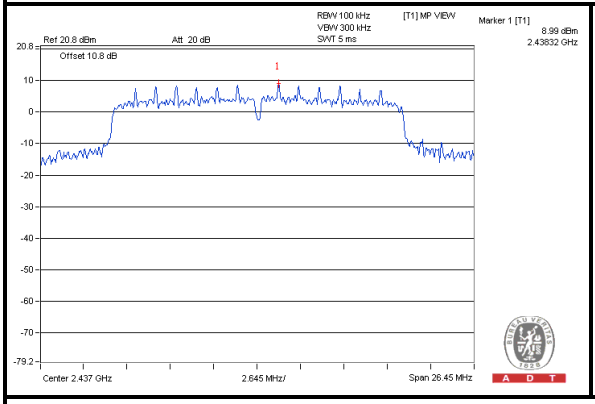
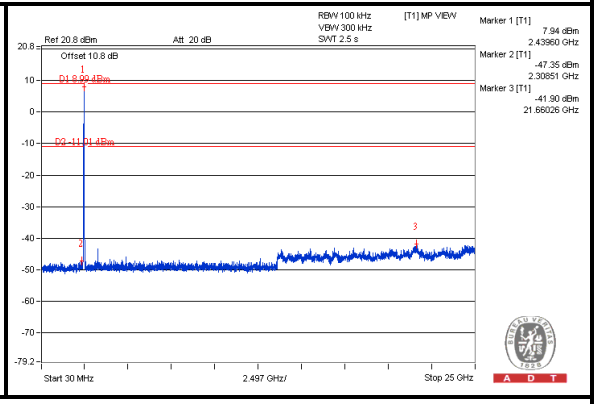
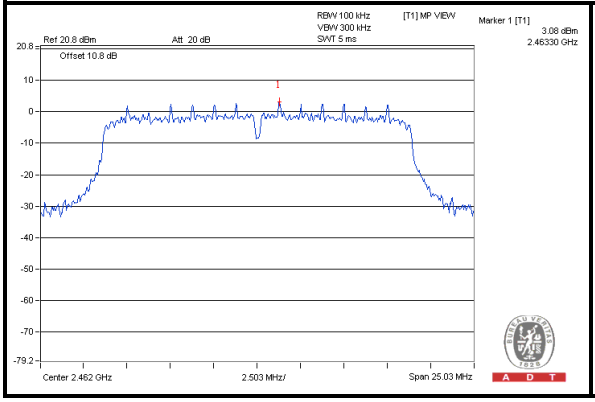
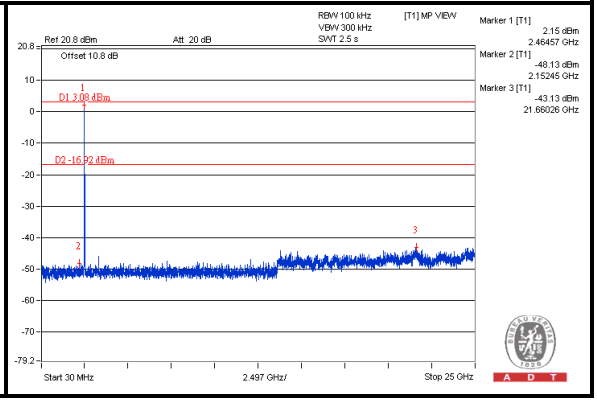




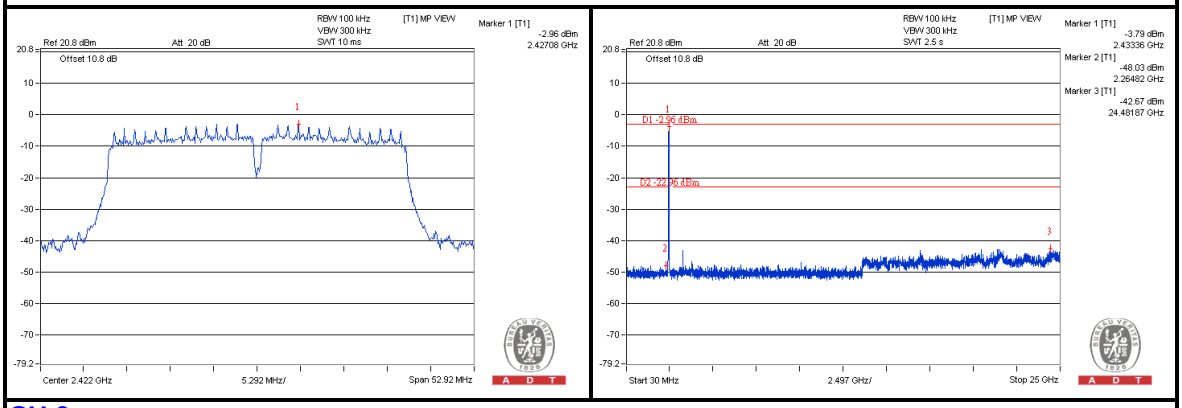
CH 11





802.11n (HT40):

CH 3



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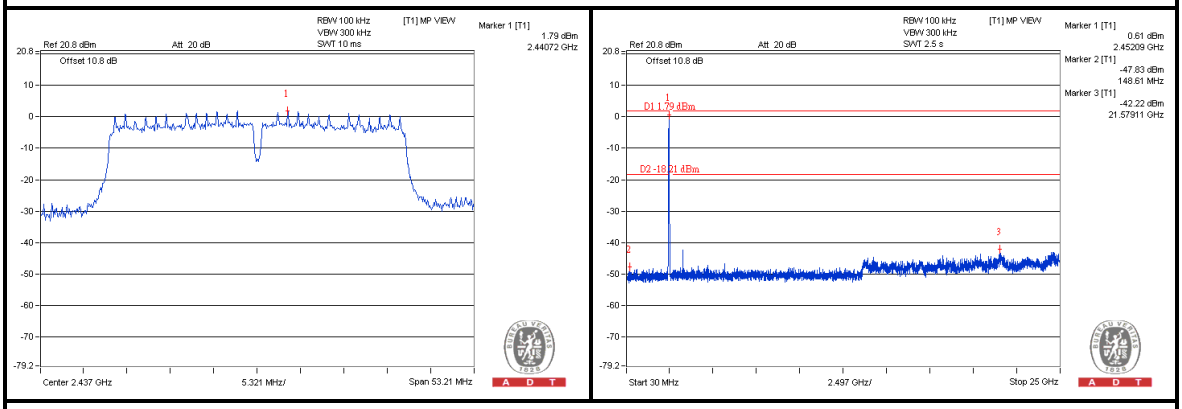
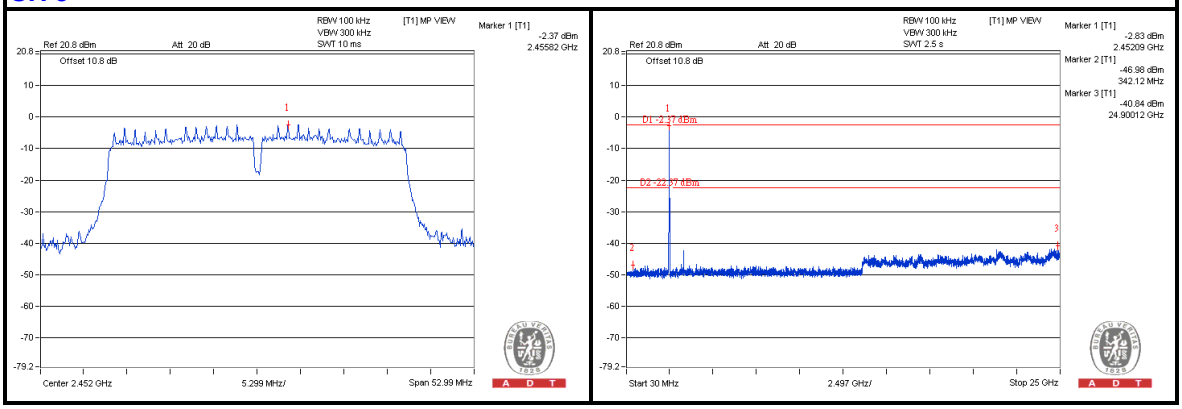


CH 9



5. TEST TYPES AND RESULTS (FOR 5GHz, 5.725~5.850GHz Band)

5.1 CONDUCTED EMISSION MEASUREMENT

5.1.1 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.

5.1.2 TEST INSTRUMENTS

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 25, 2013

5.1.3 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 levels under (Limit – 20dB) were not recorded.

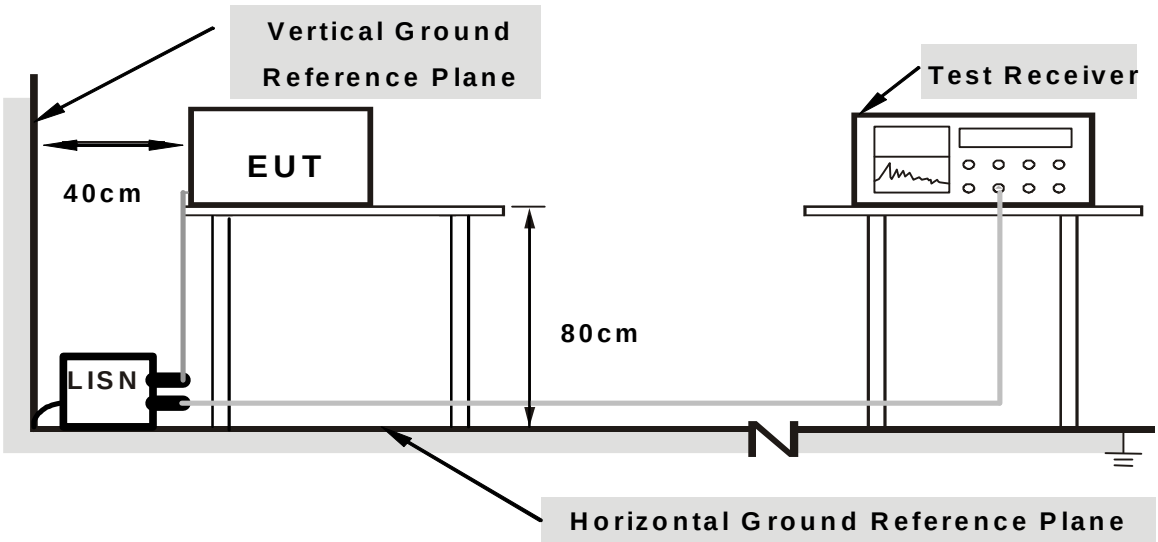
NOTE:

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

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 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.

5.1.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

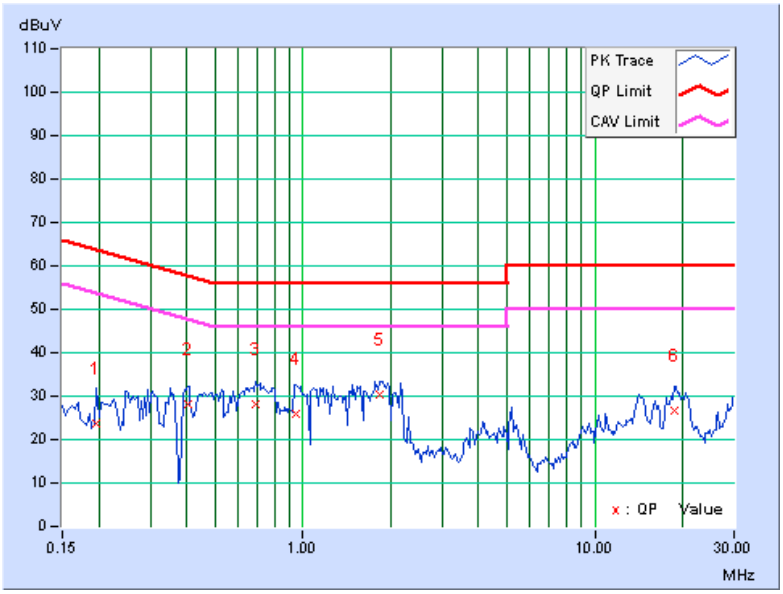
5.1.7 TEST RESULTS

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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19687	0.14	23.54	14.72	23.68	14.86	63.74	53.74	-40.06	-38.88
2	**0.40391**	**0.18**	**27.80**	**24.25**	**27.98**	**24.43**	**57.77**	**47.77**	**-29.79**	**-23.34**
3	0.68906	0.20	27.82	19.02	28.02	19.22	56.00	46.00	-27.98	-26.78
4	0.94688	0.22	25.71	21.38	25.93	21.60	56.00	46.00	-30.07	-24.40
5	1.82422	0.27	30.06	19.98	30.33	20.25	56.00	46.00	-25.67	-25.75
6	18.68750	0.99	25.53	18.55	26.52	19.54	60.00	50.00	-33.48	-30.46

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

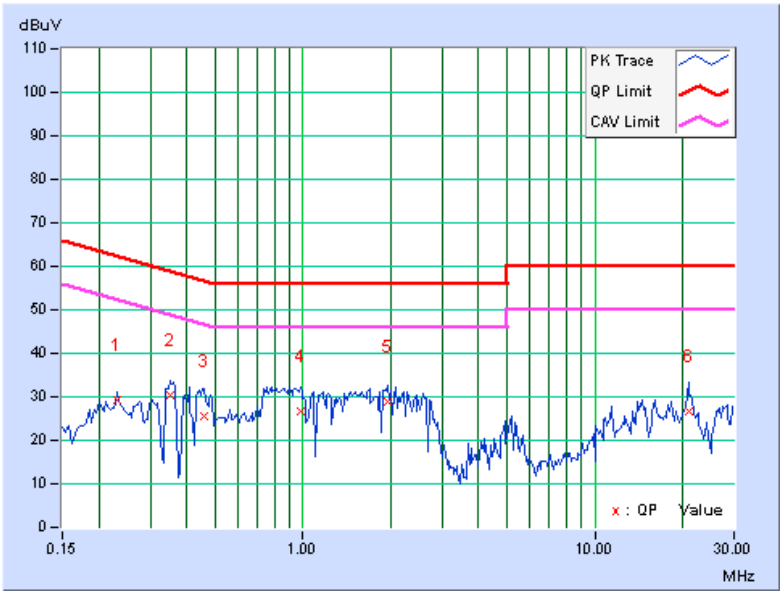


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.23203	0.13	29.02	24.58	29.15	24.71	62.38	52.38	-33.23	-27.67
2	0.34922	0.16	30.27	22.76	30.43	22.92	58.98	48.98	-28.55	-26.06
3	0.45859	0.17	25.34	17.64	25.51	17.81	56.72	46.72	-31.21	-28.91
4	0.98203	0.20	26.53	21.12	26.73	21.32	56.00	46.00	-29.27	-24.68
5	1.94141	0.26	28.80	21.19	29.06	21.45	56.00	46.00	-26.94	-24.55
6	20.91797	0.74	25.92	20.40	26.66	21.14	60.00	50.00	-33.34	-28.86

REMARKS:

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



5.2 RADIATED AND BANDEDGE EMISSION MEASUREMENT

5.2.1 LIMITS OF RADIATED AND BANDEDGE EMISSION MEASUREMENT

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

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

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

5.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29,2013	Jan. 28,2014
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	Mar. 19, 2013	Mar. 18, 2014
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.
8 Tested Date: June 22 to 24, 2013

5.2.3 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.

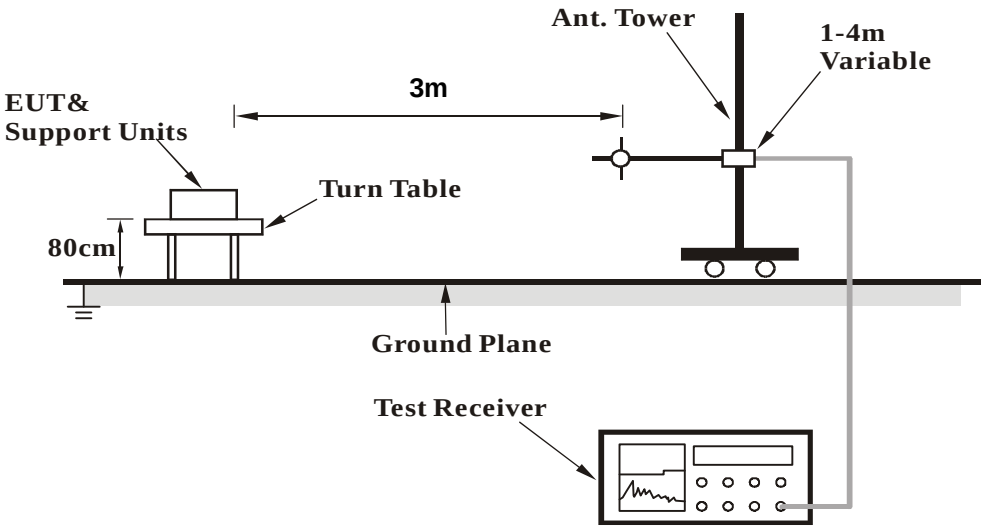
NOTE:

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.

5.2.4 DEVIATION FROM TEST STANDARD

No deviation

5.2.5 TEST SETUP



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

5.2.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

5.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 165	**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	56.72	32.3 QP	40.0	-7.7	1.75 H	330	46.29	-14.01
2	99.94	31.4 QP	43.5	-12.1	2.00 H	291	49.31	-17.88
3	185.20	28.8 QP	43.5	-14.8	2.00 H	65	44.31	-15.56
4	260.71	33.2 QP	46.0	-12.8	1.25 H	356	47.39	-14.19
5	649.44	26.4 QP	46.0	-19.7	1.00 H	333	30.83	-4.48
6	959.99	37.9 QP	46.0	-8.1	1.25 H	261	37.33	0.56
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	**94.94**	**40.0 QP**	**43.5**	**-3.5**	**1.25 V**	**33**	**58.84**	**-18.81**
2	179.53	33.0 QP	43.5	-10.5	1.50 V	212	47.78	-14.80
3	549.43	25.4 QP	46.0	-20.6	1.00 V	298	32.36	-6.94
4	696.20	30.4 QP	46.0	-15.6	1.50 V	288	34.43	-3.99
5	847.52	32.2 QP	46.0	-13.8	1.25 V	318	33.55	-1.35
6	949.61	35.6 QP	46.0	-10.4	1.00 V	291	35.03	0.59

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 149	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5745.00	108.0 PK			1.06 H	57	65.33	42.67
2	*5745.00	99.7 AV			1.06 H	57	57.03	42.67
3	11490.00	57.9 PK	74.0	-16.1	1.56 H	21	9.04	48.86
4	11490.00	47.2 AV	54.0	-6.8	1.56 H	21	-1.66	48.86
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	*5745.00	102.1 PK			1.22 V	147	59.43	42.67
2	*5745.00	92.6 AV			1.22 V	147	49.93	42.67
3	11490.00	60.6 PK	74.0	-13.4	1.29 V	75	11.74	48.86
4	11490.00	48.6 AV	54.0	-5.4	1.29 V	75	-0.26	48.86

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 limit value is defined as per 15.247.

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	108.4 PK			1.04 H	67	65.66	42.74
2	*5785.00	99.9 AV			1.04 H	67	57.16	42.74
3	11570.00	57.7 PK	74.0	-16.3	1.57 H	28	8.89	48.81
4	11570.00	46.7 AV	54.0	-7.3	1.57 H	28	-2.11	48.81
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	*5785.00	102.5 PK			1.19 V	149	59.76	42.74
2	*5785.00	93.0 AV			1.19 V	149	50.26	42.74
3	11570.00	60.8 PK	74.0	-13.2	1.27 V	76	11.99	48.81
4	11570.00	49.0 AV	54.0	-5.0	1.27 V	76	0.19	48.81

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 limit value is defined as per 15.247.

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	108.2 PK			1.08 H	71	65.33	42.87
2	*5825.00	99.8 AV			1.08 H	71	56.93	42.87
3	11650.00	58.3 PK	74.0	-15.7	1.61 H	29	9.28	49.02
4	11650.00	47.5 AV	54.0	-6.5	1.61 H	29	-1.52	49.02
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	102.4 PK			1.28 V	142	59.53	42.87
2	*5825.00	93.1 AV			1.28 V	142	50.23	42.87
3	11650.00	60.6 PK	74.0	-13.4	1.34 V	88	11.58	49.02
4	11650.00	48.8 AV	54.0	-5.2	1.34 V	88	-0.22	49.02

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 limit value is defined as per 15.247.

802.11n (HT20)

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

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	*5745.00	108.1 PK			1.01 H	72	65.43	42.67
2	*5745.00	99.4 AV			1.01 H	72	56.73	42.67
3	11490.00	58.5 PK	74.0	-15.5	1.60 H	18	9.64	48.86
4	11490.00	47.5 AV	54.0	-6.5	1.60 H	18	-1.36	48.86
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	*5745.00	102.0 PK			1.25 V	134	59.33	42.67
2	*5745.00	92.4 AV			1.25 V	134	49.73	42.67
3	11490.00	60.8 PK	74.0	-13.2	1.34 V	66	11.94	48.86
4	11490.00	48.8 AV	54.0	-5.2	1.34 V	66	-0.06	48.86

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 limit value is defined as per 15.247.

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	108.2 PK			1.09 H	60	65.46	42.74
2	*5785.00	100.0 AV			1.09 H	60	57.26	42.74
3	11570.00	57.2 PK	74.0	-16.8	1.54 H	25	8.39	48.81
4	11570.00	46.8 AV	54.0	-7.2	1.54 H	25	-2.01	48.81
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	*5785.00	102.0 PK			1.27 V	158	59.26	42.74
2	*5785.00	92.5 AV			1.27 V	158	49.76	42.74
3	11570.00	60.7 PK	74.0	-13.3	1.26 V	73	11.89	48.81
4	11570.00	48.5 AV	54.0	-5.5	1.26 V	73	-0.31	48.81

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 limit value is defined as per 15.247.

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	108.5 PK			1.04 H	73	65.63	42.87
2	*5825.00	100.1 AV			1.04 H	73	57.23	42.87
3	11650.00	67.9 PK	74.0	-6.1	1.58 H	9	18.88	49.02
4	11650.00	47.0 AV	54.0	-7.0	1.58 H	9	-2.02	49.02
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	102.2 PK			1.16 V	163	59.33	42.87
2	*5825.00	93.0 AV			1.16 V	163	50.13	42.87
3	11650.00	60.5 PK	74.0	-13.5	1.25 V	87	11.48	49.02
4	11650.00	48.4 AV	54.0	-5.6	1.25 V	87	-0.62	49.02

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 limit value is defined as per 15.247.

802.11n (HT40)

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

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	*5755.00	105.1 PK			1.07 H	57	62.41	42.69
2	*5755.00	96.7 AV			1.07 H	57	54.01	42.69
3	11510.00	57.7 PK	74.0	-16.3	1.53 H	25	8.86	48.84
4	11510.00	47.2 AV	54.0	-6.8	1.53 H	25	-1.64	48.84
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	*5755.00	102.3 PK			1.24 V	156	59.61	42.69
2	*5755.00	92.6 AV			1.24 V	156	49.91	42.69
3	11510.00	56.8 PK	74.0	-17.2	1.41 V	79	7.96	48.84
4	11510.00	45.8 AV	54.0	-8.2	1.41 V	79	-3.04	48.84

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 limit value is defined as per 15.247.

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	105.3 PK			1.06 H	62	62.55	42.75
2	*5795.00	97.1 AV			1.06 H	62	54.35	42.75
3	11590.00	58.3 PK	74.0	-15.7	1.57 H	28	9.50	48.80
4	11590.00	47.7 AV	54.0	-6.3	1.57 H	28	-1.10	48.80
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	*5795.00	102.1 PK			1.28 V	134	59.35	42.75
2	*5795.00	92.5 AV			1.28 V	134	49.75	42.75
3	11590.00	57.3 PK	74.0	-16.7	1.35 V	72	8.51	48.80
4	11590.00	45.5 AV	54.0	-8.5	1.35 V	72	-3.30	48.80

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 limit value is defined as per 15.247.

802.11ac(VHT80)

CHANNEL	TX Channel 155	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5775.00	103.6 PK			1.06 H	57	60.88	42.72
2	*5775.00	93.4 AV			1.06 H	57	50.68	42.72
3	11550.00	57.3 PK	74.0	-16.7	1.61 H	8	8.48	48.82
4	11550.00	46.8 AV	54.0	-7.2	1.61 H	8	-2.02	48.82
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	*5775.00	101.9 PK			1.23 V	161	59.18	42.72
2	*5775.00	92.7 AV			1.23 V	161	49.98	42.72
3	11550.00	56.5 PK	74.0	-17.5	1.39 V	75	7.68	48.82
4	11550.00	45.4 AV	54.0	-8.6	1.39 V	75	-3.42	48.82

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 limit value is defined as per 15.247.

5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.3.2 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 : June 24, 2013

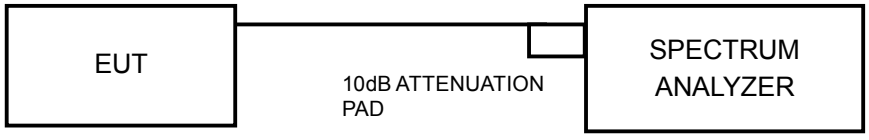
5.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. 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

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP



5.3.6 EUT OPERATING CONDITIONS

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

5.3.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	16.36	0.5	PASS
157	5785	16.34	0.5	PASS
165	5825	16.37	0.5	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
149	5745	17.08	0.5	PASS
157	5785	16.76	0.5	PASS
165	5825	16.94	0.5	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
151	5755	35.83	0.5	PASS
159	5795	36.14	0.5	PASS

802.11ac (VHT80)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
155	5775	75.54	0.5	PASS

5.4 CONDUCTED OUTPUT POWER MEASUREMENT

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

5.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power Sensor	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : June 24, 2013

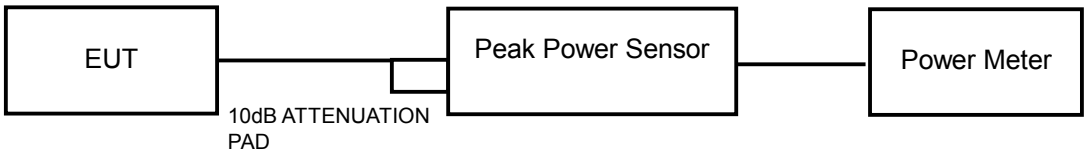
5.4.3 TEST PROCEDURES

The peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation.

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

Same as Item 5.3.6

5.4.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	73.621	18.67	30	PASS
157	5785	68.391	18.35	30	PASS
165	5825	66.527	18.23	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
149	5745	78.705	18.96	30	PASS
157	5785	75.162	18.76	30	PASS
165	5825	74.817	18.74	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
151	5755	74.989	18.75	30	PASS
159	5795	73.114	18.64	30	PASS

802.11ac (VHT80)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
155	5775	71.779	18.56	30	PASS

5.5 AVERAGE OUTPUT POWER

5.5.1 FOR REFERENCE.

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	1014008	Apr. 23, 2013	Apr. 22, 2014
Power Sensor	MA2411B	0917122	Apr. 23, 2013	Apr. 22, 2014

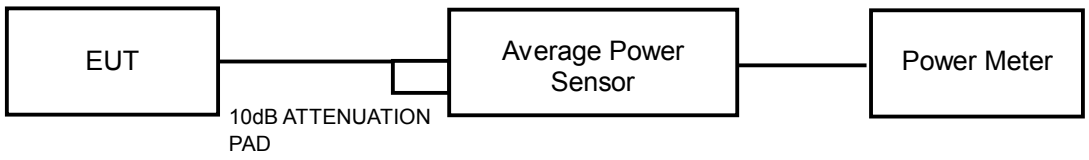
Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : June 24, 2013

5.5.3 TEST PROCEDURES

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

5.5.4 TEST SETUP



5.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6

5.5.6 TEST RESULTS

802.11a

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
149	5745	18.408	12.65
157	5785	17.140	12.34
165	5825	16.596	12.20

802.11n (HT20)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
149	5745	17.947	12.54
157	5785	17.498	12.43
165	5825	17.539	12.44

802.11n (HT40)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
151	5755	18.030	12.56
159	5795	17.539	12.44

802.11ac (VHT80)

CHAN.	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
155	5775	17.701	12.48

5.6 POWER SPECTRAL DENSITY MEASUREMENT

5.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.6.2 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 : June 24, 2013

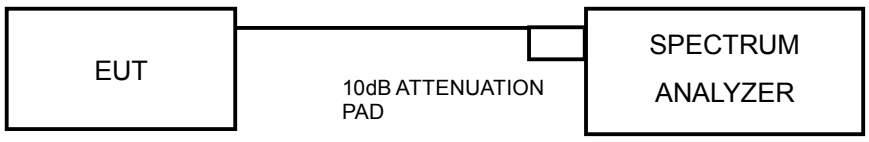
5.6.3 TEST PROCEDURE

1. Set the RBW = 3 kHz, VBW =10 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum amplitude level.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 TEST SETUP



5.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

5.6.7 TEST RESULTS

802.11a

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-4.74	8	PASS
157	5785	-5.08	8	PASS
165	5825	-5.80	8	PASS

802.11n (HT20)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
149	5745	-4.51	8	PASS
157	5785	-5.54	8	PASS
165	5825	-5.55	8	PASS

802.11n (HT40)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
151	5755	-9.39	8	PASS
159	5795	-8.65	8	PASS

802.11ac (VHT80)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
155	5775	-13.07	8	PASS

5.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

5.7.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

5.7.2 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 : June 24, 2013

5.7.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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

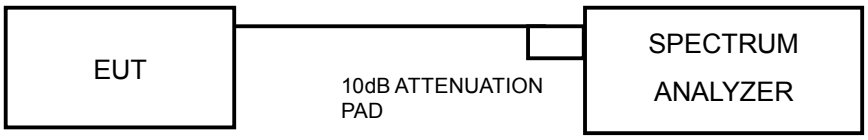
Measurement Procedure –Unwanted Emission Level

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

5.7.4 DEVIATION FROM TEST STANDARD

No deviation

5.7.5 TEST SETUP



5.7.6 EUT OPERATING CONDITION

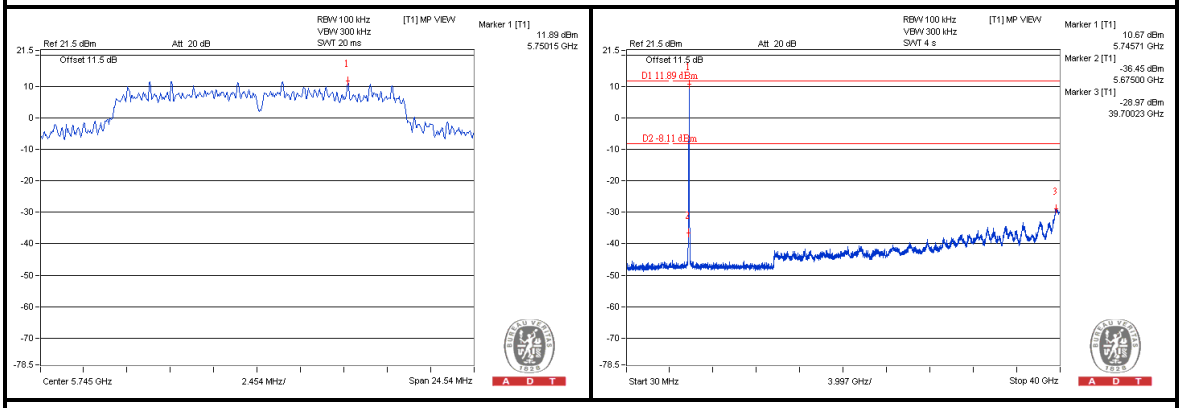
Same as Item 4.3.6

5.7.7 TEST RESULTS

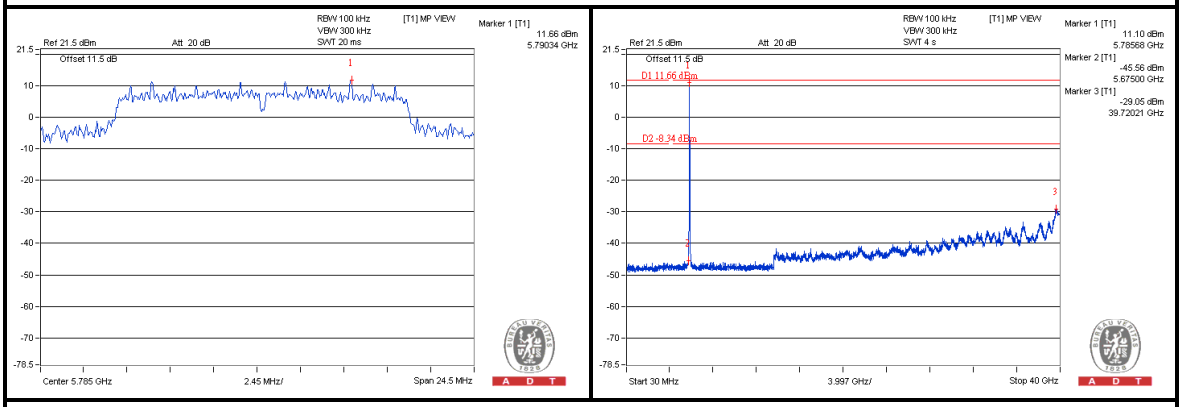
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11a

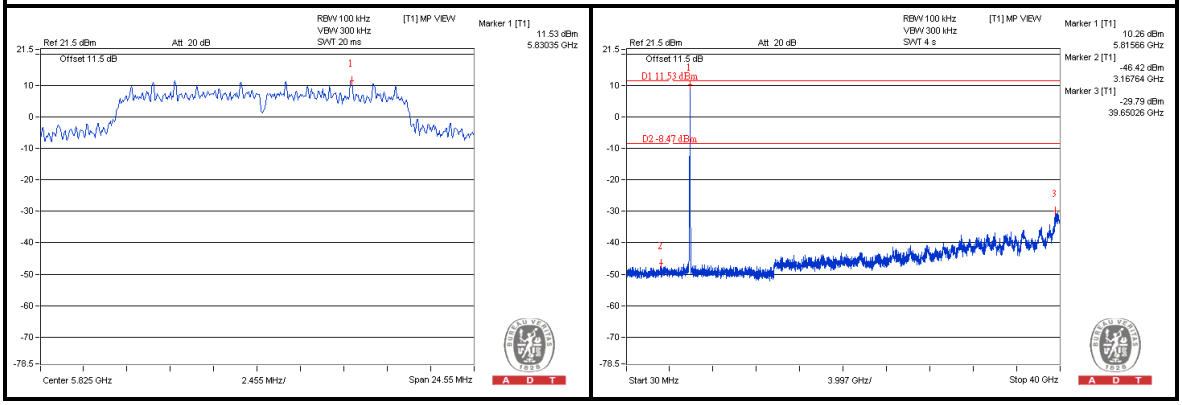
CH 149



CH 157

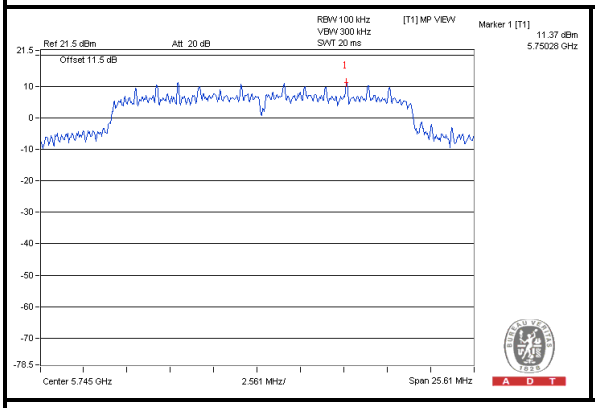


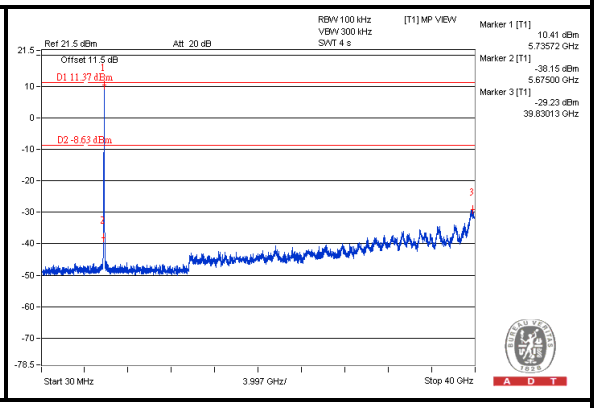
CH 165



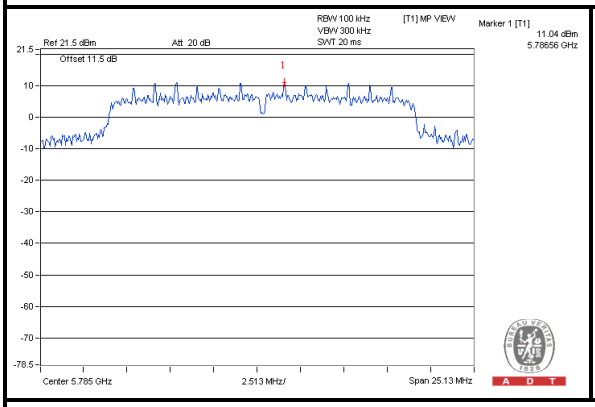
802.11n (HT20):

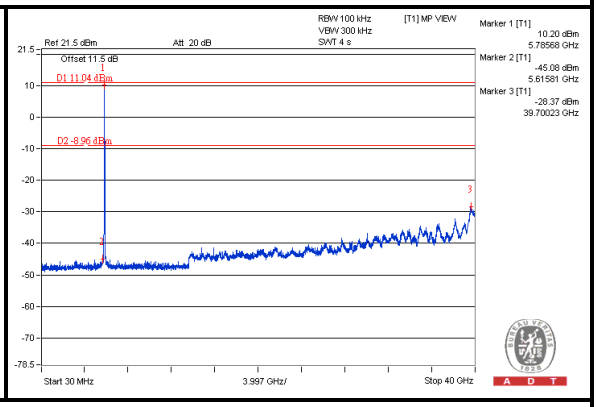
CH 149



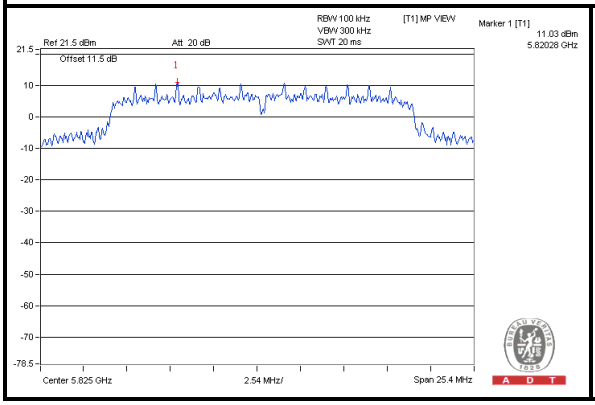


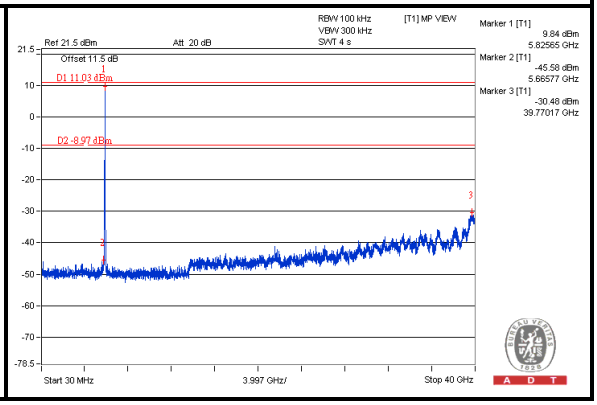
CH 157





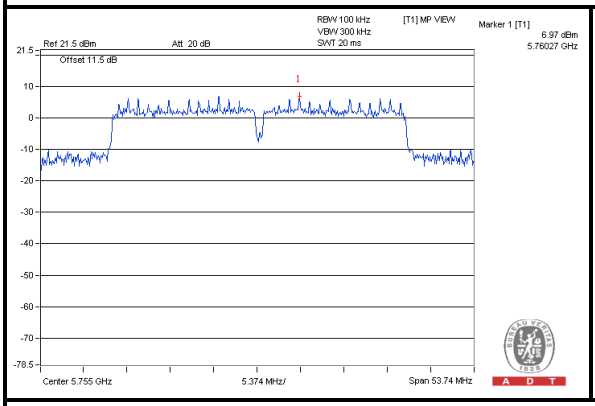
CH 165

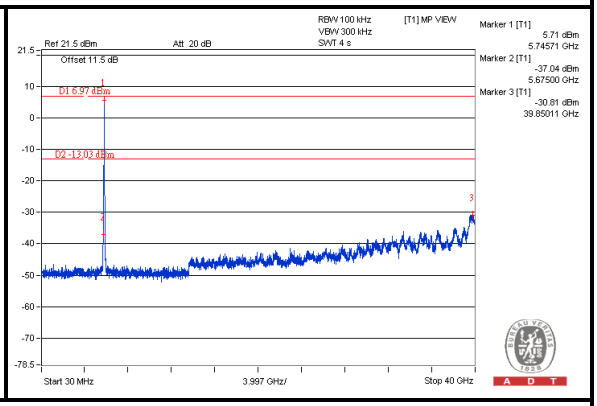




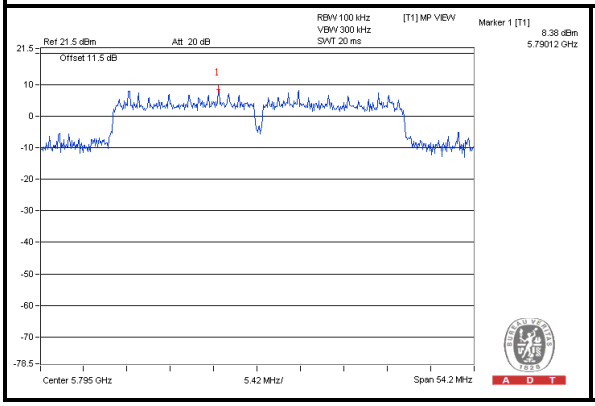
802.11n (HT40):

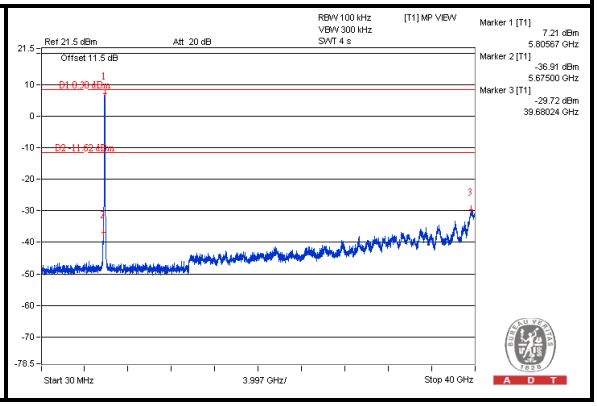
CH 151





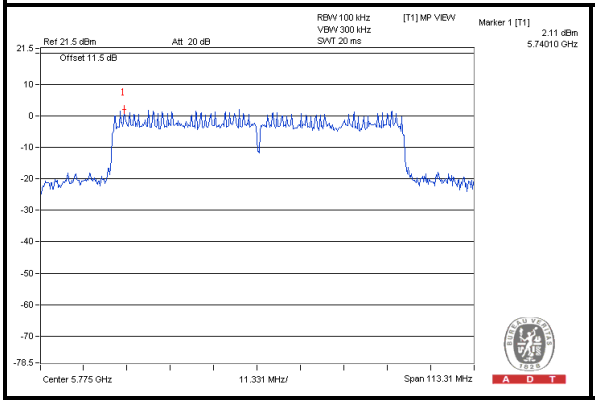
CH 159

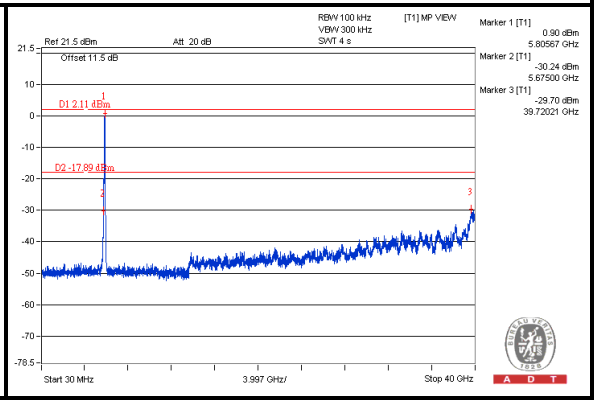




802.11ac (VHT80):

CH 155





6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

7. INFORMATION ON THE TESTING LABORATORIES

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

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

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Web Site: www.bureauveritas-adt.com

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

8. 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 ---