

FCC TEST REPORT

REPORT NO.: RF120727E01

MODEL NO.: X1000

FCC ID: Q87-X1000

RECEIVED: July 27, 2012

TESTED: Aug. 01 to 14, 2012

ISSUED: Aug. 30, 2012

APPLICANT: Cisco Consumer Products, LLC

ADDRESS: 121 Theory, Irvine, CA 92617

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

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Table of Contents

RELEASE CONTROL RECORD	4
1. CERTIFICATION	5
2. SUMMARY OF TEST RESULTS	6
2.1 MEASUREMENT UNCERTAINTY	7
3. GENERAL INFORMATION	8
3.1 GENERAL DESCRIPTION OF EUT	8
3.2 DESCRIPTION OF TEST MODES	10
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	11
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS	14
3.4 DESCRIPTION OF SUPPORT UNITS.....	15
3.5 CONFIGURATION OF SYSTEM UNDER TEST	16
4. TEST TYPES AND RESULTS	17
4.1 CONDUCTED EMISSION MEASUREMENT	17
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	17
4.1.2 TEST INSTRUMENTS.....	17
4.1.3 TEST PROCEDURES	18
4.1.4 DEVIATION FROM TEST STANDARD	18
4.1.5 TEST SETUP	19
4.1.6 EUT OPERATING CONDITIONS	19
4.1.7 TEST RESULTS (Mode 1)	20
4.1.8 TEST RESULTS (Mode 2)	22
4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT	24
4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	24
4.2.2 TEST INSTRUMENTS.....	25
4.2.3 TEST PROCEDURES	26
4.2.4 DEVIATION FROM TEST STANDARD	26
4.2.5 TEST SETUP	27
4.2.6 EUT OPERATING CONDITIONS	27
4.2.7 TEST RESULTS	28
4.3 6dB BANDWIDTH MEASUREMENT	41
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT	41
4.3.2 TEST INSTRUMENTS.....	41
4.3.3 TEST PROCEDURE.....	41
4.3.4 DEVIATION FROM TEST STANDARD	41
4.3.5 TEST SETUP	41
4.3.6 EUT OPERATING CONDITIONS	41
4.3.7 TEST RESULTS	42
4.4 CONDUCTED OUTPUT POWER MEASUREMENT	43
4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT	43
4.4.2 INSTRUMENTS.....	43



A D T

4.4.3	TEST PROCEDURES	43
4.4.4	DEVIATION FROM TEST STANDARD	43
4.4.5	TEST SETUP	43
4.4.6	EUT OPERATING CONDITIONS	43
4.4.7	TEST RESULTS	44
4.5	POWER SPECTRAL DENSITY MEASUREMENT	45
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	45
4.5.2	TEST INSTRUMENTS	45
4.5.3	TEST PROCEDURE	45
4.5.4	DEVIATION FROM TEST STANDARD	45
4.5.5	TEST SETUP	45
4.5.6	EUT OPERATING CONDITION	45
4.5.7	TEST RESULTS	46
4.6	CONDUCTED OUT-BAND EMISSION MEASUREMENT	47
4.6.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT	47
4.6.2	TEST INSTRUMENTS	47
4.6.3	TEST PROCEDURE	47
4.6.4	DEVIATION FROM TEST STANDARD	48
4.6.5	TEST SETUP	48
4.6.6	EUT OPERATING CONDITION	48
4.6.7	TEST RESULTS	48
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION	53
6.	INFORMATION ON THE TESTING LABORATORIES	54
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	55



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120727E01	Original release	Aug. 30, 2012

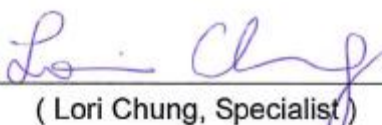


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1. CERTIFICATION

PRODUCT: N300 Wireless Router with ADSL2+Modem
BRAND NAME: Cisco
MODEL NO.: X1000
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: Cisco Consumer Products, LLC
TESTED: Aug. 01 to 14, 2012
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (Model: X1000) 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:** Aug. 30, 2012
(Lori Chung, Specialist)

APPROVED BY : , **DATE:** Aug. 30, 2012
(May Chen, Deputy Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -9.71dB at 0.15432MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB at 2384.00MHz and 2483.50MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

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)	5.59 dB
Radiated emissions (1GHz-6GHz)	3.56 dB
Radiated emissions (6GHz-18GHz)	4.10 dB
Radiated emissions (18GHz-40GHz)	4.24 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	N300 Wireless Router with ADSL2+Modem
MODEL NO.	X1000
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: Up to 11Mbps 802.11g: Up to 54Mbps 802.11n: Up to 300Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	802.11b: 75.858mW 802.11g: 229.087mW 802.11n (HT20): 470.836mW 802.11n (HT40): 237.716mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

1. The antennas provided to the EUT, please refer to the following table:

Transmitter Circuit	Antenna Type	Connector Type	Gain (dBi) <without cable loss>	Cable loss (dB)	Net Gain(dBi)	Frequency range (MHz to MHz)	Cable Length (cm)
Chain (0)	PIFA	NA	3.2	0.31	2.89	2400~2500	12.4
Chain (1)	PIFA	NA	3.7	0.14	3.56	2400~2500	5.5

2. The EUT must be supplied with a power adapter and following three different model names could be chosen as below table:

No.	Brand	Model No.	Spec.
Adapter 1	Solytech	CAD1212C-2	AC Input: 100-240V, 50-60Hz, 0.5A DC Output: 12V, 1A DC Output cable (unshielded,1.5m)
Adapter 2	Solytech	CAD1212L-2	AC Input: 100-240V, 50-60Hz, 0.5A DC Output: 12V, 1A DC Output cable (unshielded,1.5m)
Adapter 3	DVE	DSA-12GX-12 FUS	AC Input: 100-240V, 50-60Hz, 0.3A DC Output: 12V, 1A DC Output cable (unshielded,1.5m)
1. The adapters 2 are as same as Adapter 1; except for plug shape is different. 2. From the above adapters, adapters 1 and 3 were chosen for final test.			

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

MODULATION MODE	TX/RX FUNCTION
802.11b	1Tx/2Rx
802.11g	1Tx<Diversity>/2Rx
802.11n (HT20)	2Tx/2Rx
802.11n (HT40)	2Tx/2Rx

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

5. The EUT is pre-tested under following test modes :

Mode	Adapter	Polarity
Mode A	With adapter 3	Laying-flat type
Mode B	With adapter 3	Stand-up type
Mode C	With adapter 1	Laying-flat type

From the above modes, the worst radiated emission (Below 1GHz) was found in Mode B and the worst radiated emission (Above 1GHz) was found in Mode A. Therefore only the test data of the modes were recorded in this report.

6. 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

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		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **PLC**: Power Line Conducted Emission **RE < 1G**: Radiated Emission below 1GHz
RE ³ 1G: Radiated Emission above 1GHz **APCM**: Antenna Port Conducted Measurement
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)
802.11b	1 to 11	1	DSSS	DBPSK	1

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)
802.11b	1 to 11	1	DSSS	DBPSK	1

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
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	13
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	27

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
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	13
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	27

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
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	13
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	27

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	26deg. C, 61%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Nelson Teng
RE ³ 1G	25deg. C, 65%RH	120Vac, 60Hz	Evan Huang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang
OB	25deg. C, 60%RH	120Vac, 60Hz	Rex Huang

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 v01

ANSI C63.10-2009

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

3.4 DESCRIPTION OF SUPPORT UNITS

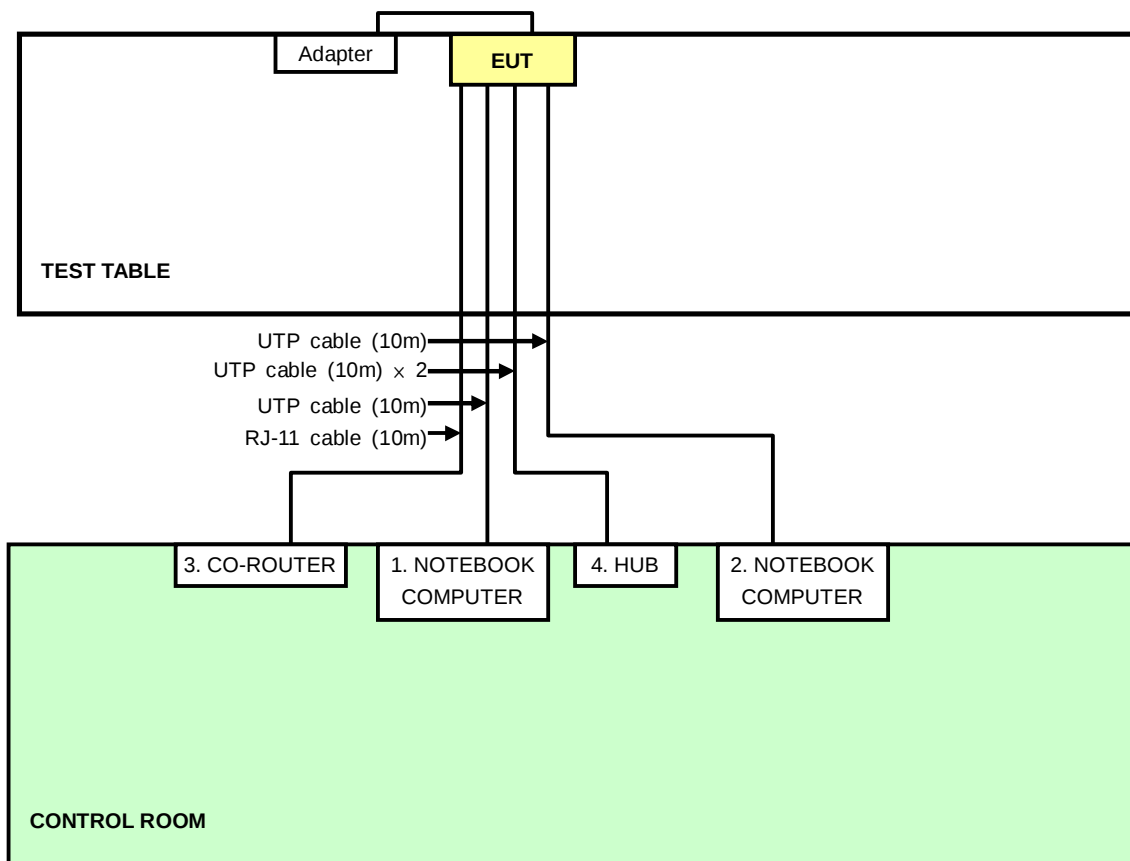
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	E6400	D814C A00 APCC	NA
2	NOTEBOOK COMPUTER	DELL	E6420	H62T3R1	FCC DoC
3	CO-ROUTER	ZyXEL	IES-1000	S4Z3112558	NA
4	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable (10m)
2	UTP cable (10m)
3	RJ-11 cable (10m)
4	UTP cable (10m)

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

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Mar. 12, 2012	Mar.11, 2013
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 07, 2011	Sep. 06, 2012
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 08,2012	June 07,2013
RF Cable (JYEBAO)	5DFB	COCCAB-001	Aug. 29, 2011	Aug. 28, 2012
50 ohms Terminator	50	EMC-3	Sep. 26, 2011	Sep. 25, 2012
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: Aug. 01, 2012

4.1.3 TEST PROCEDURES

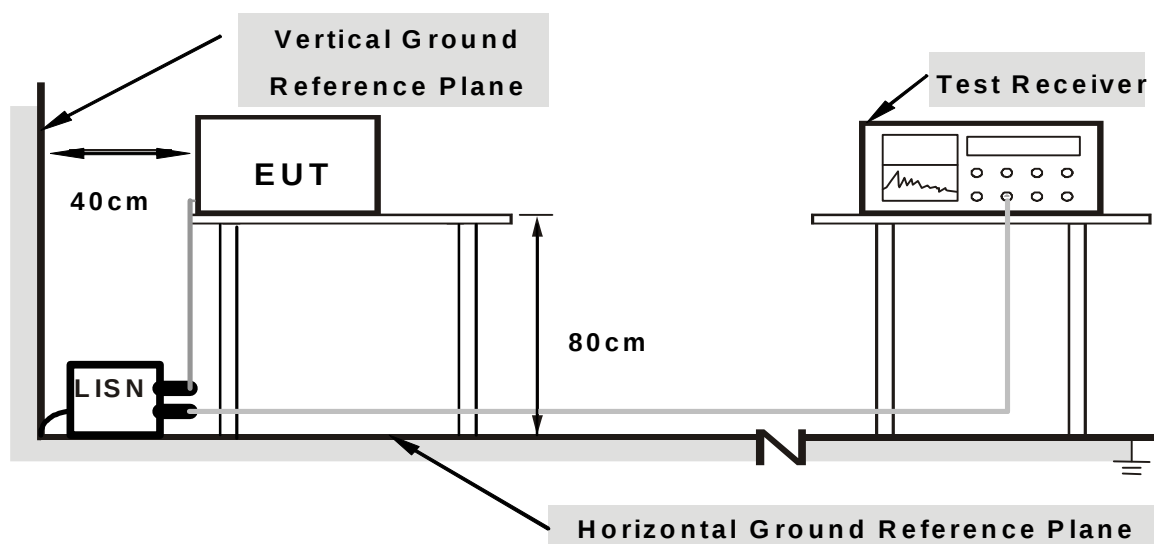
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

Note: All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

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

4.1.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Controlling software (Telnet Paste Broadcom wl command) has been activated to set the EUT under transmission/receiving condition continuously.

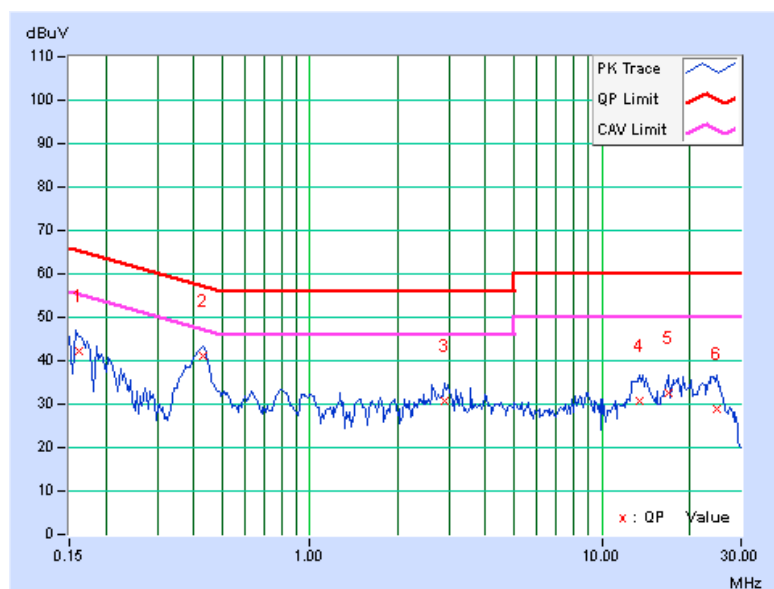
4.1.7 TEST RESULTS (Mode 1)

PHASE	Line (L)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16219	0.07	42.30	29.63	42.37	29.70	65.35	55.35	-22.98	-25.65
2	0.43125	0.10	41.02	35.23	41.12	35.33	57.23	47.23	-16.11	-11.90
3	2.91406	0.31	30.35	24.06	30.66	24.37	56.00	46.00	-25.34	-21.63
4	13.52734	0.91	29.72	18.52	30.63	19.43	60.00	50.00	-29.37	-30.57
5	16.83594	1.06	31.65	25.15	32.71	26.21	60.00	50.00	-27.29	-23.79
6	24.68359	1.29	27.64	20.40	28.93	21.69	60.00	50.00	-31.07	-28.31

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.

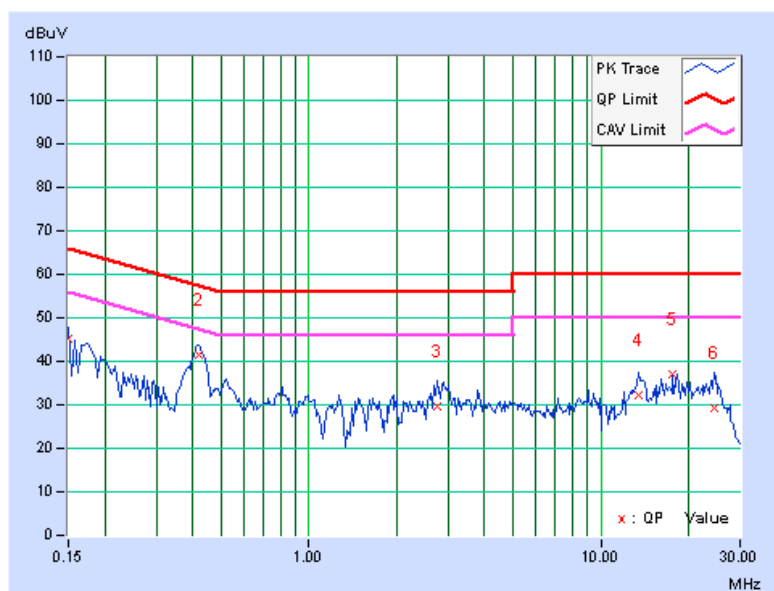


PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor [dB]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB]	AV. [dB]
1	0.15000	0.07	45.18	33.05	45.25	33.12	66.00	56.00	-20.75	-22.88
2	0.41953	0.10	41.51	35.75	41.61	35.85	57.46	47.46	-15.85	-11.61
3	2.75000	0.27	29.23	22.96	29.50	23.23	56.00	46.00	-26.50	-22.77
4	13.39063	0.79	31.41	21.61	32.20	22.40	60.00	50.00	-27.80	-27.60
5	17.69141	0.97	36.25	30.09	37.22	31.06	60.00	50.00	-22.78	-18.94
6	24.59375	1.18	28.06	22.13	29.24	23.31	60.00	50.00	-30.76	-26.69

REMARKS:

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



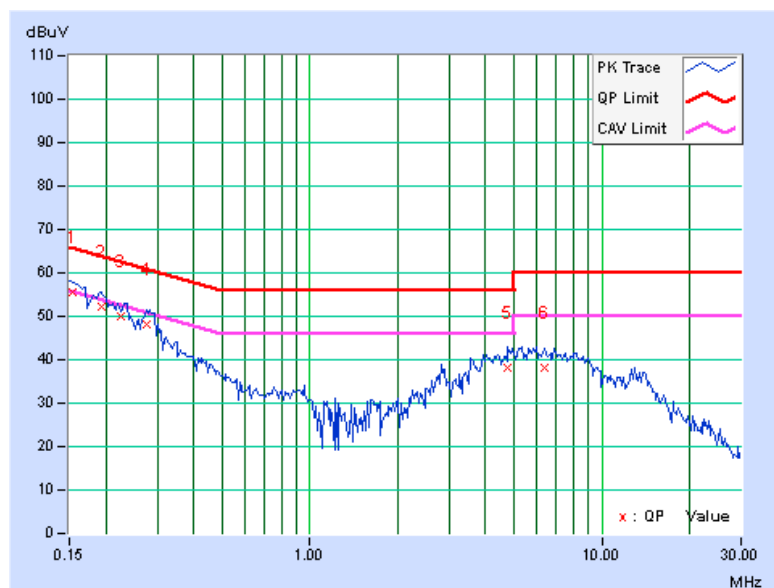
4.1.8 TEST RESULTS (Mode 2)

PHASE	Line (L)	6dB BANDWIDTH	9 kHz
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	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	0.15391	0.07	55.55	45.67	55.62	45.74	65.79	55.79	-10.17	-10.05
2	0.19297	0.08	52.17	41.55	52.25	41.63	63.91	53.91	-11.66	-12.28
3	0.22653	0.08	49.85	38.76	49.93	38.84	62.58	52.58	-12.64	-13.73
4	0.27500	0.09	47.88	35.19	47.97	35.28	60.97	50.97	-13.00	-15.69
5	4.77734	0.43	37.76	31.11	38.19	31.54	56.00	46.00	-17.81	-14.46
6	6.35547	0.52	37.52	31.03	38.04	31.55	60.00	50.00	-21.96	-18.45

REMARKS:

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

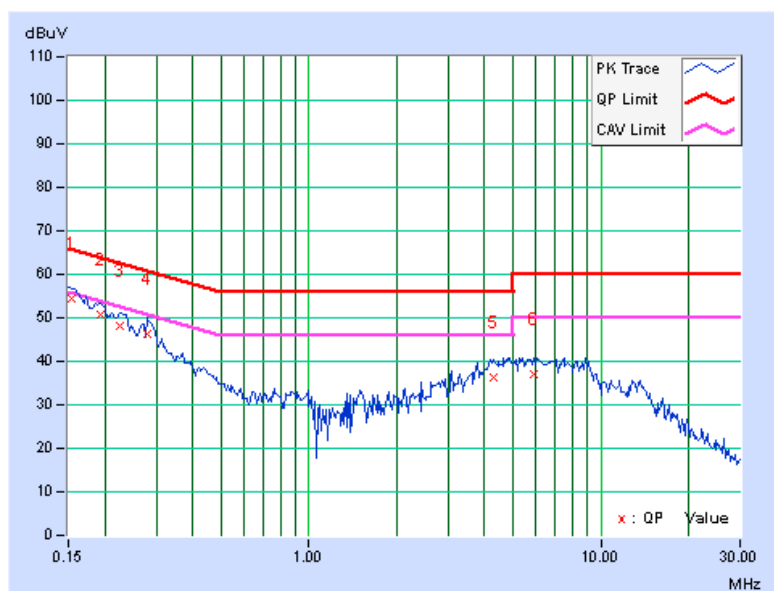


PHASE	Neutral (N)	6dB BANDWIDTH	9 kHz
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor [dB]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB (uV)]	AV. [dB (uV)]	Q.P. [dB]	AV. [dB]
1	0.15391	0.07	54.26	44.03	54.33	44.10	65.79	55.79	-11.46	-11.69
2	0.19297	0.08	50.64	40.75	50.72	40.83	63.91	53.91	-13.19	-13.08
3	0.22422	0.08	48.14	37.92	48.22	38.00	62.66	52.66	-14.44	-14.66
4	0.27891	0.09	46.39	35.59	46.48	35.68	60.85	50.85	-14.37	-15.17
5	4.31641	0.36	35.82	29.99	36.18	30.35	56.00	46.00	-19.82	-15.65
6	5.89063	0.44	36.54	30.75	36.98	31.19	60.00	50.00	-23.02	-18.81

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 under any condition of modulation.

**A D T**

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250254	July 09, 2012	July 08, 2013
Pre-Selector Agilent	N9039A	MY46520311	July 09, 2012	July 08, 2013
Signal Generator Agilent	N5181A	MY49060517	July 09, 2012	July 08, 2013
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 15, 2011	Nov. 14, 2012
Pre-Amplifier Agilent	8449B	3008A02578	June 26, 2012	June 25, 2013
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 15, 2011	Nov. 14, 2012
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Apr. 09, 2012	Apr. 08, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 14, 2011	Nov. 13, 2012
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 07, 2011	Oct. 06, 2012
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 26, 2011	Dec. 25, 2012
RF Cable	NA	CHGCAB_001	Oct. 07, 2011	Oct. 06, 2012
Software	ADT_Radiated_V8.7.05	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
- 5 The VCCI Site Registration No. is G-137.
- 6 The CANADA Site Registration No. is IC 7450H-2.
- 7 Tested Date: Aug. 04 to 14, 2012

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 meters chamber room. 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.

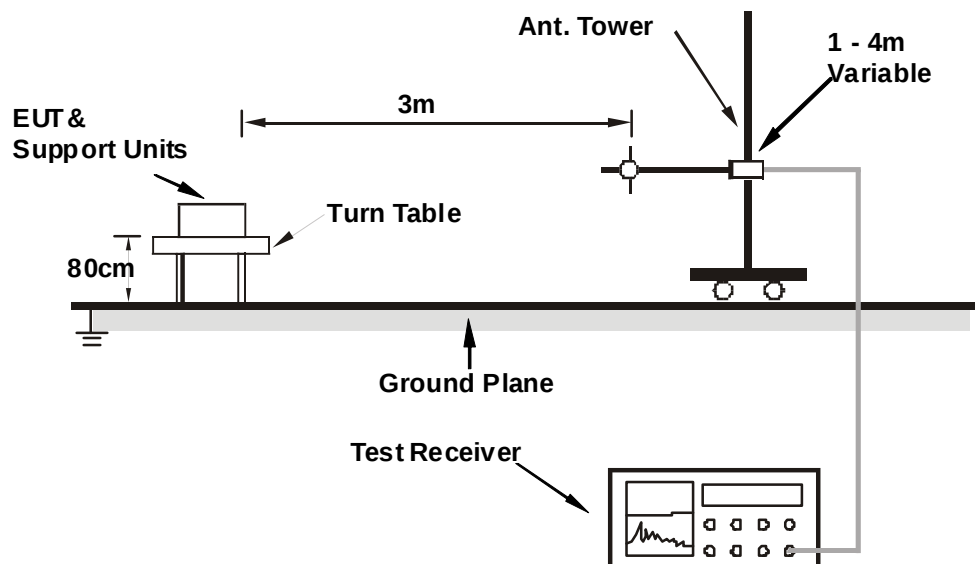
NOTE:

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

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	250.03	38.5 QP	46.0	-7.5	1.50 H	360	25.12	13.35
2	320.02	34.1 QP	46.0	-11.9	1.00 H	0	18.33	15.81
3	500.02	39.1 QP	46.0	-6.9	2.00 H	0	18.67	20.39
4	625.07	36.9 QP	46.0	-9.1	1.50 H	360	13.91	22.98
5	750.01	39.4 QP	46.0	-6.6	2.00 H	313	14.52	24.91
6	875.06	38.2 QP	46.0	-7.8	1.00 H	336	11.11	27.12
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	43.86	37.0 QP	40.0	-3.0	1.00 V	267	22.85	14.11
2	71.09	37.4 QP	40.0	-2.6	1.00 V	278	25.05	12.31
3	320.02	36.5 QP	46.0	-9.5	1.50 V	208	20.71	15.81
4	500.02	41.6 QP	46.0	-4.4	1.00 V	140	21.19	20.39
5	640.00	37.2 QP	46.0	-8.8	1.00 V	313	14.03	23.16
6	750.01	37.9 QP	46.0	-8.1	1.50 V	39	13.01	24.91

REMARKS:

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

ABOVE 1GHz DATA

802.11b

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	58.7 PK	74.0	-15.3	1.00 H	170	26.72	31.98
2	2390.00	47.4 AV	54.0	-6.6	1.00 H	170	15.42	31.98
3	*2412.00	108.1 PK			1.00 H	170	76.05	32.05
4	*2412.00	106.0 AV			1.00 H	170	73.95	32.05
5	4824.00	54.3 PK	74.0	-19.7	1.05 H	202	14.72	39.58
6	4824.00	49.5 AV	54.0	-4.5	1.05 H	202	9.92	39.58
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	57.1 PK	74.0	-16.9	1.03 V	55	25.12	31.98
2	2390.00	44.7 AV	54.0	-9.3	1.03 V	55	12.72	31.98
3	*2412.00	101.7 PK			1.03 V	55	69.65	32.05
4	*2412.00	99.3 AV			1.03 V	55	67.25	32.05
5	4824.00	54.3 PK	74.0	-19.7	1.53 V	260	14.72	39.58
6	4824.00	49.7 AV	54.0	-4.3	1.53 V	260	10.12	39.58

REMARKS:

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

CHANNEL	TX Channel 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	2356.30	58.3 PK	74.0	-15.7	1.00 H	194	26.45	31.85
2	2356.30	47.5 AV	54.0	-6.5	1.00 H	194	15.65	31.85
3	*2437.00	107.6 PK			1.00 H	194	75.48	32.12
4	*2437.00	105.4 AV			1.00 H	194	73.28	32.12
5	2483.50	57.1 PK	74.0	-16.9	1.00 H	194	24.86	32.24
6	2483.50	44.7 AV	54.0	-9.3	1.00 H	194	12.46	32.24
7	4874.00	54.1 PK	74.0	-19.9	1.09 H	220	14.40	39.70
8	4874.00	49.2 AV	54.0	-4.8	1.09 H	220	9.50	39.70
9	7311.00	55.8 PK	74.0	-18.2	1.51 H	29	8.21	47.59
10	7311.00	44.3 AV	54.0	-9.7	1.51 H	29	-3.29	47.59
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	101.6 PK			1.06 V	57	69.48	32.12
2	*2437.00	98.9 AV			1.06 V	57	66.78	32.12
3	4874.00	54.3 PK	74.0	-19.7	1.84 V	259	14.60	39.70
4	4874.00	50.2 AV	54.0	-3.8	1.84 V	259	10.50	39.70
5	7311.00	57.4 PK	74.0	-16.6	1.66 V	260	9.81	47.59
6	7311.00	50.6 AV	54.0	-3.4	1.66 V	260	3.01	47.59

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).
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	108.5 PK			1.00 H	197	76.32	32.18
2	*2462.00	106.3 AV			1.00 H	197	74.12	32.18
3	2483.50	58.9 PK	74.0	-15.1	1.00 H	197	26.66	32.24
4	2483.50	47.5 AV	54.0	-6.5	1.00 H	197	15.26	32.24
5	3282.00	51.5 PK	74.0	-22.5	1.11 H	170	17.35	34.15
6	3282.00	48.3 AV	54.0	-5.7	1.11 H	170	14.15	34.15
7	4924.00	53.5 PK	74.0	-20.5	1.05 H	204	13.66	39.84
8	4924.00	47.7 AV	54.0	-6.3	1.05 H	204	7.86	39.84
9	7386.00	55.9 PK	74.0	-18.1	1.55 H	30	8.38	47.52
10	7386.00	44.1 AV	54.0	-9.9	1.55 H	30	-3.42	47.52
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	101.7 PK			1.05 V	53	69.52	32.18
2	*2462.00	98.7 AV			1.05 V	53	66.52	32.18
3	2483.50	56.9 PK	74.0	-17.1	1.05 V	53	24.66	32.24
4	2483.50	44.4 AV	54.0	-9.6	1.05 V	53	12.16	32.24
5	3282.00	47.5 PK	74.0	-26.5	1.80 V	109	13.35	34.15
6	3282.00	41.6 AV	54.0	-12.4	1.80 V	109	7.45	34.15
7	4924.00	54.6 PK	74.0	-19.4	2.00 V	259	14.76	39.84
8	4924.00	51.2 AV	54.0	-2.8	2.00 V	259	11.36	39.84
9	7386.00	57.3 PK	74.0	-16.7	1.70 V	95	9.78	47.52
10	7386.00	51.5 AV	54.0	-2.5	1.70 V	95	3.98	47.52

REMARKS:

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

802.11g

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	72.2 PK	74.0	-1.8	1.12 H	209	40.22	31.98
2	2390.00	53.1 AV	54.0	-0.9	1.12 H	209	21.12	31.98
3	*2412.00	107.5 PK			1.12 H	209	75.45	32.05
4	*2412.00	95.8 AV			1.12 H	209	63.75	32.05
5	4824.00	47.9 PK	74.0	-26.1	1.26 H	191	8.32	39.58
6	4824.00	36.5 AV	54.0	-17.5	1.26 H	191	-3.08	39.58
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	70.1 PK	74.0	-3.9	1.22 V	142	38.12	31.98
2	2390.00	52.3 AV	54.0	-1.7	1.22 V	142	20.32	31.98
3	*2412.00	105.9 PK			1.22 V	142	73.85	32.05
4	*2412.00	94.3 AV			1.22 V	142	62.25	32.05
5	4824.00	50.5 PK	74.0	-23.5	1.05 V	131	10.92	39.58
6	4824.00	37.7 AV	54.0	-16.3	1.05 V	131	-1.88	39.58

REMARKS:

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

CHANNEL	TX Channel 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	2357.90	64.5 PK	74.0	-9.5	1.00 H	198	32.64	31.86
2	2357.90	50.1 AV	54.0	-3.9	1.00 H	198	18.24	31.86
3	*2437.00	113.8 PK			1.00 H	198	81.68	32.12
4	*2437.00	101.8 AV			1.00 H	198	69.68	32.12
5	2483.50	64.1 PK	74.0	-9.9	1.00 H	198	31.86	32.24
6	2483.50	47.6 AV	54.0	-6.4	1.00 H	198	15.36	32.24
7	4874.00	50.1 PK	74.0	-23.9	1.23 H	199	10.40	39.70
8	4874.00	37.5 AV	54.0	-16.5	1.23 H	199	-2.20	39.70
9	7311.00	56.0 PK	74.0	-18.0	1.59 H	40	8.41	47.59
10	7311.00	43.3 AV	54.0	-10.7	1.59 H	40	-4.29	47.59
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	106.7 PK			1.27 V	146	74.58	32.12
2	*2437.00	96.6 AV			1.27 V	146	64.48	32.12
3	4874.00	51.7 PK	74.0	-22.3	1.07 V	133	12.00	39.70
4	4874.00	40.2 AV	54.0	-13.8	1.07 V	133	0.50	39.70
5	7311.00	59.9 PK	74.0	-14.1	1.87 V	92	12.31	47.59
6	7311.00	47.7 AV	54.0	-6.3	1.87 V	92	0.11	47.59

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).
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	106.7 PK			1.09 H	219	74.52	32.18
2	*2462.00	96.0 AV			1.09 H	219	63.82	32.18
3	2483.50	73.3 PK	74.0	-0.7	1.09 H	219	41.06	32.24
4	2483.50	51.8 AV	54.0	-2.2	1.09 H	219	19.56	32.24
5	4924.00	48.1 PK	74.0	-25.9	1.26 H	205	8.26	39.84
6	4924.00	36.4 AV	54.0	-17.6	1.26 H	205	-3.44	39.84
7	7386.00	53.7 PK	74.0	-20.3	1.54 H	43	6.18	47.52
8	7386.00	41.1 AV	54.0	-12.9	1.54 H	43	-6.42	47.52
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	106.2 PK			1.28 V	144	74.02	32.18
2	*2462.00	94.4 AV			1.28 V	144	62.22	32.18
3	2483.50	70.1 PK	74.0	-3.9	1.28 V	144	37.86	32.24
4	2483.50	50.8 AV	54.0	-3.2	1.28 V	144	18.56	32.24
5	4924.00	49.9 PK	74.0	-24.1	1.08 V	145	10.06	39.84
6	4924.00	37.3 AV	54.0	-16.7	1.08 V	145	-2.54	39.84
7	7386.00	57.5 PK	74.0	-16.5	1.83 V	79	9.98	47.52
8	7386.00	44.4 AV	54.0	-9.6	1.83 V	79	-3.12	47.52

REMARKS:

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

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	66.1 PK	74.0	-7.9	1.00 H	218	34.12	31.98
2	2390.00	53.4 AV	54.0	-0.6	1.00 H	218	21.42	31.98
3	*2412.00	109.7 PK			1.00 H	218	77.65	32.05
4	*2412.00	97.2 AV			1.00 H	218	65.15	32.05
5	4824.00	47.9 PK	74.0	-26.1	1.22 H	200	8.32	39.58
6	4824.00	36.5 AV	54.0	-17.5	1.22 H	200	-3.08	39.58
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	69.3 PK	74.0	-4.7	1.01 V	342	37.32	31.98
2	2390.00	49.5 AV	54.0	-4.5	1.01 V	342	17.52	31.98
3	*2412.00	104.4 PK			1.01 V	342	72.35	32.05
4	*2412.00	91.6 AV			1.01 V	342	59.55	32.05
5	4824.00	50.6 PK	74.0	-23.4	1.02 V	128	11.02	39.58
6	4824.00	38.1 AV	54.0	-15.9	1.02 V	128	-1.48	39.58

REMARKS:

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

CHANNEL	TX Channel 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	2356.00	65.5 PK	74.0	-8.5	1.00 H	218	33.65	31.85
2	2356.00	52.7 AV	54.0	-1.3	1.00 H	218	20.85	31.85
3	*2437.00	112.9 PK			1.00 H	218	80.78	32.12
4	*2437.00	100.3 AV			1.00 H	218	68.18	32.12
5	2483.50	60.3 PK	74.0	-13.7	1.00 H	218	28.06	32.24
6	2483.50	47.2 AV	54.0	-6.8	1.00 H	218	14.96	32.24
7	4874.00	50.4 PK	74.0	-23.6	1.25 H	185	10.70	39.70
8	4874.00	37.8 AV	54.0	-16.2	1.25 H	185	-1.90	39.70
9	7311.00	56.5 PK	74.0	-17.5	1.63 H	25	8.91	47.59
10	7311.00	43.8 AV	54.0	-10.2	1.63 H	25	-3.79	47.59
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	107.8 PK			1.05 V	326	75.68	32.12
2	*2437.00	94.8 AV			1.05 V	326	62.68	32.12
3	4874.00	51.4 PK	74.0	-22.6	1.13 V	145	11.70	39.70
4	4874.00	39.7 AV	54.0	-14.3	1.13 V	145	0.00	39.70
5	7311.00	59.4 PK	74.0	-14.6	1.91 V	84	11.81	47.59
6	7311.00	47.3 AV	54.0	-6.7	1.91 V	84	-0.29	47.59

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).
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	110.8 PK			1.00 H	197	78.62	32.18
2	*2462.00	99.3 AV			1.00 H	197	67.12	32.18
3	2483.50	72.5 PK	74.0	-1.5	1.00 H	197	40.26	32.24
4	2483.50	53.2 AV	54.0	-0.8	1.00 H	197	20.96	32.24
5	4924.00	48.0 PK	74.0	-26.0	1.30 H	201	8.16	39.84
6	4924.00	36.5 AV	54.0	-17.5	1.30 H	201	-3.34	39.84
7	7386.00	54.3 PK	74.0	-19.7	1.54 H	59	6.78	47.52
8	7386.00	41.5 AV	54.0	-12.5	1.54 H	59	-6.02	47.52
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	104.4 PK			1.04 V	351	72.22	32.18
2	*2462.00	92.0 AV			1.04 V	351	59.82	32.18
3	2483.50	65.3 PK	74.0	-8.7	1.04 V	351	33.06	32.24
4	2483.50	48.6 AV	54.0	-5.4	1.04 V	351	16.36	32.24
5	4924.00	49.9 PK	74.0	-24.1	1.06 V	161	10.06	39.84
6	4924.00	37.4 AV	54.0	-16.6	1.06 V	161	-2.44	39.84
7	7386.00	58.1 PK	74.0	-15.9	1.81 V	85	10.58	47.52
8	7386.00	44.9 AV	54.0	-9.1	1.81 V	85	-2.62	47.52

REMARKS:

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

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	2384.00	68.4 PK	74.0	-5.6	1.00 H	218	36.44	31.96
2	2384.00	53.5 AV	54.0	-0.5	1.00 H	218	21.54	31.96
3	*2422.00	106.9 PK			1.00 H	219	74.82	32.08
4	*2422.00	91.8 AV			1.00 H	219	59.72	32.08
5	4844.00	48.1 PK	74.0	-25.9	1.31 H	203	8.47	39.63
6	4844.00	36.4 AV	54.0	-17.6	1.31 H	203	-3.23	39.63
7	7266.00	53.9 PK	74.0	-20.1	1.56 H	60	6.30	47.60
8	7266.00	41.4 AV	54.0	-12.6	1.56 H	60	-6.20	47.60
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	2384.00	64.4 PK	74.0	-9.6	1.03 V	348	32.44	31.96
2	2384.00	49.7 AV	54.0	-4.3	1.03 V	348	17.74	31.96
3	*2422.00	100.0 PK			1.03 V	348	67.92	32.08
4	*2422.00	86.2 AV			1.03 V	348	54.12	32.08
5	4844.00	49.3 PK	74.0	-24.7	1.12 V	153	9.67	39.63
6	4844.00	37.0 AV	54.0	-17.0	1.12 V	153	-2.63	39.63
7	7266.00	58.8 PK	74.0	-15.2	1.81 V	97	11.20	47.60
8	7266.00	45.4 AV	54.0	-8.6	1.81 V	97	-2.20	47.60

REMARKS:

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

CHANNEL	TX Channel 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	67.8 PK	74.0	-6.2	1.00 H	182	35.82	31.98
2	2390.00	52.4 AV	54.0	-1.6	1.00 H	182	20.42	31.98
3	*2437.00	109.6 PK			1.00 H	182	77.48	32.12
4	*2437.00	99.1 AV			1.00 H	182	66.98	32.12
5	2483.50	66.1 PK	74.0	-7.9	1.00 H	182	33.86	32.24
6	2483.50	50.1 AV	54.0	-3.9	1.00 H	182	17.86	32.24
7	4874.00	51.0 PK	74.0	-23.0	1.24 H	197	11.30	39.70
8	4874.00	38.1 AV	54.0	-15.9	1.24 H	197	-1.60	39.70
9	7311.00	56.9 PK	74.0	-17.1	1.66 H	17	9.31	47.59
10	7311.00	44.1 AV	54.0	-9.9	1.66 H	17	-3.49	47.59
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	101.9 PK			1.02 V	349	69.78	32.12
2	*2437.00	87.7 AV			1.02 V	349	55.58	32.12
3	4874.00	51.5 PK	74.0	-22.5	1.18 V	147	11.80	39.70
4	4874.00	39.8 AV	54.0	-14.2	1.18 V	147	0.10	39.70
5	7311.00	59.0 PK	74.0	-15.0	1.88 V	92	11.41	47.59
6	7311.00	46.9 AV	54.0	-7.1	1.88 V	92	-0.69	47.59

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).
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	105.8 PK			1.00 H	198	73.64	32.16
2	*2452.00	92.1 AV			1.00 H	198	59.94	32.16
3	2483.50	67.8 PK	74.0	-6.2	1.24 H	224	35.56	32.24
4	2483.50	53.5 AV	54.0	-0.5	1.24 H	224	21.26	32.24
5	4904.00	48.1 PK	74.0	-25.9	1.26 H	214	8.33	39.77
6	4904.00	36.8 AV	54.0	-17.2	1.26 H	214	-2.97	39.77
7	7356.00	54.2 PK	74.0	-19.8	1.55 H	56	6.65	47.55
8	7356.00	41.6 AV	54.0	-12.4	1.55 H	56	-5.95	47.55
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	99.8 PK			1.05 V	342	67.64	32.16
2	*2452.00	86.2 AV			1.05 V	342	54.04	32.16
3	2483.50	64.2 PK	74.0	-9.8	1.05 V	342	31.96	32.24
4	2483.50	49.8 AV	54.0	-4.2	1.05 V	342	17.56	32.24
5	4904.00	49.8 PK	74.0	-24.2	1.11 V	159	10.03	39.77
6	4904.00	37.1 AV	54.0	-16.9	1.11 V	159	-2.67	39.77
7	7356.00	58.2 PK	74.0	-15.8	1.78 V	80	10.65	47.55
8	7356.00	44.8 AV	54.0	-9.2	1.78 V	80	-2.75	47.55

REMARKS:

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

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	100036	Dec. 14, 2011	Dec. 13, 2012

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 : Aug. 14, 2012

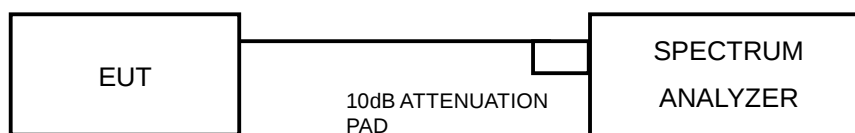
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
2. Set the video bandwidth (VBW) $\geq 3 \times$ 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	7.98	0.5	PASS
6	2437	7.57	0.5	PASS
11	2462	8.11	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.04	0.5	PASS
6	2437	15.96	0.5	PASS
11	2462	15.72	0.5	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.37	16.51	0.5	PASS
6	2437	16.35	16.93	0.5	PASS
11	2462	17.23	16.78	0.5	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	36.14	35.76	0.5	PASS
6	2437	35.65	35.91	0.5	PASS
9	2452	35.78	35.91	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 band: 1 Watt (30dBm)

4.4.2 INSTRUMENTS

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

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Aug. 14, 2012

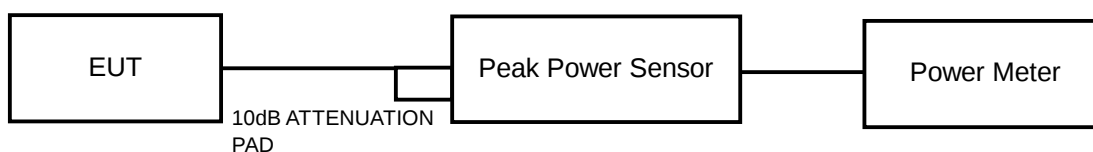
4.4.3 TEST PROCEDURES

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

4.4.4 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	75.858	18.8	30	PASS
6	2437	74.131	18.7	30	PASS
11	2462	74.131	18.7	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	165.959	22.2	30	PASS
6	2437	229.087	23.6	30	PASS
11	2462	162.181	22.1	30	PASS

802.11n (HT20)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	20.1	21.3	237.225	23.75	30	PASS
6	2437	23.3	24.1	470.836	26.73	30	PASS
11	2462	21.6	22.6	326.514	25.14	30	PASS

802.11n (HT40)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	18.5	19.1	152.078	21.82	30	PASS
6	2437	20.7	20.8	237.716	23.76	30	PASS
9	2452	18.2	18.9	143.694	21.57	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Dec. 14, 2011	Dec. 13, 2012

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 : Aug. 14, 2012

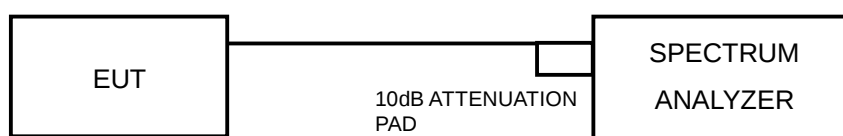
4.5.3 TEST PROCEDURE

1. Set the RBW = 100 kHz, VBW =300 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 power level in any 100 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3 \text{ kHz}/100\text{kHz})$

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	7.21	-8.02	8	PASS
6	2437	6.88	-8.35	8	PASS
11	2462	7.31	-7.92	8	PASS

802.11g

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	4.24	-10.99	8	PASS
6	2437	5.85	-9.38	8	PASS
11	2462	3.61	-11.62	8	PASS

802.11n (HT20)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	0.78	-14.45	3.01	-11.44	8	PASS
	6	2437	5.39	-9.84	3.01	-6.83	8	PASS
	11	2462	3.09	-12.14	3.01	-9.13	8	PASS
1	1	2412	1.84	-13.39	3.01	-10.38	8	PASS
	6	2437	4.46	-10.77	3.01	-7.76	8	PASS
	11	2462	2.62	-12.61	3.01	-9.60	8	PASS

802.11n (HT40)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	3	2422	-3.09	-18.32	3.01	-15.31	8	PASS
	6	2437	-0.77	-16.00	3.01	-12.99	8	PASS
	9	2452	-2.97	-18.20	3.01	-15.19	8	PASS
1	3	2422	-2.04	-17.27	3.01	-14.26	8	PASS
	6	2437	-0.03	-15.26	3.01	-12.25	8	PASS
	9	2452	-1.81	-17.04	3.01	-14.03	8	PASS

4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100036	Dec. 14, 2011	Dec. 13, 2012

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 : Aug. 14, 2012

4.6.3 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

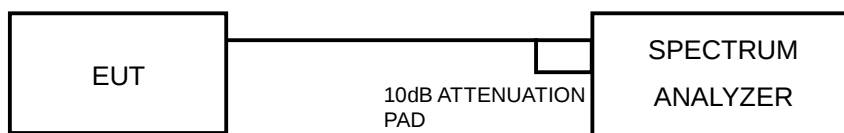
MEASUREMENT PROCEDURE OOB

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

4.6.4 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

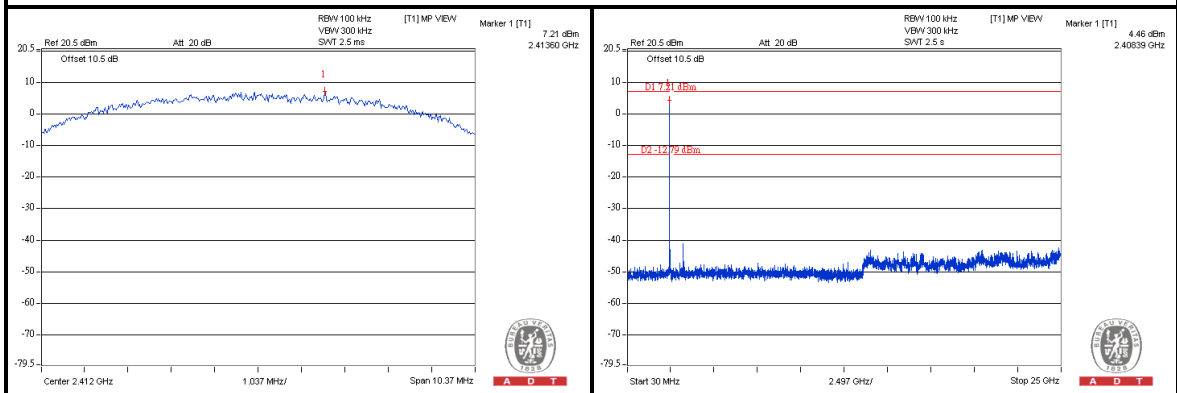
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



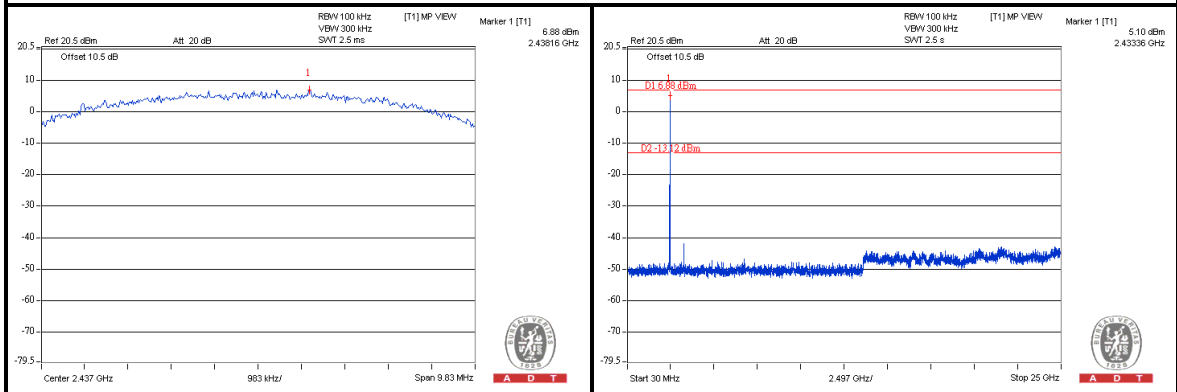
A D T

802.11b

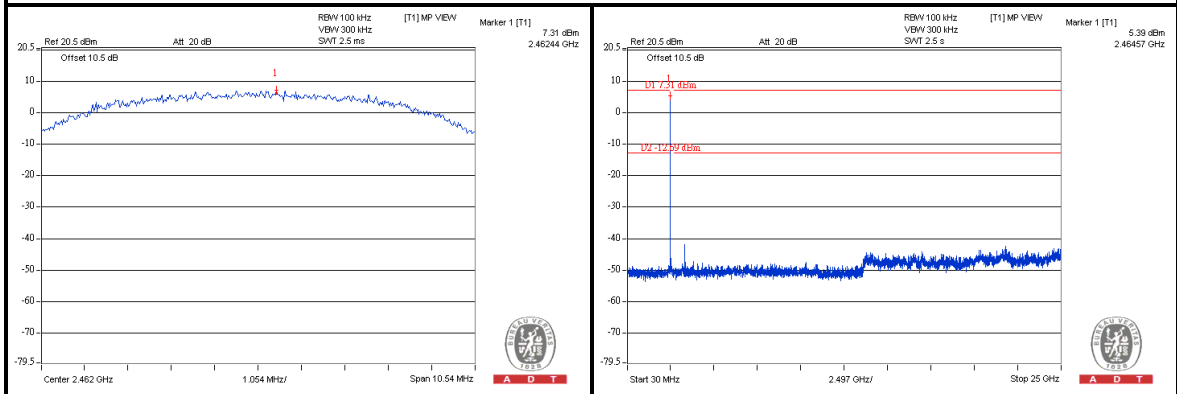
CH 1



CH 6



CH 11

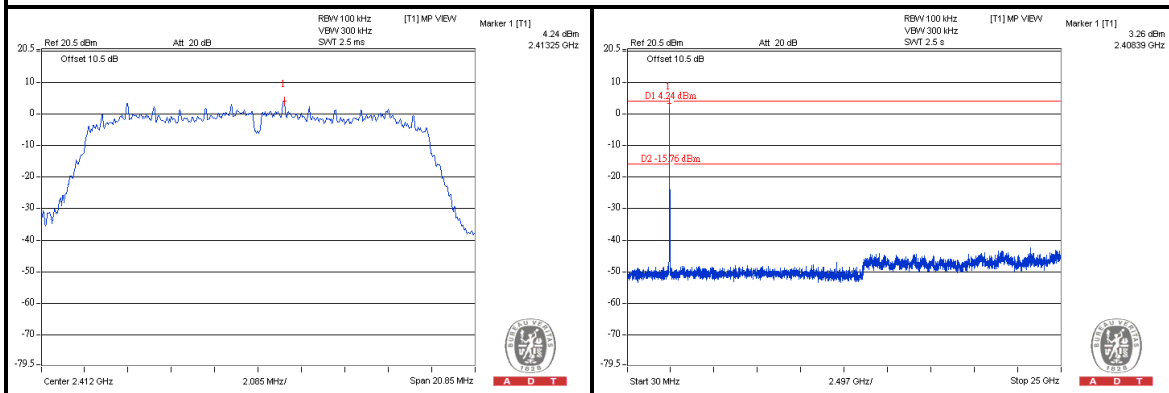




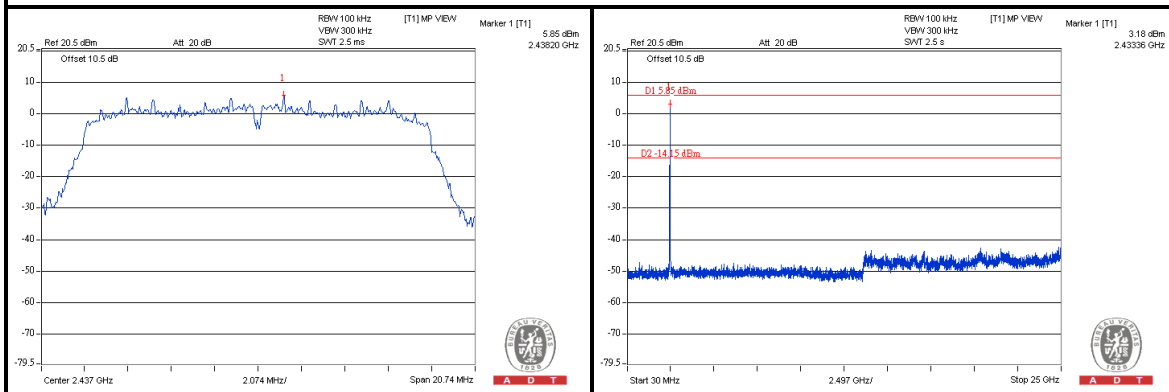
A D T

802.11g

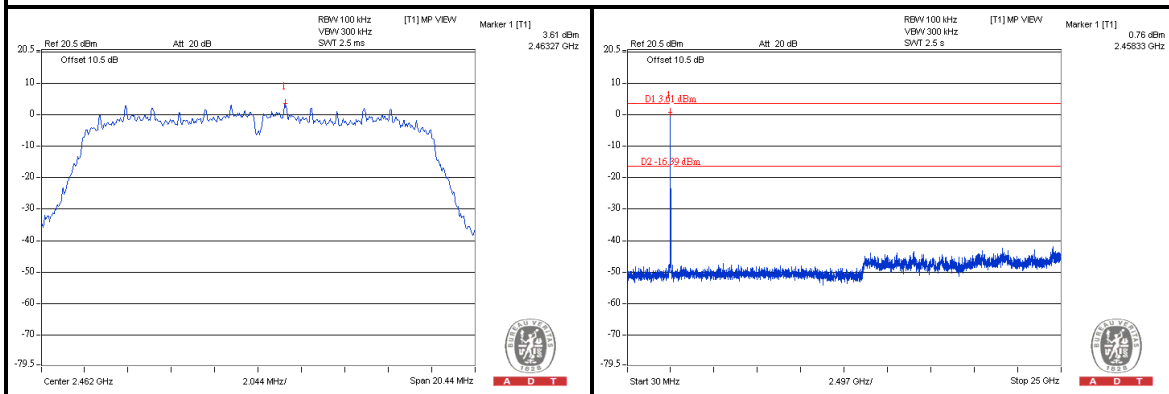
CH 1



CH 6



CH 11

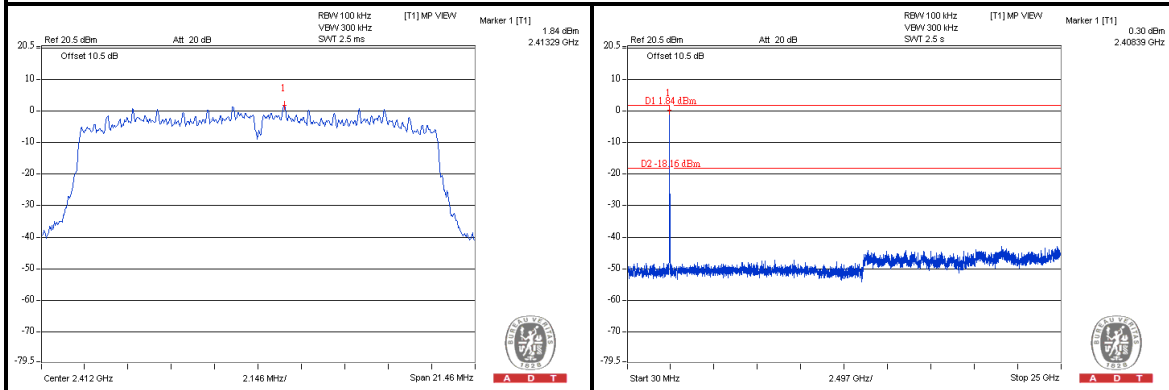




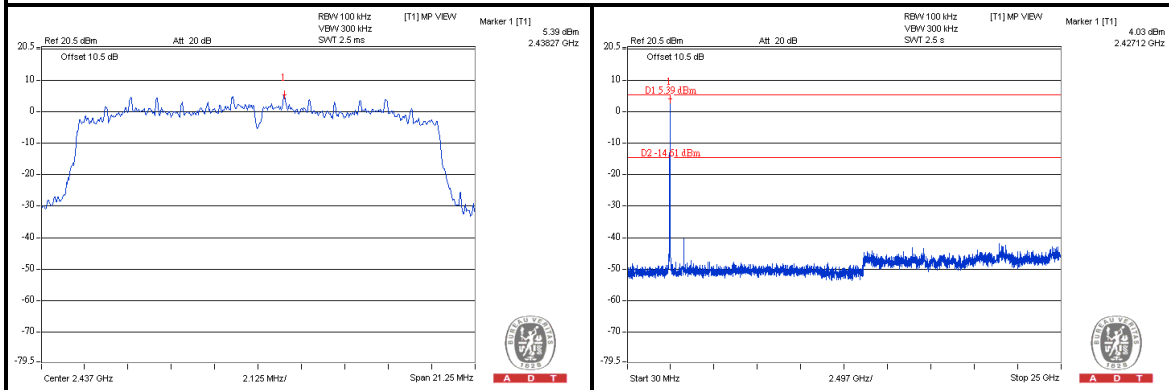
A D T

802.11n (HT20)

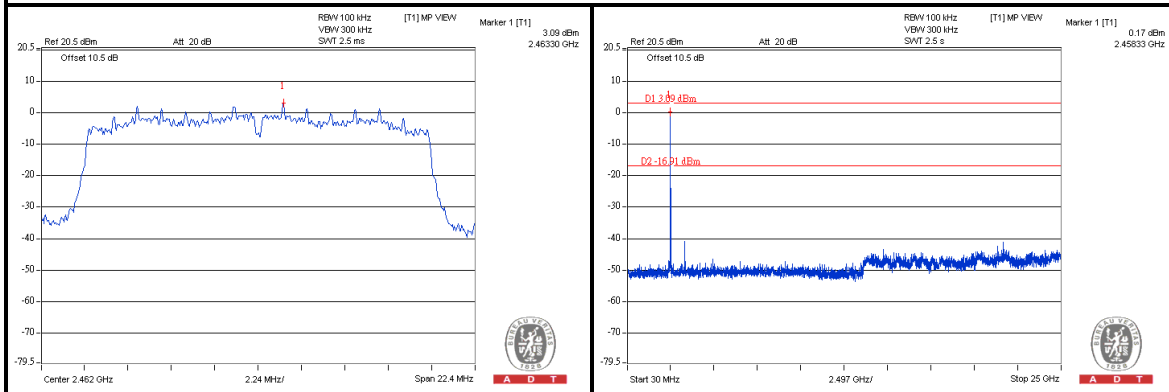
CH 1



CH 6



CH 11

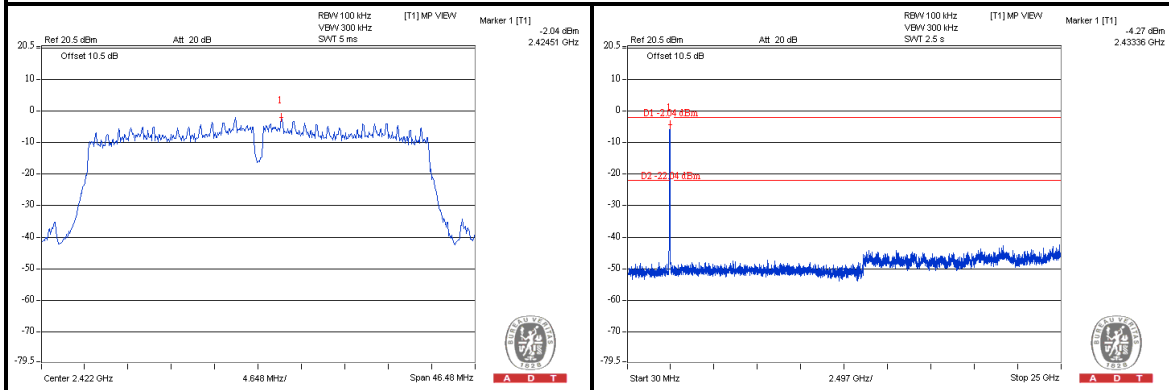




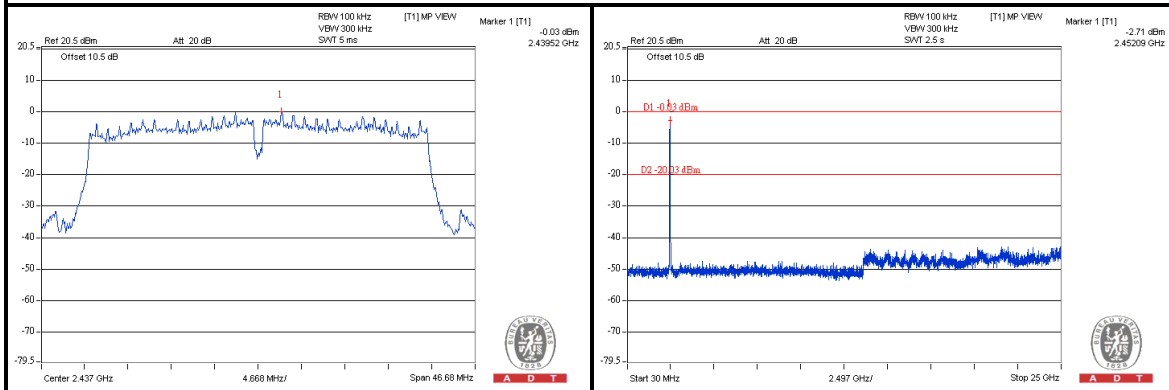
A D T

802.11n (HT40)

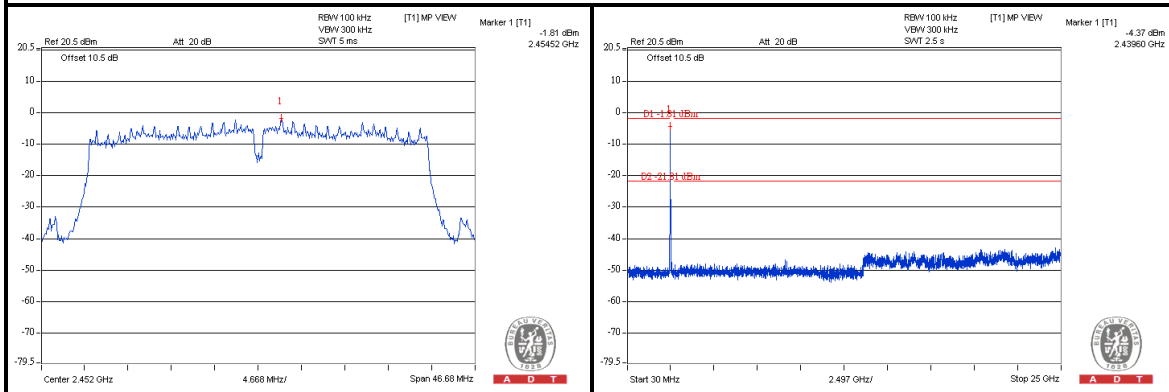
CH 1



CH 6



CH 11



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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6. INFORMATION ON THE TESTING LABORATORIES

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

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

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Web Site: www.adt.com.tw

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



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

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

--- END ---