



FCC TEST REPORT

REPORT NO.: RF130408E07A

MODEL NO.: R2010A

FCC ID: Z28-R2010A

RECEIVED: Sep. 18, 2013

TESTED: Oct. 02 to 03, 2013

ISSUED: Jun. 19, 2014

APPLICANT: ZUNIDATA SYSTEMS, INC.

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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 DUTY CYCLE OF TEST SIGNAL.....	14
3.5 DESCRIPTION OF SUPPORT UNITS	15
3.6 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	18
4.1.6 EUT OPERATING CONDITIONS	19
4.1.7 TEST RESULTS	20
4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT.....	22
4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	22
4.2.2 TEST INSTRUMENTS	23
4.2.3 TEST PROCEDURES	24
4.2.4 DEVIATION FROM TEST STANDARD	24
4.2.5 TEST SETUP	25
4.2.6 EUT OPERATING CONDITIONS	25
4.2.7 TEST RESULTS	26
4.3 6dB BANDWIDTH MEASUREMENT	39
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT	39
4.3.2 TEST INSTRUMENTS	39
4.3.3 TEST PROCEDURE	39
4.3.4 DEVIATION FROM TEST STANDARD	39
4.3.5 TEST SETUP	39
4.3.6 EUT OPERATING CONDITIONS	39
4.3.7 TEST RESULTS	40
4.4 CONDUCTED OUTPUT POWER MEASUREMENT	42
4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT.....	42
4.4.2 INSTRUMENTS.....	42
4.4.3 TEST PROCEDURES	42
4.4.4 DEVIATION FROM TEST STANDARD	42
4.4.5 TEST SETUP	42
4.4.6 EUT OPERATING CONDITIONS	42
4.4.7 TEST RESULTS	43
4.5 AVERAGE OUTPUT POWER	44
4.5.1 FOR REFERENCE.....	44
4.5.2 TEST INSTRUMENTS	44
4.5.3 TEST PROCEDURES	44
4.5.4 TEST SETUP	44



A D T

4.5.5	EUT OPERATING CONDITIONS	44
4.5.6	TEST RESULTS	45
4.6	POWER SPECTRAL DENSITY MEASUREMENT	46
4.6.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	46
4.6.2	TEST INSTRUMENTS	46
4.6.3	TEST PROCEDURE	46
4.6.4	DEVIATION FROM TEST STANDARD	46
4.6.5	TEST SETUP	46
4.6.6	EUT OPERATING CONDITION	46
4.6.7	TEST RESULTS	47
4.7	CONDUCTED OUT-BAND EMISSION MEASUREMENT	49
4.7.1	LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT	49
4.7.2	TEST INSTRUMENTS	49
4.7.3	TEST PROCEDURE	49
4.7.4	DEVIATION FROM TEST STANDARD	50
4.7.5	TEST SETUP	50
4.7.6	EUT OPERATING CONDITION	50
4.7.7	TEST RESULTS	50
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION	55
6.	INFORMATION ON THE TESTING LABORATORIES	56
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	57



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130408E07A	Original release	Jun. 19, 2014




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1. CERTIFICATION

PRODUCT: 802.11n 150Mbps Wi-Fi Router
BRAND NAME: ZUNIDATA
MODEL NO.: R2010A
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: ZUNIDATA SYSTEMS, INC.
TESTED: Oct. 02 to 03, 2013
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (Model: R2010A) 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:** Jun. 19, 2014
(Claire Kuan, Specialist)

APPROVED BY :  , **DATE:** Jun. 19, 2014
(May Chen, Manager)



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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 -12.75dB at 3.18750MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.9dB at 43.81MHz
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.



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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)	5.46 dB
Radiated emissions (1GHz -6GHz)	3.73 dB
Radiated emissions (6GHz -18GHz)	3.90 dB
Radiated emissions (18GHz -40GHz)	4.11 dB



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	802.11n 150Mbps Wi-Fi Router
MODEL NO.	R2010A
POWER SUPPLY	DC 5V from USB interface
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 150Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11
MAXIMUM OUTPUT POWER	802.11b: 64.714mW 802.11g: 116.413mW 802.11n (HT20): 89.536mW 802.11n (HT40): 70.469mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

NOTE:

1. The EUT has two colors which are identical to each other in all aspects except for the following table:

Brand	Model No.	Description (exterior color)	Different
ZUNIDATA	R2010A	Black	For marketing requirement & exterior color difference
		White	

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

Brand	Model	Gain (dBi)	Antenna Type	Connector Type
NA	NA	3.06	PIFA	NA



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3. The EUT incorporates a SISO function.

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX/1RX
802.11g	1TX/1RX
802.11n (HT20)	1TX/1RX
802.11n (HT40)	1TX/1RX

4. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 7.
5. 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.



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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		



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3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **PLC**: Power Line Conducted Emission **RE < 1G**: Radiated Emission below 1GHz
RE ≥ 1G: Radiated Emission above 1GHz **APCM**: Antenna Port Conducted Measurement
OB: Conducted Out-Band Emission Measurement

NOTE: 1. "-" means no effect.

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

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



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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	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	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	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

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	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5



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TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	26deg. C, 59%RH	120Vac, 60Hz	Sean Huang
RE<1G	25deg. C, 66%RH	120Vac, 60Hz	Andy Ho
RE≥1G	23deg. C, 66%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee
OB	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee

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 DUTY CYCLE OF TEST SIGNAL

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





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3.5 DESCRIPTION OF SUPPORT UNITS

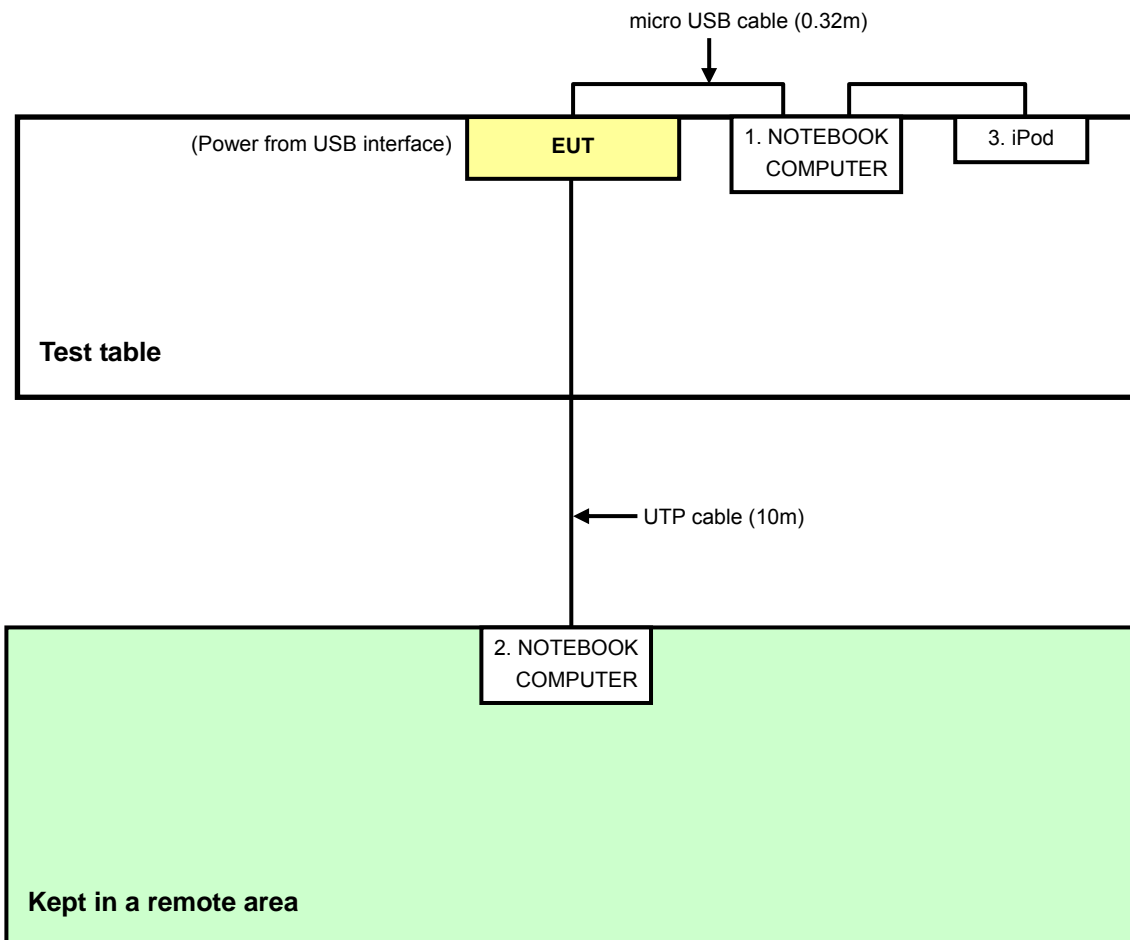
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP32LA	HSLB32S	FCC DoC
3	iPod	Apple	MC749TA/A	CC4DMFJUDFDM	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	USB cable (0.32m)
2	UTP cable (0.1m)
3	UTP cable (10m)

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

3.6 CONFIGURATION OF SYSTEM UNDER TEST





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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 ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 06, 2013	June 05, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-03	Sep. 24, 2013	Sep. 23, 2014
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: Oct. 03, 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.

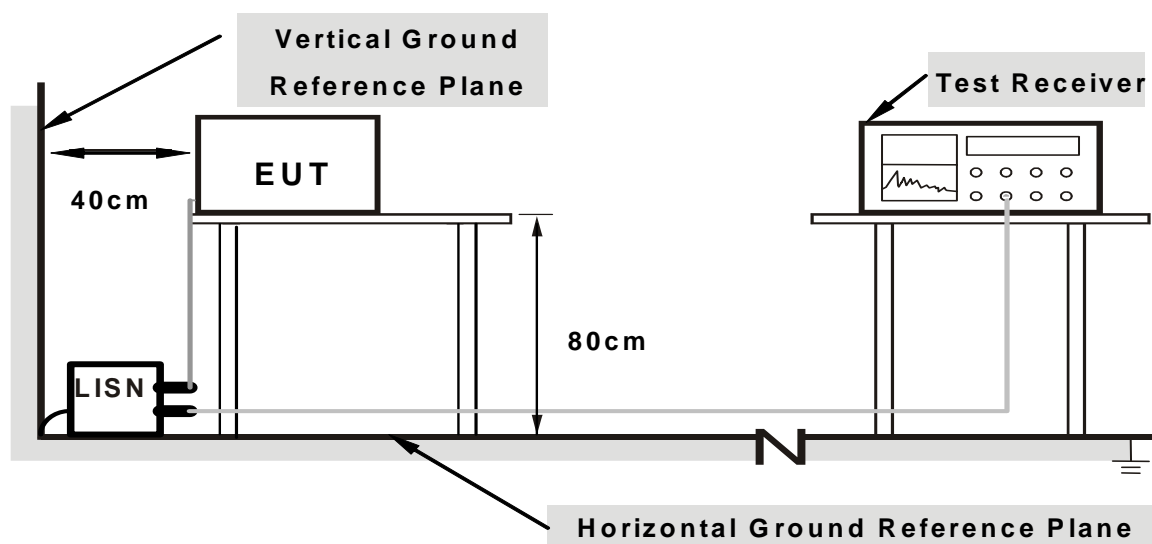
NOTE:

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. Turn on the power of EUT.
2. The communication partner run test program “MP_TEST_2.3.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

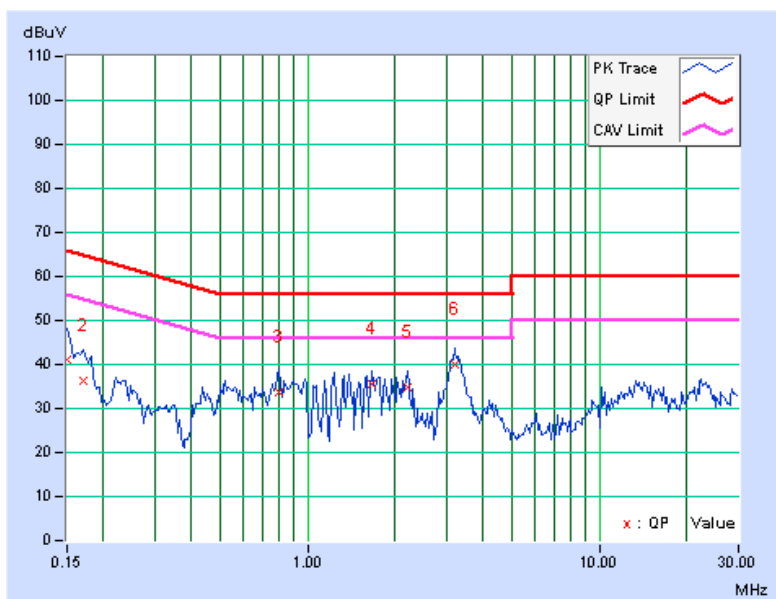
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.12	41.05	26.85	41.17	26.97	66.00	56.00	-24.83	-29.03
2	0.16953	0.13	36.01	22.44	36.14	22.57	64.98	54.98	-28.85	-32.42
3	0.79844	0.21	33.45	27.77	33.66	27.98	56.00	46.00	-22.34	-18.02
4	1.67188	0.26	35.41	30.40	35.67	30.66	56.00	46.00	-20.33	-15.34
5	2.20703	0.29	34.53	29.99	34.82	30.28	56.00	46.00	-21.18	-15.72
6	3.18750	0.33	39.78	32.92	40.11	33.25	56.00	46.00	-15.89	-12.75

REMARKS:

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

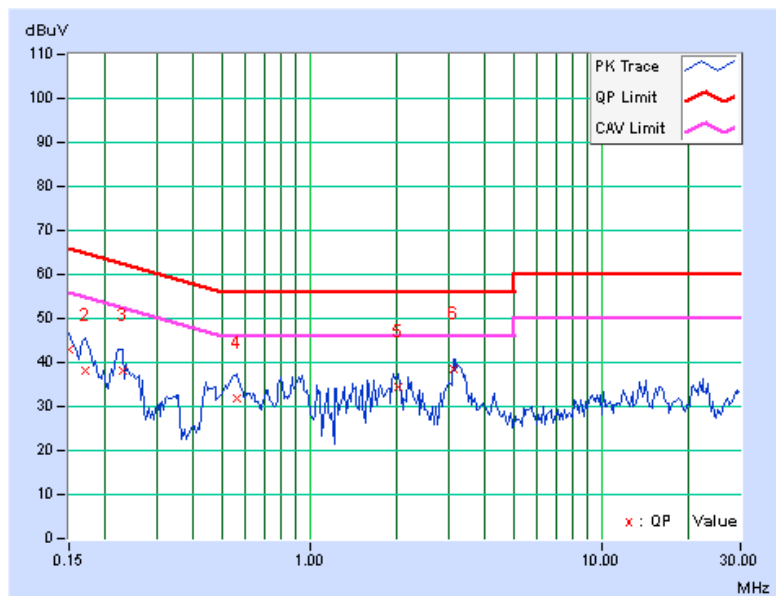


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor [dB]	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.10	42.69	28.22	42.79	28.32	66.00	56.00	-23.21	-27.68
2	0.16953	0.11	37.90	27.51	38.01	27.62	64.98	54.98	-26.98	-27.37
3	0.22812	0.13	38.03	25.26	38.16	25.39	62.52	52.52	-24.36	-27.13
4	0.56406	0.18	31.78	20.25	31.96	20.43	56.00	46.00	-24.04	-25.57
5	2.01953	0.26	34.28	29.72	34.54	29.98	56.00	46.00	-21.46	-16.02
6	3.11328	0.30	38.19	31.54	38.49	31.84	56.00	46.00	-17.51	-14.16

REMARKS:

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





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4.2 RADIATED EMISSION AND BANDEGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEGE 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.



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4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
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
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The 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: Oct. 02, 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:

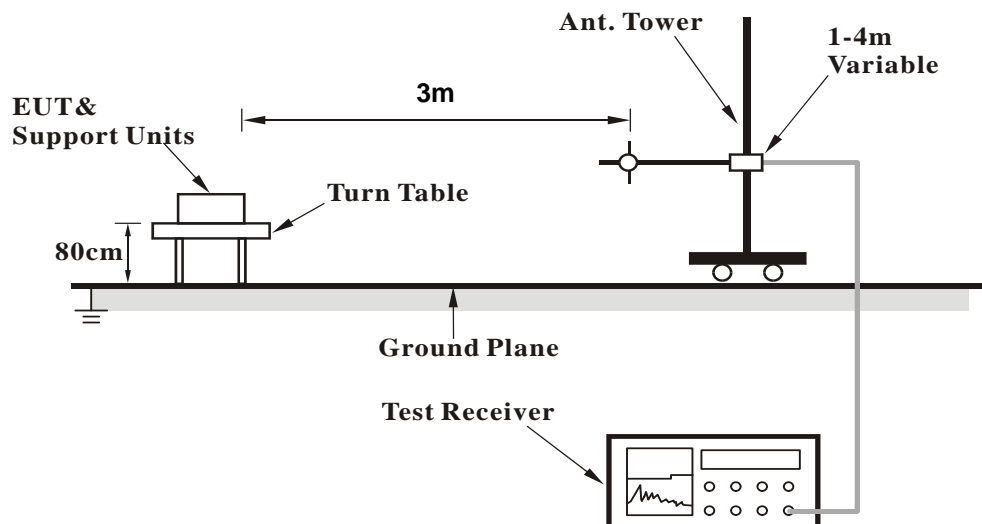
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

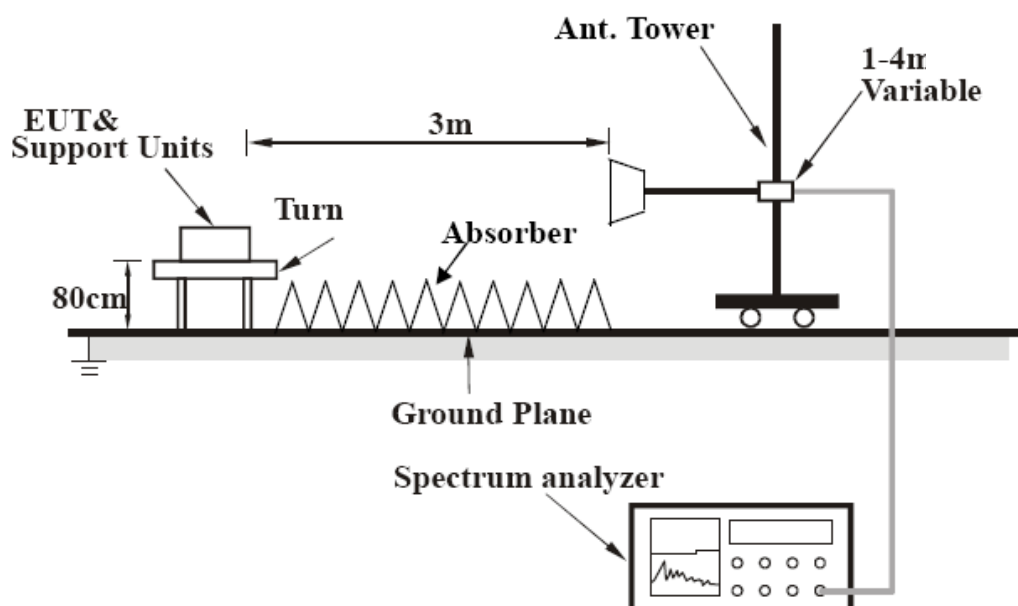
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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



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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	51.92	36.3 QP	40.0	-3.7	1.50 H	76	49.45	-13.14
2	59.29	36.9 QP	40.0	-3.1	2.00 H	293	51.04	-14.15
3	75.83	28.5 QP	40.0	-11.5	2.00 H	244	45.95	-17.43
4	156.25	38.8 QP	43.5	-4.7	2.00 H	259	52.20	-13.44
5	302.42	41.4 QP	46.0	-4.6	1.00 H	256	54.08	-12.65
6	472.61	42.2 QP	46.0	-3.8	2.00 H	360	50.63	-8.42
7	609.19	38.9 QP	46.0	-7.1	1.50 H	268	43.95	-5.04

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	43.81	37.1 QP	40.0	-2.9	1.06 V	169	50.39	-13.29
2	51.05	36.4 QP	40.0	-3.6	1.00 V	174	49.77	-13.33
3	106.73	35.2 QP	43.5	-8.3	1.00 V	0	52.13	-16.90
4	472.71	40.4 QP	46.0	-5.6	1.00 V	356	48.82	-8.41
5	929.82	35.9 QP	46.0	-10.1	1.00 V	360	35.62	0.29
6	945.20	38.1 QP	46.0	-7.9	1.00 V	4	37.61	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



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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	49.8 PK	74.0	-24.2	1.14 H	200	16.91	32.89
2	2390.00	38.3 AV	54.0	-15.7	1.14 H	200	5.41	32.89
3	*2412.00	102.0 PK			1.14 H	200	69.03	32.97
4	*2412.00	99.3 AV			1.14 H	200	66.33	32.97
5	4824.00	47.7 PK	74.0	-26.3	1.18 H	283	6.92	40.78
6	4824.00	36.2 AV	54.0	-17.8	1.18 H	283	-4.58	40.78

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	48.0 PK	74.0	-26.0	1.00 V	272	15.11	32.89
2	2390.00	37.1 AV	54.0	-16.9	1.00 V	272	4.21	32.89
3	*2412.00	100.6 PK			1.00 V	272	67.63	32.97
4	*2412.00	98.0 AV			1.00 V	272	65.03	32.97
5	4824.00	47.6 PK	74.0	-26.4	1.23 V	180	6.82	40.78
6	4824.00	38.8 AV	54.0	-15.2	1.23 V	180	-1.98	40.78

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.



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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	*2437.00	101.7 PK			1.10 H	201	68.65	33.05
2	*2437.00	99.2 AV			1.10 H	201	66.15	33.05
3	4874.00	46.6 PK	74.0	-27.4	1.11 H	163	5.64	40.96
4	4874.00	36.4 AV	54.0	-17.6	1.11 H	163	-4.56	40.96
5	7311.00	54.9 PK	74.0	-19.1	1.12 H	158	6.04	48.86
6	7311.00	42.9 AV	54.0	-11.1	1.12 H	158	-5.96	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	*2437.00	102.1 PK			1.00 V	274	69.05	33.05
2	*2437.00	99.5 AV			1.00 V	274	66.45	33.05
3	4874.00	48.4 PK	74.0	-25.6	1.90 V	164	7.44	40.96
4	4874.00	39.1 AV	54.0	-14.9	1.90 V	164	-1.86	40.96
5	7311.00	55.7 PK	74.0	-18.3	1.90 V	158	6.84	48.86
6	7311.00	43.0 AV	54.0	-11.0	1.90 V	158	-5.86	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.



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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	2383.00	47.6 PK	74.0	-26.4	1.09 H	20	14.74	32.86
2	2383.00	36.9 AV	54.0	-17.1	1.09 H	20	4.04	32.86
3	*2462.00	104.0 PK			1.09 H	13	70.86	33.14
4	*2462.00	101.5 AV			1.09 H	13	68.36	33.14
5	2483.50	52.0 PK	74.0	-22.0	1.09 H	13	18.79	33.21
6	2483.50	40.1 AV	54.0	-13.9	1.09 H	13	6.89	33.21
7	4924.00	46.6 PK	74.0	-27.4	1.05 H	176	5.49	41.11
8	4924.00	36.2 AV	54.0	-17.8	1.05 H	176	-4.91	41.11
9	7386.00	54.8 PK	74.0	-19.2	1.00 H	173	5.95	48.85
10	7386.00	42.6 AV	54.0	-11.4	1.00 H	173	-6.25	48.85

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	101.4 PK			1.00 V	275	68.26	33.14
2	*2462.00	98.6 AV			1.00 V	275	65.46	33.14
3	4924.00	48.9 PK	74.0	-25.1	1.93 V	177	7.79	41.11
4	4924.00	39.6 AV	54.0	-14.4	1.93 V	177	-1.51	41.11
5	7386.00	55.2 PK	74.0	-18.8	1.93 V	180	6.35	48.85
6	7386.00	43.2 AV	54.0	-10.8	1.93 V	180	-5.65	48.85

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.



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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	51.5 PK	74.0	-22.5	1.10 H	200	18.61	32.89
2	2390.00	38.6 AV	54.0	-15.4	1.10 H	200	5.71	32.89
3	*2412.00	102.9 PK			1.10 H	200	69.93	32.97
4	*2412.00	93.6 AV			1.10 H	200	60.63	32.97
5	2491.00	50.8 PK	74.0	-23.2	1.10 H	206	17.57	33.23
6	2491.00	41.7 AV	54.0	-12.3	1.10 H	206	8.47	33.23
7	4824.00	47.0 PK	74.0	-27.0	1.00 H	183	6.22	40.78
8	4824.00	36.4 AV	54.0	-17.6	1.00 H	183	-4.38	40.78

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	49.3 PK	74.0	-24.7	1.00 V	275	16.41	32.89
2	2390.00	37.0 AV	54.0	-17.0	1.00 V	275	4.11	32.89
3	*2412.00	100.1 PK			1.00 V	275	67.13	32.97
4	*2412.00	90.8 AV			1.00 V	275	57.83	32.97
5	2491.00	49.7 PK	74.0	-24.3	1.00 V	275	16.47	33.23
6	2491.00	39.2 AV	54.0	-14.8	1.00 V	275	5.97	33.23
7	4824.00	47.9 PK	74.0	-26.1	1.36 V	198	7.12	40.78
8	4824.00	39.3 AV	54.0	-14.7	1.36 V	198	-1.48	40.78

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.



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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	46.4 PK	74.0	-27.6	1.08 H	195	13.64	32.76
2	2356.00	35.2 AV	54.0	-18.8	1.08 H	195	2.44	32.76
3	*2437.00	101.6 PK			1.08 H	204	68.55	33.05
4	*2437.00	92.3 AV			1.08 H	204	59.25	33.05
5	4874.00	46.5 PK	74.0	-27.5	1.07 H	189	5.54	40.96
6	4874.00	35.9 AV	54.0	-18.1	1.07 H	189	-5.06	40.96
7	7311.00	55.2 PK	74.0	-18.8	1.05 H	185	6.34	48.86
8	7311.00	43.0 AV	54.0	-11.0	1.05 H	185	-5.86	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	2356.00	45.2 PK	74.0	-28.8	1.00 V	265	12.44	32.76
2	2356.00	34.1 AV	54.0	-19.9	1.00 V	265	1.34	32.76
3	*2437.00	100.3 PK			1.00 V	288	67.25	33.05
4	*2437.00	91.0 AV			1.00 V	288	57.95	33.05
5	4874.00	48.2 PK	74.0	-25.8	1.36 V	184	7.24	40.96
6	4874.00	39.5 AV	54.0	-14.5	1.36 V	184	-1.46	40.96
7	7311.00	56.4 PK	74.0	-17.6	1.36 V	179	7.54	48.86
8	7311.00	44.1 AV	54.0	-9.9	1.36 V	179	-4.76	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.



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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	2382.00	49.8 PK	74.0	-24.2	1.08 H	19	16.94	32.86
2	2382.00	39.6 AV	54.0	-14.4	1.08 H	19	6.74	32.86
3	*2462.00	102.9 PK			1.08 H	204	69.76	33.14
4	*2462.00	93.7 AV			1.08 H	204	60.56	33.14
5	2483.50	52.3 PK	74.0	-21.7	1.08 H	204	19.09	33.21
6	2483.50	40.5 AV	54.0	-13.5	1.08 H	204	7.29	33.21
7	4924.00	46.7 PK	74.0	-27.3	1.04 H	180	5.59	41.11
8	4924.00	36.3 AV	54.0	-17.7	1.04 H	180	-4.81	41.11
9	7386.00	54.8 PK	74.0	-19.2	1.06 H	180	5.95	48.85
10	7386.00	42.9 AV	54.0	-11.1	1.06 H	180	-5.95	48.85

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	2382.00	46.8 PK	74.0	-27.2	1.00 V	175	48.02	-1.22
2	2382.00	35.5 AV	54.0	-18.5	1.00 V	175	36.72	-1.22
3	*2462.00	100.2 PK			1.00 V	298	101.09	-0.89
4	*2462.00	90.8 AV			1.00 V	298	91.69	-0.89
5	2483.50	50.5 PK	74.0	-23.5	1.00 V	289	51.30	-0.80
6	2483.50	38.2 AV	54.0	-15.8	1.00 V	289	39.00	-0.80
7	4924.00	48.0 PK	74.0	-26.0	1.41 V	200	40.06	7.94
8	4924.00	39.5 AV	54.0	-14.5	1.41 V	200	31.56	7.94
9	7386.00	54.9 PK	74.0	-19.1	1.32 V	187	39.39	15.51
10	7386.00	43.1 AV	54.0	-10.9	1.32 V	187	27.59	15.51

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.



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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	53.8 PK	74.0	-20.2	1.08 H	199	20.91	32.89
2	2390.00	38.3 AV	54.0	-15.7	1.08 H	199	5.41	32.89
3	*2412.00	101.7 PK			1.08 H	199	68.73	32.97
4	*2412.00	92.3 AV			1.08 H	199	59.33	32.97
5	2492.00	52.0 PK	74.0	-22.0	1.08 H	206	18.75	33.25
6	2492.00	44.0 AV	54.0	-10.0	1.08 H	206	10.75	33.25
7	4824.00	47.2 PK	74.0	-26.8	1.05 H	166	6.42	40.78
8	4824.00	36.7 AV	54.0	-17.3	1.05 H	166	-4.08	40.78

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	49.7 PK	74.0	-24.3	1.00 V	288	16.81	32.89
2	2390.00	37.2 AV	54.0	-16.8	1.00 V	288	4.31	32.89
3	*2412.00	99.8 PK			1.00 V	290	66.83	32.97
4	*2412.00	90.6 AV			1.00 V	290	57.63	32.97
5	2492.00	49.8 PK	74.0	-24.2	1.00 V	289	16.55	33.25
6	2492.00	39.1 AV	54.0	-14.9	1.00 V	289	5.85	33.25
7	4824.00	48.6 PK	74.0	-25.4	1.41 V	195	7.82	40.78
8	4824.00	39.8 AV	54.0	-14.2	1.41 V	195	-0.98	40.78

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.



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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	48.1 PK	74.0	-25.9	1.13 H	194	15.34	32.76
2	2356.00	37.1 AV	54.0	-16.9	1.13 H	194	4.34	32.76
3	*2437.00	102.9 PK			1.13 H	14	69.85	33.05
4	*2437.00	93.6 AV			1.13 H	14	60.55	33.05
5	4874.00	46.3 PK	74.0	-27.7	1.06 H	168	5.34	40.96
6	4874.00	36.1 AV	54.0	-17.9	1.06 H	168	-4.86	40.96
7	7311.00	54.9 PK	74.0	-19.1	1.00 H	171	6.04	48.86
8	7311.00	43.1 AV	54.0	-10.9	1.00 H	171	-5.76	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	2356.00	44.7 PK	74.0	-29.3	1.02 V	263	11.94	32.76
2	2356.00	33.8 AV	54.0	-20.2	1.02 V	263	1.04	32.76
3	*2437.00	100.2 PK			1.02 V	311	67.15	33.05
4	*2437.00	90.7 AV			1.02 V	311	57.65	33.05
5	4874.00	49.1 PK	74.0	-24.9	1.21 V	180	8.14	40.96
6	4874.00	39.9 AV	54.0	-14.1	1.21 V	180	-1.06	40.96
7	7311.00	56.5 PK	74.0	-17.5	1.21 V	156	7.64	48.86
8	7311.00	43.0 AV	54.0	-11.0	1.21 V	156	-5.86	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.



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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	2381.00	50.1 PK	74.0	-23.9	1.10 H	196	17.24	32.86
2	2381.00	39.1 AV	54.0	-14.9	1.10 H	196	6.24	32.86
3	*2462.00	103.2 PK			1.10 H	207	70.06	33.14
4	*2462.00	93.5 AV			1.10 H	207	60.36	33.14
5	2483.50	54.3 PK	74.0	-19.7	1.10 H	207	21.09	33.21
6	2483.50	41.2 AV	54.0	-12.8	1.10 H	207	7.99	33.21
7	4924.00	46.5 PK	74.0	-27.5	1.07 H	157	5.39	41.11
8	4924.00	36.5 AV	54.0	-17.5	1.07 H	157	-4.61	41.11
9	7386.00	54.4 PK	74.0	-19.6	1.00 H	182	5.55	48.85
10	7386.00	42.7 AV	54.0	-11.3	1.00 H	182	-6.15	48.85

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	2381.00	44.1 PK	74.0	-29.9	1.00 V	248	11.24	32.86
2	2381.00	33.4 AV	54.0	-20.6	1.00 V	248	0.54	32.86
3	*2462.00	100.7 PK			1.00 V	323	67.56	33.14
4	*2462.00	91.1 AV			1.00 V	323	57.96	33.14
5	2483.50	50.0 PK	74.0	-24.0	1.00 V	323	16.79	33.21
6	2483.50	39.3 AV	54.0	-14.7	1.00 V	323	6.09	33.21
7	4924.00	49.0 PK	74.0	-25.0	1.24 V	168	7.89	41.11
8	4924.00	39.5 AV	54.0	-14.5	1.24 V	168	-1.61	41.11
9	7386.00	56.4 PK	74.0	-17.6	1.23 V	143	7.55	48.85
10	7386.00	42.7 AV	54.0	-11.3	1.23 V	143	-6.15	48.85

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.



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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	52.0 PK	74.0	-22.0	1.11 H	201	19.11	32.89
2	2390.00	39.5 AV	54.0	-14.5	1.11 H	201	6.61	32.89
3	*2422.00	98.8 PK			1.11 H	201	65.80	33.00
4	*2422.00	88.9 AV			1.11 H	201	55.90	33.00
5	4844.00	46.8 PK	74.0	-27.2	1.12 H	168	5.95	40.85
6	4844.00	36.6 AV	54.0	-17.4	1.12 H	168	-4.25	40.85
7	7266.00	54.6 PK	74.0	-19.4	1.00 H	198	5.75	48.85
8	7266.00	43.1 AV	54.0	-10.9	1.00 H	198	-5.75	48.85

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	44.1 PK	74.0	-29.9	1.05 V	320	11.21	32.89
2	2390.00	33.4 AV	54.0	-20.6	1.05 V	320	0.51	32.89
3	*2422.00	96.3 PK			1.05 V	320	63.30	33.00
4	*2422.00	86.4 AV			1.05 V	320	53.40	33.00
5	4844.00	48.9 PK	74.0	-25.1	1.19 V	182	8.05	40.85
6	4844.00	39.6 AV	54.0	-14.4	1.19 V	182	-1.25	40.85
7	7266.00	56.5 PK	74.0	-17.5	1.18 V	133	7.65	48.85
8	7266.00	42.8 AV	54.0	-11.2	1.18 V	133	-6.05	48.85

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.



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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	*2437.00	99.2 PK			1.10 H	202	66.15	33.05
2	*2437.00	89.6 AV			1.10 H	202	56.55	33.05
3	4874.00	46.8 PK	74.0	-27.2	1.10 H	160	5.84	40.96
4	4874.00	36.8 AV	54.0	-17.2	1.10 H	160	-4.16	40.96
5	7311.00	54.6 PK	74.0	-19.4	1.04 H	206	5.74	48.86
6	7311.00	43.4 AV	54.0	-10.6	1.04 H	206	-5.46	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	*2437.00	95.7 PK			1.01 V	308	62.65	33.05
2	*2437.00	86.0 AV			1.01 V	308	52.95	33.05
3	4874.00	48.5 PK	74.0	-25.5	1.27 V	153	7.54	40.96
4	4874.00	38.0 AV	54.0	-16.0	1.27 V	153	-2.96	40.96
5	7311.00	55.5 PK	74.0	-18.5	1.27 V	180	6.64	48.86
6	7311.00	43.3 AV	54.0	-10.7	1.27 V	180	-5.56	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.



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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	99.5 PK			1.09 H	14	66.39	33.11
2	*2452.00	89.5 AV			1.09 H	14	56.39	33.11
3	2483.50	53.6 PK	74.0	-20.4	1.09 H	14	20.39	33.21
4	2483.50	40.1 AV	54.0	-13.9	1.09 H	14	6.89	33.21
5	4904.00	46.7 PK	74.0	-27.3	1.13 H	157	5.63	41.07
6	4904.00	36.7 AV	54.0	-17.3	1.13 H	157	-4.37	41.07
7	7356.00	55.2 PK	74.0	-18.8	1.10 H	204	6.35	48.85
8	7356.00	43.7 AV	54.0	-10.3	1.10 H	204	-5.15	48.85

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	96.1 PK			1.00 V	316	62.99	33.11
2	*2452.00	86.2 AV			1.00 V	316	53.09	33.11
3	2483.50	49.9 PK	74.0	-24.1	1.05 V	323	16.69	33.21
4	2483.50	39.3 AV	54.0	-14.7	1.05 V	323	6.09	33.21
5	4904.00	48.4 PK	74.0	-25.6	1.31 V	146	7.33	41.07
6	4904.00	38.1 AV	54.0	-15.9	1.31 V	146	-2.97	41.07
7	7356.00	55.9 PK	74.0	-18.1	1.30 V	169	7.05	48.85
8	7356.00	43.6 AV	54.0	-10.4	1.30 V	169	-5.25	48.85

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 : Oct. 03, 2013

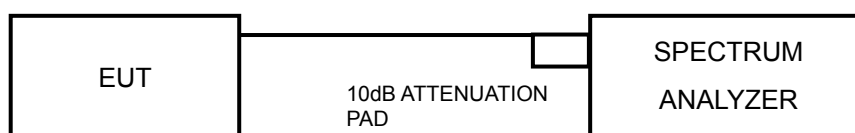
4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100kHz
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	10.11	0.5	PASS
6	2437	10.13	0.5	PASS
11	2462	10.13	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.63	0.5	PASS
6	2437	16.63	0.5	PASS
11	2462	16.63	0.5	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.85	0.5	PASS
6	2437	17.86	0.5	PASS
11	2462	17.86	0.5	PASS

802.11n (HT40)

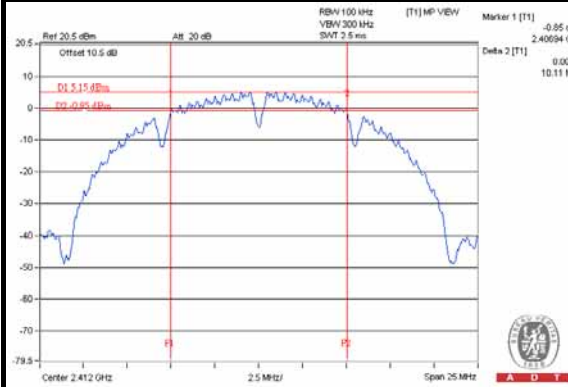
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.49	0.5	PASS
6	2437	36.49	0.5	PASS
9	2452	36.49	0.5	PASS



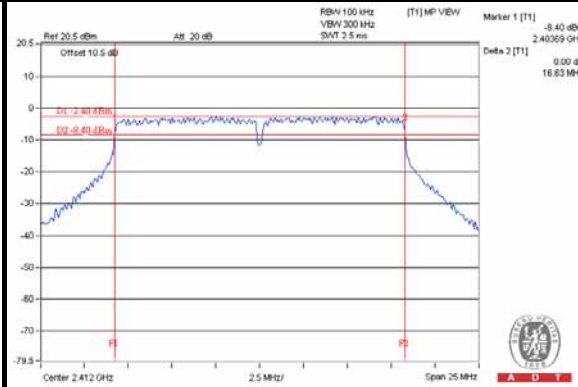
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SPECTRUM PLOT OF WORST VALUE

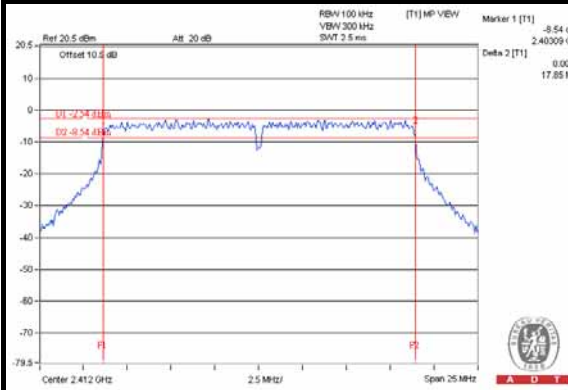
802.11b / CH1



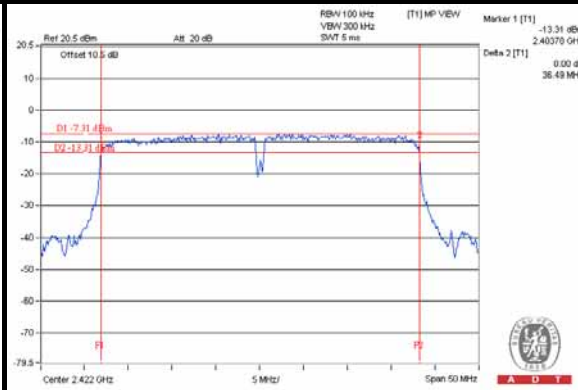
802.11g / CH1



802.11n (HT20) / CH1



802.11n (HT40) / CH1





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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 : Oct. 03, 2013

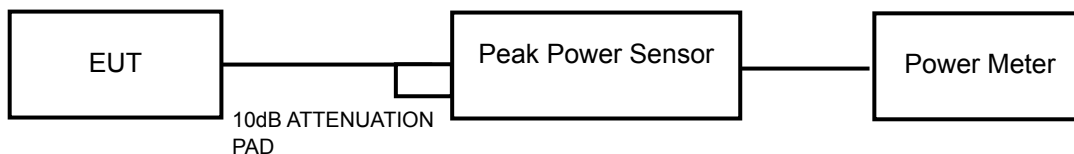
4.4.3 TEST PROCEDURES

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	64.417	18.09	30	PASS
6	2437	64.714	18.11	30	PASS
11	2462	60.117	17.79	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	114.551	20.59	30	PASS
6	2437	116.413	20.66	30	PASS
11	2462	112.720	20.52	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	88.512	19.47	30	PASS
6	2437	89.536	19.52	30	PASS
11	2462	88.308	19.46	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	69.183	18.40	30	PASS
6	2437	70.469	18.48	30	PASS
9	2452	65.917	18.19	30	PASS



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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

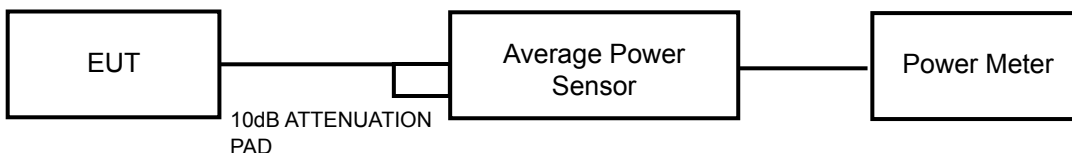
Note:

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 : Oct. 03, 2013

4.5.3 TEST PROCEDURES

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

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6



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4.5.6 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	38.019	15.80
6	2437	38.194	15.82
11	2462	37.584	15.75

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	18.880	12.76
6	2437	19.409	12.88
11	2462	18.664	12.71

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	14.791	11.70
6	2437	15.136	11.80
11	2462	14.928	11.74

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
3	2422	12.445	10.95
6	2437	12.531	10.98
9	2452	11.967	10.78

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 : Oct. 03, 2013

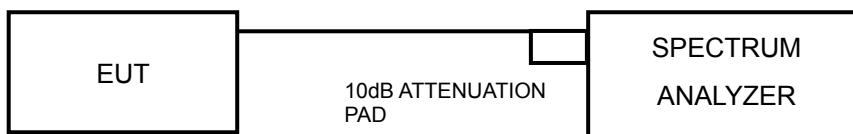
4.6.3 TEST PROCEDURE

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



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4.6.7 TEST RESULTS

802.11b

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-14.94	8	PASS
6	2437	-14.71	8	PASS
11	2462	-14.77	8	PASS

802.11g

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-16.84	8	PASS
6	2437	-16.72	8	PASS
11	2462	-16.81	8	PASS

802.11n (HT20)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-17.34	8	PASS
6	2437	-17.36	8	PASS
11	2462	-17.22	8	PASS

802.11n (HT40)

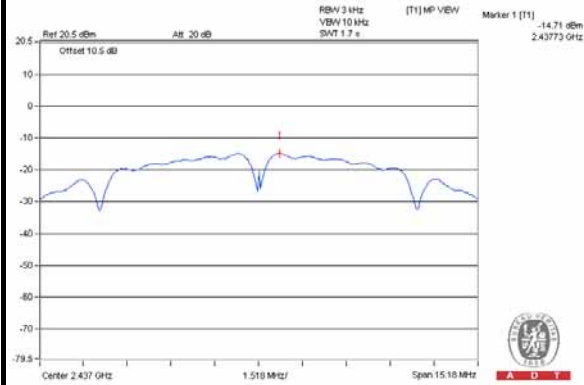
Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-20.50	8	PASS
6	2437	-19.67	8	PASS
9	2452	-19.69	8	PASS



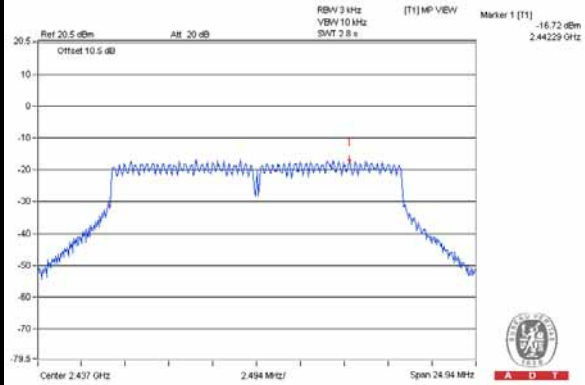
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SPECTRUM PLOT OF WORST VALUE

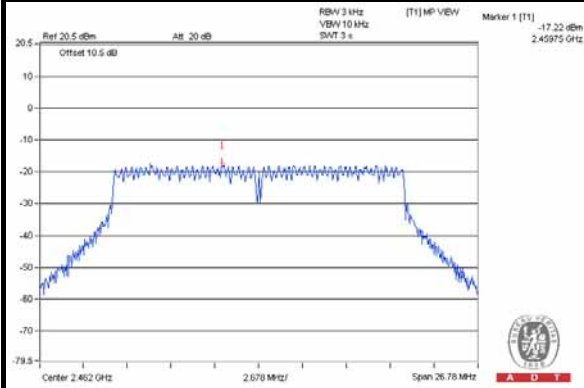
802.11b / CH6



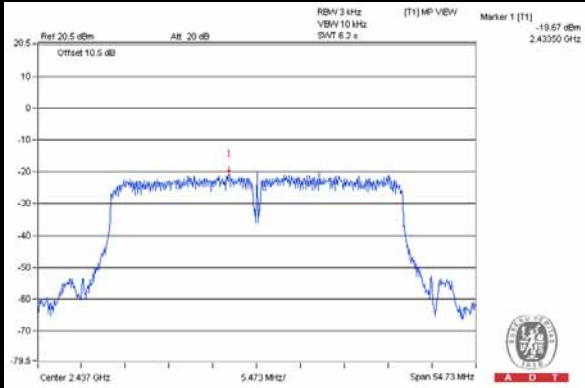
802.11g / CH6



802.11n (HT20) / CH11



802.11n (HT40) / CH6



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 : Oct. 03, 2013

4.7.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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.

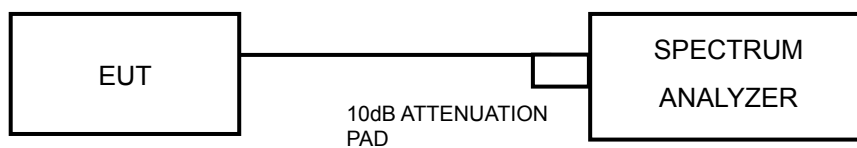
Measurement Procedure –Unwanted Emission Level

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.

4.7.4 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

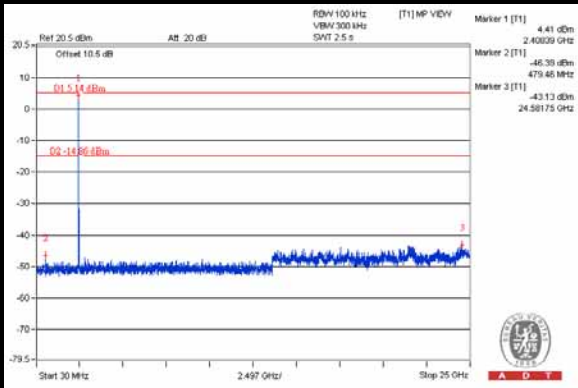
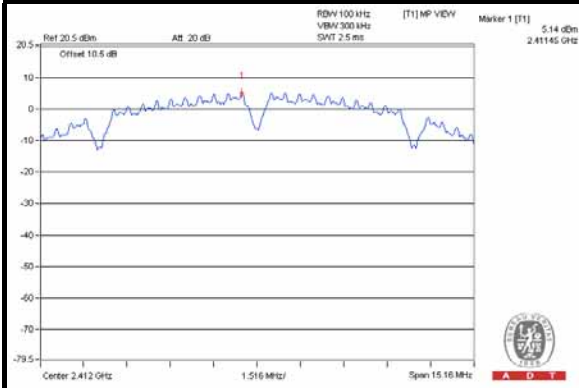
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



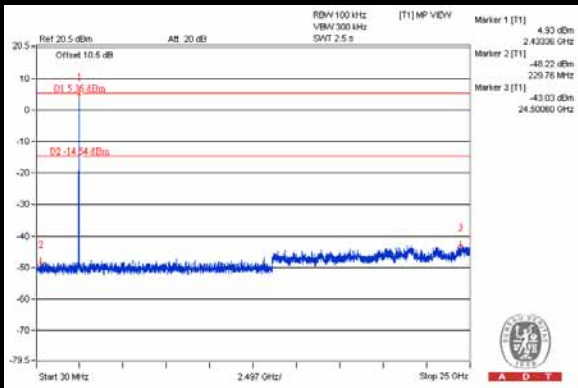
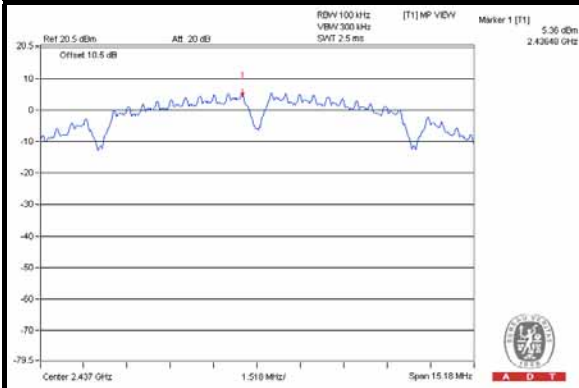
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802.11b:

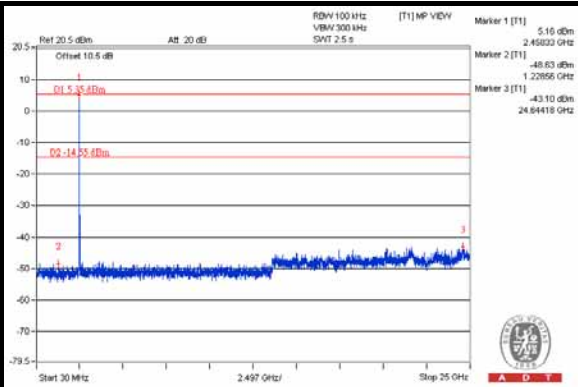
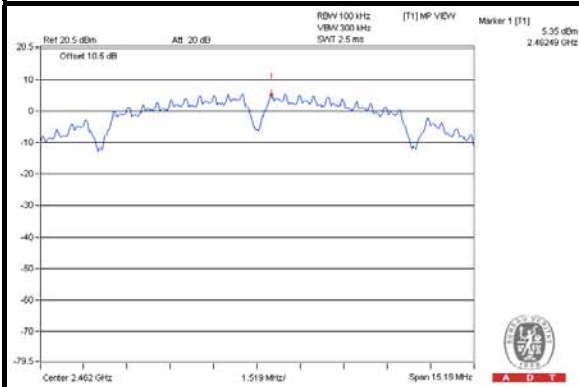
CH 1



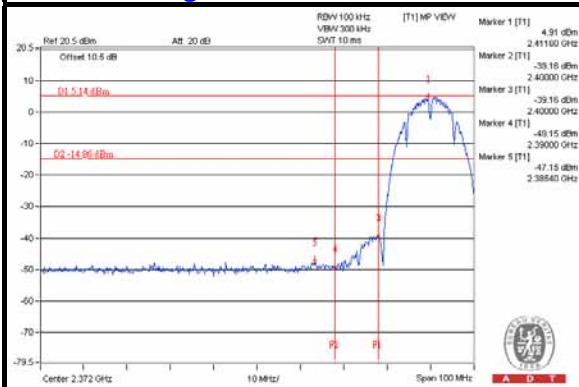
CH 6



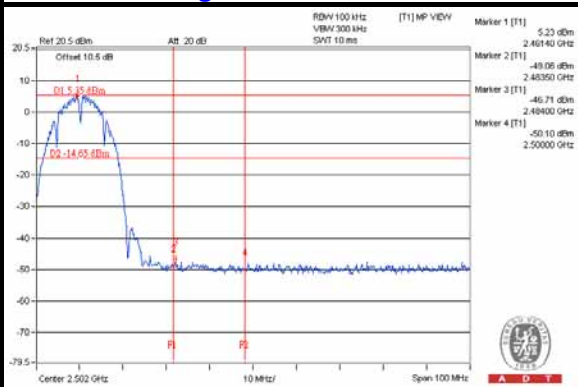
CH 11



CH 1 Band edge



CH 11 Band edge

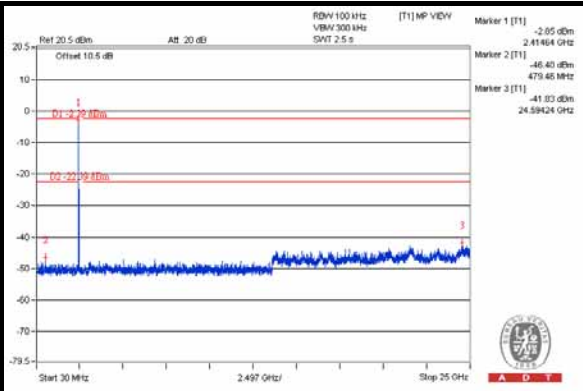
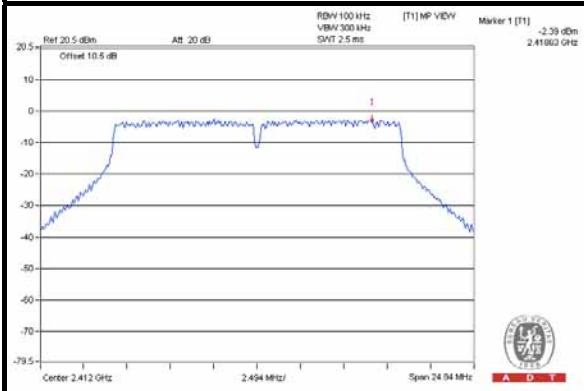




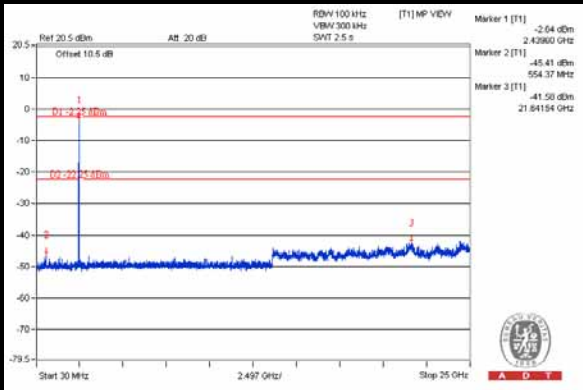
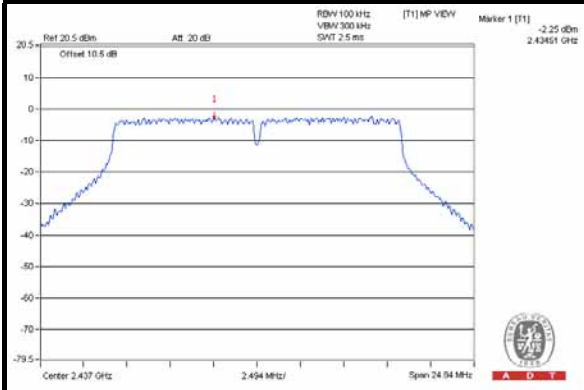
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802.11g:

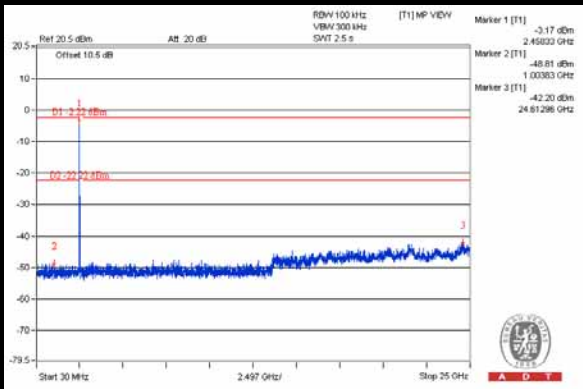
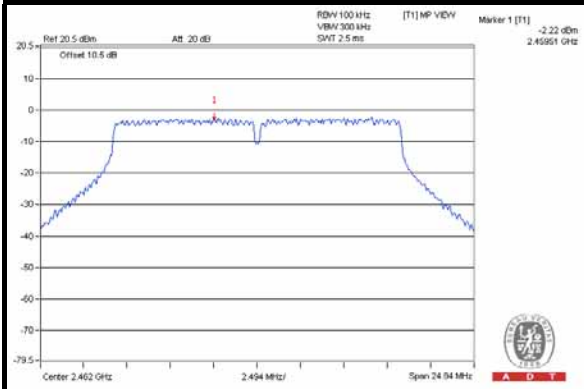
CH 1



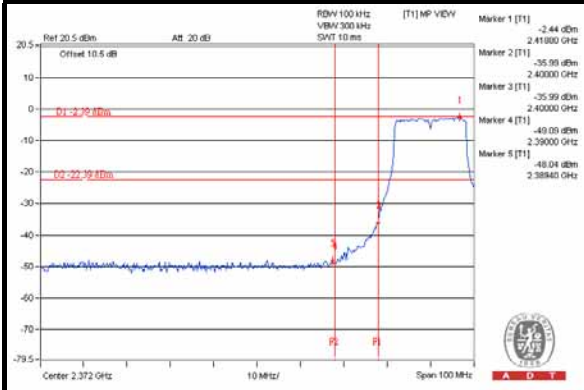
CH 6



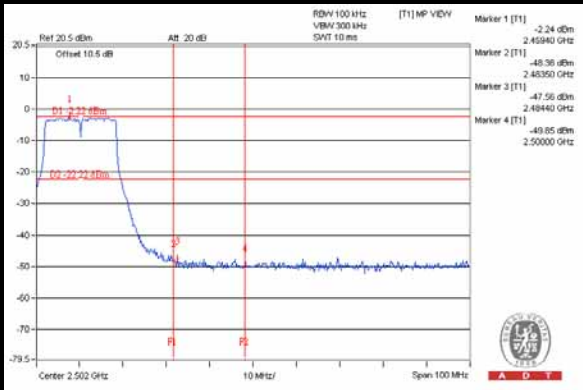
CH 11



CH 1 Band edge

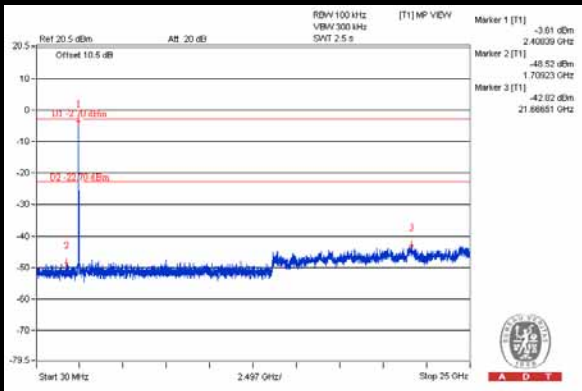
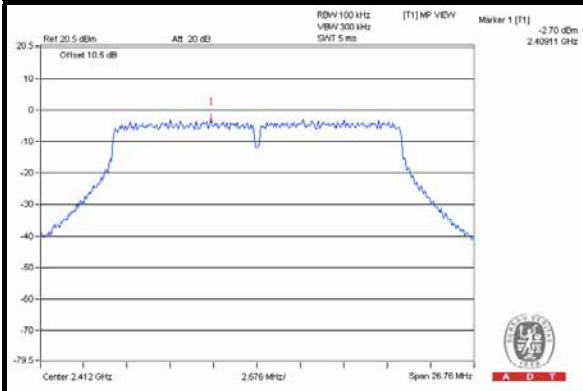


CH 11 Band edge

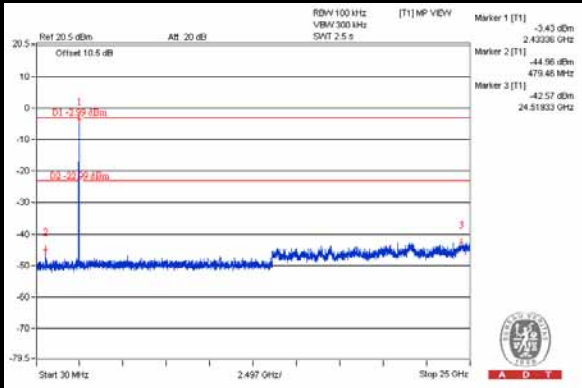
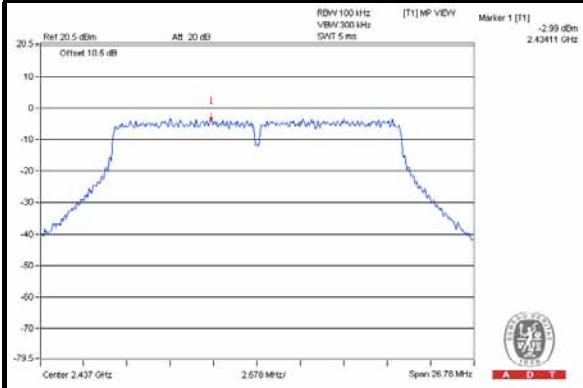


802.11n (HT20):

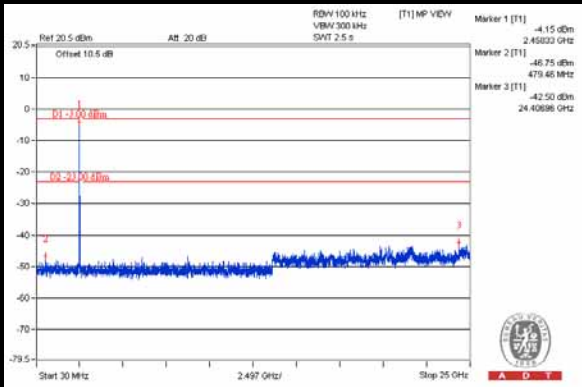
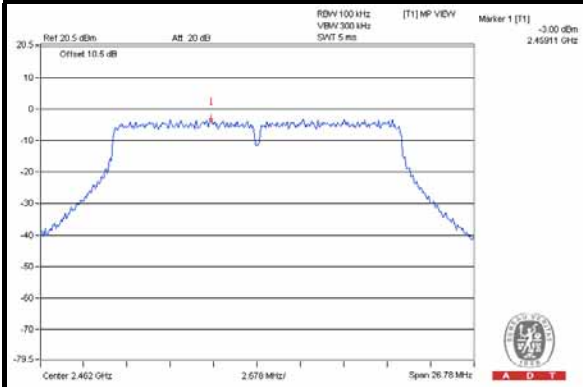
CH 1



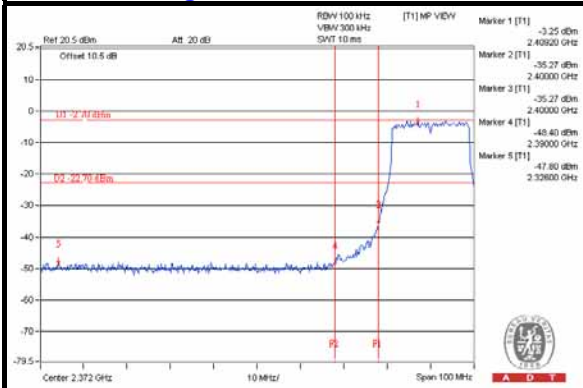
CH 6



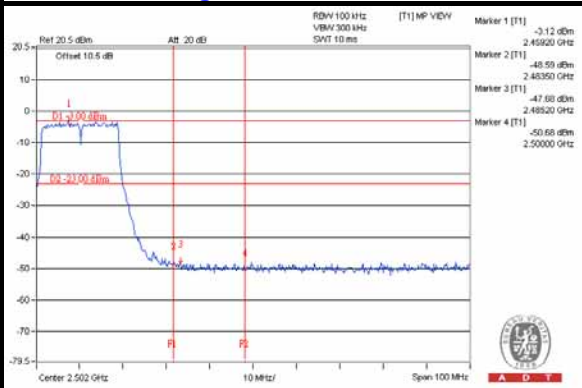
CH 11



CH 1 Band edge



CH 11 Band edge

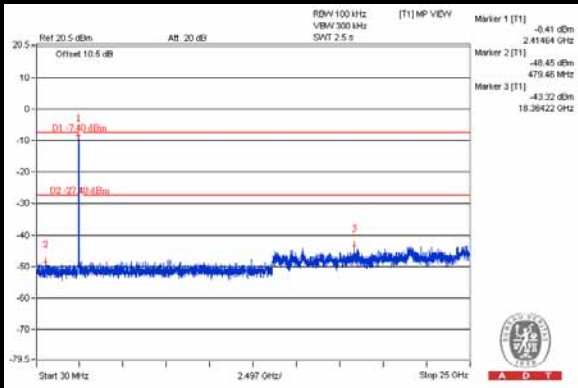
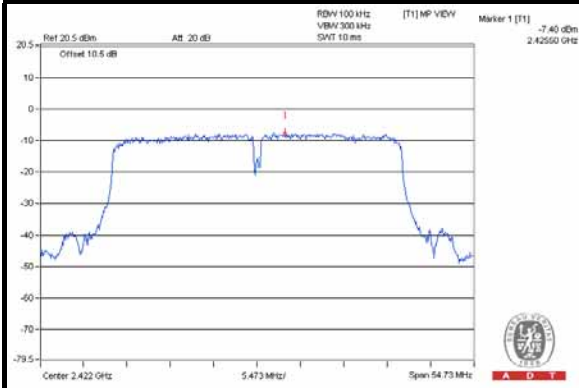




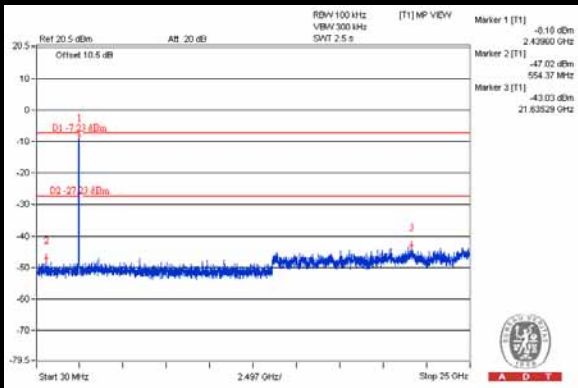
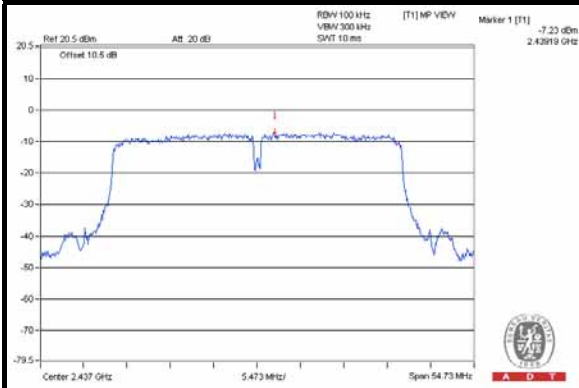
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802.11n (HT40):

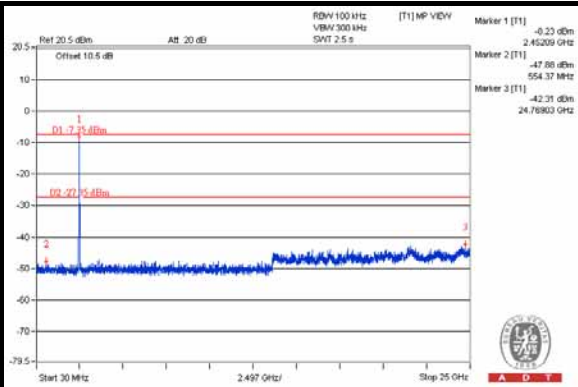
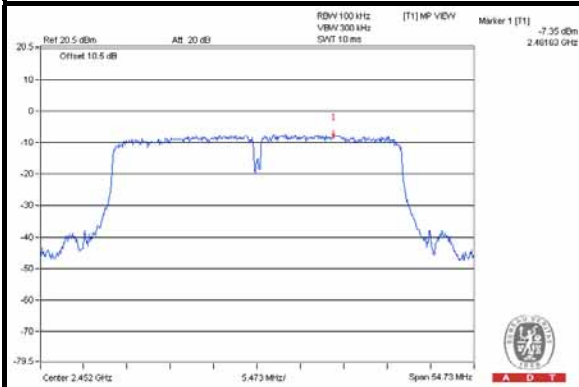
CH 3



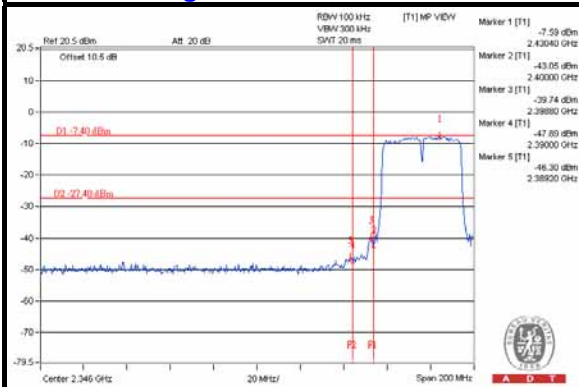
CH 6



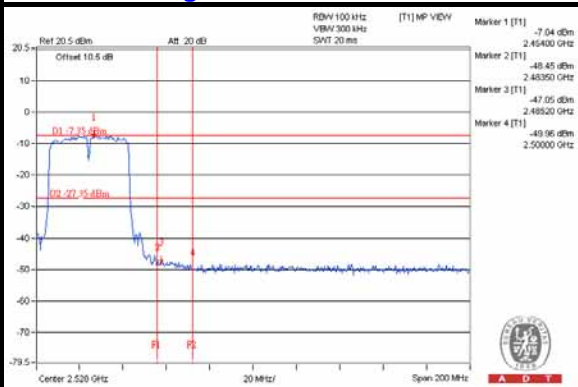
CH 9



CH 3 Band edge



CH 9 Band edge



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.bureauveritas-adt.com

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 ---