



FCC TEST REPORT

REPORT NO.: RF140311E07

MODEL NO.: T77H505

FCC ID: B3QT77H505

RECEIVED: Mar. 11, 2014

TESTED: Mar. 17 to Apr. 02, 2014

ISSUED: Apr. 21, 2014

APPLICANT: BROTHER INDUSTRIES, LTD.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140311E07	Original release	Apr. 21, 2014

1. CERTIFICATION

PRODUCT: IEEE802.11b/g/n Wi-Fi module
BRAND NAME: Brother
MODEL NO.: T77H505
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: BROTHER INDUSTRIES, LTD.
TESTED: Mar. 17 to Apr. 02, 2014
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (Model: T77H505) 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:** Apr. 21, 2014
(Claire Kuan, Specialist)

APPROVED BY :  , **DATE:** Apr. 21, 2014
(May Chen, 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 -12.73dB at 12.81840MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.3dB at 2390.00MHz
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.



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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)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.65 dB
Radiated emissions (6GHz -18GHz)	3.88 dB
Radiated emissions (18GHz -40GHz)	4.11 dB



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	IEEE802.11b/g/n Wi-Fi module
MODEL NO.	T77H505
POWER SUPPLY	DC 3.3V \pm 10% from host equipment
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 150Mbps
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: 106.905mW 802.11g: 240.436mW 802.11n (HT20): 183.231mW 802.11n (HT40): 179.061mW
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:

Gain (dBi)	Antenna Type	Connector Type	Frequency range (MHz to MHz)	Cable Loss (dB)
2.12	PCB	NA	2400~2500	NA

2. 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

3. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 7.
4. 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: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.

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	1	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	1	OFDM	BPSK	6

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
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	TESTED BY
PLC	26deg. C, 66%RH	120Vac, 60Hz (SYSTEM)	Gavin Peng
RE<1G	25deg. C, 65%RH	120Vac, 60Hz (SYSTEM)	Tim Ho
RE≥1G	23deg. C, 67%RH	120Vac, 60Hz (SYSTEM)	Nelson Teng
APCM	25deg. C, 60%RH	120Vac, 60Hz (SYSTEM)	Robert Cheng
OB	25deg. C, 60%RH	120Vac, 60Hz (SYSTEM)	Robert Cheng

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.

3.4 DUTY CYCLE OF TEST SIGNAL

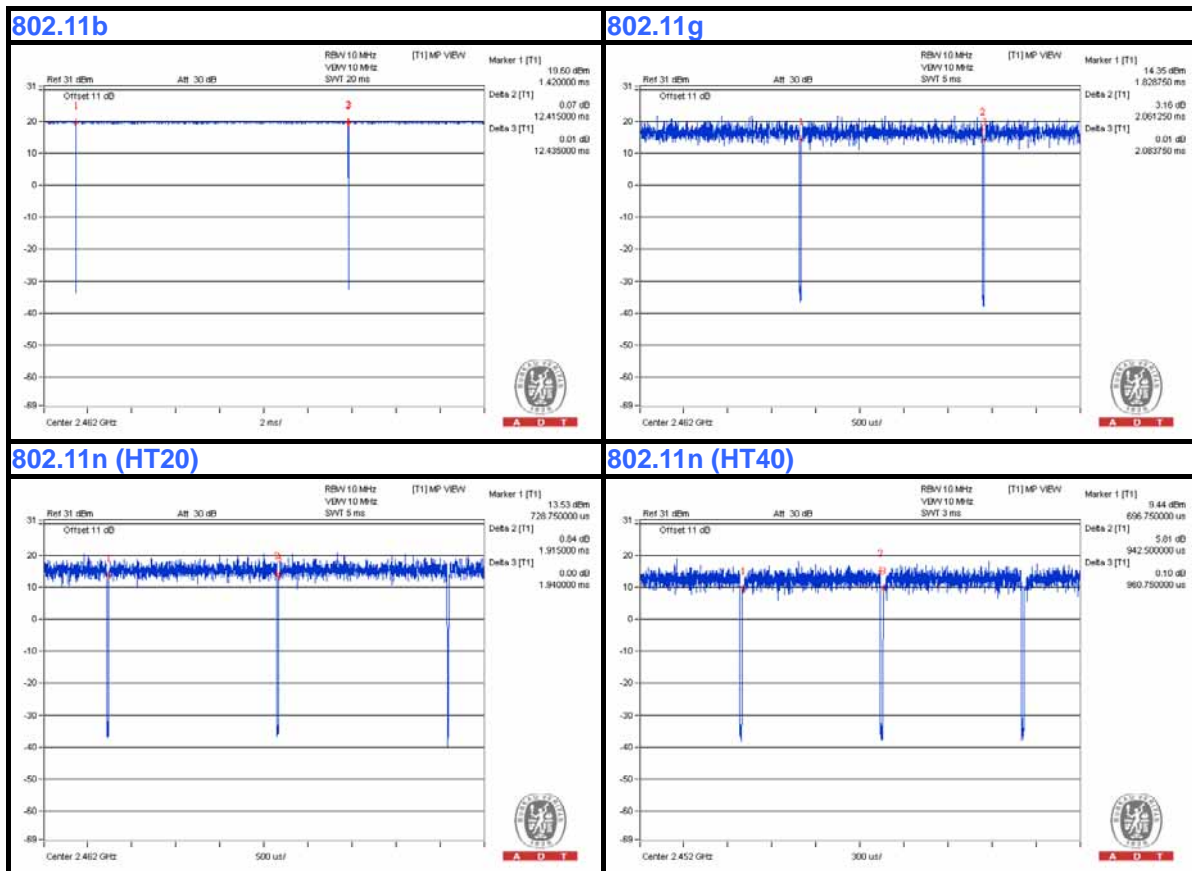
Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11b: Duty cycle = $12.415 \text{ ms} / 12.435 \text{ ms} = 0.998$

802.11g: Duty cycle = $2.061 \text{ ms} / 2.083 \text{ ms} = 0.989$

802.11n (HT20): Duty cycle = $1.915 \text{ ms} / 1.94 \text{ ms} = 0.987$

802.11n (HT40): Duty cycle = $0.942 \text{ ms} / 0.960 \text{ ms} = 0.981$





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3.5 DESCRIPTION OF SUPPORT UNITS

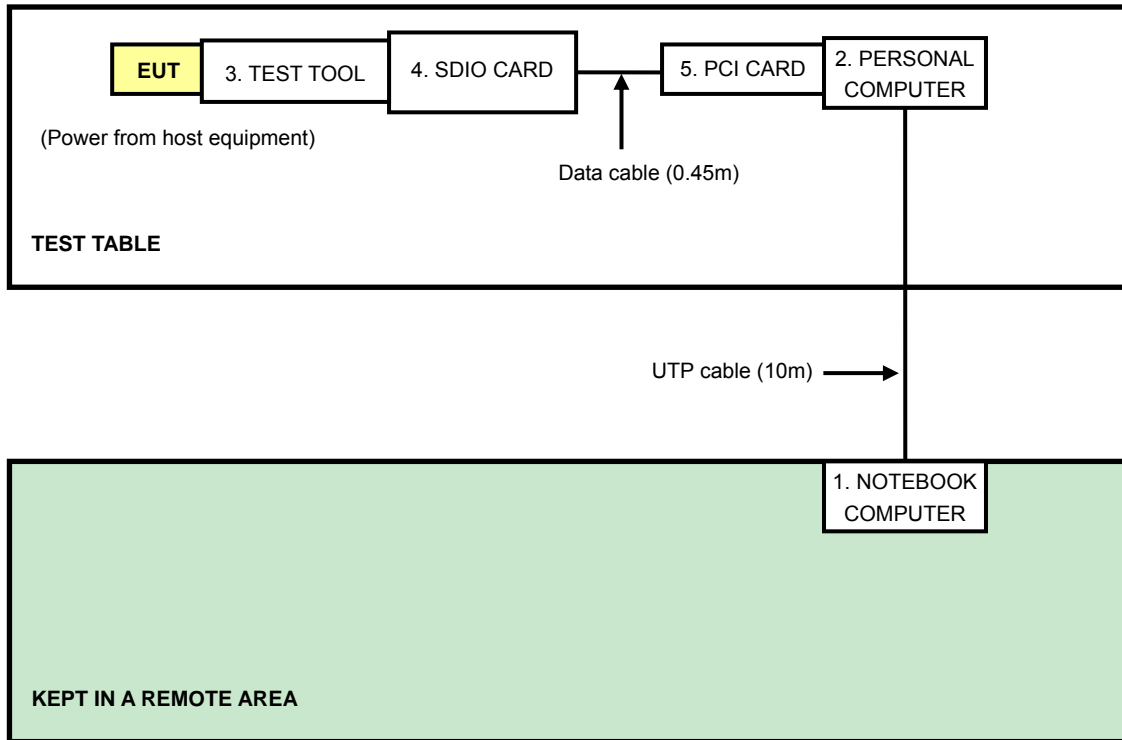
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Product	Brand	Model No.	Serial No.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	PERSONAL COPUTER	DELL	DCNE	HRJB32S	FCC DoC
3	TEST TOOL	Hon Hai	NA	NA	NA
4	SDIO CARD	Hon Hai	NA	NA	NA
5	PCI CARD	Hon Hai	NA	NA	NA

No.	Signal cable description
1	UTP cable (10m)
2	Data cable (0.45m)

Note: The power cords of the above support units were unshielded (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 (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver LIG NEX1	ER-265	L09068005	July 22, 2013	July 21, 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	CONCAB-003	Mar. 07, 2014	Mar. 06, 2015
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: Mar. 18, 2014

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.

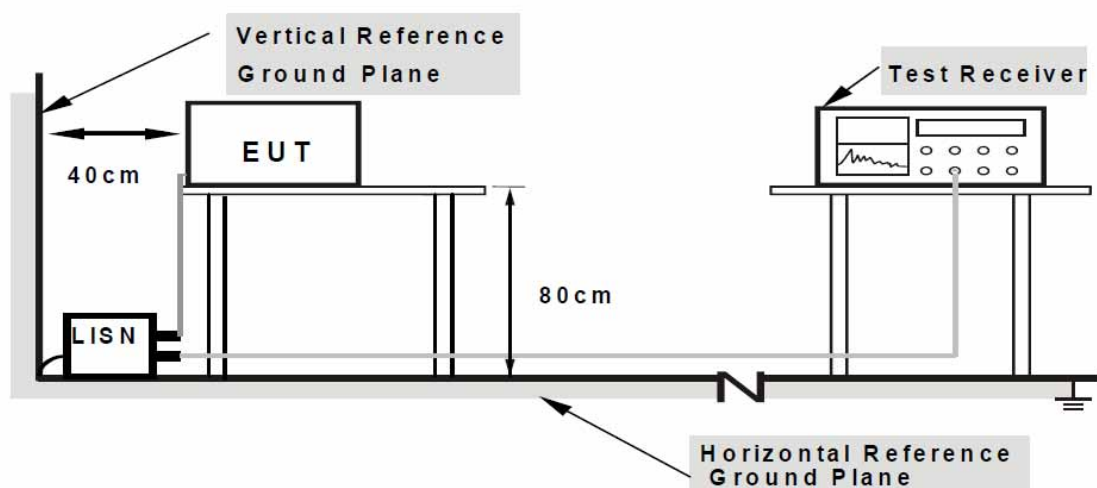
NOTE:

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.



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4.1.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared computer systems (support units 1~5) to act as communication partner.
3. The communication partner ran test program "MTool_2.0.1.1.exe" to enable EUT under transmission/receiving condition continuously.

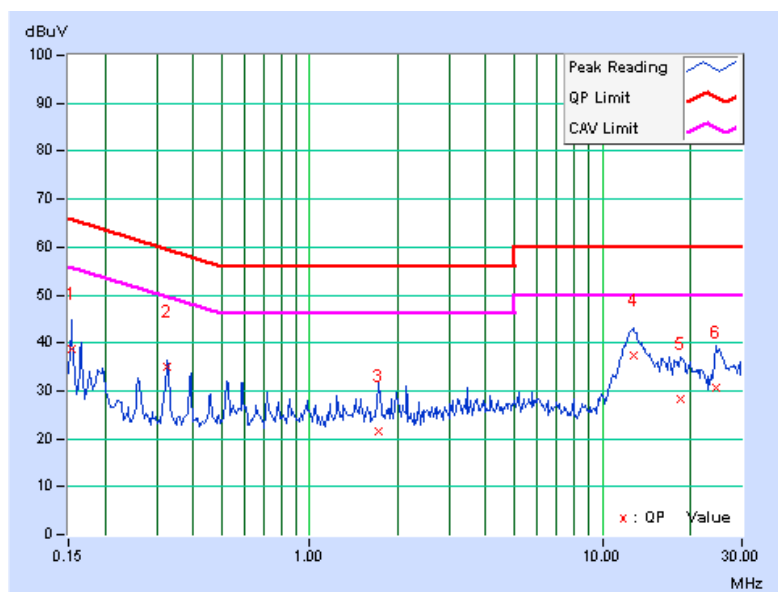
4.1.7 TEST RESULTS

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

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	0.15391	9.96	28.77	13.81	38.73	23.77	65.79	55.79	-27.06	-32.02
2	0.32595	9.97	25.20	24.40	35.17	34.37	59.55	49.55	-24.38	-15.18
3	1.72964	10.02	11.49	8.68	21.51	18.70	56.00	46.00	-34.49	-27.30
4	12.73238	10.37	26.85	21.19	37.22	31.56	60.00	50.00	-22.78	-18.44
5	18.47617	10.52	17.68	9.71	28.20	20.23	60.00	50.00	-31.80	-29.77
6	24.35290	10.70	19.89	11.25	30.59	21.95	60.00	50.00	-29.41	-28.05

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

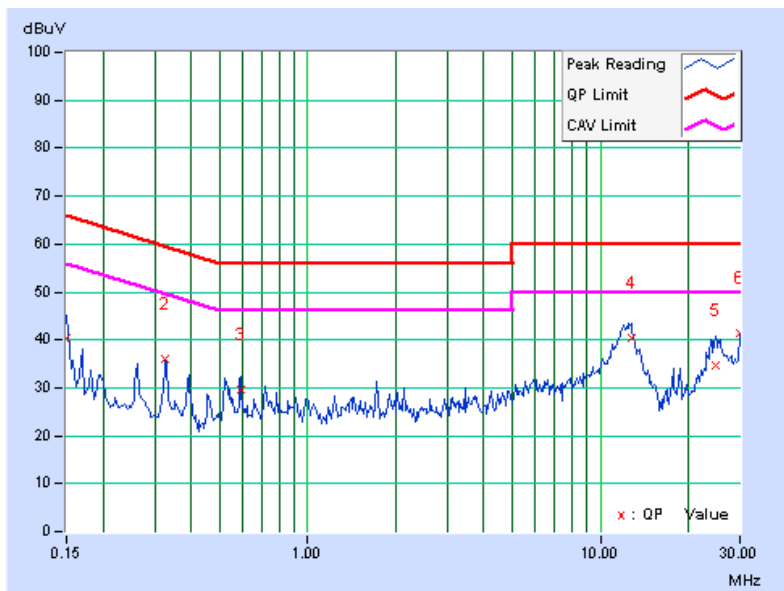


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

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	9.96	30.31	13.54	40.27	23.50	66.00	56.00	-25.73	-32.50
2	0.32595	9.97	26.04	23.84	36.01	33.81	59.55	49.55	-23.54	-15.74
3	0.58792	9.98	19.63	16.86	29.61	26.84	56.00	46.00	-26.39	-19.16
4	12.81840	10.37	30.12	26.90	40.49	37.27	60.00	50.00	-19.51	-12.73
5	24.65006	10.70	24.03	18.45	34.73	29.15	60.00	50.00	-25.27	-20.85
6	30.00000	10.87	30.57	19.34	41.44	30.21	60.00	50.00	-18.56	-19.79

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. 21, 2014	Jan. 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 15, 2013	July 14, 2014
Horn_Antenna AISl	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
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: Mar. 17 to 26, 2014



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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:

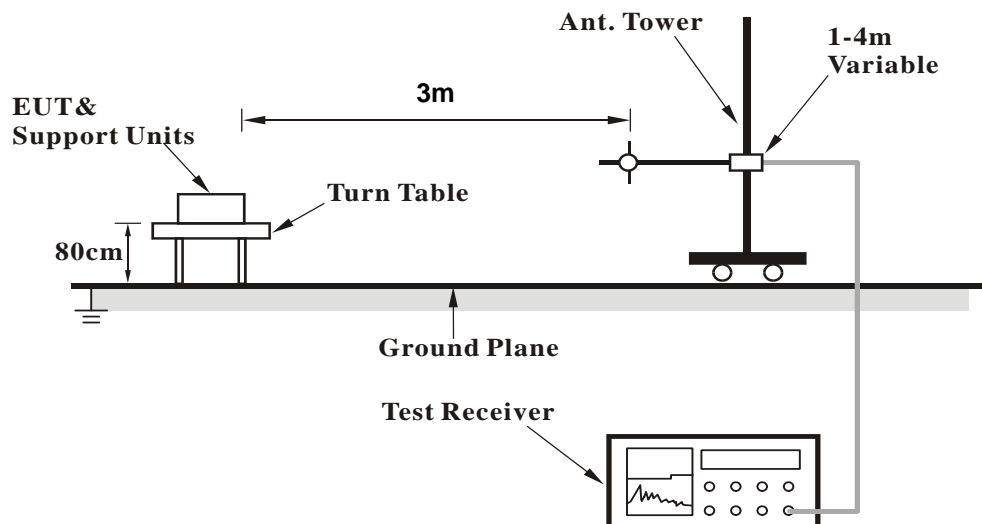
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

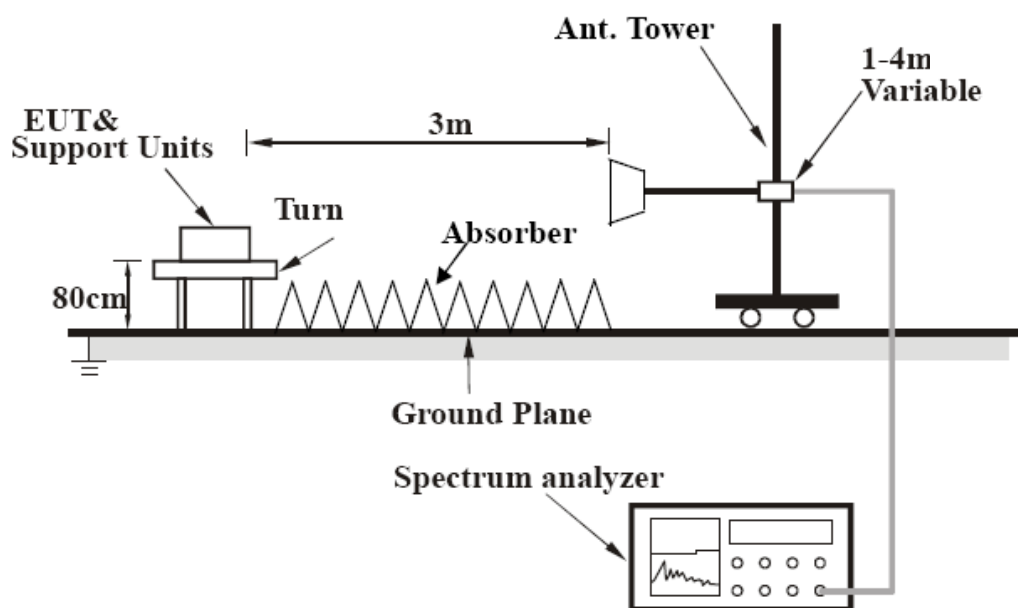
No deviation

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 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	108.08	40.5 QP	43.5	-3.0	1.50 H	360	56.95	-16.49
2	121.37	34.4 QP	43.5	-9.1	1.50 H	165	49.55	-15.12
3	137.96	30.5 QP	43.5	-13.0	2.00 H	112	44.24	-13.72
4	199.85	40.2 QP	43.5	-3.3	1.50 H	145	56.52	-16.30
5	365.09	42.4 QP	46.0	-3.6	1.00 H	335	53.01	-10.61
6	630.53	42.8 QP	46.0	-3.2	1.50 H	0	47.10	-4.32

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	108.23	38.7 QP	43.5	-4.8	1.00 V	282	55.20	-16.48
2	165.95	38.3 QP	43.5	-5.2	1.00 V	231	51.74	-13.48
3	298.69	39.9 QP	46.0	-6.1	1.50 V	283	52.35	-12.41
4	365.04	40.0 QP	46.0	-6.0	1.50 V	183	50.61	-10.61
5	630.53	42.3 QP	46.0	-3.8	1.00 V	163	46.57	-4.32
6	766.23	39.2 QP	46.0	-6.8	1.50 V	0	40.84	-1.68

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	2381.72	61.8 PK	74.0	-12.2	1.08 H	10	63.53	-1.73
2	2381.72	53.1 AV	54.0	-0.9	1.08 H	10	54.83	-1.73
3	*2412.00	108.1 PK			1.08 H	10	109.70	-1.60
4	*2412.00	106.0 AV			1.08 H	10	107.60	-1.60
5	4824.00	49.2 PK	74.0	-24.8	1.08 H	98	42.00	7.20
6	4824.00	36.6 AV	54.0	-17.4	1.08 H	98	29.40	7.20

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	54.8 PK	74.0	-19.2	1.00 V	64	56.50	-1.70
2	2390.00	47.6 AV	54.0	-6.4	1.00 V	64	49.30	-1.70
3	*2412.00	102.7 PK			1.00 V	64	104.30	-1.60
4	*2412.00	100.1 AV			1.00 V	64	101.70	-1.60
5	4824.00	46.2 PK	74.0	-27.8	1.00 V	158	39.00	7.20
6	4824.00	33.8 AV	54.0	-20.2	1.00 V	158	26.60	7.20

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	108.7 PK			1.05 H	350	110.19	-1.49
2	*2437.00	106.6 AV			1.05 H	350	108.09	-1.49
3	4874.00	48.6 PK	74.0	-25.4	1.14 H	91	41.27	7.33
4	4874.00	36.0 AV	54.0	-18.0	1.14 H	91	28.67	7.33
5	7311.00	53.8 PK	74.0	-20.2	1.35 H	250	38.84	14.96
6	7311.00	40.7 AV	54.0	-13.3	1.35 H	250	25.74	14.96

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	102.5 PK			1.06 V	90	103.99	-1.49
2	*2437.00	100.5 AV			1.06 V	90	101.99	-1.49
3	4874.00	49.0 PK	74.0	-25.0	1.42 V	224	41.67	7.33
4	4874.00	36.3 AV	54.0	-17.7	1.42 V	224	28.97	7.33
5	7311.00	53.8 PK	74.0	-20.2	1.20 V	291	38.84	14.96
6	7311.00	41.0 AV	54.0	-13.0	1.20 V	291	26.04	14.96

REMARKS:

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



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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	*2462.00	108.1 PK			1.08 H	337	109.48	-1.38
2	*2462.00	106.2 AV			1.08 H	337	107.58	-1.38
3	2491.78	61.3 PK	74.0	-12.7	1.08 H	337	62.55	-1.25
4	2491.78	51.3 AV	54.0	-2.7	1.08 H	337	52.55	-1.25
5	4924.00	48.6 PK	74.0	-25.4	1.11 H	105	41.13	7.47
6	4924.00	36.2 AV	54.0	-17.8	1.11 H	105	28.73	7.47
7	7386.00	54.1 PK	74.0	-19.9	1.31 H	248	39.21	14.89
8	7386.00	41.2 AV	54.0	-12.8	1.31 H	248	26.31	14.89

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	102.5 PK			1.00 V	93	103.88	-1.38
2	*2462.00	100.4 AV			1.00 V	93	101.78	-1.38
3	2483.50	58.5 PK	74.0	-15.5	1.00 V	93	59.78	-1.28
4	2483.50	47.6 AV	54.0	-6.4	1.00 V	93	48.88	-1.28
5	4924.00	48.8 PK	74.0	-25.2	1.40 V	238	41.33	7.47
6	4924.00	36.4 AV	54.0	-17.6	1.40 V	238	28.93	7.47
7	7386.00	54.1 PK	74.0	-19.9	1.22 V	303	39.21	14.89
8	7386.00	41.4 AV	54.0	-12.6	1.22 V	303	26.51	14.89

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	73.7 PK	74.0	-0.3	1.10 H	12	75.40	-1.70
2	2390.00	48.6 AV	54.0	-5.4	1.10 H	12	50.30	-1.70
3	*2412.00	108.5 PK			1.10 H	12	110.10	-1.60
4	*2412.00	98.6 AV			1.10 H	12	100.20	-1.60
5	4824.00	48.4 PK	74.0	-25.6	1.15 H	106	41.20	7.20
6	4824.00	36.1 AV	54.0	-17.9	1.15 H	106	28.90	7.20

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	68.1 PK	74.0	-5.9	1.00 V	65	69.80	-1.70
2	2390.00	40.4 AV	54.0	-13.6	1.00 V	65	42.10	-1.70
3	*2412.00	102.1 PK			1.00 V	65	103.70	-1.60
4	*2412.00	91.1 AV			1.00 V	65	92.70	-1.60
5	4824.00	48.5 PK	74.0	-25.5	1.42 V	243	41.30	7.20
6	4824.00	36.4 AV	54.0	-17.6	1.42 V	243	29.20	7.20

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	109.1 PK			1.10 H	23	110.59	-1.49
2	*2437.00	99.1 AV			1.10 H	23	100.59	-1.49
3	4874.00	48.6 PK	74.0	-25.4	1.09 H	102	41.27	7.33
4	4874.00	36.1 AV	54.0	-17.9	1.09 H	102	28.77	7.33
5	7311.00	53.5 PK	74.0	-20.5	1.38 H	253	38.54	14.96
6	7311.00	40.3 AV	54.0	-13.7	1.38 H	253	25.34	14.96

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	102.5 PK			1.00 V	60	103.99	-1.49
2	*2437.00	91.3 AV			1.00 V	60	92.79	-1.49
3	4874.00	48.3 PK	74.0	-25.7	1.38 V	242	40.97	7.33
4	4874.00	36.0 AV	54.0	-18.0	1.38 V	242	28.67	7.33
5	7311.00	54.6 PK	74.0	-19.4	1.24 V	293	39.64	14.96
6	7311.00	41.7 AV	54.0	-12.3	1.24 V	293	26.74	14.96

REMARKS:

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



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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	*2462.00	107.1 PK			1.06 H	335	108.48	-1.38
2	*2462.00	98.4 AV			1.06 H	335	99.78	-1.38
3	2483.50	71.8 PK	74.0	-2.2	1.06 H	335	73.08	-1.28
4	2483.50	49.5 AV	54.0	-4.5	1.06 H	335	50.78	-1.28
5	4924.00	48.9 PK	74.0	-25.1	1.14 H	99	41.43	7.47
6	4924.00	36.1 AV	54.0	-17.9	1.14 H	99	28.63	7.47
7	7386.00	54.3 PK	74.0	-19.7	1.38 H	254	39.41	14.89
8	7386.00	41.1 AV	54.0	-12.9	1.38 H	254	26.21	14.89

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	101.5 PK			1.00 V	64	102.88	-1.38
2	*2462.00	90.6 AV			1.00 V	64	91.98	-1.38
3	2483.50	65.2 PK	74.0	-8.8	1.00 V	64	66.48	-1.28
4	2483.50	38.8 AV	54.0	-15.2	1.00 V	64	40.08	-1.28
5	4924.00	48.4 PK	74.0	-25.6	1.37 V	243	40.93	7.47
6	4924.00	36.1 AV	54.0	-17.9	1.37 V	243	28.63	7.47
7	7386.00	53.9 PK	74.0	-20.1	1.21 V	315	39.01	14.89
8	7386.00	41.3 AV	54.0	-12.7	1.21 V	315	26.41	14.89

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	72.4 PK	74.0	-1.6	1.10 H	11	74.10	-1.70
2	2390.00	48.3 AV	54.0	-5.7	1.10 H	11	50.00	-1.70
3	*2412.00	106.1 PK			1.10 H	11	107.70	-1.60
4	*2412.00	97.2 AV			1.10 H	11	98.80	-1.60
5	4824.00	48.3 PK	74.0	-25.7	1.09 H	119	41.10	7.20
6	4824.00	36.0 AV	54.0	-18.0	1.09 H	119	28.80	7.20

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.7 PK	74.0	-6.3	1.00 V	66	69.40	-1.70
2	2390.00	40.1 AV	54.0	-13.9	1.00 V	66	41.80	-1.70
3	*2412.00	100.9 PK			1.00 V	66	102.50	-1.60
4	*2412.00	89.8 AV			1.00 V	66	91.40	-1.60
5	4824.00	48.7 PK	74.0	-25.3	1.41 V	247	41.50	7.20
6	4824.00	36.6 AV	54.0	-17.4	1.41 V	247	29.40	7.20

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	106.7 PK			1.07 H	329	108.19	-1.49
2	*2437.00	97.7 AV			1.07 H	329	99.19	-1.49
3	4874.00	48.8 PK	74.0	-25.2	1.09 H	91	41.47	7.33
4	4874.00	36.4 AV	54.0	-17.6	1.09 H	91	29.07	7.33
5	7311.00	54.3 PK	74.0	-19.7	1.34 H	263	39.34	14.96
6	7311.00	41.6 AV	54.0	-12.4	1.34 H	263	26.64	14.96

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	100.1 PK			1.00 V	60	101.59	-1.49
2	*2437.00	89.2 AV			1.00 V	60	90.69	-1.49
3	4874.00	49.0 PK	74.0	-25.0	1.43 V	234	41.67	7.33
4	4874.00	36.5 AV	54.0	-17.5	1.43 V	234	29.17	7.33
5	7311.00	54.2 PK	74.0	-19.8	1.23 V	330	39.24	14.96
6	7311.00	41.4 AV	54.0	-12.6	1.23 V	330	26.44	14.96

REMARKS:

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



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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	*2462.00	105.9 PK			1.08 H	335	107.28	-1.38
2	*2462.00	97.2 AV			1.08 H	335	98.58	-1.38
3	2483.50	70.6 PK	74.0	-3.4	1.08 H	335	71.88	-1.28
4	2483.50	49.0 AV	54.0	-5.0	1.08 H	335	50.28	-1.28
5	4924.00	48.6 PK	74.0	-25.4	1.10 H	120	41.13	7.47
6	4924.00	36.0 AV	54.0	-18.0	1.10 H	120	28.53	7.47
7	7386.00	54.2 PK	74.0	-19.8	1.28 H	241	39.31	14.89
8	7386.00	41.4 AV	54.0	-12.6	1.28 H	241	26.51	14.89

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	100.6 PK			1.00 V	66	101.98	-1.38
2	*2462.00	89.5 AV			1.00 V	66	90.88	-1.38
3	2483.50	64.7 PK	74.0	-9.3	1.00 V	66	65.98	-1.28
4	2483.50	38.7 AV	54.0	-15.3	1.00 V	66	39.98	-1.28
5	4924.00	48.2 PK	74.0	-25.8	1.37 V	252	40.73	7.47
6	4924.00	35.7 AV	54.0	-18.3	1.37 V	252	28.23	7.47
7	7386.00	53.8 PK	74.0	-20.2	1.18 V	320	38.91	14.89
8	7386.00	41.2 AV	54.0	-12.8	1.18 V	320	26.31	14.89

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	72.5 PK	74.0	-1.5	1.09 H	360	74.20	-1.70
2	2390.00	53.4 AV	54.0	-0.6	1.09 H	360	55.10	-1.70
3	*2422.00	104.5 PK			1.09 H	360	106.05	-1.55
4	*2422.00	95.1 AV			1.09 H	360	96.65	-1.55
5	4844.00	48.5 PK	74.0	-25.5	1.11 H	112	41.26	7.24
6	4844.00	36.3 AV	54.0	-17.7	1.11 H	112	29.06	7.24
7	7266.00	53.8 PK	74.0	-20.2	1.32 H	249	38.78	15.02
8	7266.00	41.1 AV	54.0	-12.9	1.32 H	249	26.08	15.02

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.4 PK	74.0	-7.6	1.00 V	65	68.10	-1.70
2	2390.00	44.2 AV	54.0	-9.8	1.00 V	65	45.90	-1.70
3	*2422.00	98.2 PK			1.00 V	65	99.75	-1.55
4	*2422.00	86.8 AV			1.00 V	65	88.35	-1.55
5	4844.00	48.0 PK	74.0	-26.0	1.36 V	235	40.76	7.24
6	4844.00	35.9 AV	54.0	-18.1	1.36 V	235	28.66	7.24
7	7266.00	53.5 PK	74.0	-20.5	1.26 V	305	38.48	15.02
8	7266.00	41.0 AV	54.0	-13.0	1.26 V	305	25.98	15.02

REMARKS:

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



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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	2390.00	65.9 PK	74.0	-8.1	1.36 H	327	67.60	-1.70
2	2390.00	48.9 AV	54.0	-5.1	1.36 H	327	50.60	-1.70
3	*2437.00	102.1 PK			1.36 H	327	103.59	-1.49
4	*2437.00	93.7 AV			1.36 H	327	95.19	-1.49
5	2483.50	62.7 PK	74.0	-11.3	1.36 H	327	63.98	-1.28
6	2483.50	47.2 AV	54.0	-6.8	1.36 H	327	48.48	-1.28
7	4874.00	48.9 PK	74.0	-25.1	1.10 H	120	41.57	7.33
8	4874.00	36.5 AV	54.0	-17.5	1.10 H	120	29.17	7.33
9	7311.00	53.6 PK	74.0	-20.4	1.26 H	234	38.64	14.96
10	7311.00	40.8 AV	54.0	-13.2	1.26 H	234	25.84	14.96

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.0 PK	74.0	-13.0	1.00 V	66	62.70	-1.70
2	2390.00	39.5 AV	54.0	-14.5	1.00 V	66	41.20	-1.70
3	*2437.00	97.7 PK			1.00 V	66	99.19	-1.49
4	*2437.00	87.2 AV			1.00 V	66	88.69	-1.49
5	2483.50	58.4 PK	74.0	-15.6	1.00 V	66	59.68	-1.28
6	2483.50	36.8 AV	54.0	-17.2	1.00 V	66	38.08	-1.28
7	4874.00	49.0 PK	74.0	-25.0	1.33 V	248	41.67	7.33
8	4874.00	36.6 AV	54.0	-17.4	1.33 V	248	29.27	7.33
9	7311.00	54.3 PK	74.0	-19.7	1.25 V	331	39.34	14.96
10	7311.00	41.6 AV	54.0	-12.4	1.25 V	331	26.64	14.96

REMARKS:

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



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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	103.3 PK			1.05 H	336	104.72	-1.42
2	*2452.00	94.5 AV			1.05 H	336	95.92	-1.42
3	2483.50	69.1 PK	74.0	-4.9	1.05 H	336	70.38	-1.28
4	2483.50	52.1 AV	54.0	-1.9	1.05 H	336	53.38	-1.28
5	4904.00	48.5 PK	74.0	-25.5	1.09 H	95	41.09	7.41
6	4904.00	35.9 AV	54.0	-18.1	1.09 H	95	28.49	7.41
7	7356.00	53.5 PK	74.0	-20.5	1.26 H	257	38.59	14.91
8	7356.00	40.7 AV	54.0	-13.3	1.26 H	257	25.79	14.91

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	98.5 PK			1.00 V	66	99.92	-1.42
2	*2452.00	87.2 AV			1.00 V	66	88.62	-1.42
3	2483.50	63.6 PK	74.0	-10.4	1.00 V	66	64.88	-1.28
4	2483.50	42.3 AV	54.0	-11.7	1.00 V	66	43.58	-1.28
5	4904.00	48.2 PK	74.0	-25.8	1.41 V	246	40.79	7.41
6	4904.00	35.6 AV	54.0	-18.4	1.41 V	246	28.19	7.41
7	7356.00	53.4 PK	74.0	-20.6	1.26 V	321	38.49	14.91
8	7356.00	41.1 AV	54.0	-12.9	1.26 V	321	26.19	14.91

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) – 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	100036	Jan. 21, 2014	Jan. 20, 2015

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 : Apr. 02, 2014

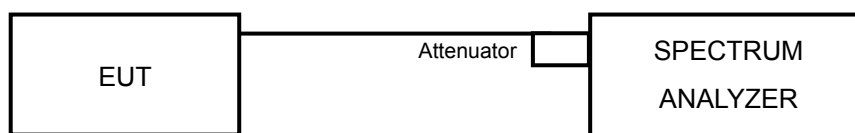
4.3.3 TEST PROCEDURE

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.



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4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.05	0.5	PASS
6	2437	7.59	0.5	PASS
11	2462	8.06	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.49	0.5	PASS
6	2437	15.17	0.5	PASS
11	2462	15.33	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.19	0.5	PASS
6	2437	15.98	0.5	PASS
11	2462	15.98	0.5	PASS

802.11n (HT40)

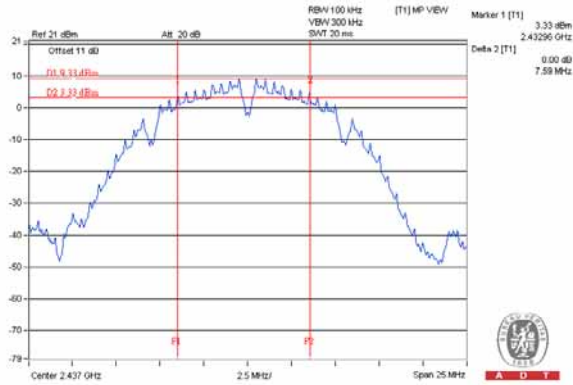
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.20	0.5	PASS
6	2437	35.22	0.5	PASS
9	2452	35.21	0.5	PASS



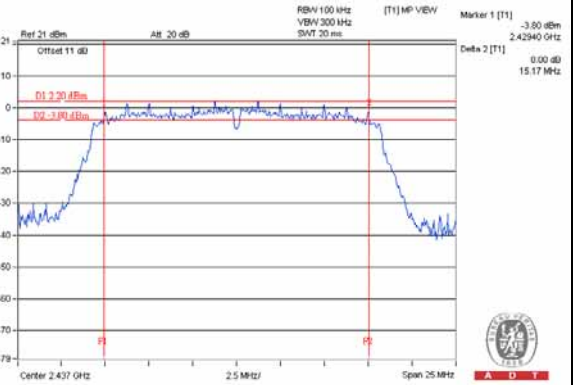
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SPECTRUM PLOT OF WORST VALUE

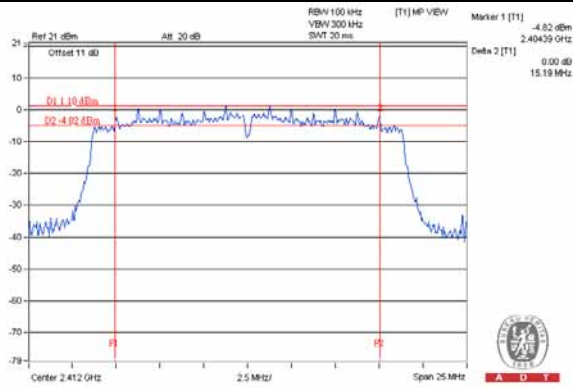
802.11b / CH6



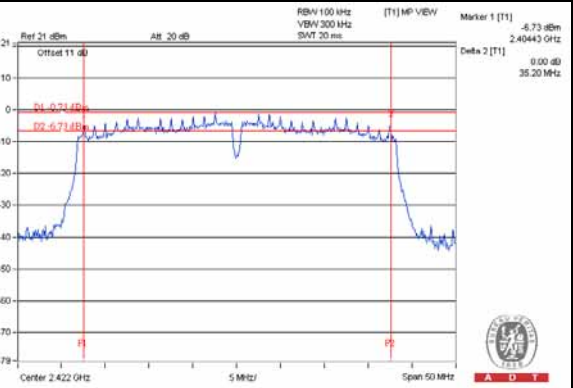
802.11g / CH6



802.11n (HT20) / CH1



802.11n (HT40) / CH3



4.4 CONDUCTED OUTPUT POWER MEASUREMENT

4.4.1 LIMITS OF CONDUCTED 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 : Apr. 02, 2014

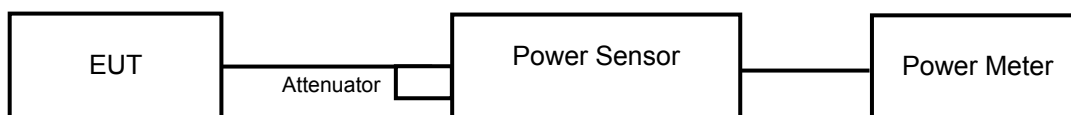
4.4.3 TEST PROCEDURES

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



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4.4.7 TEST RESULTS

FOR PEAK POWER

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	106.905	20.29	30	PASS
6	2437	105.925	20.25	30	PASS
11	2462	104.713	20.20	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	240.436	23.81	30	PASS
6	2437	220.800	23.44	30	PASS
11	2462	224.388	23.51	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	181.552	22.59	30	PASS
6	2437	183.231	22.63	30	PASS
11	2462	182.810	22.62	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	179.061	22.53	30	PASS
6	2437	147.911	21.70	30	PASS
9	2452	151.705	21.81	30	PASS



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FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	53.456	17.28
6	2437	54.450	17.36
11	2462	53.951	17.32

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	22.233	13.47
6	2437	22.387	13.50
11	2462	23.067	13.63

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	16.904	12.28
6	2437	16.634	12.21
11	2462	17.258	12.37

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
3	2422	18.239	12.61
6	2437	18.155	12.59
9	2452	18.793	12.74

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	Jan. 21, 2014	Jan. 20, 2015

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 : Apr. 02, 2014

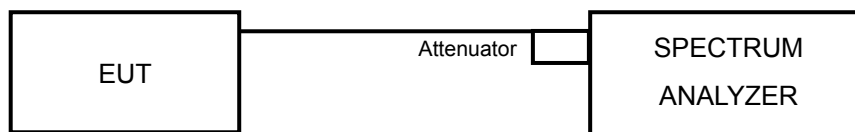
4.5.3 TEST PROCEDURE

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.

4.5.4 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	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-2.90	8	PASS
6	2437	-2.55	8	PASS
11	2462	-2.43	8	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-10.42	8	PASS
6	2437	-10.42	8	PASS
11	2462	-10.35	8	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-11.02	8	PASS
6	2437	-11.28	8	PASS
11	2462	-11.15	8	PASS

802.11n (HT40)

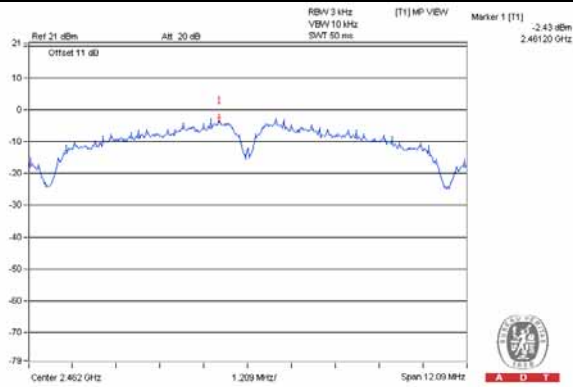
CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
3	2422	-13.05	8	PASS
6	2437	-13.45	8	PASS
9	2452	-13.13	8	PASS



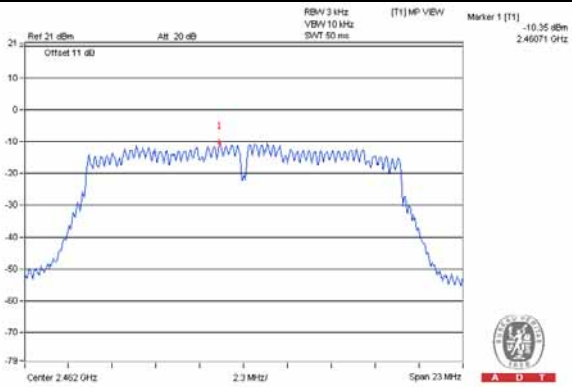
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SPECTRUM PLOT OF WORST VALUE

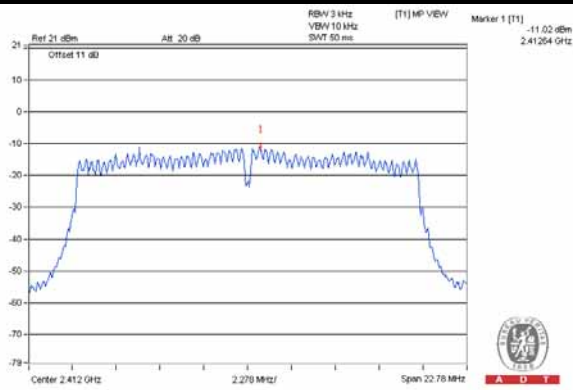
802.11b / CH11



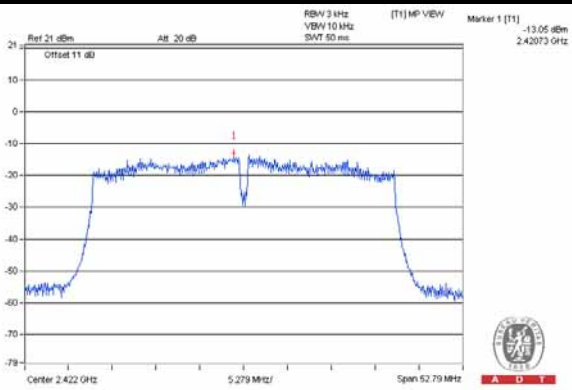
802.11g / CH11



802.11n (HT20) / CH1



802.11n (HT40) / CH3





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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	Jan. 21, 2014	Jan. 20, 2015

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 : Apr. 02, 2014

4.6.3 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.

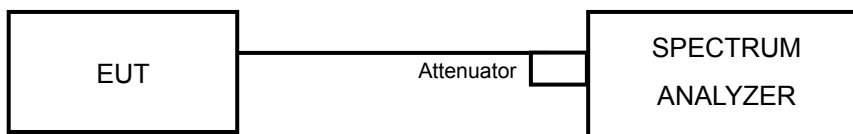
Measurement Procedure –Unwanted Emission Level

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.

4.6.4 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

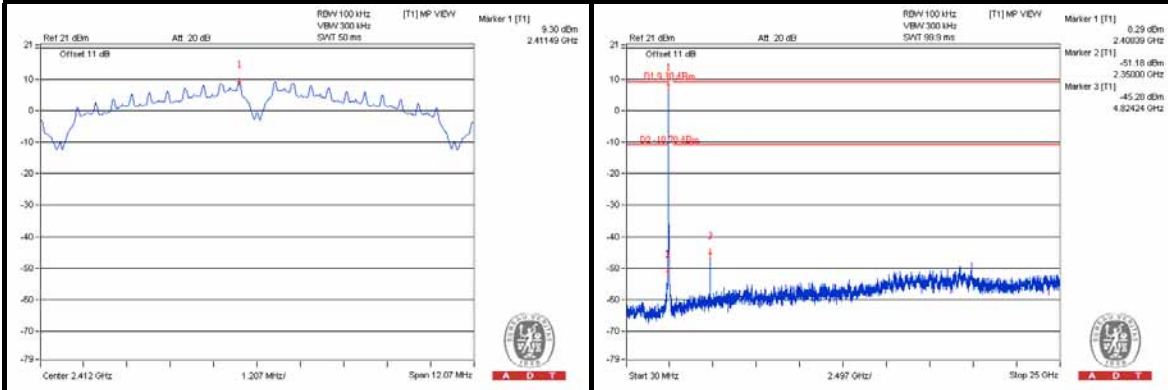
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



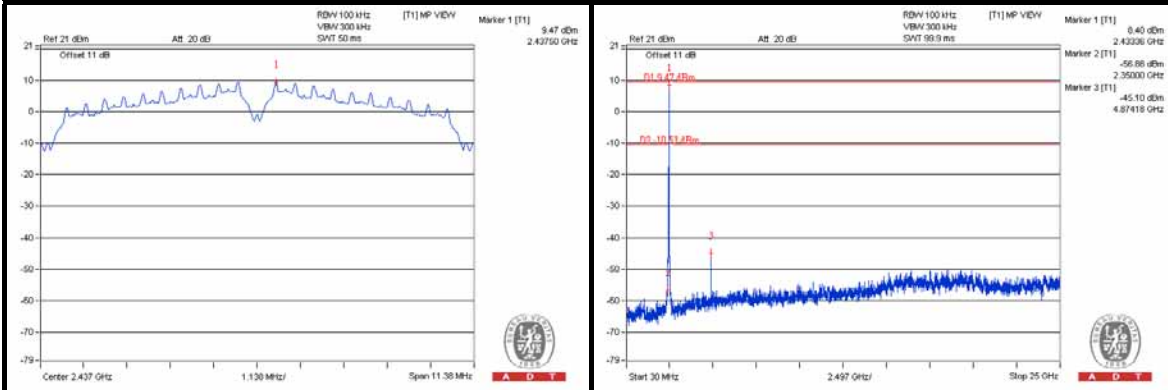
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802.11b:

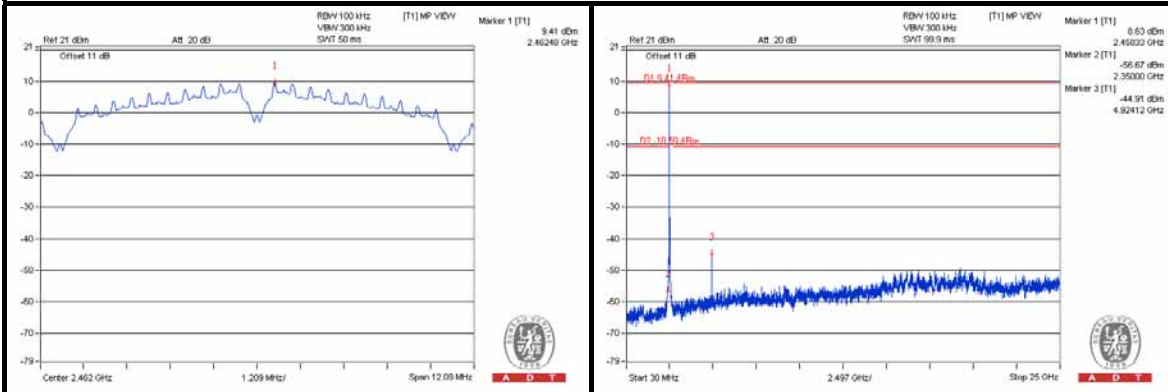
CH 1



CH 6



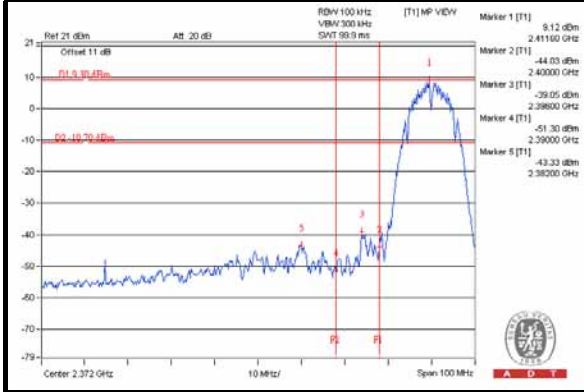
CH 11



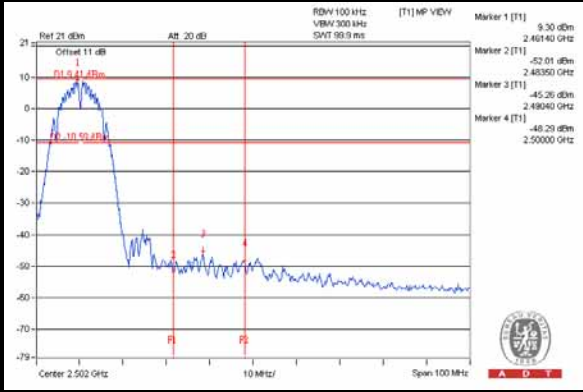


A D T

CH 1 Band edge



CH 11 Band edge

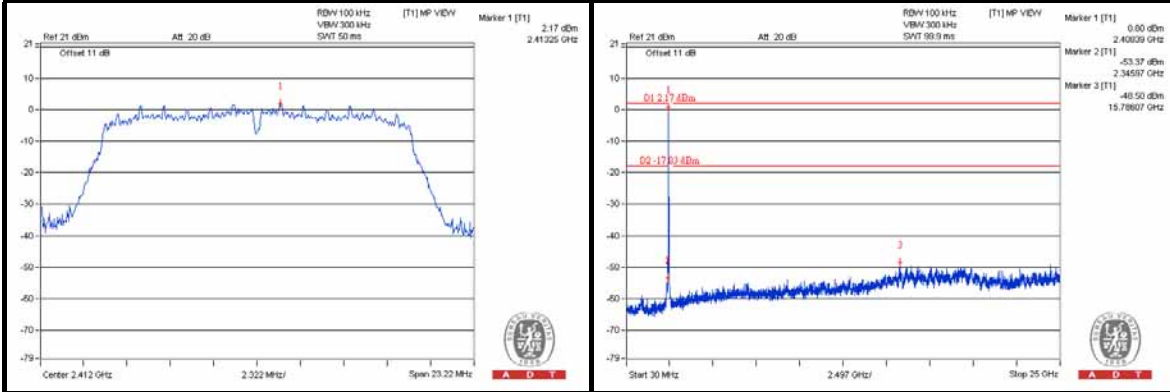




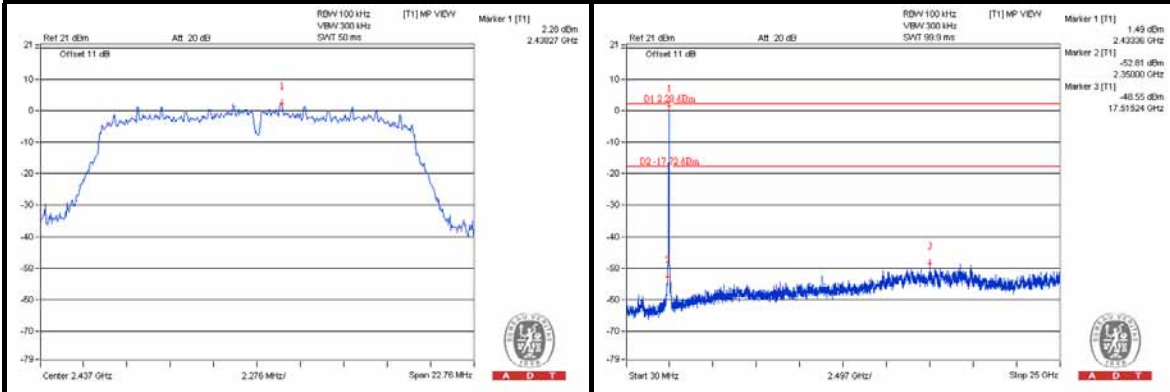
A D T

802.11g:

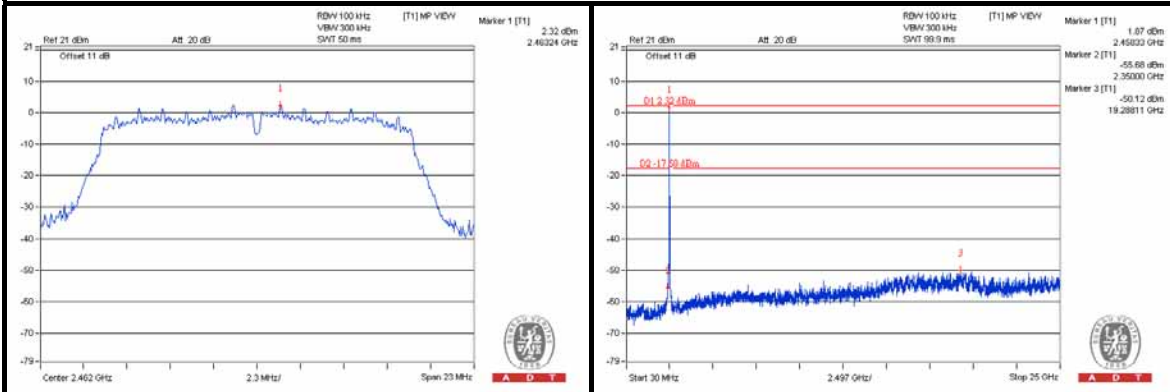
CH 1



CH 6



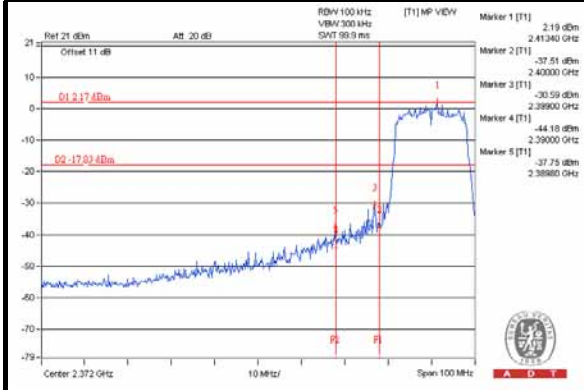
CH 11



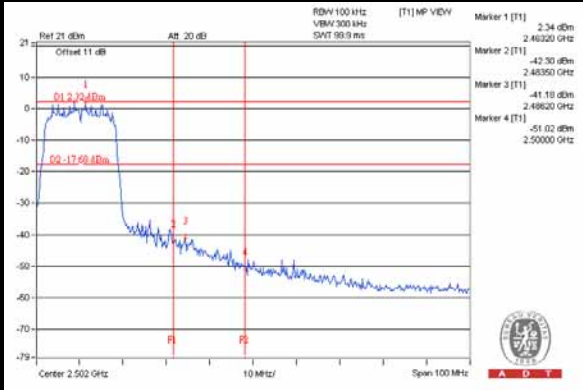


A D T

CH 1 Band edge



CH 11 Band edge

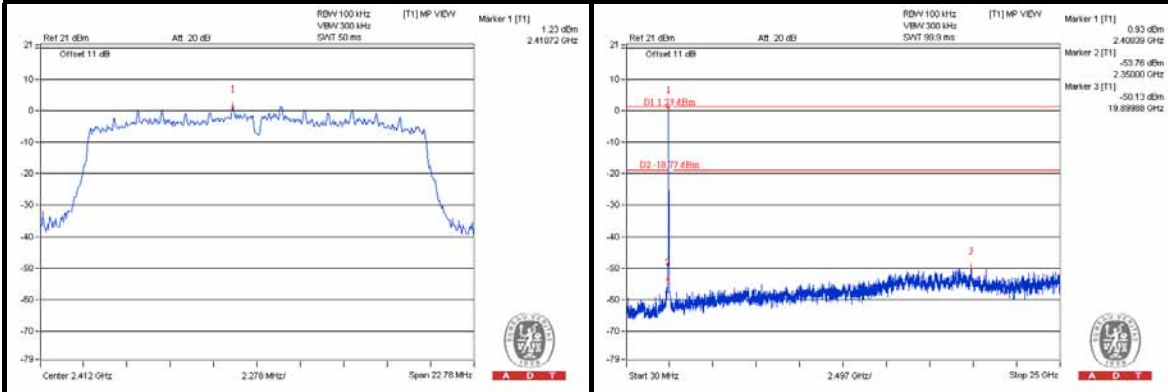




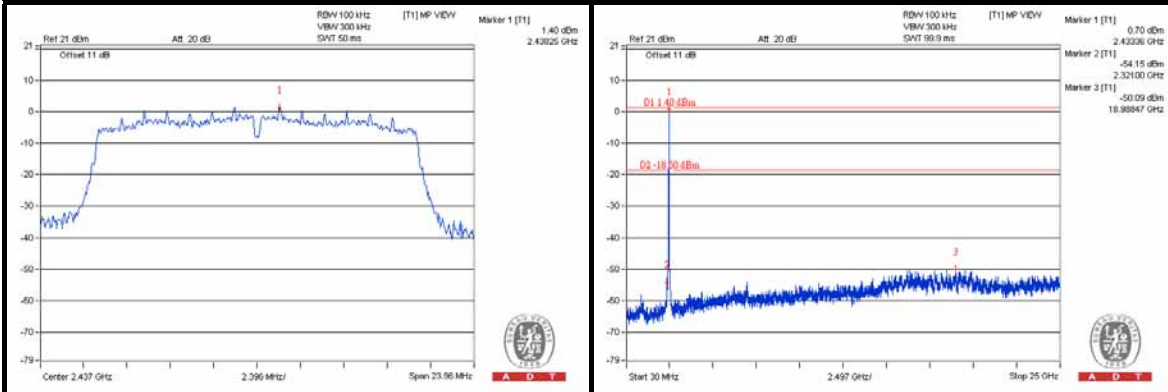
A D T

802.11n (HT20):

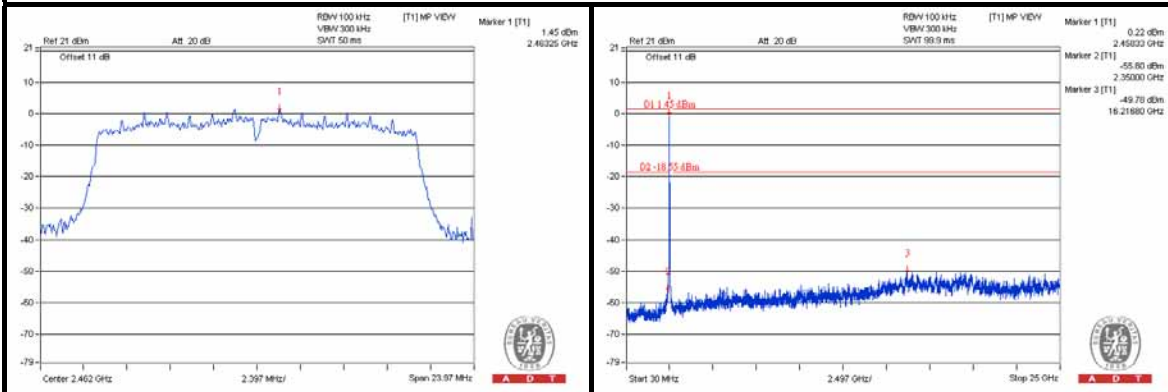
CH 1



CH 6



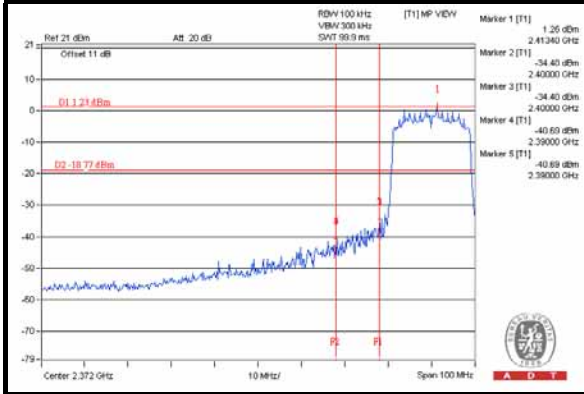
CH 11



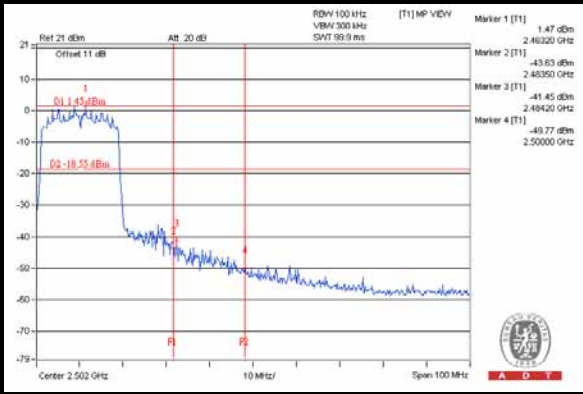


A D T

CH 1 Band edge



CH 11 Band edge

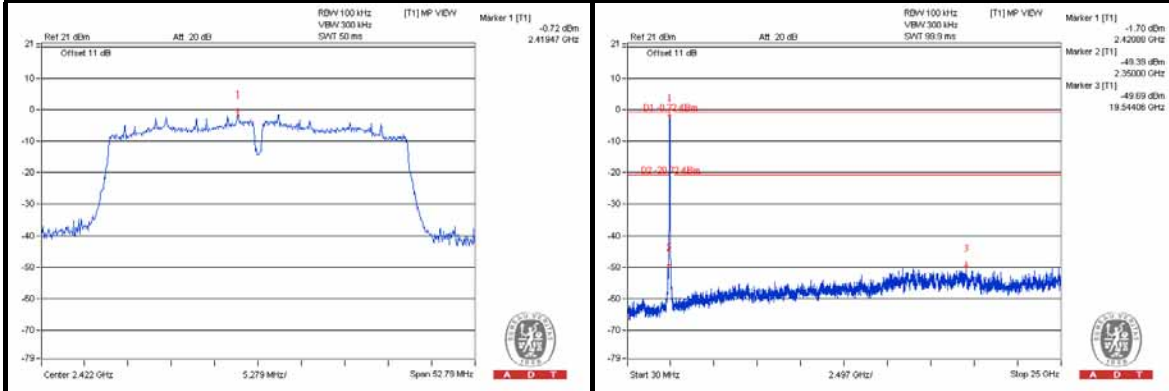




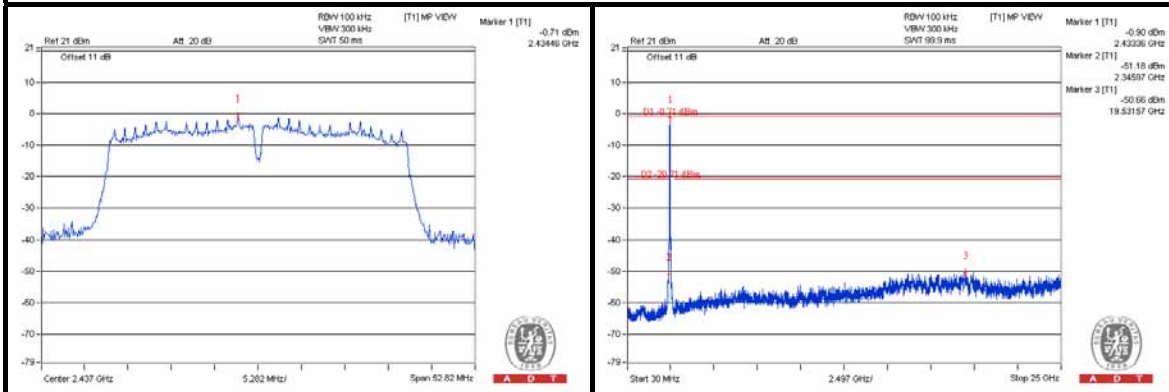
A D T

802.11n (HT40):

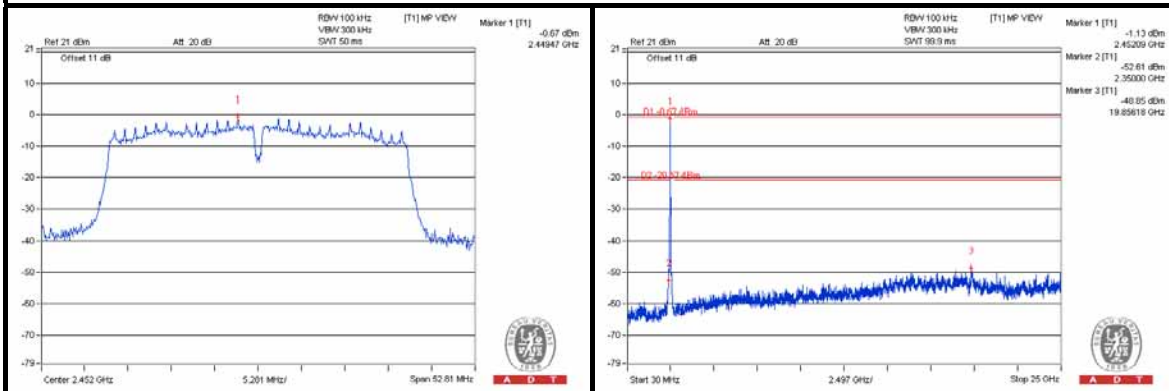
CH 3



CH 6



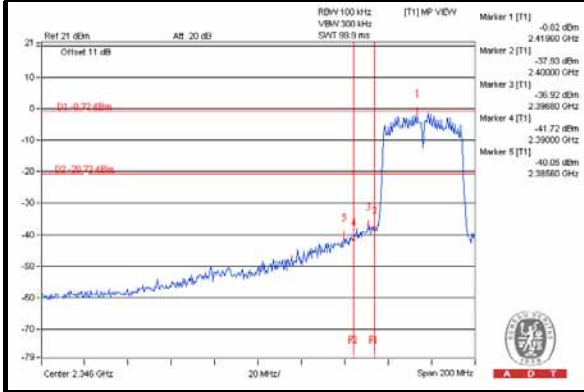
CH 9



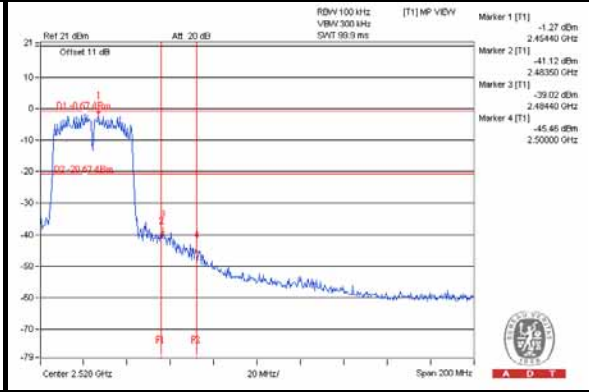


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CH 3 Band edge



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 ---