



FCC TEST REPORT

REPORT NO.: RF130701E01

MODEL NO.: GA-D5100

FCC ID: O6LGA-D5100

RECEIVED: July 01, 2013

TESTED: July 10 to 12, 2013

ISSUED: July 19, 2013

APPLICANT: Tranwo Technology Corp.

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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
RF130701E01	Original release	July 19, 2013



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1. CERTIFICATION

PRODUCT: 150M Pocket Wi-Fi Router
BRAND NAME: Tranwo
MODEL NO.: GA-D5100
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: Tranwo Technology Corp.
TESTED: July 10 to 12, 2013
STANDARDS: FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10-2009

The above equipment (Model: GA-D5100) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , **DATE:** July 19, 2013
(Lori Chung, Specialist)

APPROVED BY :  , **DATE:** July 19, 2013
(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 -5.46dB at 2.79688MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.8dB 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)	5.63 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	150M Pocket Wi-Fi Router
MODEL NO.	GA-D5100
INPUT POWER	AC100-240V, 50/60Hz, 0.1A
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: 20.137mW 802.11g: 52.602mW 802.11n (HT20): 50.699mW 802.11n (HT40): 48.753mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA



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NOTE:

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

Brand	Model name	Gain (dBi)	Antenna Type	Connector	Frequency range (MHz to MHz)
Tranwo	10-399-0000XX-00	0.7018	Internal Monopole	NA	2400~2500

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

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.

3.2 DESCRIPTION OF TEST MODES

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

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

7 channels are provided for 802.11n (HT40):

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



3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	RE < 1G	RE ≥ 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 Y-plane (for below 1GHz) and Z-plane (for above 1GHz).

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, 61%RH	120Vac, 60Hz	Jyunchun Lin
RE<1G	21deg. C, 70%RH	120Vac, 60Hz	Chilin Lee
RE ³ 1G	24deg. C, 70%RH	120Vac, 60Hz	Tim Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng
OB	25deg. C, 60%RH	120Vac, 60Hz	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.

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

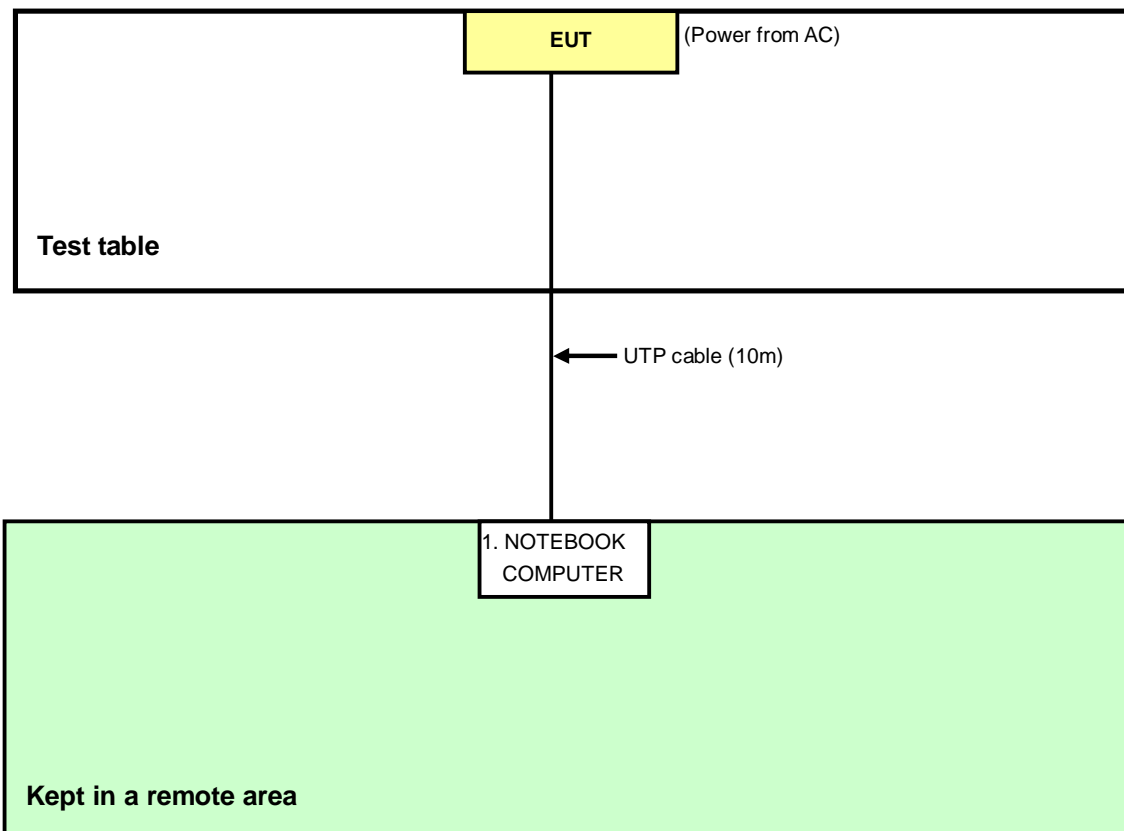
3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	UTP cable (10m)

3.5 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)	
0.15-0.5 0.5-5 5-30	Quasi-peak	Average
	66 to 56	56 to 46
	56	46
	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. 06, 2012	Sep. 05, 2013
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 07, 2013	June 06, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-3	Sep. 25, 2012	Sep. 24, 2013
Software ADT	BV ADT_Cond_V7.3.7. 3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: July 12, 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.

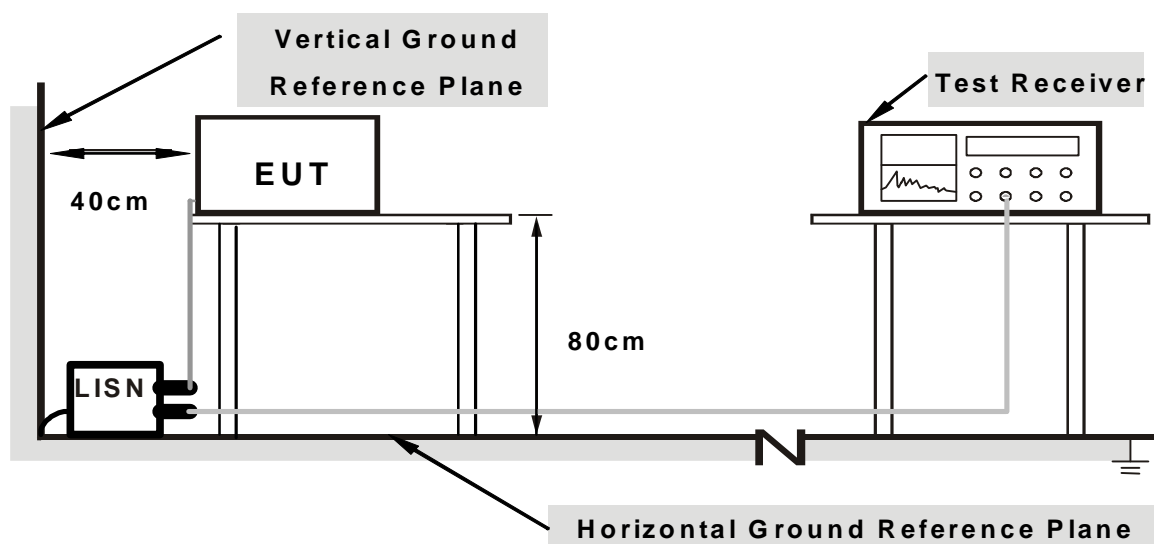
NOTE:

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.



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4.1.6 EUT OPERATING CONDITIONS

1. Turn on the power of EUT.
2. The communication partner run test program “Console (Ralink command)” to enable EUT under transmission/receiving condition continuously at specific channel frequency.



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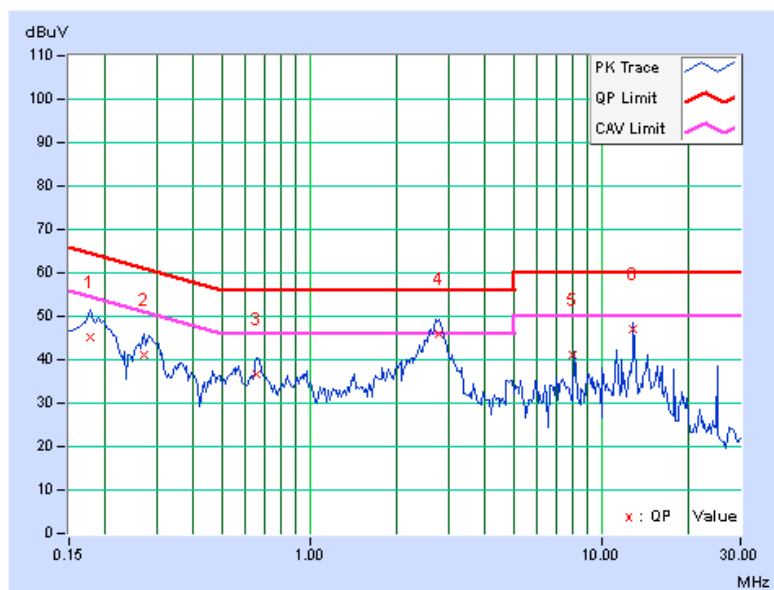
4.1.7 TEST RESULTS

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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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	0.17734	0.14	45.02	35.08	45.16	35.22	64.61	54.61	-19.45	-19.39
2	0.27109	0.17	40.76	29.09	40.93	29.26	61.08	51.08	-20.16	-21.83
3	0.66172	0.22	36.54	29.89	36.76	30.11	56.00	46.00	-19.24	-15.89
4	2.79688	0.39	45.45	40.15	45.84	40.54	56.00	46.00	-10.16	-5.46
5	8.01922	0.76	40.52	35.06	41.28	35.82	60.00	50.00	-18.72	-14.18
6	12.86328	1.07	45.87	38.11	46.94	39.18	60.00	50.00	-13.06	-10.82

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.





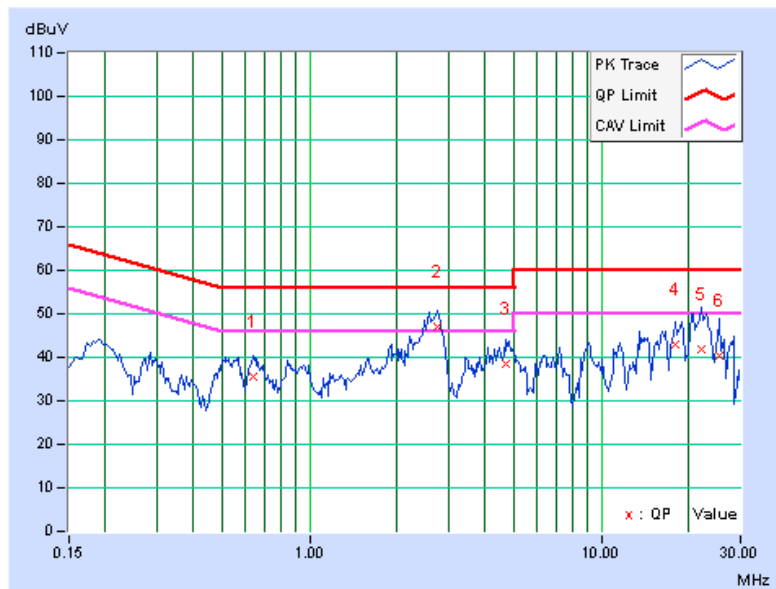
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PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.64219	0.20	35.18	30.39	35.38	30.59	56.00	46.00	-20.62	-15.41
2	2.74609	0.35	46.78	39.57	47.13	39.92	56.00	46.00	-8.87	-6.08
3	4.68359	0.47	38.17	30.47	38.64	30.94	56.00	46.00	-17.36	-15.06
4	17.92578	1.05	41.86	34.31	42.91	35.36	60.00	50.00	-17.09	-14.64
5	21.96484	1.18	40.52	29.15	41.70	30.33	60.00	50.00	-18.30	-19.67
6	25.35938	1.29	39.19	32.19	40.48	33.48	60.00	50.00	-19.52	-16.52

REMARKS:

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



4.2 RADIATED EMISSION AND 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 under any condition of modulation.



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4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer Agilent	E4446A	MY48250253	Sep. 03, 2012	Sep. 02, 2013
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29, 2013	Jan. 28, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
Horn_Antenna AISi	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Software	ADT_Radiated _V8.7.07	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: July 10 to 12, 2013

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

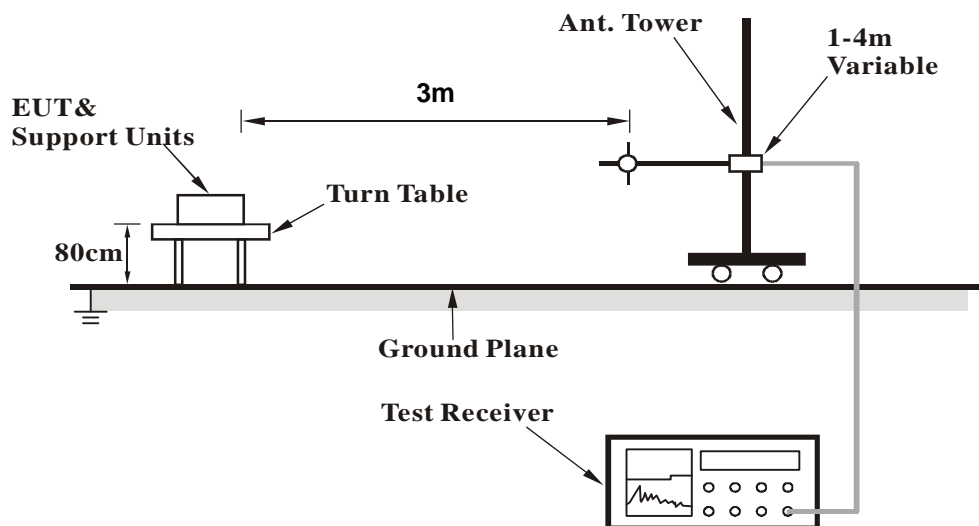
NOTE:

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 1	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	120.02	36.6 QP	43.5	-6.9	2.00 H	260	52.14	-15.56
2	240.00	39.6 QP	46.0	-6.4	1.00 H	133	54.53	-14.91
3	359.99	41.8 QP	46.0	-4.2	2.00 H	24	53.04	-11.22
4	599.97	41.1 QP	46.0	-4.9	1.50 H	301	46.60	-5.47
5	720.01	38.2 QP	46.0	-7.8	1.00 H	319	41.93	-3.73
6	840.00	40.0 QP	46.0	-6.0	1.00 H	24	41.44	-1.40
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	37.50	33.5 QP	40.0	-6.5	1.00 V	162	47.48	-13.99
2	107.11	34.2 QP	43.5	-9.3	2.00 V	10	51.00	-16.82
3	250.00	32.3 QP	46.0	-13.7	1.50 V	360	46.73	-14.44
4	599.97	40.2 QP	46.0	-5.8	1.50 V	113	45.69	-5.47
5	719.96	39.2 QP	46.0	-6.8	1.00 V	271	42.96	-3.73
6	840.00	38.7 QP	46.0	-7.3	1.00 V	77	40.08	-1.40

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	49.1 PK	74.0	-24.9	1.31 H	235	52.39	-3.29
2	2390.00	37.8 AV	54.0	-16.2	1.31 H	235	41.09	-3.29
3	*2412.00	97.6 PK			1.31 H	235	100.81	-3.21
4	*2412.00	94.7 AV			1.31 H	235	97.91	-3.21
5	4824.00	51.7 PK	74.0	-22.3	1.23 H	298	46.44	5.26
6	4824.00	40.4 AV	54.0	-13.6	1.23 H	298	35.14	5.26

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	50.4 PK	74.0	-23.6	1.26 V	344	53.69	-3.29
2	2390.00	35.3 AV	54.0	-18.7	1.26 V	344	38.59	-3.29
3	*2412.00	92.5 PK			1.26 V	344	95.71	-3.21
4	*2412.00	89.1 AV			1.26 V	344	92.31	-3.21
5	4824.00	51.5 PK	74.0	-22.5	1.24 V	306	46.24	5.26
6	4824.00	40.3 AV	54.0	-13.7	1.24 V	306	35.04	5.26

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	49.9 PK	74.0	-24.1	1.28 H	243	53.19	-3.29
2	2390.00	35.1 AV	54.0	-18.9	1.28 H	243	38.39	-3.29
3	*2437.00	97.5 PK			1.28 H	243	100.62	-3.12
4	*2437.00	94.3 AV			1.28 H	243	97.42	-3.12
5	2483.50	50.1 PK	74.0	-23.9	1.28 H	243	53.04	-2.94
6	2483.50	35.3 AV	54.0	-18.7	1.28 H	243	38.24	-2.94
7	4874.00	51.4 PK	74.0	-22.6	1.23 H	319	46.01	5.39
8	4874.00	40.1 AV	54.0	-13.9	1.23 H	319	34.71	5.39
9	7311.00	56.0 PK	74.0	-18.0	1.47 H	165	42.73	13.27
10	7311.00	44.5 AV	54.0	-9.5	1.47 H	165	31.23	13.27

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	49.8 PK	74.0	-24.2	1.26 V	337	53.09	-3.29
2	2390.00	35.0 AV	54.0	-19.0	1.26 V	337	38.29	-3.29
3	*2437.00	92.4 PK			1.26 V	337	95.52	-3.12
4	*2437.00	88.8 AV			1.26 V	337	91.92	-3.12
5	2483.50	50.4 PK	74.0	-23.6	1.26 V	337	53.34	-2.94
6	2483.50	35.5 AV	54.0	-18.5	1.26 V	337	38.44	-2.94
7	4874.00	51.0 PK	74.0	-23.0	1.16 V	323	45.61	5.39
8	4874.00	39.8 AV	54.0	-14.2	1.16 V	323	34.41	5.39
9	7311.00	55.2 PK	74.0	-18.8	1.47 V	143	41.93	13.27
10	7311.00	43.7 AV	54.0	-10.3	1.47 V	143	30.43	13.27

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	97.9 PK			1.36 H	242	100.92	-3.02
2	*2462.00	94.9 AV			1.36 H	242	97.92	-3.02
3	2483.50	49.0 PK	74.0	-25.0	1.36 H	242	51.94	-2.94
4	2483.50	38.0 AV	54.0	-16.0	1.36 H	242	40.94	-2.94
5	4924.00	51.2 PK	74.0	-22.8	1.22 H	321	45.67	5.53
6	4924.00	40.0 AV	54.0	-14.0	1.22 H	321	34.47	5.53
7	7386.00	55.6 PK	74.0	-18.4	1.51 H	152	42.35	13.25
8	7386.00	44.0 AV	54.0	-10.0	1.51 H	152	30.75	13.25

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	92.2 PK			1.29 V	345	95.22	-3.02
2	*2462.00	88.4 AV			1.29 V	345	91.42	-3.02
3	2483.50	49.9 PK	74.0	-24.1	1.29 V	345	52.84	-2.94
4	2483.50	35.2 AV	54.0	-18.8	1.29 V	345	38.14	-2.94
5	4924.00	51.6 PK	74.0	-22.4	1.21 V	309	46.07	5.53
6	4924.00	40.2 AV	54.0	-13.8	1.21 V	309	34.67	5.53
7	7386.00	55.3 PK	74.0	-18.7	1.29 V	345	42.05	13.25
8	7386.00	43.5 AV	54.0	-10.5	1.29 V	345	30.25	13.25

REMARKS:

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



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	64.8 PK	74.0	-9.2	1.33 H	303	68.09	-3.29
2	2390.00	48.8 AV	54.0	-5.2	1.33 H	303	52.09	-3.29
3	*2412.00	100.1 PK			1.33 H	303	103.31	-3.21
4	*2412.00	92.1 AV			1.33 H	303	95.31	-3.21
5	4824.00	51.3 PK	74.0	-22.7	1.23 H	298	46.04	5.26
6	4824.00	40.1 AV	54.0	-13.9	1.23 H	298	34.84	5.26

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.9 PK	74.0	-17.1	1.24 V	330	60.19	-3.29
2	2390.00	41.1 AV	54.0	-12.9	1.24 V	330	44.39	-3.29
3	*2412.00	90.5 PK			1.24 V	330	93.71	-3.21
4	*2412.00	86.4 AV			1.24 V	330	89.61	-3.21
5	4824.00	51.4 PK	74.0	-22.6	1.19 V	301	46.14	5.26
6	4824.00	40.0 AV	54.0	-14.0	1.19 V	301	34.74	5.26

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	2384.00	51.5 PK	74.0	-22.5	1.30 H	303	54.81	-3.31
2	2384.00	40.2 AV	54.0	-13.8	1.30 H	303	43.51	-3.31
3	*2437.00	99.5 PK			1.30 H	303	102.62	-3.12
4	*2437.00	91.7 AV			1.30 H	303	94.82	-3.12
5	2483.50	50.1 PK	74.0	-23.9	1.30 H	303	53.04	-2.94
6	2483.50	35.5 AV	54.0	-18.5	1.30 H	303	38.44	-2.94
7	4874.00	51.3 PK	74.0	-22.7	1.22 H	328	45.91	5.39
8	4874.00	39.7 AV	54.0	-14.3	1.22 H	328	34.31	5.39
9	7311.00	56.1 PK	74.0	-17.9	1.51 H	175	42.83	13.27
10	7311.00	44.4 AV	54.0	-9.6	1.51 H	175	31.13	13.27

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	51.4 PK	74.0	-22.6	1.26 V	289	54.69	-3.29
2	2390.00	40.1 AV	54.0	-13.9	1.26 V	289	43.39	-3.29
3	*2437.00	91.2 PK			1.22 V	281	94.32	-3.12
4	*2437.00	86.5 AV			1.22 V	281	89.62	-3.12
5	2483.50	50.0 PK	74.0	-24.0	1.32 V	298	52.94	-2.94
6	2483.50	35.5 AV	54.0	-18.5	1.32 V	298	38.44	-2.94
7	4874.00	50.9 PK	74.0	-23.1	1.14 V	316	45.51	5.39
8	4874.00	39.5 AV	54.0	-14.5	1.14 V	316	34.11	5.39
9	7311.00	55.0 PK	74.0	-19.0	1.49 V	152	41.73	13.27
10	7311.00	43.3 AV	54.0	-10.7	1.49 V	152	30.03	13.27

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	99.9 PK			1.29 H	290	102.92	-3.02
2	*2462.00	92.0 AV			1.29 H	290	95.02	-3.02
3	2483.50	65.0 PK	74.0	-9.0	1.29 H	290	67.94	-2.94
4	2483.50	49.0 AV	54.0	-5.0	1.29 H	290	51.94	-2.94
5	4924.00	50.9 PK	74.0	-23.1	1.25 H	313	45.37	5.53
6	4924.00	39.6 AV	54.0	-14.4	1.25 H	313	34.07	5.53
7	7386.00	55.6 PK	74.0	-18.4	1.52 H	175	42.35	13.25
8	7386.00	44.2 AV	54.0	-9.8	1.52 H	175	30.95	13.25

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	90.0 PK			1.29 V	343	93.02	-3.02
2	*2462.00	86.1 AV			1.29 V	343	89.12	-3.02
3	2483.50	57.0 PK	74.0	-17.0	1.27 V	345	59.94	-2.94
4	2483.50	41.5 AV	54.0	-12.5	1.27 V	345	44.44	-2.94
5	4924.00	51.3 PK	74.0	-22.7	1.21 V	333	45.77	5.53
6	4924.00	40.0 AV	54.0	-14.0	1.21 V	333	34.47	5.53
7	7386.00	55.0 PK	74.0	-19.0	1.53 V	141	41.75	13.25
8	7386.00	43.7 AV	54.0	-10.3	1.53 V	141	30.45	13.25

REMARKS:

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



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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	68.9 PK	74.0	-5.1	1.32 H	304	72.19	-3.29
2	2390.00	50.1 AV	54.0	-3.9	1.32 H	304	53.39	-3.29
3	*2412.00	99.8 PK			1.32 H	304	103.01	-3.21
4	*2412.00	91.5 AV			1.32 H	304	94.71	-3.21
5	4824.00	51.6 PK	74.0	-22.4	1.16 H	280	46.34	5.26
6	4824.00	40.5 AV	54.0	-13.5	1.16 H	280	35.24	5.26

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.8 PK	74.0	-17.2	1.27 V	334	60.09	-3.29
2	2390.00	40.8 AV	54.0	-13.2	1.27 V	334	44.09	-3.29
3	*2412.00	90.4 PK			1.25 V	341	93.61	-3.21
4	*2412.00	86.5 AV			1.25 V	341	89.71	-3.21
5	4824.00	51.5 PK	74.0	-22.5	1.15 V	288	46.24	5.26
6	4824.00	40.3 AV	54.0	-13.7	1.15 V	288	35.04	5.26

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	49.4 PK	74.0	-24.6	1.23 H	254	52.69	-3.29
2	2390.00	34.8 AV	54.0	-19.2	1.23 H	254	38.09	-3.29
3	*2437.00	99.8 PK			1.23 H	254	102.92	-3.12
4	*2437.00	91.7 AV			1.23 H	254	94.82	-3.12
5	2483.50	49.5 PK	74.0	-24.5	1.23 H	254	52.44	-2.94
6	2483.50	34.8 AV	54.0	-19.2	1.23 H	254	37.74	-2.94
7	4874.00	51.6 PK	74.0	-22.4	1.20 H	324	46.21	5.39
8	4874.00	39.9 AV	54.0	-14.1	1.20 H	324	34.51	5.39
9	7311.00	55.8 PK	74.0	-18.2	1.46 H	185	42.53	13.27
10	7311.00	44.0 AV	54.0	-10.0	1.46 H	185	30.73	13.27

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	51.6 PK	74.0	-22.4	1.30 V	295	54.89	-3.29
2	2390.00	40.1 AV	54.0	-13.9	1.30 V	295	43.39	-3.29
3	*2437.00	90.2 PK			1.23 V	334	93.32	-3.12
4	*2437.00	86.3 AV			1.23 V	334	89.42	-3.12
5	2483.50	50.1 PK	74.0	-23.9	1.28 V	310	53.04	-2.94
6	2483.50	35.5 AV	54.0	-18.5	1.28 V	310	38.44	-2.94
7	4874.00	50.7 PK	74.0	-23.3	1.20 V	321	45.31	5.39
8	4874.00	39.1 AV	54.0	-14.9	1.20 V	321	33.71	5.39
9	7311.00	54.3 PK	74.0	-19.7	1.53 V	167	41.03	13.27
10	7311.00	42.9 AV	54.0	-11.1	1.53 V	167	29.63	13.27

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	100.1 PK			1.23 H	256	103.12	-3.02
2	*2462.00	92.0 AV			1.23 H	256	95.02	-3.02
3	2483.50	69.1 PK	74.0	-4.9	1.23 H	256	72.04	-2.94
4	2483.50	50.0 AV	54.0	-4.0	1.23 H	256	52.94	-2.94
5	4924.00	51.6 PK	74.0	-22.4	1.25 H	318	46.07	5.53
6	4924.00	39.7 AV	54.0	-14.3	1.25 H	318	34.17	5.53
7	7386.00	55.7 PK	74.0	-18.3	1.47 H	180	42.45	13.25
8	7386.00	43.6 AV	54.0	-10.4	1.47 H	180	30.35	13.25

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	90.7 PK			1.24 V	343	93.72	-3.02
2	*2462.00	86.3 AV			1.24 V	343	89.32	-3.02
3	2483.50	49.6 PK	74.0	-24.4	1.27 V	358	52.54	-2.94
4	2483.50	34.9 AV	54.0	-19.1	1.27 V	358	37.84	-2.94
5	4924.00	50.4 PK	74.0	-23.6	1.16 V	327	44.87	5.53
6	4924.00	38.8 AV	54.0	-15.2	1.16 V	327	33.27	5.53
7	7386.00	53.7 PK	74.0	-20.3	1.47 V	155	40.45	13.25
8	7386.00	42.5 AV	54.0	-11.5	1.47 V	155	29.25	13.25

REMARKS:

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



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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	68.8 PK	74.0	-5.2	1.32 H	302	72.09	-3.29
2	2390.00	53.2 AV	54.0	-0.8	1.32 H	302	56.49	-3.29
3	*2422.00	95.2 PK			1.32 H	302	98.37	-3.17
4	*2422.00	86.5 AV			1.32 H	302	89.67	-3.17
5	4844.00	50.2 PK	74.0	-23.8	1.18 H	314	44.89	5.31
6	4844.00	38.6 AV	54.0	-15.4	1.18 H	314	33.29	5.31
7	7266.00	54.3 PK	74.0	-19.7	1.58 H	160	41.01	13.29
8	7266.00	43.0 AV	54.0	-11.0	1.58 H	160	29.71	13.29

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	63.1 PK	74.0	-10.9	1.37 V	311	66.39	-3.29
2	2390.00	48.3 AV	54.0	-5.7	1.37 V	311	51.59	-3.29
3	*2422.00	89.1 PK			1.24 V	354	92.27	-3.17
4	*2422.00	80.7 AV			1.24 V	354	83.87	-3.17
5	4844.00	50.7 PK	74.0	-23.3	1.29 V	317	45.39	5.31
6	4844.00	38.7 AV	54.0	-15.3	1.29 V	317	33.39	5.31
7	7266.00	54.0 PK	74.0	-20.0	1.55 V	163	40.71	13.29
8	7266.00	42.8 AV	54.0	-11.2	1.55 V	163	29.51	13.29

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	63.7 PK	74.0	-10.3	1.31 H	291	66.99	-3.29
2	2390.00	48.7 AV	54.0	-5.3	1.31 H	291	51.99	-3.29
3	*2437.00	97.0 PK			1.31 H	291	100.12	-3.12
4	*2437.00	88.3 AV			1.31 H	291	91.42	-3.12
5	2483.50	63.8 PK	74.0	-10.2	1.31 H	291	66.74	-2.94
6	2483.50	48.9 AV	54.0	-5.1	1.31 H	291	51.84	-2.94
7	4874.00	50.3 PK	74.0	-23.7	1.24 H	315	44.91	5.39
8	4874.00	38.9 AV	54.0	-15.1	1.24 H	315	33.51	5.39
9	7311.00	54.1 PK	74.0	-19.9	1.55 H	171	40.83	13.27
10	7311.00	42.6 AV	54.0	-11.4	1.55 H	171	29.33	13.27

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	63.8 PK	74.0	-10.2	1.31 V	297	67.09	-3.29
2	2390.00	49.1 AV	54.0	-4.9	1.31 V	297	52.39	-3.29
3	*2437.00	91.8 PK			1.19 V	337	94.92	-3.12
4	*2437.00	82.9 AV			1.19 V	337	86.02	-3.12
5	2483.50	63.6 PK	74.0	-10.4	1.29 V	303	66.54	-2.94
6	2483.50	48.9 AV	54.0	-5.1	1.29 V	303	51.84	-2.94
7	4874.00	50.9 PK	74.0	-23.1	1.24 V	312	45.51	5.39
8	4874.00	39.1 AV	54.0	-14.9	1.24 V	312	33.71	5.39
9	7311.00	53.8 PK	74.0	-20.2	1.54 V	155	40.53	13.27
10	7311.00	42.7 AV	54.0	-11.3	1.54 V	155	29.43	13.27

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	95.4 PK			1.32 H	304	98.45	-3.05
2	*2452.00	87.1 AV			1.32 H	304	90.15	-3.05
3	2483.50	68.0 PK	74.0	-6.0	1.32 H	304	70.94	-2.94
4	2483.50	53.0 AV	54.0	-1.0	1.32 H	304	55.94	-2.94
5	4904.00	50.7 PK	74.0	-23.3	1.23 H	321	45.23	5.47
6	4904.00	39.2 AV	54.0	-14.8	1.23 H	321	33.73	5.47
7	7356.00	54.6 PK	74.0	-19.4	1.48 H	163	41.35	13.25
8	7356.00	43.2 AV	54.0	-10.8	1.48 H	163	29.95	13.25

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	89.8 PK			1.20 V	338	92.85	-3.05
2	*2452.00	81.4 AV			1.20 V	338	84.45	-3.05
3	2483.50	63.9 PK	74.0	-10.1	1.28 V	300	66.84	-2.94
4	2483.50	49.0 AV	54.0	-5.0	1.28 V	300	51.94	-2.94
5	4904.00	50.8 PK	74.0	-23.2	1.25 V	322	45.33	5.47
6	4904.00	39.2 AV	54.0	-14.8	1.25 V	322	33.73	5.47
7	7356.00	54.8 PK	74.0	-19.2	1.51 V	172	41.55	13.25
8	7356.00	43.3 AV	54.0	-10.7	1.51 V	172	30.05	13.25

REMARKS:

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

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, 2013	Jan. 20, 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 : July 11, 2013

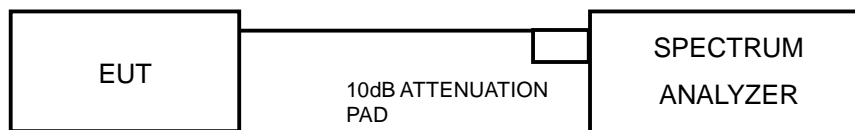
4.3.3 TEST PROCEDURE

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.



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4.3.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	11.60	0.5	PASS
6	2437	11.60	0.5	PASS
11	2462	11.61	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.58	0.5	PASS
6	2437	16.58	0.5	PASS
11	2462	16.57	0.5	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.71	0.5	PASS
6	2437	17.70	0.5	PASS
11	2462	17.71	0.5	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.47	0.5	PASS
6	2437	36.46	0.5	PASS
9	2452	36.47	0.5	PASS



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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 band: 1 Watt (30dBm)

4.4.2 INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 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 : July 11, 2013

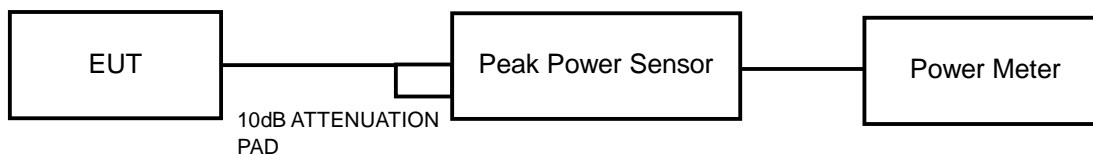
4.4.3 TEST PROCEDURES

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



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4.4.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	20.137	13.04	30	PASS
6	2437	18.750	12.73	30	PASS
11	2462	16.520	12.18	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	52.602	17.21	30	PASS
6	2437	50.234	17.01	30	PASS
11	2462	47.206	16.74	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	50.699	17.05	30	PASS
6	2437	47.206	16.74	30	PASS
11	2462	42.855	16.32	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
3	2422	32.137	15.07	30	PASS
6	2437	48.753	16.88	30	PASS
9	2452	39.537	15.97	30	PASS

4.5 AVERAGE OUTPUT POWER

4.5.1 FOR REFERENCE.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power Meter	ML2495A	0824006	May 20, 2013	May 19, 2014
Power Sensor	MA2411B	0738172	May 20, 2013	May 19, 2014

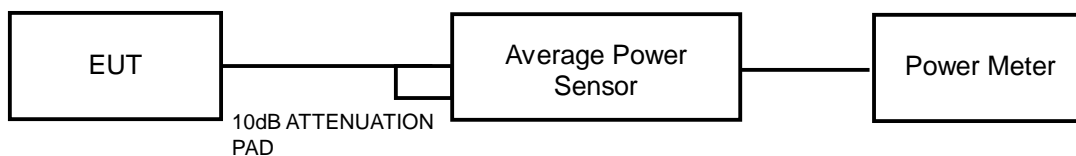
Note:

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 : July 11, 2013

4.5.3 TEST PROCEDURES

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

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6



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4.5.6 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	12.794	11.07
6	2437	11.830	10.73
11	2462	10.399	10.17

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	15.959	12.03
6	2437	14.997	11.76
11	2462	13.804	11.40

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	15.311	11.85
6	2437	14.588	11.64
11	2462	13.213	11.21

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
3	2422	9.333	9.70
6	2437	14.488	11.61
9	2452	11.695	10.68

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	100036	Jan. 21, 2013	Jan. 20, 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 : July 11, 2013

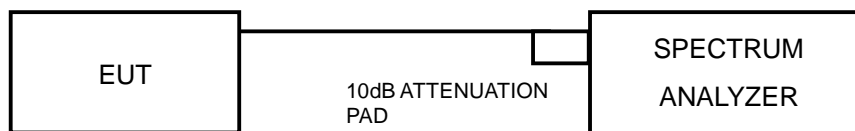
4.6.3 TEST PROCEDURE

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	-15.16	8	PASS
6	2437	-15.63	8	PASS
11	2462	-15.94	8	PASS

802.11g

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-18.12	8	PASS
6	2437	-18.39	8	PASS
11	2462	-18.63	8	PASS

802.11n (HT20)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-17.50	8	PASS
6	2437	-17.54	8	PASS
11	2462	-18.71	8	PASS

802.11n (HT40)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-21.31	8	PASS
6	2437	-20.05	8	PASS
9	2452	-20.58	8	PASS



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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	100036	Jan. 21, 2013	Jan. 20, 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 : July 11, 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.

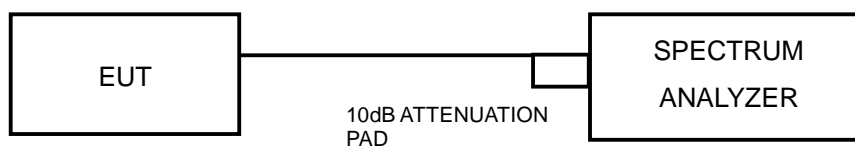
Measurement Procedure –Unwanted Emission Level

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

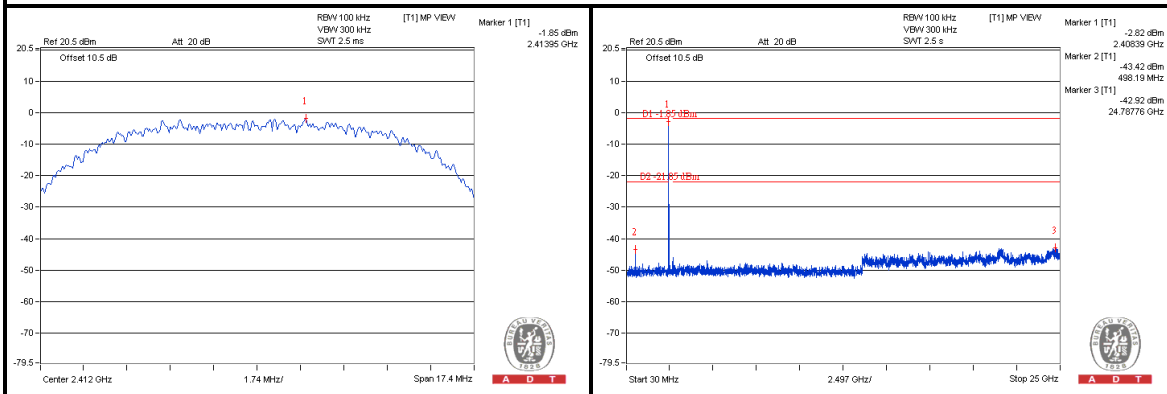
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



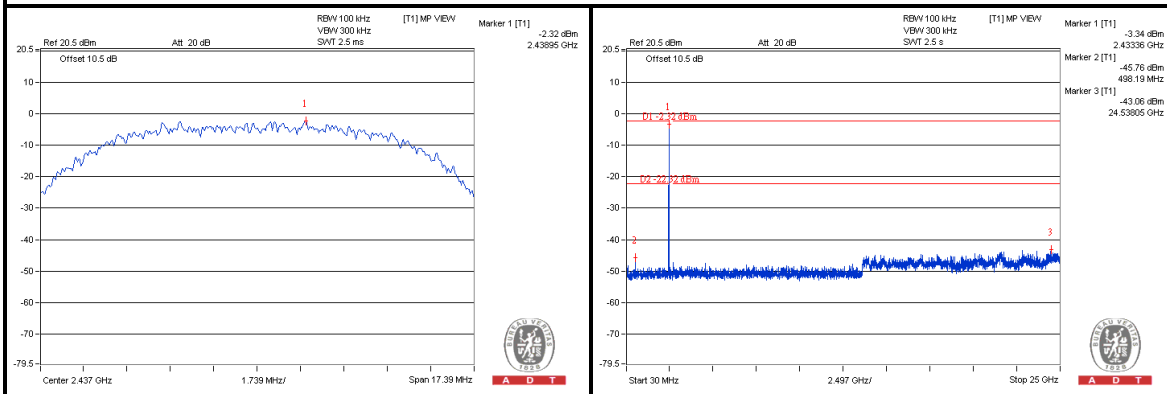
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802.11b:

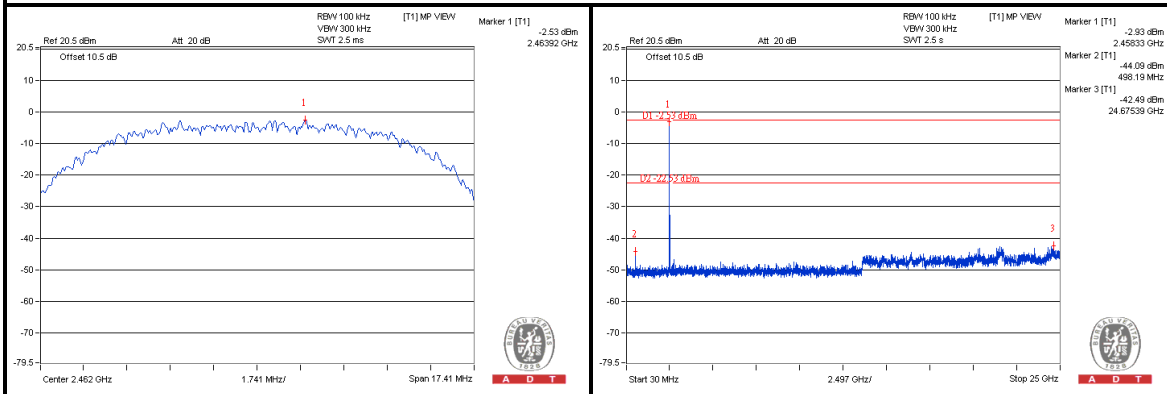
CH 1



CH 6



CH 11

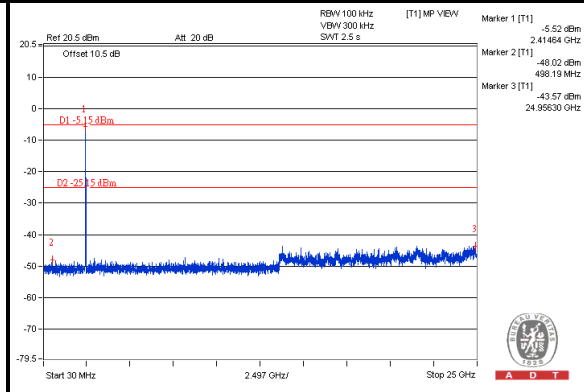
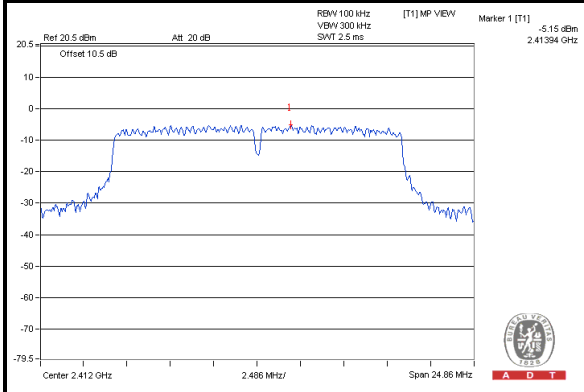




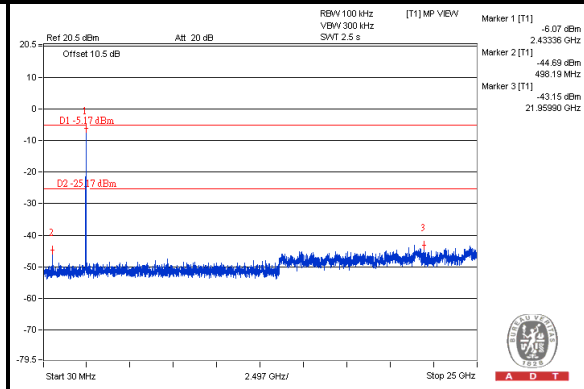
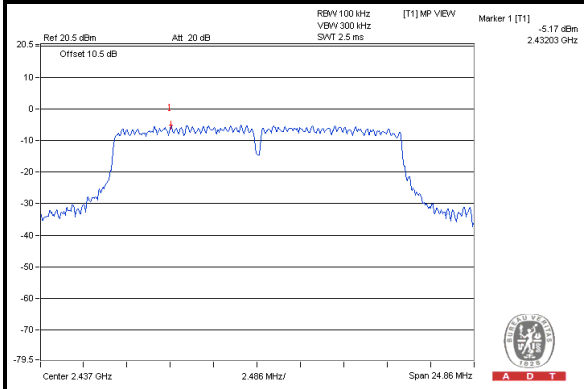
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802.11g:

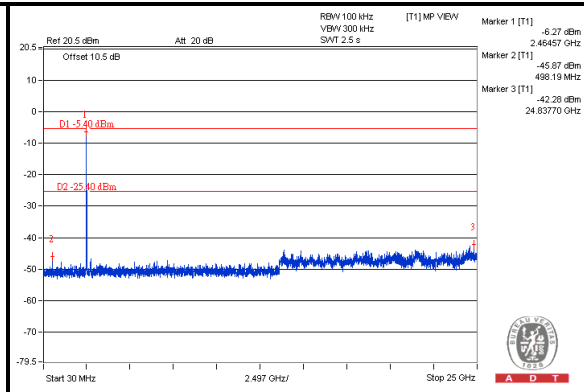
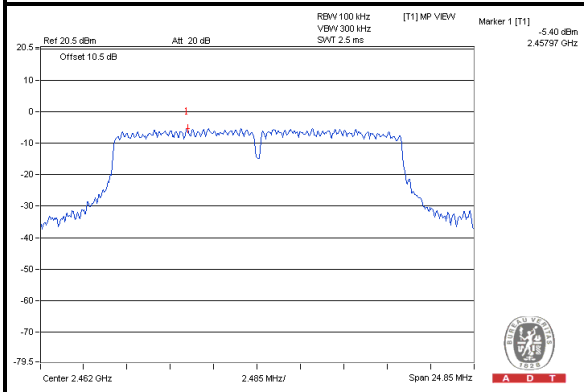
CH 1



CH 6



CH 11

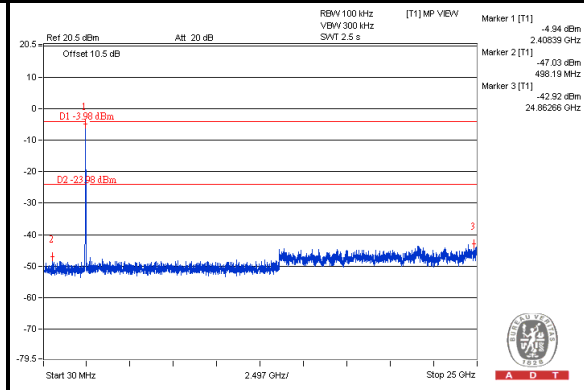
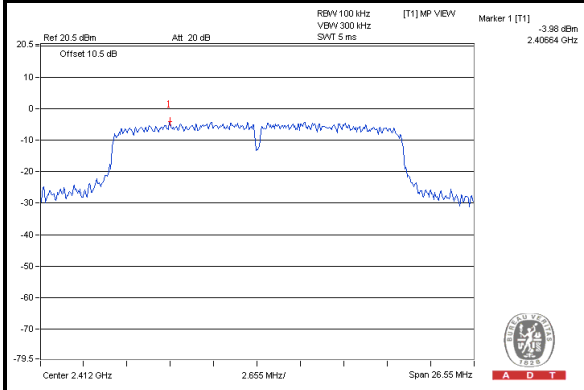




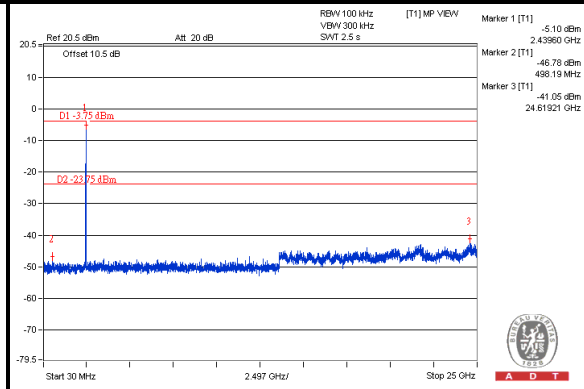
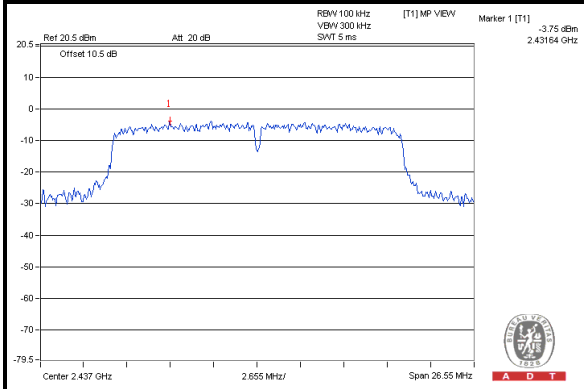
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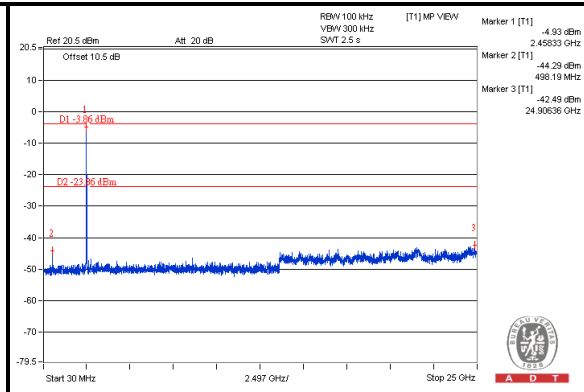
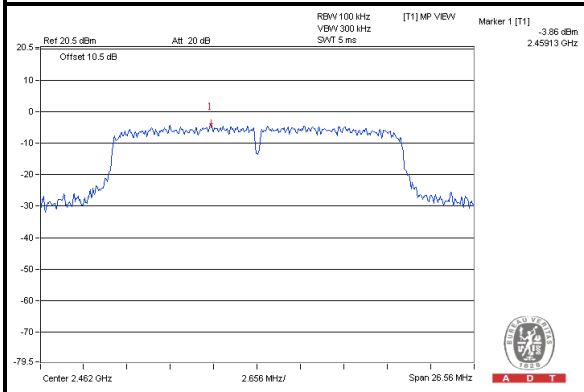
CH 1



CH 6



CH 11

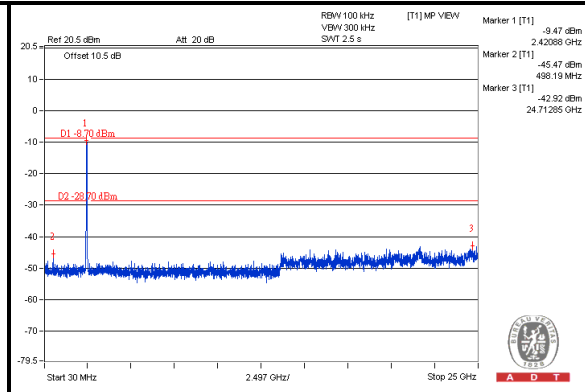
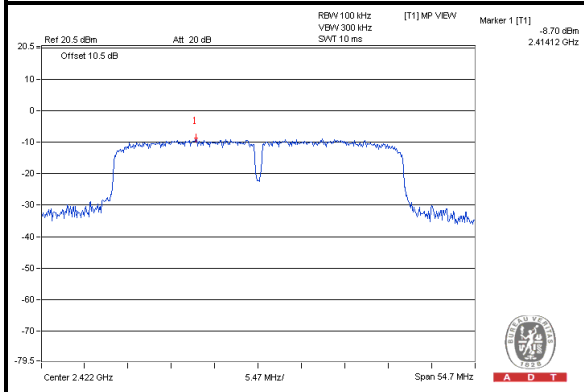




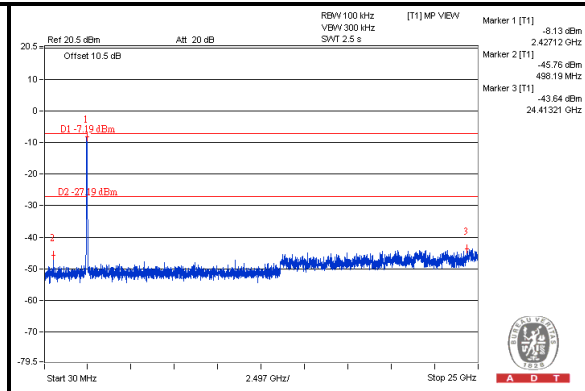
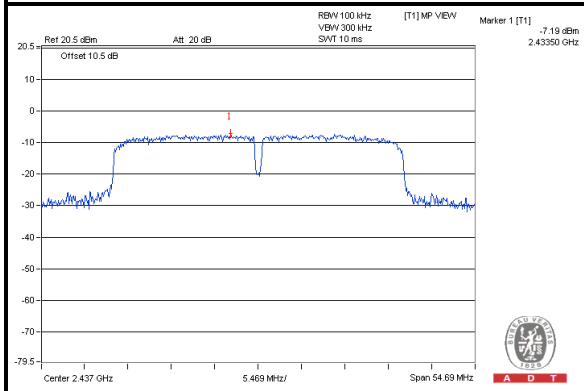
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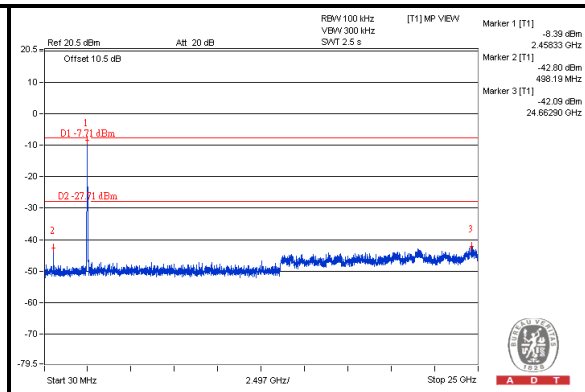
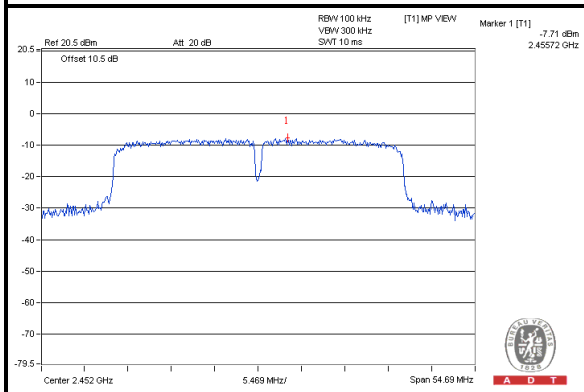
CH 3



CH 6



CH 9





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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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





6. INFORMATION ON THE TESTING LABORATORIES

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

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

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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 ---