FCC TEST REPORT

REPORT NO.:	RF130925E07
MODEL NO.:	TV-IP862IC, TV-IP662WI
FCC ID:	XU8TVIP662-862
RECEIVED:	Sep. 17, 2013
TESTED:	Sep. 17 to 30, 2013
ISSUED:	Nov. 01, 2013
APPLICANT:	TRENDnet, Inc
ADDRESS:	20675 Manhattan Place, Torrance, CA 90501 USA
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS :	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (1):	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

This report should not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130925E07	Original release	Nov. 01, 2013

1. CERTIFICATION

PRODUCT:	HD Wireless Day/Night PTZ Cloud Camera, Megapixel Wireless Day/Night PTZ Network Camera
BRAND NAME:	TRENDnet
MODEL NO.:	TV-IP862IC, TV-IP662WI
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	TRENDnet, Inc
TESTED:	Sep. 17 to 30, 2013
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (Model: TV-IP862IC) 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:** *Nov. 01, 2013*
(Lori Chung, Specialist)

APPROVED BY : _____ , **DATE:** *Nov. 01, 2013*
(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 -12.48dB at 0.15781MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.5dB at 2483.50MHz & 4924.00MHz
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	Antenna connector is soldering not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

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

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement	Value
Conducted emissions	2.98 dB
Radiated emissions (30MHz-1GHz)	5.46 dB
Radiated emissions (1GHz -6GHz)	3.73 dB
Radiated emissions (6GHz -18GHz)	3.90 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	HD Wireless Day/Night PTZ Cloud Camera, Megapixel Wireless Day/Night PTZ Network Camera
MODEL NO.	TV-IP862IC, TV-IP662WI
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 150Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11
MAXIMUM OUTPUT POWER	802.11b: 179.473mW 802.11g: 403.645mW 802.11n (HT20): 410.204mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	RJ45 cable (unshielded, 1.8m) x 1
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1

NOTE:

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

Brand	Model No.	Product Name	Difference
TRENDnet	TV-IP862IC	HD Wireless Day/Night PTZ Cloud Camera	Can connect to Far-end server
	TV-IP662WI	Megapixel Wireless Day/Night PTZ Network Camera	Can't connect to Far-end server

From the above models, model: **TV-IP862IC** was selected as representative model for the test and its data was recorded in this report.

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

Brand	Model	Antenna Type	Connector	Antenna Gain (dBi) (Include cable loss)	Cable Loss (dB)	Cable Length (cm)	Frequency range (MHz to MHz)
HL Technology	260-31076	Dipole	soldering	2.23	NA	5	2400 ~ 2500

3. The EUT must be supplied with a power adapter and following two different models could be chosen as following table:

No	Brand	Model No.	Spec.
1	AMIGO	AMS9-1201000FU2	Input: 100-240V, 0.5A, 50-60Hz Output: 12V, 1A DC output cable: 1.5m, unshielded
2	CWT	CAP012121 US	Input: 100-240V, 0.35A, 47-63Hz Output: 12V, 1A DC output cable: 1.5m, unshielded
From the above adapters, the worst radiated emission was found in **Adapter 1**. Therefore only the test data of the modes were recorded in this report.			

4. 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

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

6. 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		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	PLC	RE < 1G	RE ≥ 1G	APCM	OB	
MODE 1	√	√	√	√	√	With adapter 1
MODE 2	√	-	-	-	-	With adapter 2

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

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

OB: Conducted Out-Band Emission Measurement

NOTE: 1. "-"means no effect.

POWER LINE CONDUCTED EMISSION TEST:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

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)
802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

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

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	26deg. C,60%RH	120Vac, 60Hz	Barry Lee
RE<1G	25deg. C, 71%RH	120Vac, 60Hz	Andy Ho
RE≥1G	22deg. C, 63%RH	120Vac, 60Hz	Chilin Lee
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee
OB	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r01

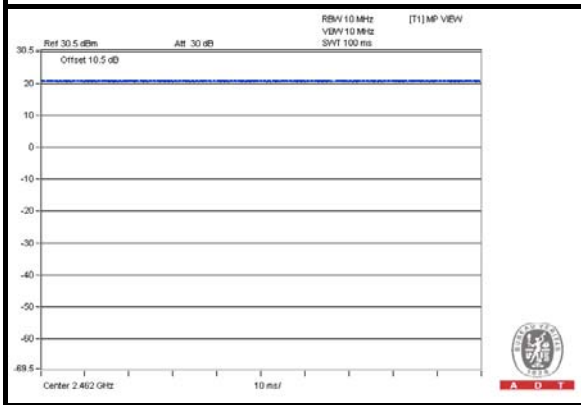
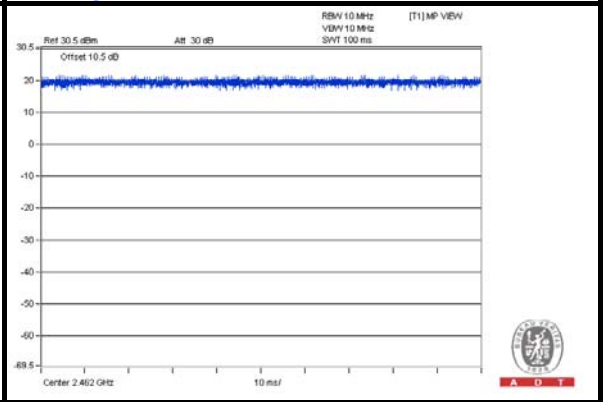
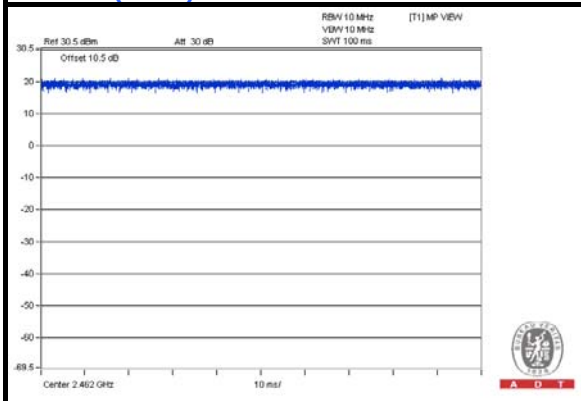
ANSI C63.10-2009

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

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

3.4 DUTY CYCLE OF TEST SIGNAL

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

802.11b	802.11g
	
802.11n (HT20)	
	

3.5 DESCRIPTION OF SUPPORT UNITS

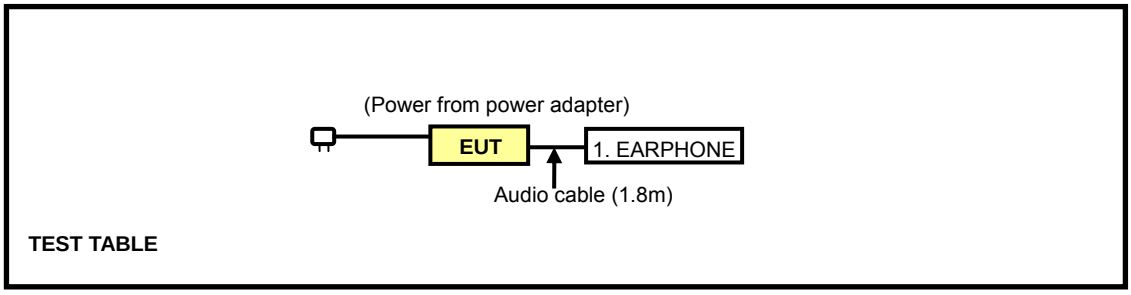
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	EARPHONE	Hawk	HKC920	H001	FCC DoC

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	Audio cable (1.8m)

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

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (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 ROHDE & SCHWARZ	ESCS 30	100375	Mar. 08, 2013	Mar. 07, 2014
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 05, 2013	Sep. 04, 2014
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100072	June 06, 2013	June 05, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 11, 2013	Mar. 10, 2014
50 ohms Terminator	50	EMC-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: Sep. 17, 2013

4.1.3 TEST PROCEDURES

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

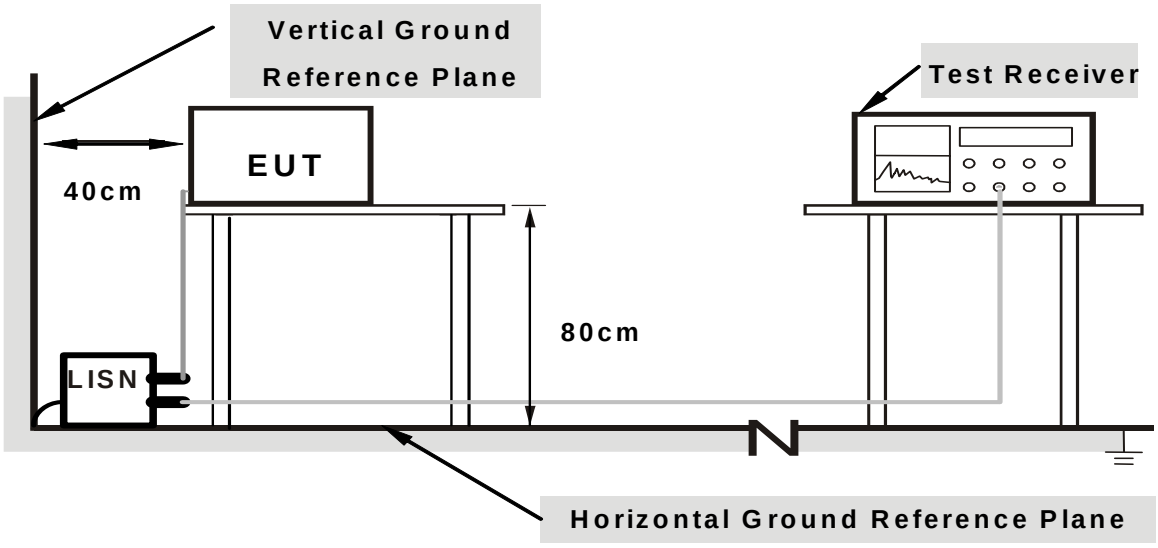
NOTE:

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

1. Turn on the power of EUT.
2. The communication partner run test program “RT5x7xQA.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

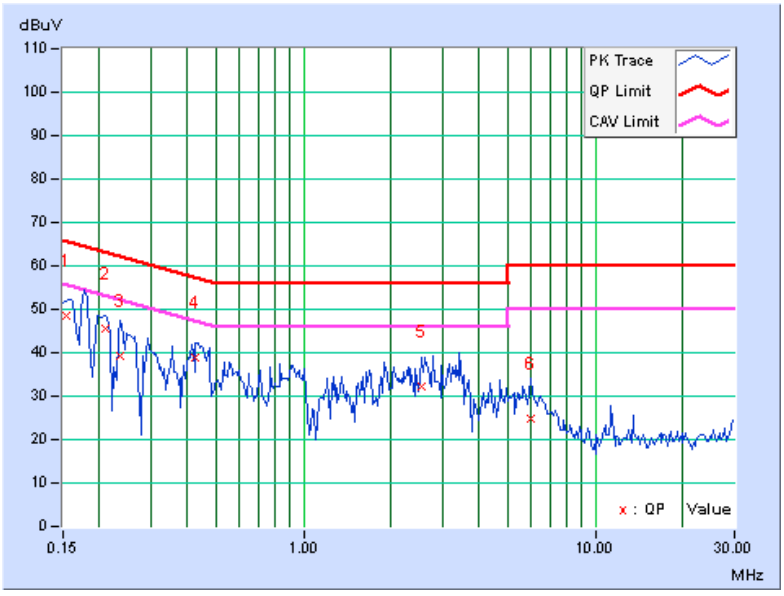
4.1.7 TEST RESULTS (MODE 1)

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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15309	0.13	48.52	37.21	48.65	37.34	65.83	55.83	-17.18	-18.49
2	0.20859	0.15	45.45	34.22	45.60	34.37	63.26	53.26	-17.66	-18.89
3	0.23594	0.16	38.92	16.15	39.08	16.31	62.24	52.24	-23.16	-35.93
4	0.42734	0.20	38.52	26.67	38.72	26.87	57.30	47.30	-18.58	-20.43
5	2.53125	0.37	31.70	19.32	32.07	19.69	56.00	46.00	-23.93	-26.31
6	6.02734	0.62	24.24	14.65	24.86	15.27	60.00	50.00	-35.14	-34.73

REMARKS:

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

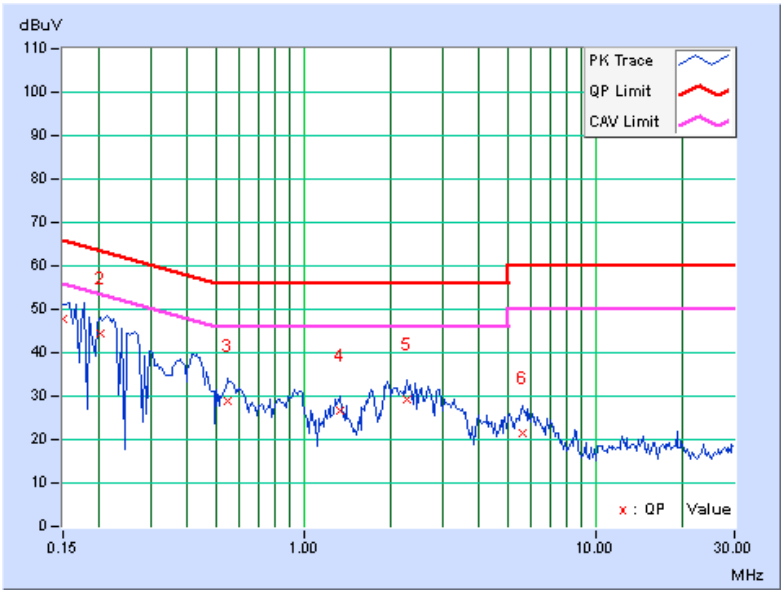


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.11	47.71	32.84	47.82	32.95	66.00	56.00	-18.18	-23.05
2	0.20078	0.13	44.23	27.07	44.36	27.20	63.58	53.58	-19.22	-26.38
3	0.55234	0.20	28.81	12.88	29.01	13.08	56.00	46.00	-26.99	-32.92
4	1.33203	0.25	26.39	13.33	26.64	13.58	56.00	46.00	-29.36	-32.42
5	2.27344	0.32	28.99	17.80	29.31	18.12	56.00	46.00	-26.69	-27.88
6	5.63281	0.51	21.05	10.77	21.56	11.28	60.00	50.00	-38.44	-38.72

REMARKS:

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



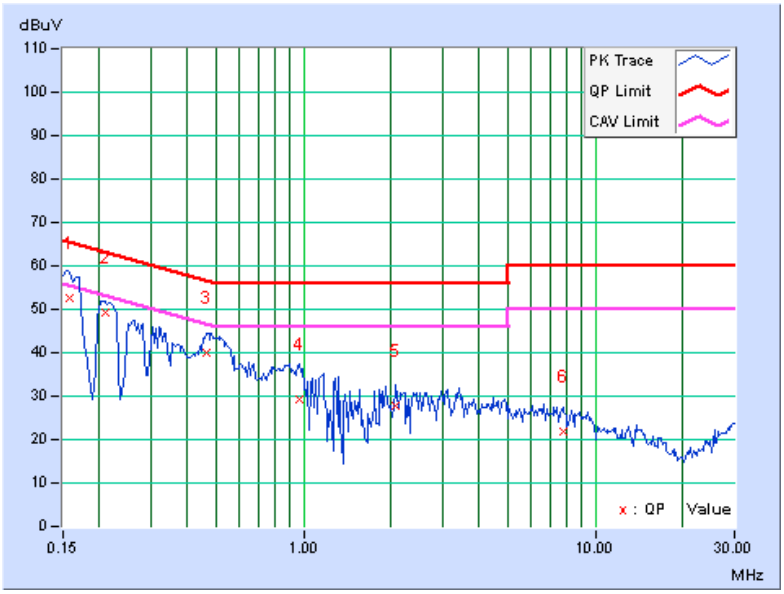
4.1.8 TEST RESULTS (MODE 2)

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

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15781**	**0.13**	**52.45**	**42.97**	**52.58**	**43.10**	**65.58**	**55.58**	**-13.00**	**-12.48**
2	0.20859	0.15	49.00	37.48	49.15	37.63	63.26	53.26	-14.11	-15.63
3	0.46641	0.21	39.67	24.31	39.88	24.52	56.58	46.58	-16.70	-22.06
4	0.97031	0.25	29.15	13.38	29.40	13.63	56.00	46.00	-26.60	-32.37
5	2.07031	0.34	27.38	14.36	27.72	14.70	56.00	46.00	-28.28	-31.30
6	7.75000	0.74	21.07	9.52	21.81	10.26	60.00	50.00	-38.19	-39.74

REMARKS:

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

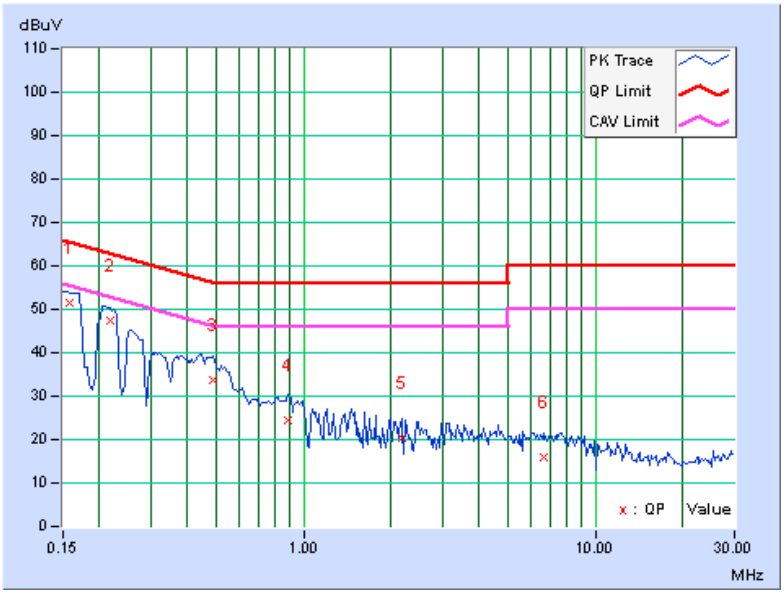


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.11	51.37	41.12	51.48	41.23	65.58	55.58	-14.10	-14.35
2	0.21641	0.13	47.27	34.02	47.40	34.15	62.96	52.96	-15.55	-18.80
3	0.48984	0.19	33.50	20.50	33.69	20.69	56.17	46.17	-22.48	-25.48
4	0.88047	0.21	24.24	12.10	24.45	12.31	56.00	46.00	-31.55	-33.69
5	2.17188	0.31	20.10	10.79	20.41	11.10	56.00	46.00	-35.59	-34.90
6	6.64453	0.57	15.39	5.81	15.96	6.38	60.00	50.00	-44.04	-43.62

REMARKS:

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



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

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

NOTE:

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

4.2.2 TEST INSTRUMENTS

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 16, 2013	Jan. 15, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Mar. 25, 2013	Mar. 24, 2014
RF Cable	NA	CHHCAB_001	Oct. 07, 2012	Oct. 06, 2013
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 30, 2012	Oct. 29, 2013
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 26, 2012	Dec. 25, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5 The CANADA Site Registration No. is IC 7450H-3.
6 Tested Date: Sep. 18, 2013

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 29, 2013	Jan. 28, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 14, 2012	Nov. 13, 2013
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Mar. 19, 2013	Mar. 18, 2014
RF Cable	NA	CHGCAB_001	Oct. 06, 2012	Oct. 05, 2013
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 19, 2012	Nov. 18, 2013
Pre-Amplifier Agilent	8449B	3008A02578	June 25, 2013	June 24, 2014
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 25, 2012	Dec. 24, 2013
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 14, 2012	Nov. 13, 2013
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 12, 2012	Oct. 11, 2013
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5 The VCCI Site Registration No. is G-137.
6 The CANADA Site Registration No. is IC 7450H-2.
7 Tested Date: Sep. 26 to 30, 2013

4.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

NOTE:

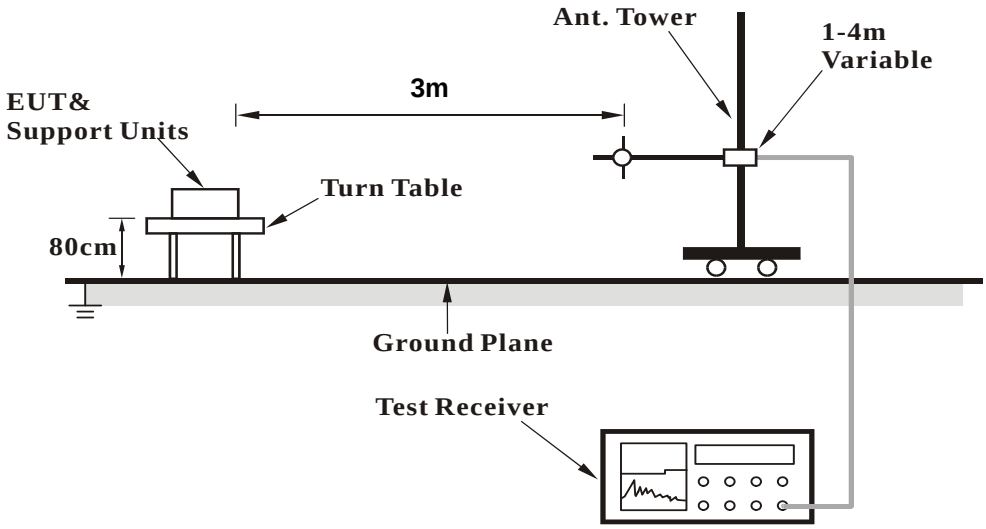
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.2.4 DEVIATION FROM TEST STANDARD

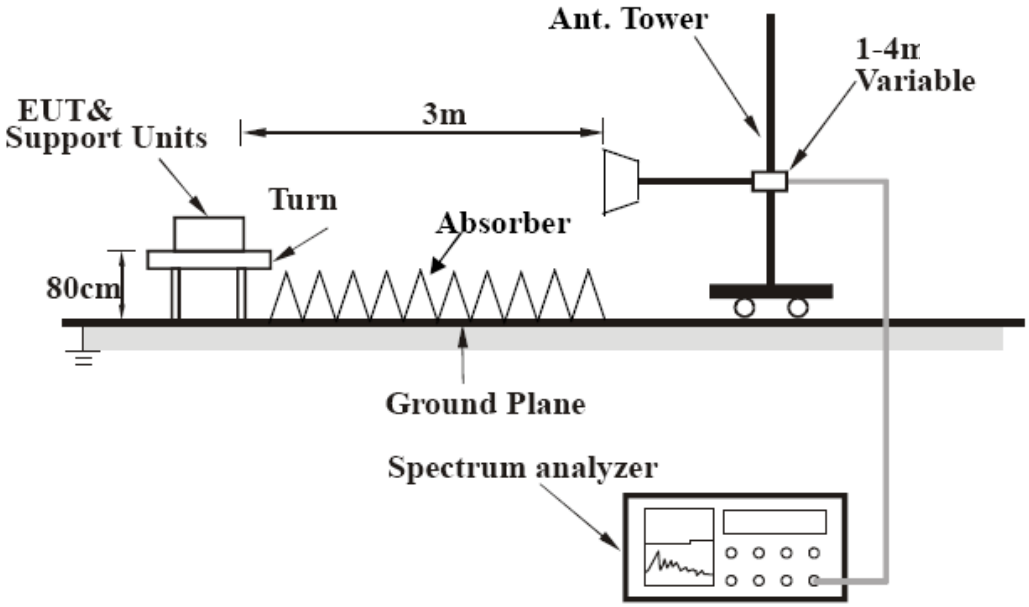
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11n (HT20)

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	56.38	33.3 QP	40.0	-6.7	1.50 H	341	46.86	-13.58
2	94.80	31.7 QP	43.5	-11.8	2.00 H	282	50.28	-18.57
3	337.25	33.3 QP	46.0	-12.8	1.00 H	25	44.34	-11.09
4	400.06	37.6 QP	46.0	-8.4	1.00 H	47	47.48	-9.92
5	800.08	37.1 QP	46.0	-8.9	1.00 H	27	39.02	-1.96
6	959.99	33.3 QP	46.0	-12.7	1.50 H	350	32.31	1.03
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	48.58	36.9 QP	40.0	-3.1	1.00 V	255	50.49	-13.56
2	61.42	36.0 QP	40.0	-4.0	1.02 V	204	49.78	-13.82
3	75.15	31.2 QP	40.0	-8.8	2.00 V	27	48.22	-17.03
4	378.04	32.6 QP	46.0	-13.4	1.50 V	80	42.85	-10.21
5	400.01	35.5 QP	46.0	-10.5	1.00 V	243	45.40	-9.92
6	800.08	34.0 QP	46.0	-12.0	2.00 V	285	35.94	-1.96

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

ABOVE 1GHz DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	53.7 PK	74.0	-20.3	1.29 H	146	55.68	-1.98
2	2390.00	44.6 AV	54.0	-9.4	1.29 H	146	46.58	-1.98
3	*2412.00	102.3 PK			1.29 H	146	104.19	-1.89
4	*2412.00	100.0 AV			1.29 H	146	101.89	-1.89
5	4824.00	56.1 PK	74.0	-17.9	1.04 H	95	49.47	6.63
6	4824.00	52.5 AV	54.0	-1.5	1.04 H	95	45.87	6.63
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	58.3 PK	74.0	-15.7	1.22 V	314	60.28	-1.98
2	2390.00	50.1 AV	54.0	-3.9	1.22 V	314	52.08	-1.98
3	*2412.00	109.1 PK			1.22 V	314	110.99	-1.89
4	*2412.00	106.9 AV			1.22 V	314	108.79	-1.89
5	4824.00	56.2 PK	74.0	-17.8	1.27 V	142	49.57	6.63
6	4824.00	53.2 AV	54.0	-0.8	1.27 V	142	46.57	6.63

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	102.0 PK			1.32 H	174	103.79	-1.79
2	*2437.00	100.0 AV			1.32 H	174	101.79	-1.79
3	4874.00	55.4 PK	74.0	-18.6	1.00 H	122	48.57	6.83
4	4874.00	52.5 AV	54.0	-1.5	1.00 H	122	45.67	6.83
5	7311.00	54.9 PK	74.0	-19.1	1.00 H	320	40.50	14.40
6	7311.00	42.9 AV	54.0	-11.1	1.00 H	320	28.50	14.40
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	2383.00	56.9 PK	74.0	-17.1	1.00 V	20	58.91	-2.01
2	2383.00	46.0 AV	54.0	-8.0	1.00 V	20	48.01	-2.01
3	*2437.00	109.3 PK			1.00 V	20	111.09	-1.79
4	*2437.00	107.1 AV			1.00 V	20	108.89	-1.79
5	2490.00	54.7 PK	74.0	-19.3	1.00 V	20	56.27	-1.57
6	2490.00	43.3 AV	54.0	-10.7	1.00 V	20	44.87	-1.57
7	4874.00	56.3 PK	74.0	-17.7	1.13 V	135	49.47	6.83
8	4874.00	53.3 AV	54.0	-0.7	1.13 V	135	46.47	6.83
9	7311.00	55.2 PK	74.0	-18.8	1.05 V	153	40.80	14.40
10	7311.00	43.0 AV	54.0	-11.0	1.05 V	153	28.60	14.40

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
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.8 PK			1.34 H	161	103.48	-1.68
2	*2462.00	99.7 AV			1.34 H	161	101.38	-1.68
3	2483.50	53.4 PK	74.0	-20.6	1.34 H	161	54.99	-1.59
4	2483.50	44.3 AV	54.0	-9.7	1.34 H	161	45.89	-1.59
5	4924.00	55.3 PK	74.0	-18.7	1.00 H	136	48.32	6.98
6	4924.00	52.1 AV	54.0	-1.9	1.00 H	136	45.12	6.98
7	7386.00	55.2 PK	74.0	-18.8	1.00 H	311	41.00	14.20
8	7386.00	43.1 AV	54.0	-10.9	1.00 H	311	28.90	14.20
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	*2462.00	110.0 PK			1.18 V	314	111.68	-1.68
2	*2462.00	107.9 AV			1.18 V	314	109.58	-1.68
3	2483.50	61.9 PK	74.0	-12.1	1.19 V	314	63.49	-1.59
4	2483.50	51.9 AV	54.0	-2.1	1.19 V	314	53.49	-1.59
5	4924.00	56.3 PK	74.0	-17.7	1.04 V	188	49.32	6.98
6	**4924.00**	**53.5 AV**	**54.0**	**-0.5**	**1.04 V**	**188**	**46.52**	**6.98**
7	7386.00	55.1 PK	74.0	-18.9	1.00 V	133	40.90	14.20
8	7386.00	42.9 AV	54.0	-11.1	1.00 V	133	28.70	14.20

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.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	63.1 PK	74.0	-10.9	1.26 H	349	65.08	-1.98
2	2390.00	44.8 AV	54.0	-9.2	1.26 H	349	46.78	-1.98
3	*2412.00	101.5 PK			1.26 H	349	103.39	-1.89
4	*2412.00	91.6 AV			1.26 H	349	93.49	-1.89
5	4824.00	55.2 PK	74.0	-18.8	1.07 H	157	48.57	6.63
6	4824.00	40.1 AV	54.0	-13.9	1.07 H	157	33.47	6.63
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	70.2 PK	74.0	-3.8	1.21 V	315	72.18	-1.98
2	2390.00	53.1 AV	54.0	-0.9	1.21 V	315	55.08	-1.98
3	*2412.00	110.2 PK			1.21 V	315	112.09	-1.89
4	*2412.00	99.4 AV			1.21 V	315	101.29	-1.89
5	4824.00	54.8 PK	74.0	-19.2	1.11 V	214	48.17	6.63
6	4824.00	40.0 AV	54.0	-14.0	1.11 V	214	33.37	6.63

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	107.8 PK			1.33 H	147	109.59	-1.79
2	*2437.00	99.0 AV			1.33 H	147	100.79	-1.79
3	4874.00	55.1 PK	74.0	-18.9	1.12 H	154	48.27	6.83
4	4874.00	43.4 AV	54.0	-10.6	1.12 H	154	36.57	6.83
5	7311.00	55.6 PK	74.0	-18.4	1.04 H	322	41.20	14.40
6	7311.00	43.4 AV	54.0	-10.6	1.04 H	322	29.00	14.40
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	2384.00	65.8 PK	74.0	-8.2	1.21 V	316	67.81	-2.01
2	2384.00	52.0 AV	54.0	-2.0	1.21 V	316	54.01	-2.01
3	*2437.00	114.3 PK			1.21 V	316	116.09	-1.79
4	*2437.00	103.9 AV			1.21 V	316	105.69	-1.79
5	2489.30	65.5 PK	74.0	-8.5	1.17 V	316	67.08	-1.58
6	2489.30	51.9 AV	54.0	-2.1	1.17 V	316	53.48	-1.58
7	4874.00	55.1 PK	74.0	-18.9	1.09 V	200	48.27	6.83
8	4874.00	43.3 AV	54.0	-10.7	1.09 V	200	36.47	6.83
9	7311.00	55.5 PK	74.0	-18.5	1.03 V	138	41.10	14.40
10	7311.00	43.3 AV	54.0	-10.7	1.03 V	138	28.90	14.40

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
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	100.2 PK			1.05 H	45	101.88	-1.68
2	*2462.00	91.1 AV			1.05 H	45	92.78	-1.68
3	2483.50	63.4 PK	74.0	-10.6	1.05 H	45	64.99	-1.59
4	2483.50	44.8 AV	54.0	-9.2	1.05 H	45	46.39	-1.59
5	4924.00	54.9 PK	74.0	-19.1	1.03 H	166	47.92	6.98
6	4924.00	39.7 AV	54.0	-14.3	1.03 H	166	32.72	6.98
7	7386.00	55.7 PK	74.0	-18.3	1.04 H	321	41.50	14.20
8	7386.00	43.5 AV	54.0	-10.5	1.04 H	321	29.30	14.20
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	*2462.00	110.1 PK			1.20 V	316	111.78	-1.68
2	*2462.00	99.5 AV			1.20 V	316	101.18	-1.68
3	2483.50	72.2 PK	74.0	-1.8	1.20 V	316	73.79	-1.59
4	**2483.50**	**53.5 AV**	**54.0**	**-0.5**	**1.20 V**	**316**	**55.09**	**-1.59**
5	4924.00	54.7 PK	74.0	-19.3	1.12 V	205	47.72	6.98
6	4924.00	40.1 AV	54.0	-13.9	1.12 V	205	33.12	6.98
7	7386.00	55.0 PK	74.0	-19.0	1.03 V	143	40.80	14.20
8	7386.00	43.0 AV	54.0	-11.0	1.03 V	143	28.80	14.20

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.

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	63.4 PK	74.0	-10.6	1.31 H	345	65.38	-1.98
2	2390.00	45.2 AV	54.0	-8.8	1.31 H	345	47.18	-1.98
3	*2412.00	101.8 PK			1.31 H	345	103.69	-1.89
4	*2412.00	91.9 AV			1.31 H	345	93.79	-1.89
5	4824.00	55.9 PK	74.0	-18.1	1.08 H	165	49.27	6.63
6	4824.00	40.6 AV	54.0	-13.4	1.08 H	165	33.97	6.63
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.0 PK	74.0	-4.0	1.23 V	215	71.98	-1.98
2	2390.00	53.4 AV	54.0	-0.6	1.23 V	215	55.38	-1.98
3	*2412.00	109.2 PK			1.23 V	315	111.09	-1.89
4	*2412.00	98.8 AV			1.23 V	315	100.69	-1.89
5	4824.00	54.5 PK	74.0	-19.5	1.16 V	205	47.87	6.63
6	4824.00	39.7 AV	54.0	-14.3	1.16 V	205	33.07	6.63

REMARKS:

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

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	107.7 PK			1.37 H	161	111.33	-3.63
2	*2437.00	98.8 AV			1.37 H	161	102.43	-3.63
3	4874.00	55.3 PK	74.0	-18.7	1.12 H	153	49.22	6.08
4	4874.00	43.6 AV	54.0	-10.4	1.12 H	153	37.52	6.08
5	7311.00	55.6 PK	74.0	-18.4	1.06 H	307	45.15	10.45
6	7311.00	43.3 AV	54.0	-10.7	1.06 H	307	32.85	10.45
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	2385.30	62.9 PK	74.0	-11.1	1.18 V	315	66.70	-3.80
2	2385.30	51.8 AV	54.0	-2.2	1.18 V	315	55.60	-3.80
3	*2437.00	114.3 PK			1.18 V	315	117.93	-3.63
4	*2437.00	103.5 AV			1.18 V	315	107.13	-3.63
5	2488.70	69.1 PK	74.0	-4.9	1.18 V	315	72.56	-3.46
6	2488.70	52.4 AV	54.0	-1.6	1.18 V	315	55.86	-3.46
7	4874.00	55.3 PK	74.0	-18.7	1.09 V	196	49.22	6.08
8	4874.00	43.4 AV	54.0	-10.6	1.09 V	196	37.32	6.08
9	7311.00	55.4 PK	74.0	-18.6	1.08 V	137	44.95	10.45
10	7311.00	43.2 AV	54.0	-10.8	1.08 V	137	32.75	10.45

REMARKS:

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

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	100.3 PK			1.00 H	36	101.98	-1.68
2	*2462.00	91.3 AV			1.00 H	36	92.98	-1.68
3	2483.50	63.2 PK	74.0	-10.8	1.00 H	36	64.79	-1.59
4	2483.50	44.8 AV	54.0	-9.2	1.00 H	36	46.39	-1.59
5	4924.00	55.2 PK	74.0	-18.8	1.05 H	151	48.22	6.98
6	4924.00	39.8 AV	54.0	-14.2	1.05 H	151	32.82	6.98
7	7386.00	56.1 PK	74.0	-17.9	1.02 H	323	41.90	14.20
8	7386.00	43.8 AV	54.0	-10.2	1.02 H	323	29.60	14.20
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	*2462.00	108.6 PK			1.19 V	315	110.28	-1.68
2	*2462.00	98.6 AV			1.19 V	315	100.28	-1.68
3	2483.50	71.9 PK	74.0	-2.1	1.19 V	315	73.49	-1.59
4	**2483.50**	**53.5 AV**	**54.0**	**-0.5**	**1.19 V**	**315**	**55.09**	**-1.59**
5	4924.00	54.4 PK	74.0	-19.6	1.15 V	217	47.42	6.98
6	4924.00	39.7 AV	54.0	-14.3	1.15 V	217	32.72	6.98
7	7386.00	55.1 PK	74.0	-18.9	1.07 V	131	40.90	14.20
8	7386.00	43.2 AV	54.0	-10.8	1.07 V	131	29.00	14.20

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.

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S SPECTRUM ANALYZER	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 27, 2013

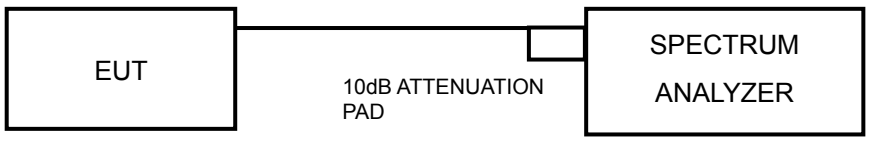
4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

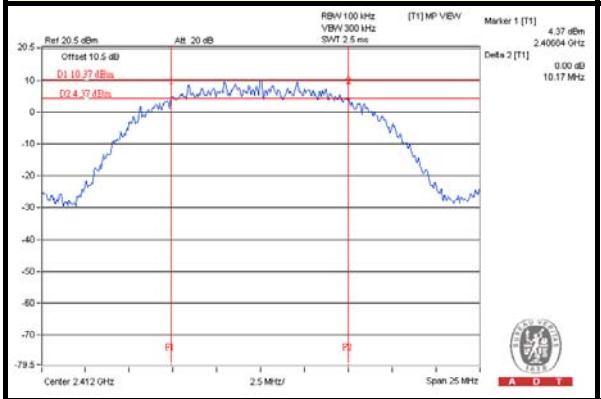
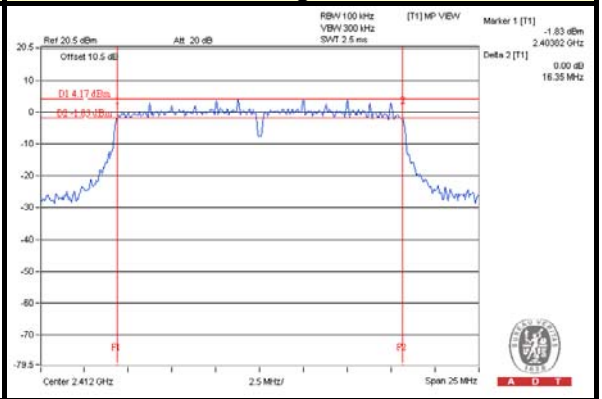
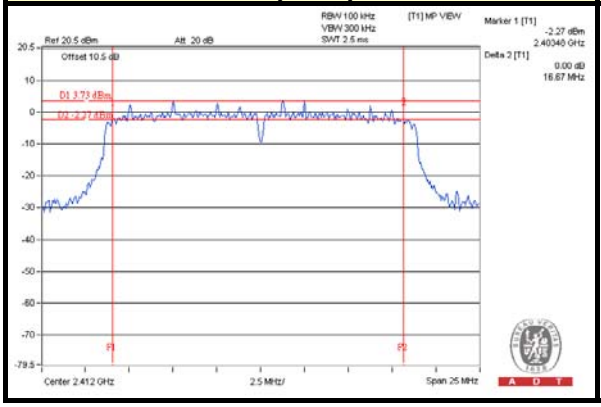
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.17	0.5	PASS
6	2437	10.23	0.5	PASS
11	2462	10.23	0.5	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.35	0.5	PASS
6	2437	16.35	0.5	PASS
11	2462	16.38	0.5	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.67	0.5	PASS
6	2437	16.67	0.5	PASS
11	2462	16.68	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11b / CH1	**802.11g / CH1**
	
802.11n (HT20) / CH1	
	

4.4 CONDUCTED OUTPUT POWER MEASUREMENT

4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

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

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

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 : Sep. 27, 2013

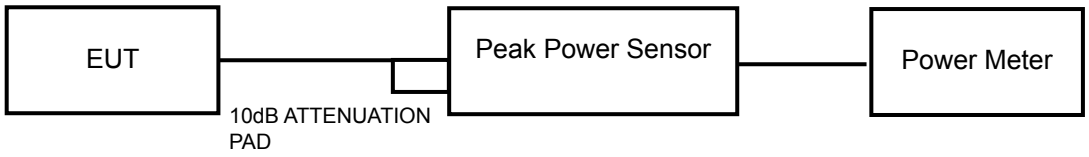
4.4.3 TEST PROCEDURES

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	171.396	22.34	30	PASS
6	2437	179.473	22.54	30	PASS
11	2462	178.649	22.52	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	171.396	22.34	30	PASS
6	2437	403.645	26.06	30	PASS
11	2462	182.810	22.62	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	239.332	23.79	30	PASS
6	2437	410.204	26.13	30	PASS
11	2462	252.930	24.03	30	PASS

4.5 AVERAGE OUTPUT POWER

4.5.1 FOR REFERENCE.

4.5.2 TEST INSTRUMENTS

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

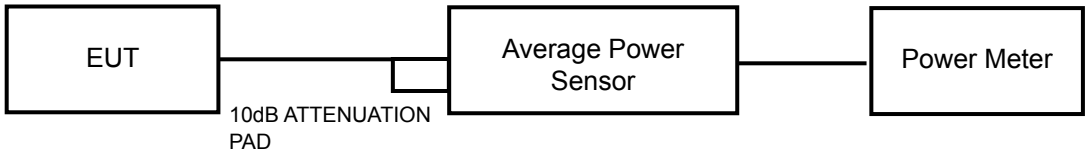
Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 27, 2013

4.5.3 TEST PROCEDURES

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

4.5.4 TEST SETUP



4.5.5 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.5.6 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	110.408	20.43
6	2437	123.310	20.91
11	2462	114.025	20.57

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	48.641	16.87
6	2437	130.017	21.14
11	2462	43.954	16.43

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	38.726	15.88
6	2437	127.938	21.07
11	2462	38.637	15.87

4.6 POWER SPECTRAL DENSITY MEASUREMENT

4.6.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 27, 2013

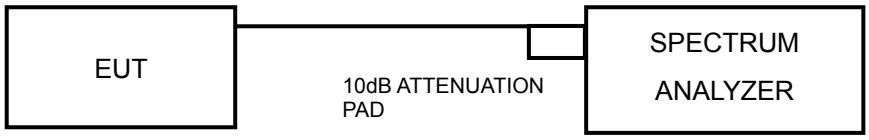
4.6.3 TEST PROCEDURE

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

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.6.7 TEST RESULTS

802.11b

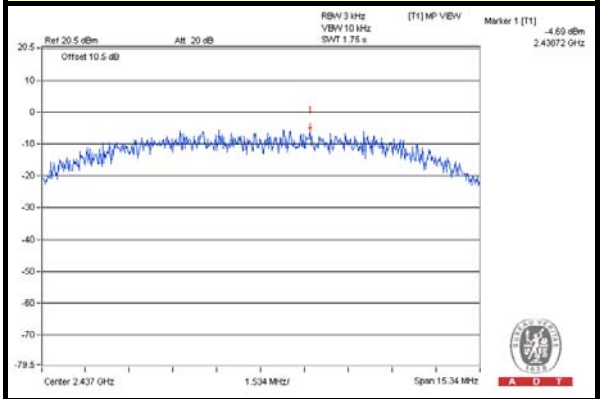
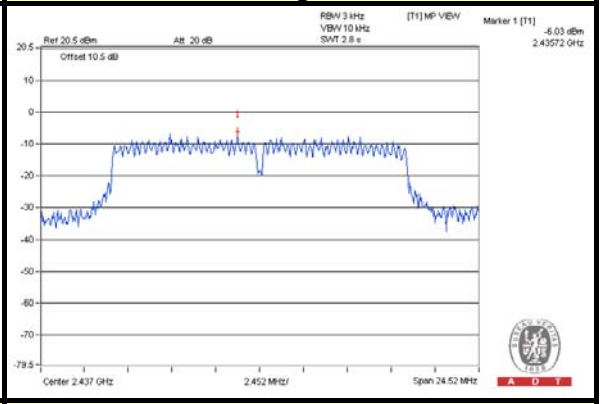
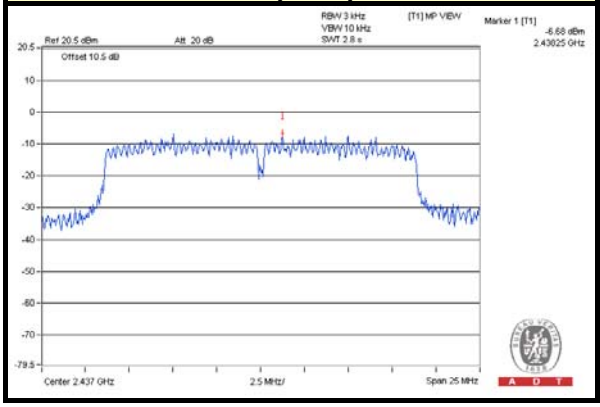
Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-4.82	8	PASS
6	2437	-4.69	8	PASS
11	2462	-6.29	8	PASS

802.11g

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.29	8	PASS
6	2437	-6.03	8	PASS
11	2462	-11.59	8	PASS

802.11n (HT20)

Channel	FREQUENCY (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-10.60	8	PASS
6	2437	-6.68	8	PASS
11	2462	-12.57	8	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11b / CH6	**802.11g / CH6**
	
802.11n (HT20) / CH6	
	

4.7 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.7.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

4.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
R&S Spectrum Analyzer	FSP40	100037	Nov. 01, 2012	Oct. 31, 2013

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 27, 2013

4.7.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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

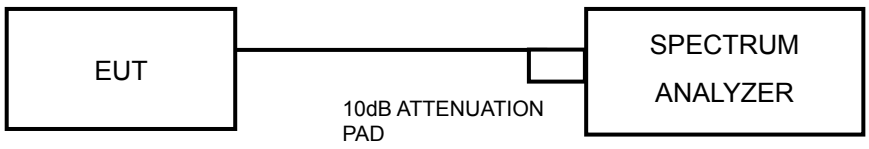
Measurement Procedure –Unwanted Emission Level

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

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



4.7.6 EUT OPERATING CONDITION

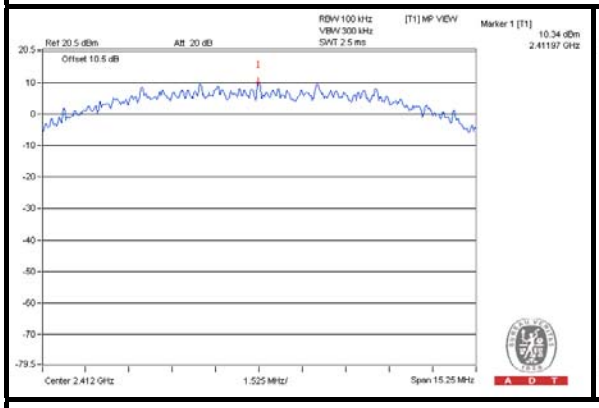
Same as Item 4.3.6

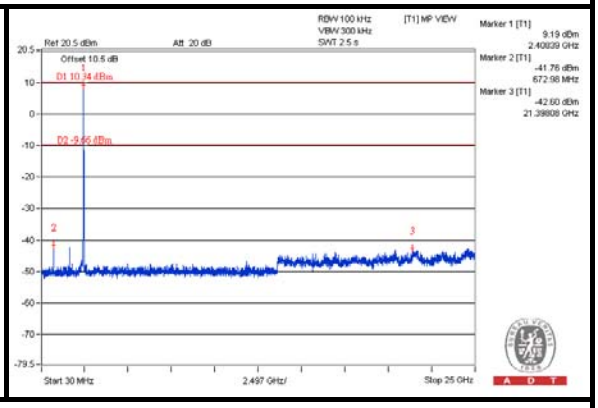
4.7.7 TEST RESULTS

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

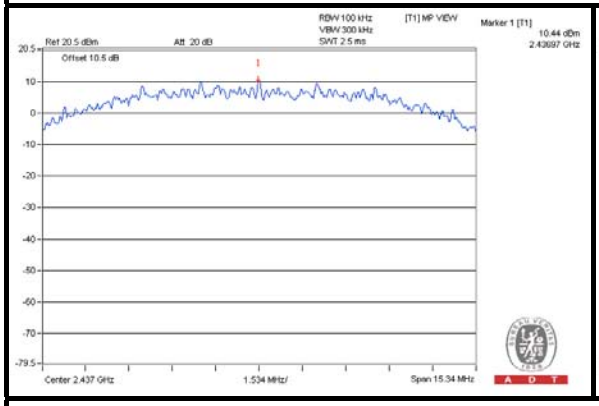
802.11b:

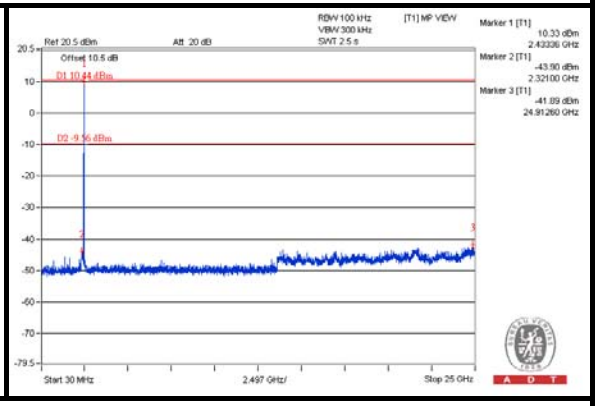
CH 1



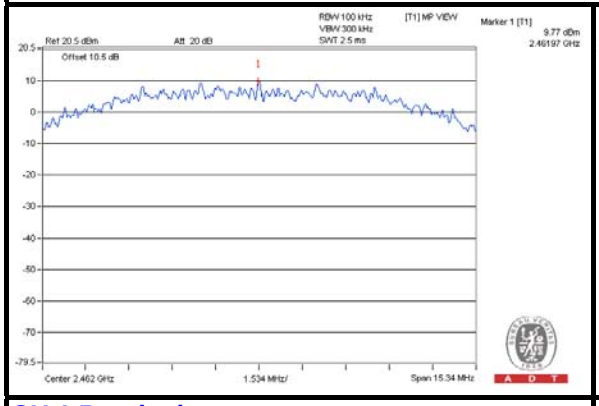


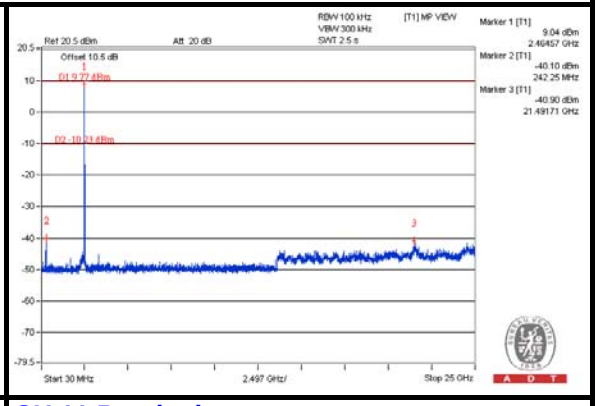
CH 6



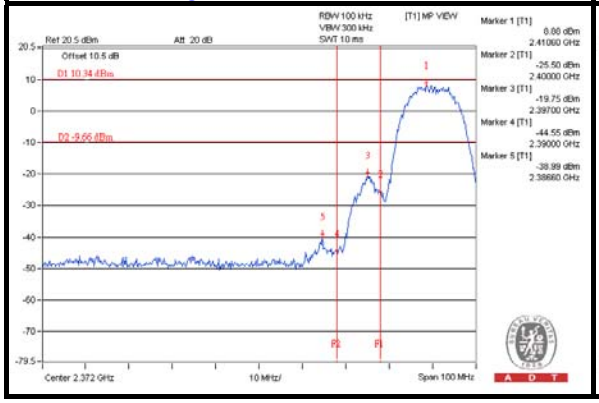


CH 11

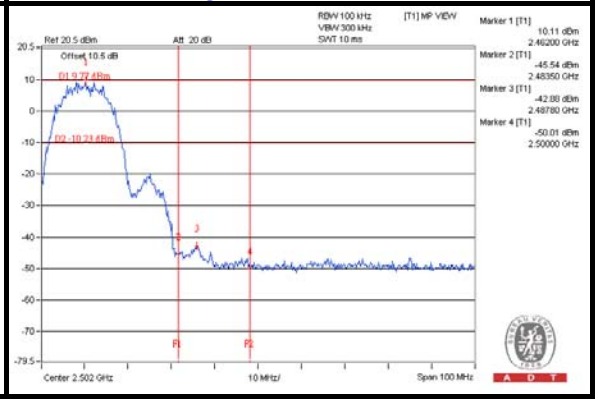




CH 1 Band edge

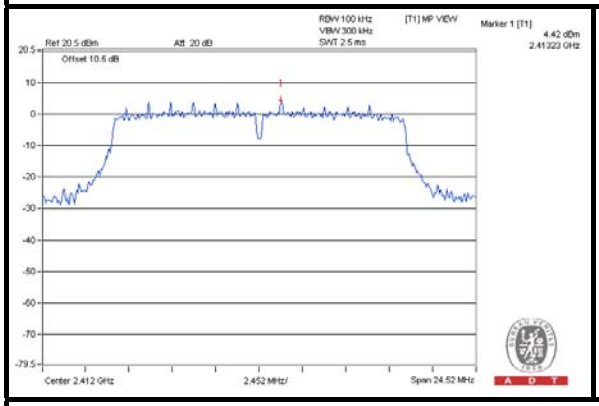


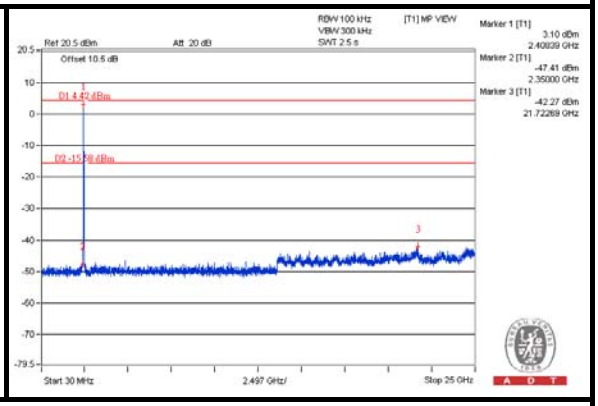
CH 11 Band edge



802.11g:

CH 1





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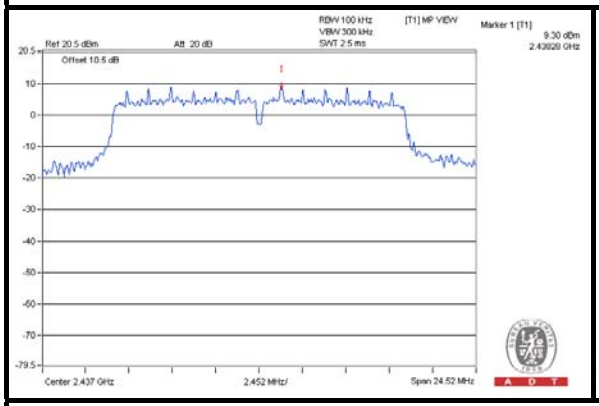

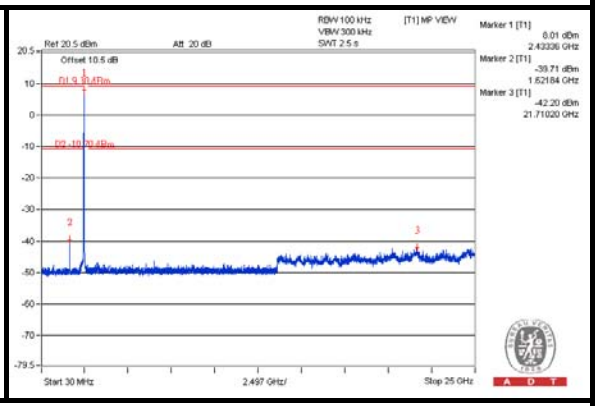

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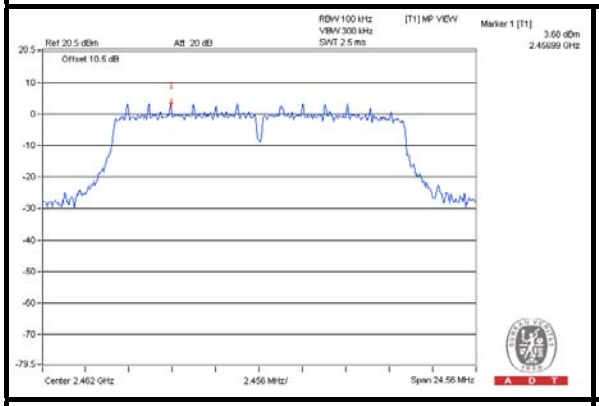
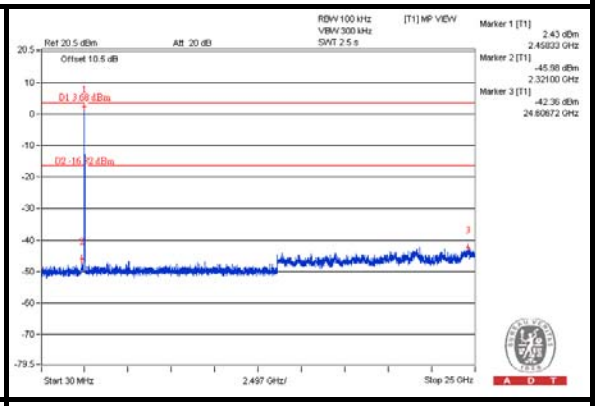
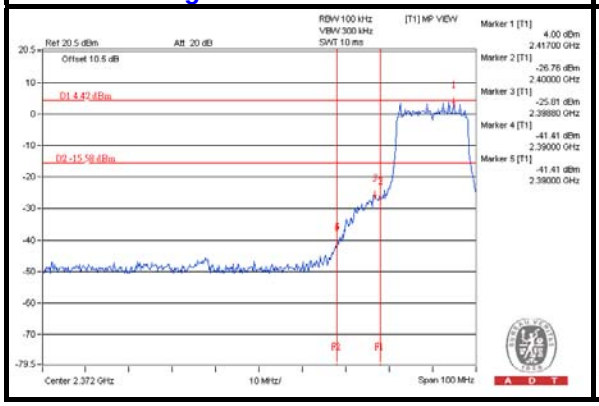




CH 1 Band edge



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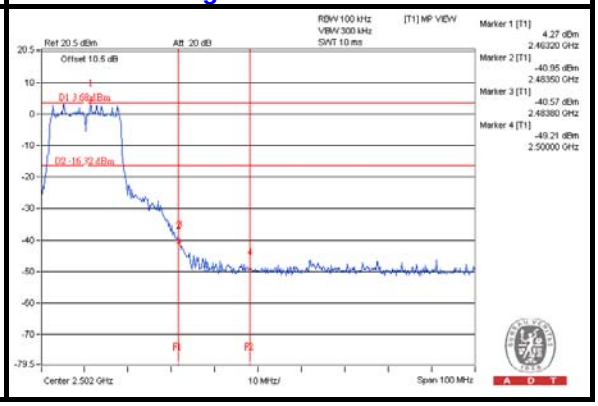

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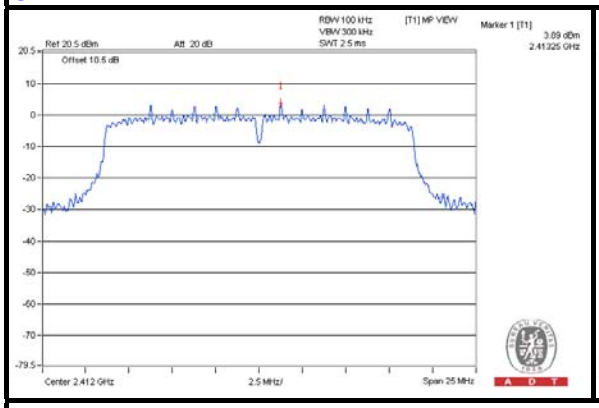
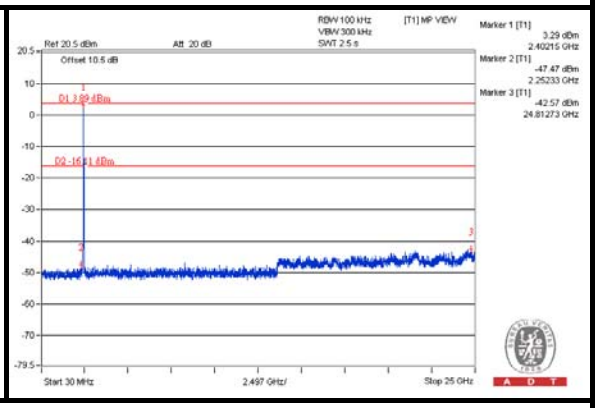
CH 1





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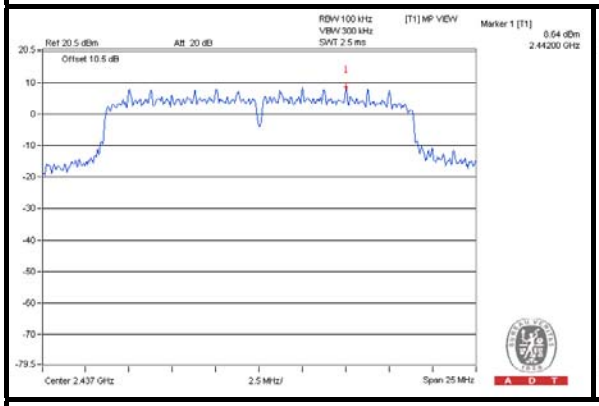

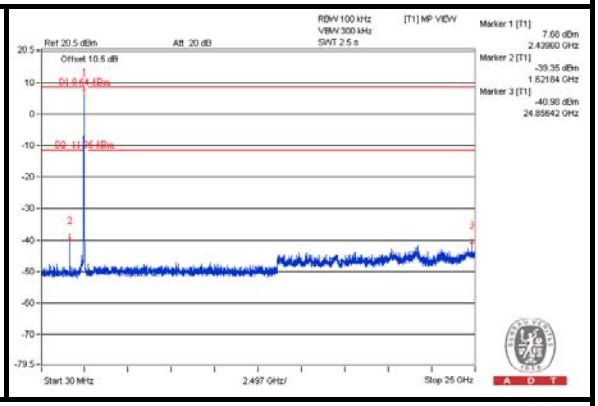

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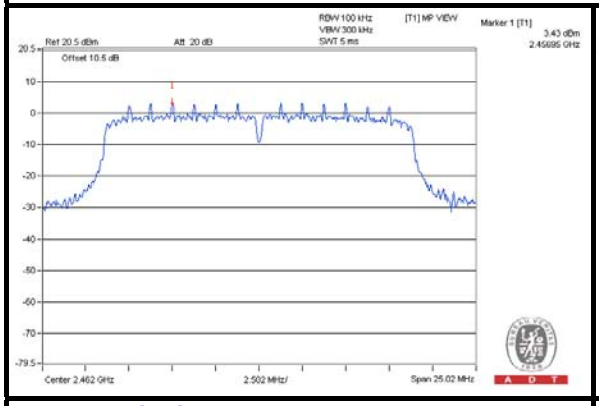
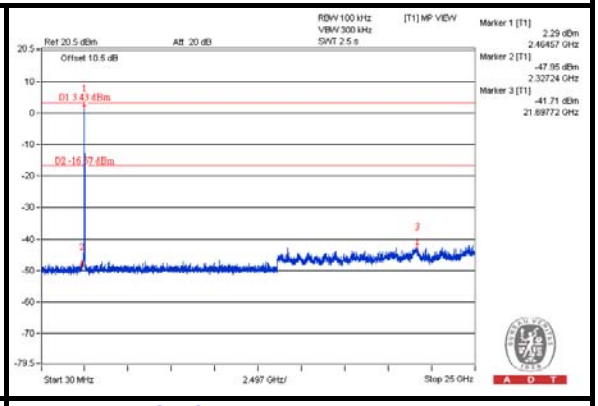
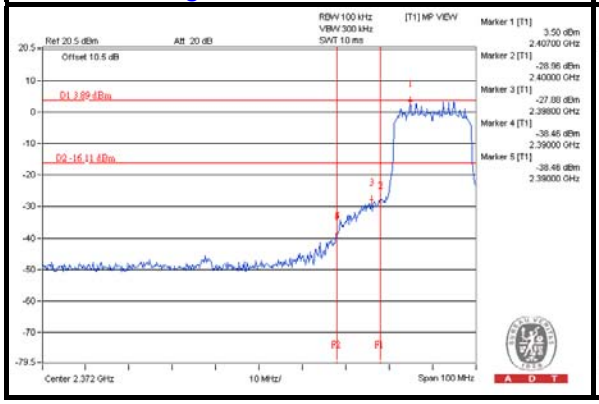
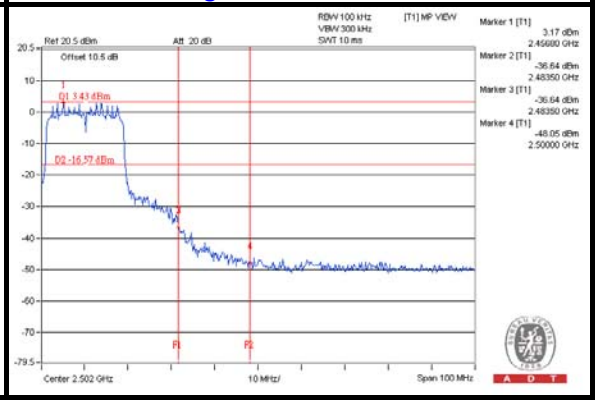




CH 1 Band edge



CH 11 Band edge



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.

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.

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