FCC TEST REPORT

REPORT NO.:	RF131031E01
MODEL NO.:	E1700
FCC ID:	Q87-E1700
RECEIVED:	Oct. 31, 2013
TESTED:	Nov. 04 to 11, 2013
ISSUED:	Nov. 19, 2013
APPLICANT:	Linksys LLC
ADDRESS:	131 Theory Drive, Irvine, CA 92617, 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
RF131031E01	Original release	Nov. 19, 2013

1. CERTIFICATION

PRODUCT:	Single-Band Wireless-N Router with Gigabit Ports
BRAND NAME:	Linksys
MODEL NO.:	E1700
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	Linksys LLC
TESTED:	Nov. 04 to 11, 2013
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (Model: E1700) 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. 19, 2013
(Midoli Peng, Specialist)

APPROVED BY : _____ , **DATE:** Nov. 19, 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 -0.42dB at 0.42257MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 4874.00MHz
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 R-SMA 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)	3.54 dB
Radiated emissions (6GHz -18GHz)	4.08 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Single-Band Wireless-N Router with Gigabit Ports
MODEL NO.	E1700
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	802.11b: 80.538mW 802.11g: 308.319mW 802.11n (HT20): 494.331mW 802.11n (HT40): 207.212mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	RJ-45 Cable (unshielded, 1.5m) x1
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x1

NOTE:

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

No	Brand	Model No.	Spec.
1	HON-KWANG	HK-T112-A120	Input: 100-240V, 0.35A, 50/60Hz Output: 12V, 1.0A DC output cable: 1.5m, unshielded
2	HON-KWANG	HK-Q106-A12	Input: 100-240V, 0.2A, 50/60Hz Output: 12V, 0.5A DC output cable: 1.5m, unshielded
3	HON-KWANG	HK-U-120A050-CP	Input: 100-240V, 0.2A, 50/60Hz Output: 12V, 0.5A 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.			

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

MODULATION MODE	Tx/Rx FUNCTION
802.11b	1Tx(Fixed chain 0)/2Rx
802.11g	1Tx(Fixed chain 0)/2Rx
802.11n (HT20)	2Tx/2Rx
802.11n (HT40)	2Tx/2Rx

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

Set 1				
Transmitter Circuit	Antenna Type	Gain (dBi)	Connecter Type	Frequency range (MHz to MHz
Chain (0)	Dipole	3.5	R-SMA	2400 ~ 2500
Chain (1)	Dipole	3.5	R-SMA	2400 ~ 2500
Set 2				
Transmitter Circuit	Antenna Type	Gain (dBi)	Connecter Type	Frequency range (MHz to MHz
Chain (0)	Dipole	3.5	R-SMA	2400 ~ 2483.5
Chain (1)	Dipole	3.5	R-SMA	2400 ~ 2483.5

Set 1 was chosen for final test.

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

5. The 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

Operated in 2400 ~ 2483.5MHz band:

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

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

7 channels are provided for 802.11n (HT40):

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

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

RE ³ 1G: Radiated Emission above 1GHz **APCM:** Antenna Port Conducted Measurement

OB: Conducted Out-Band Emission Measurement

NOTE: 1. "-"means no effect.

2. The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane**.

POWER LINE CONDUCTED EMISSION TEST:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11n (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 N 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
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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	26deg. C,67%RH	120Vac, 60Hz	Scott Chen
	27deg. C,60%RH	120Vac, 60Hz	Anderson Chen
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Andy Ho
RE≥1G	24deg. C, 72%RH	120Vac, 60Hz	Andy Ho
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee
OB	25deg. C, 60%RH	120Vac, 60Hz	Chilin Lee

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C (15.247)

558074 D01 DTS Meas Guidance v03r01

662911 D01 Multiple Transmitter Output v01 r02

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

If duty cycle of test signal is > 98 %, duty factor is not required.

If duty cycle of test signal is < 98%, duty factor shall be considered.

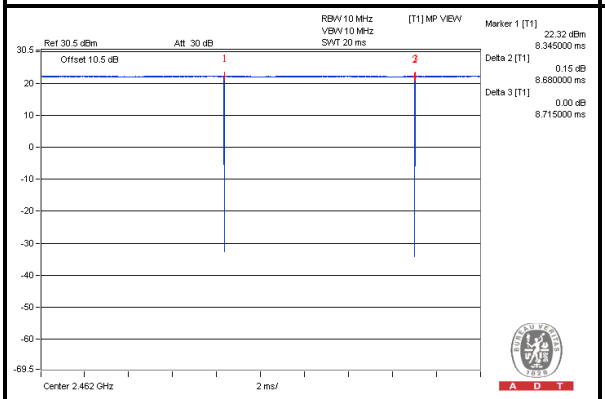
802.11b: Duty cycle = 8.68 ms/8.715 ms = 0.996

802.11g: Duty cycle = 1.439 ms/1.457 ms = 0.988

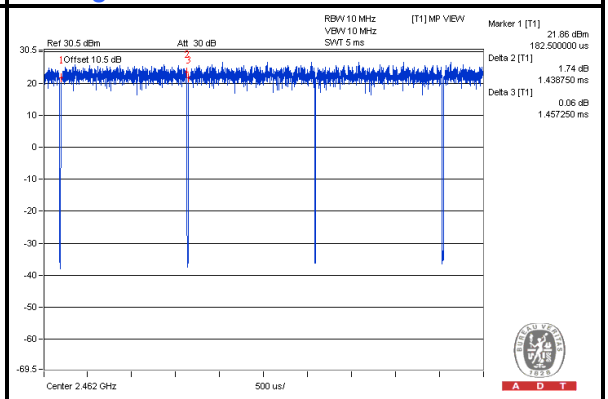
802.11n (HT20): Duty cycle = 1.345 ms/1.364 ms = 0.986

802.11n (HT40): Duty cycle = 0.664 ms/0.684 ms = 0.971, Duty factor = 10 * log(1/0.971) = 0.13

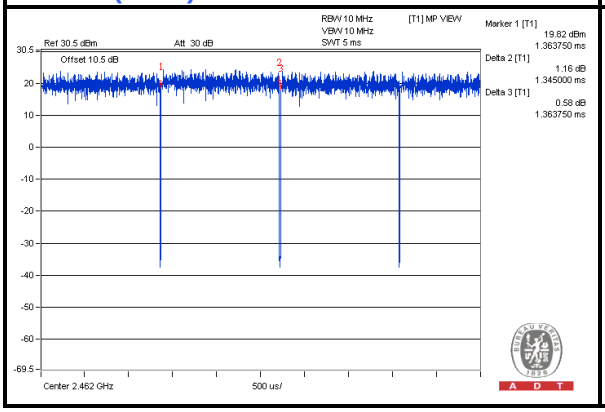
802.11b



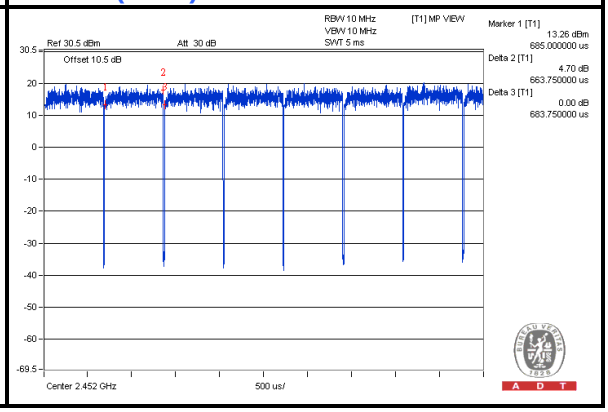
802.11g



802.11n (HT20)



802.11n (HT40)



3.5 DESCRIPTION OF SUPPORT UNITS

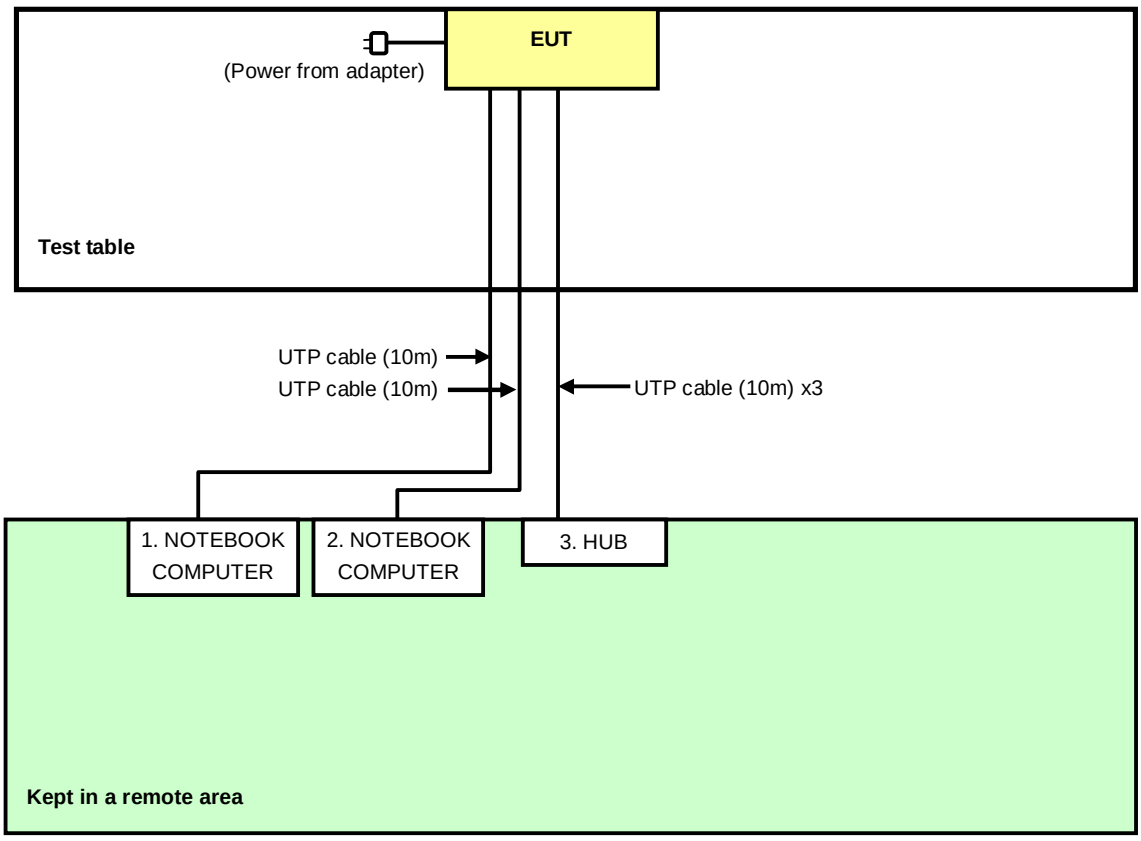
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP32LA	FSLB32S	FCC DoC
2	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC
3	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC

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

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-03	Sep. 24, 2013	Sep. 23, 2014
Software ADT	BV ADT_Cond_V7.3.7.3	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3 The VCCI Con C Registration No. is C-3611.
4 Tested Date: Nov. 05 to 11, 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.

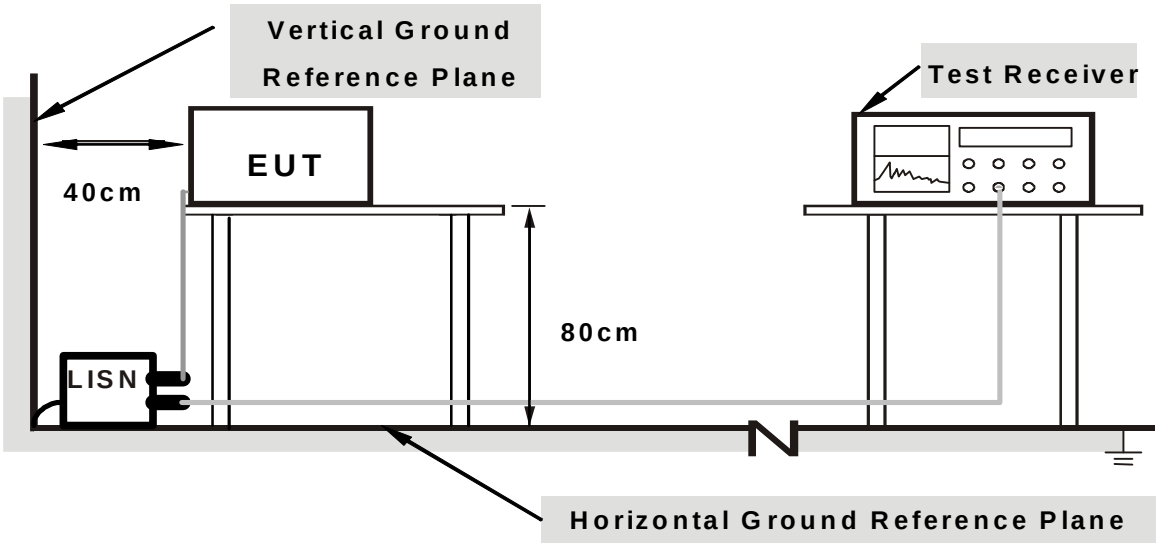
NOTE:

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. Placed the EUT on testing table.
2. Prepared computer system (support units 1 ~ 2) to act as communication partners.
3. The communication partner ran test program “MT7620QA.exe [V1.0.6.0]” to enable EUT under transmission/receiving condition continuously.

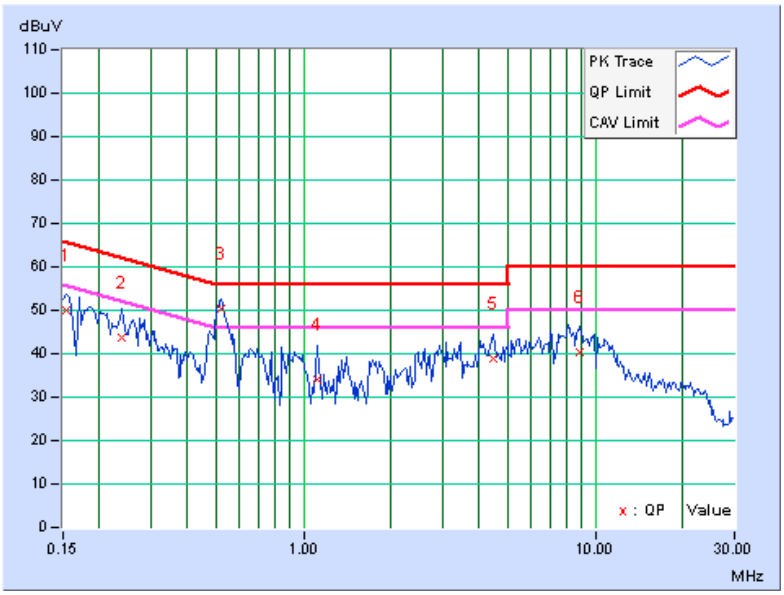
4.1.7 TEST RESULTS (Mode 1)

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	0.15391	0.08	49.80	35.29	49.88	35.37	65.79	55.79	-15.90	-20.41
2	0.23984	0.11	43.77	30.47	43.88	30.58	62.10	52.10	-18.22	-21.52
3	0.52109	0.15	50.28	44.93	50.43	45.08	56.00	46.00	-5.57	-0.92
4	1.12109	0.17	34.05	23.71	34.22	23.88	56.00	46.00	-21.78	-22.12
5	4.47266	0.29	38.68	29.44	38.97	29.73	56.00	46.00	-17.03	-16.27
6	8.83203	0.43	39.93	31.08	40.36	31.51	60.00	50.00	-19.64	-18.49

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

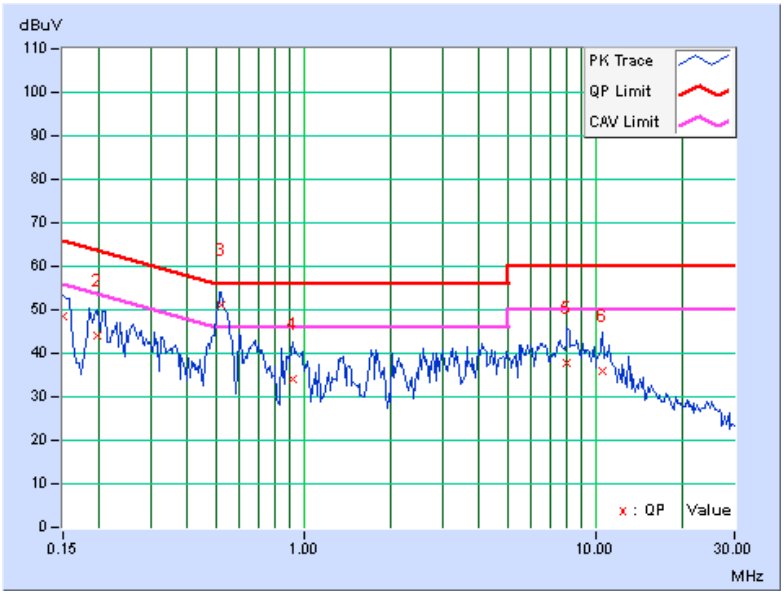


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	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	0.09	48.35	30.85	48.44	30.94	66.00	56.00	-17.56	-25.06
2	0.19687	0.10	43.80	24.60	43.90	24.70	63.74	53.74	-19.84	-29.04
3	0.52109	0.15	50.83	45.27	50.98	45.42	56.00	46.00	-5.02	-0.58
4	0.91563	0.17	34.02	22.96	34.19	23.13	56.00	46.00	-21.81	-22.87
5	8.00391	0.41	37.21	28.16	37.62	28.57	60.00	50.00	-22.38	-21.43
6	10.60938	0.49	35.29	27.23	35.78	27.72	60.00	50.00	-24.22	-22.28

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



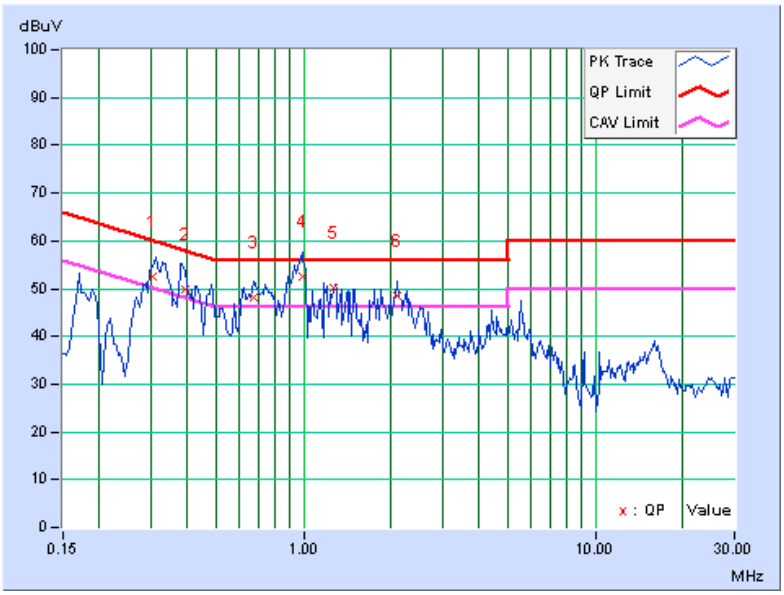
4.1.8 TEST RESULTS (Mode 2)

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	0.30278	0.09	52.46	46.67	52.55	46.76	60.17	50.17	-7.62	-3.41
2	0.39554	0.11	49.67	37.91	49.78	38.02	57.95	47.95	-8.17	-9.93
3	0.67731	0.12	48.11	36.37	48.23	36.49	56.00	46.00	-7.77	-9.51
4	0.99444	0.13	52.24	41.24	52.37	41.37	56.00	46.00	-3.63	-4.63
5	1.27210	0.14	49.99	38.16	50.13	38.30	56.00	46.00	-5.87	-7.70
6	2.09779	0.18	48.32	37.19	48.50	37.37	56.00	46.00	-7.50	-8.63

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

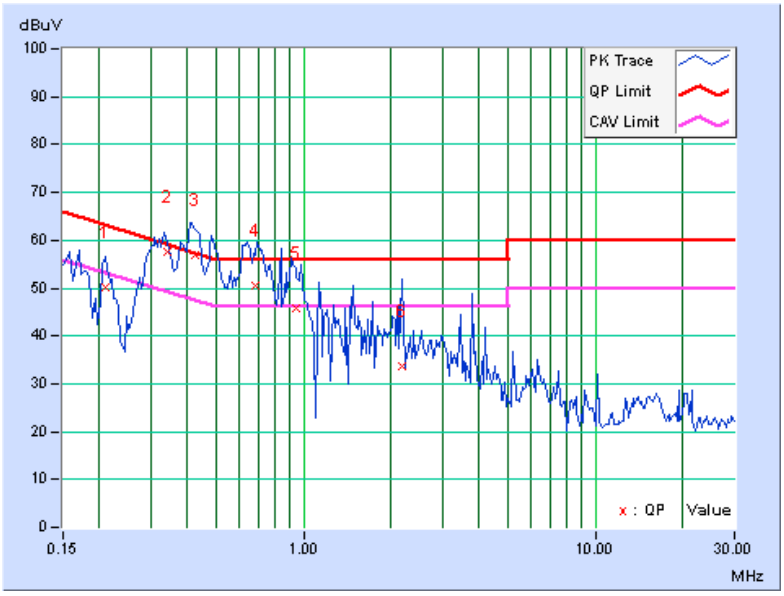


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	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	0.20841	0.05	49.98	34.77	50.03	34.82	63.27	53.27	-13.24	-18.45
2	0.34031	0.09	57.58	45.31	57.67	45.40	59.20	49.20	-1.52	-3.79
3	**0.42257**	**0.11**	**56.87**	**43.41**	**56.98**	**43.52**	**57.40**	**47.40**	**-0.42**	**-3.88**
4	0.68769	0.12	50.46	37.22	50.58	37.34	56.00	46.00	-5.42	-8.66
5	0.94927	0.14	45.79	33.21	45.93	33.35	56.00	46.00	-10.07	-12.65
6	2.18701	0.19	33.55	23.09	33.74	23.28	56.00	46.00	-22.26	-22.72

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



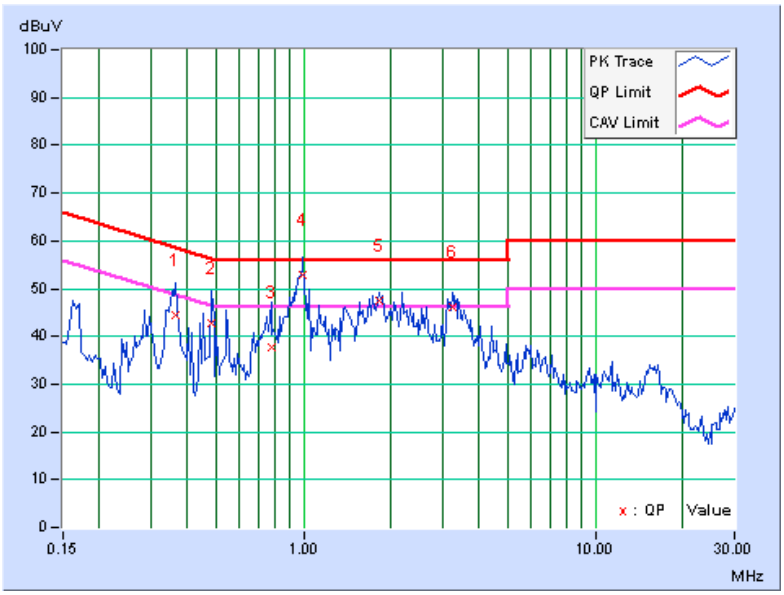
4.1.9 TEST RESULTS (Mode 3)

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	0.36484	0.10	44.48	39.51	44.58	39.61	58.62	48.62	-14.04	-9.01
2	0.48203	0.11	42.69	30.69	42.80	30.80	56.30	46.30	-13.50	-15.50
3	0.77500	0.12	37.73	30.15	37.85	30.27	56.00	46.00	-18.15	-15.73
4	0.99766	0.13	52.64	40.11	52.77	40.24	56.00	46.00	-3.23	-5.76
5	1.81250	0.16	47.48	39.67	47.64	39.83	56.00	46.00	-8.36	-6.17
6	3.23828	0.28	45.83	35.86	46.11	36.14	56.00	46.00	-9.89	-9.86

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

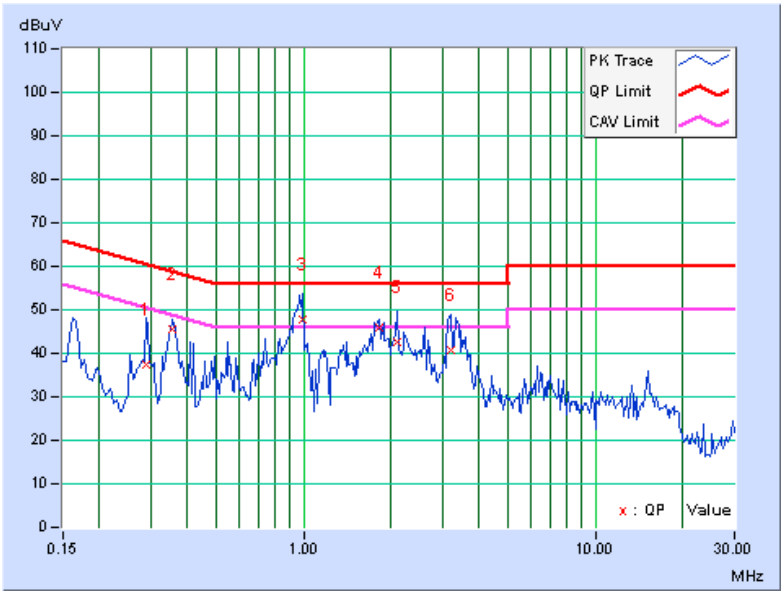


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	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	0.29063	0.08	37.27	31.01	37.35	31.09	60.51	50.51	-23.16	-19.42
2	0.35703	0.10	45.50	41.33	45.60	41.43	58.80	48.80	-13.20	-7.37
3	0.99766	0.14	47.69	33.04	47.83	33.18	56.00	46.00	-8.17	-12.82
4	1.81641	0.17	45.94	34.99	46.11	35.16	56.00	46.00	-9.89	-10.84
5	2.09375	0.18	42.30	29.78	42.48	29.96	56.00	46.00	-13.52	-16.04
6	3.18359	0.22	40.55	28.27	40.77	28.49	56.00	46.00	-15.23	-17.51

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 30dB 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

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. 06, 2013	Oct. 05, 2014
Horn_Antenna AISI	AIH.8018	0000220091110	Nov. 27, 2012	Nov. 26, 2013
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
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. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
5 The CANADA Site Registration No. is IC 7450H-3.
6 Tested Date: Nov. 05, 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:

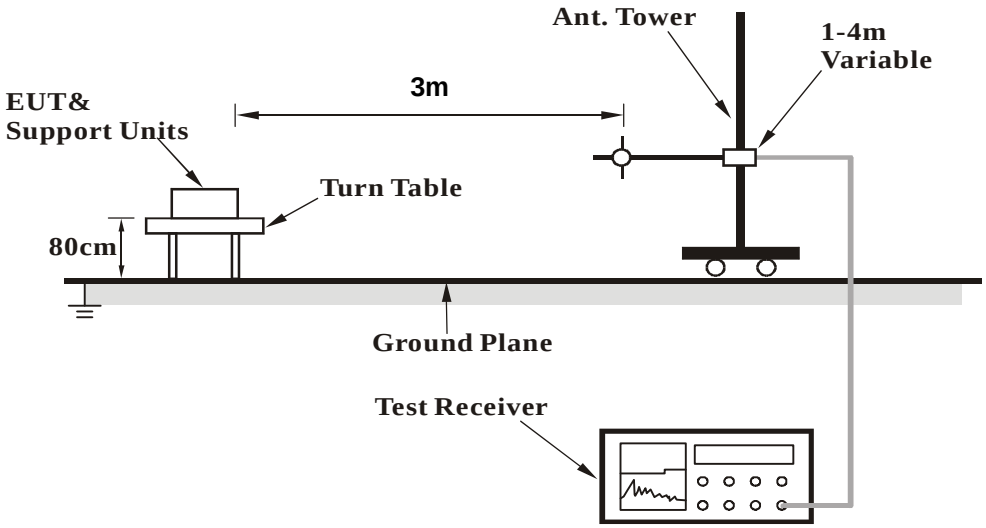
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) 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

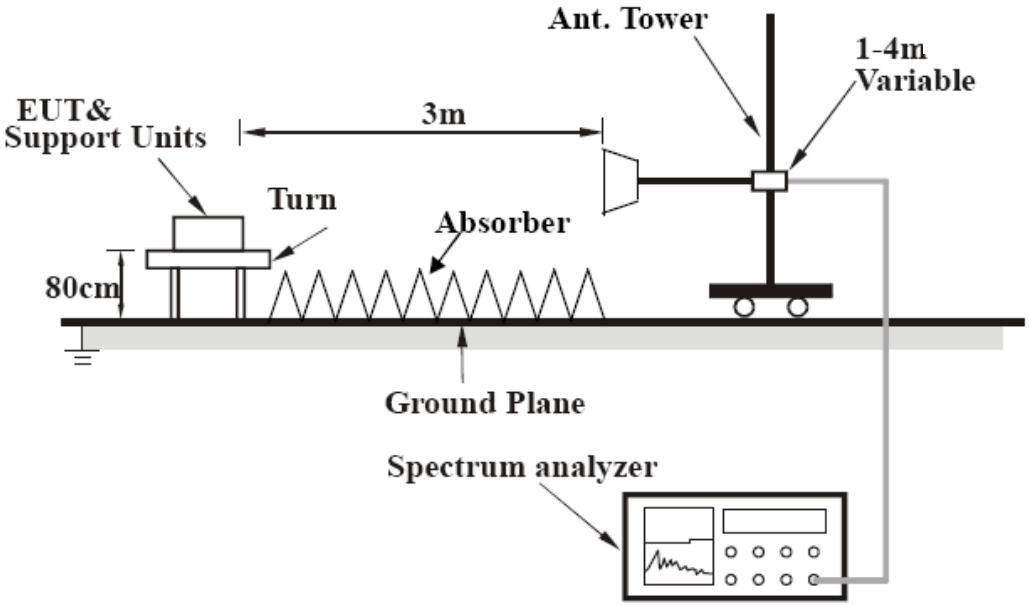
No deviation

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	125.01	39.8 QP	43.5	-3.7	1.50 H	75	54.12	-14.33
2	160.32	39.3 QP	43.5	-4.2	1.50 H	283	52.09	-12.83
3	301.36	43.2 QP	46.0	-2.8	1.00 H	41	54.87	-11.69
4	334.91	40.0 QP	46.0	-6.0	1.09 H	59	50.69	-10.71
5	374.98	45.3 QP	46.0	-0.7	1.00 H	52	55.23	-9.91
6	703.13	42.9 QP	46.0	-3.1	1.00 H	360	46.33	-3.41
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	125.01	40.5 QP	43.5	-3.0	1.00 V	16	54.85	-14.33
2	301.45	41.7 QP	46.0	-4.3	1.50 V	360	53.42	-11.68
3	339.33	41.8 QP	46.0	-4.2	2.00 V	0	52.33	-10.54
4	500.01	42.1 QP	46.0	-3.9	1.00 V	128	49.18	-7.06
5	692.66	40.2 QP	46.0	-5.8	1.50 V	359	43.75	-3.51
6	1000.00	44.2 QP	54.0	-9.8	1.00 V	310	42.26	1.94

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	2319.00	51.1 PK	74.0	-22.9	1.36 H	94	17.80	33.30
2	2319.00	42.9 AV	54.0	-11.1	1.36 H	94	9.60	33.30
3	*2412.00	100.2 PK			1.36 H	209	66.61	33.59
4	*2412.00	97.3 AV			1.36 H	209	63.71	33.59
5	4824.00	56.8 PK	74.0	-17.2	1.49 H	13	13.62	43.18
6	4824.00	53.8 AV	54.0	-0.2	1.49 H	13	10.62	43.18
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	2319.00	54.8 PK	74.0	-19.2	1.08 V	117	21.50	33.30
2	2319.00	47.4 AV	54.0	-6.6	1.08 V	117	14.10	33.30
3	*2412.00	106.1 PK			1.08 V	65	72.51	33.59
4	*2412.00	103.6 AV			1.08 V	65	70.01	33.59
5	4824.00	54.5 PK	74.0	-19.5	1.00 V	149	11.32	43.18
6	4824.00	50.2 AV	54.0	-3.8	1.00 V	149	7.02	43.18

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	2320.00	51.8 PK	74.0	-22.2	1.05 H	206	18.50	33.30
2	2320.00	45.4 AV	54.0	-8.6	1.05 H	206	12.10	33.30
3	*2437.00	99.6 PK			1.05 H	159	65.93	33.67
4	*2437.00	96.7 AV			1.05 H	159	63.03	33.67
5	4874.00	56.4 PK	74.0	-17.6	1.62 H	43	13.16	43.24
6	**4874.00**	**53.9 AV**	**54.0**	**-0.1**	**1.62 H**	**43**	**10.66**	**43.24**
7	7311.00	54.9 PK	74.0	-19.1	1.00 H	150	6.83	48.07
8	7311.00	42.1 AV	54.0	-11.9	1.00 H	150	-5.97	48.07
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	2320.00	55.2 PK	74.0	-18.8	1.06 V	121	21.90	33.30
2	2320.00	47.9 AV	54.0	-6.1	1.06 V	121	14.60	33.30
3	*2437.00	106.3 PK			1.06 V	114	72.63	33.67
4	*2437.00	103.7 AV			1.06 V	114	70.03	33.67
5	4874.00	54.6 PK	74.0	-19.4	1.01 V	155	11.36	43.24
6	4874.00	51.4 AV	54.0	-2.6	1.01 V	155	8.16	43.24
7	7311.00	55.5 PK	74.0	-18.5	1.00 V	237	7.43	48.07
8	7311.00	42.2 AV	54.0	-11.8	1.00 V	237	-5.87	48.07

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	2319.00	50.2 PK	74.0	-23.8	1.00 H	164	16.90	33.30
2	2319.00	40.5 AV	54.0	-13.5	1.00 H	164	7.20	33.30
3	*2462.00	98.9 PK			1.00 H	310	65.16	33.74
4	*2462.00	96.0 AV			1.00 H	310	62.26	33.74
5	2500.00	48.6 PK	74.0	-25.4	1.00 H	155	14.74	33.86
6	2500.00	38.5 AV	54.0	-15.5	1.00 H	155	4.64	33.86
7	4924.00	56.4 PK	74.0	-17.6	1.63 H	42	13.13	43.27
8	4924.00	53.6 AV	54.0	-0.4	1.63 H	42	10.33	43.27
9	7386.00	56.0 PK	74.0	-18.0	1.00 H	165	7.60	48.40
10	7386.00	42.6 AV	54.0	-11.4	1.00 H	165	-5.80	48.40
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	2319.00	56.0 PK	74.0	-18.0	1.11 V	114	22.70	33.30
2	2319.00	50.3 AV	54.0	-3.7	1.11 V	114	17.00	33.30
3	*2462.00	108.0 PK			1.30 V	63	74.26	33.74
4	*2462.00	105.6 AV			1.30 V	63	71.86	33.74
5	2500.00	56.6 PK	74.0	-17.4	1.01 V	125	22.74	33.86
6	2500.00	47.6 AV	54.0	-6.4	1.01 V	125	13.74	33.86
7	4924.00	56.0 PK	74.0	-18.0	1.94 V	113	12.73	43.27
8	4924.00	52.8 AV	54.0	-1.2	1.94 V	113	9.53	43.27
9	7386.00	55.5 PK	74.0	-18.5	1.00 V	241	7.10	48.40
10	7386.00	42.4 AV	54.0	-11.6	1.00 V	241	-6.00	48.40

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.

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	62.8 PK	74.0	-11.2	1.10 H	20	29.27	33.53
2	2390.00	47.5 AV	54.0	-6.5	1.10 H	20	13.97	33.53
3	*2412.00	105.1 PK			1.10 H	20	71.51	33.59
4	*2412.00	94.8 AV			1.10 H	20	61.21	33.59
5	4824.00	52.0 PK	74.0	-22.0	1.25 H	5	8.82	43.18
6	4824.00	39.6 AV	54.0	-14.4	1.25 H	5	-3.58	43.18
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	71.6 PK	74.0	-2.4	1.07 V	115	38.07	33.53
2	2390.00	53.4 AV	54.0	-0.6	1.07 V	115	19.87	33.53
3	*2412.00	112.5 PK			1.07 V	115	78.91	33.59
4	*2412.00	101.7 AV			1.07 V	115	68.11	33.59
5	4824.00	52.0 PK	74.0	-22.0	1.56 V	354	8.82	43.18
6	4824.00	39.2 AV	54.0	-14.8	1.56 V	354	-3.98	43.18

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	2390.00	60.2 PK	74.0	-13.8	1.06 H	21	26.67	33.53
2	2390.00	43.3 AV	54.0	-10.7	1.06 H	21	9.77	33.53
3	*2437.00	109.8 PK			1.06 H	21	76.13	33.67
4	*2437.00	100.0 AV			1.06 H	21	66.33	33.67
5	2483.50	65.5 PK	74.0	-8.5	1.06 H	21	31.69	33.81
6	2483.50	45.1 AV	54.0	-8.9	1.06 H	21	11.29	33.81
7	4874.00	58.2 PK	74.0	-15.8	1.95 H	27	14.96	43.24
8	4874.00	45.2 AV	54.0	-8.8	1.95 H	27	1.96	43.24
9	7311.00	58.0 PK	74.0	-16.0	1.73 H	178	9.93	48.07
10	7311.00	45.4 AV	54.0	-8.6	1.73 H	178	-2.67	48.07
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	66.3 PK	74.0	-7.7	1.09 V	145	32.77	33.53
2	2390.00	49.6 AV	54.0	-4.4	1.09 V	145	16.07	33.53
3	*2437.00	117.6 PK			1.09 V	145	83.93	33.67
4	*2437.00	107.9 AV			1.09 V	145	74.23	33.67
5	2483.50	73.4 PK	74.0	-0.6	1.09 V	145	39.59	33.81
6	2483.50	52.0 AV	54.0	-2.0	1.09 V	145	18.19	33.81
7	4874.00	57.4 PK	74.0	-16.6	1.36 V	144	14.16	43.24
8	4874.00	44.5 AV	54.0	-9.5	1.36 V	144	1.26	43.24
9	7311.00	61.2 PK	74.0	-12.8	1.71 V	281	13.13	48.07
10	7311.00	49.5 AV	54.0	-4.5	1.71 V	281	1.43	48.07

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	102.9 PK			1.00 H	310	69.16	33.74
2	*2462.00	92.3 AV			1.00 H	310	58.56	33.74
3	2483.50	62.4 PK	74.0	-11.6	1.00 H	310	28.59	33.81
4	2483.50	44.8 AV	54.0	-9.2	1.00 H	310	10.99	33.81
5	4924.00	51.5 PK	74.0	-22.5	1.30 H	15	8.23	43.27
6	4924.00	39.2 AV	54.0	-14.8	1.30 H	15	-4.07	43.27
7	7386.00	55.2 PK	74.0	-18.8	1.00 H	250	6.80	48.40
8	7386.00	42.3 AV	54.0	-11.7	1.00 H	250	-6.10	48.40
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	*2462.00	117.4 PK			1.11 V	142	83.66	33.74
2	*2462.00	107.6 AV			1.11 V	142	73.86	33.74
3	2483.50	72.2 PK	74.0	-1.8	1.11 V	142	38.39	33.81
4	2483.50	53.5 AV	54.0	-0.5	1.11 V	142	19.69	33.81
5	4924.00	52.1 PK	74.0	-21.9	1.50 V	341	8.83	43.27
6	4924.00	39.5 AV	54.0	-14.5	1.50 V	341	-3.77	43.27
7	7386.00	55.4 PK	74.0	-18.6	1.00 V	105	7.00	48.40
8	7386.00	42.9 AV	54.0	-11.1	1.00 V	105	-5.50	48.40

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.

802.11n (20MHz)

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	59.5 PK	74.0	-14.5	1.08 H	149	25.97	33.53
2	2390.00	40.8 AV	54.0	-13.2	1.08 H	149	7.27	33.53
3	*2412.00	105.2 PK			1.10 H	155	71.61	33.59
4	*2412.00	94.2 AV			1.10 H	155	60.61	33.59
5	4824.00	60.4 PK	74.0	-13.6	1.88 H	307	17.22	43.18
6	4824.00	47.0 AV	54.0	-7.0	1.88 H	307	3.82	43.18
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	70.7 PK	74.0	-3.3	1.08 V	266	37.17	33.53
2	2390.00	53.3 AV	54.0	-0.7	1.08 V	266	19.77	33.53
3	*2412.00	111.9 PK			1.08 V	266	78.31	33.59
4	*2412.00	100.7 AV			1.08 V	266	67.11	33.59
5	4824.00	59.5 PK	74.0	-14.5	1.24 V	190	16.32	43.18
6	4824.00	46.7 AV	54.0	-7.3	1.24 V	190	3.52	43.18

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	2390.00	66.4 PK	74.0	-7.6	1.07 H	156	32.87	33.53
2	2390.00	46.0 AV	54.0	-8.0	1.07 H	156	12.47	33.53
3	*2437.00	113.5 PK			1.07 H	156	79.83	33.67
4	*2437.00	102.3 AV			1.07 H	156	68.63	33.67
5	2483.50	63.4 PK	74.0	-10.6	1.07 H	156	29.59	33.81
6	2483.50	42.1 AV	54.0	-11.9	1.07 H	156	8.29	33.81
7	4874.00	60.4 PK	74.0	-13.6	1.93 H	312	17.16	43.24
8	4874.00	47.4 AV	54.0	-6.6	1.93 H	312	4.16	43.24
9	7311.00	56.0 PK	74.0	-18.0	1.85 H	302	7.93	48.07
10	7311.00	43.2 AV	54.0	-10.8	1.85 H	302	-4.87	48.07
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.5 PK	74.0	-6.5	1.11 V	146	33.97	33.53
2	2390.00	50.5 AV	54.0	-3.5	1.11 V	146	16.97	33.53
3	*2437.00	119.1 PK			1.11 V	146	85.43	33.67
4	*2437.00	108.3 AV			1.11 V	146	74.63	33.67
5	2483.50	72.9 PK	74.0	-1.1	1.11 V	146	39.09	33.81
6	2483.50	50.7 AV	54.0	-3.3	1.11 V	146	16.89	33.81
7	4874.00	58.9 PK	74.0	-15.1	1.25 V	200	15.66	43.24
8	4874.00	46.3 AV	54.0	-7.7	1.25 V	200	3.06	43.24
9	7311.00	55.6 PK	74.0	-18.4	1.00 V	288	7.53	48.07
10	7311.00	43.1 AV	54.0	-10.9	1.00 V	288	-4.97	48.07

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	105.1 PK			1.05 H	159	71.36	33.74
2	*2462.00	94.1 AV			1.05 H	159	60.36	33.74
3	2483.50	60.0 PK	74.0	-14.0	1.05 H	159	26.19	33.81
4	2483.50	41.1 AV	54.0	-12.9	1.05 H	159	7.29	33.81
5	4924.00	60.4 PK	74.0	-13.6	1.92 H	321	17.13	43.27
6	4924.00	47.1 AV	54.0	-6.9	1.92 H	321	3.83	43.27
7	7386.00	55.5 PK	74.0	-18.5	1.80 H	292	7.10	48.40
8	7386.00	42.8 AV	54.0	-11.2	1.80 H	292	-5.60	48.40
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	*2462.00	112.9 PK			1.10 V	139	79.16	33.74
2	*2462.00	100.8 AV			1.10 V	139	67.06	33.74
3	2483.50	72.8 PK	74.0	-1.2	1.10 V	139	38.99	33.81
4	2483.50	51.0 AV	54.0	-3.0	1.10 V	139	17.19	33.81
5	4924.00	59.6 PK	74.0	-14.4	1.29 V	188	16.33	43.27
6	4924.00	46.7 AV	54.0	-7.3	1.29 V	188	3.43	43.27
7	7386.00	54.8 PK	74.0	-19.2	1.00 V	294	6.40	48.40
8	7386.00	42.6 AV	54.0	-11.4	1.00 V	294	-5.80	48.40

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.

802.11n (40MHz)

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	57.7 PK	74.0	-16.3	1.07 H	141	24.17	33.53
2	2390.00	40.7 AV	54.0	-13.3	1.07 H	141	7.17	33.53
3	*2422.00	102.4 PK			1.06 H	165	68.78	33.62
4	*2422.00	91.7 AV			1.06 H	165	58.08	33.62
5	4844.00	57.1 PK	74.0	-16.9	1.96 H	317	13.90	43.20
6	4844.00	45.2 AV	54.0	-8.8	1.96 H	317	2.00	43.20
7	7266.00	54.4 PK	74.0	-19.6	1.91 H	308	6.49	47.91
8	7266.00	41.9 AV	54.0	-12.1	1.91 H	308	-6.01	47.91
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.2 PK	74.0	-3.8	1.09 V	322	36.63	33.53
2	2390.00	53.5 AV	54.0	-0.5	1.09 V	322	19.99	33.53
3	*2422.00	109.1 PK			1.09 V	322	75.48	33.62
4	*2422.00	97.1 AV			1.09 V	322	63.48	33.62
5	4844.00	55.1 PK	74.0	-18.9	1.20 V	210	11.90	43.20
6	4844.00	42.7 AV	54.0	-11.3	1.20 V	210	-0.50	43.20
7	7266.00	55.0 PK	74.0	-19.0	1.00 V	137	7.09	47.91
8	7266.00	42.0 AV	54.0	-12.0	1.00 V	137	-5.91	47.91

REMARKS:

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

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	56.8 PK	74.0	-17.2	1.09 H	157	23.27	33.53
2	2390.00	40.8 AV	54.0	-13.2	1.09 H	157	7.27	33.53
3	*2437.00	105.8 PK			1.09 H	157	72.13	33.67
4	*2437.00	94.5 AV			1.09 H	157	60.83	33.67
5	2483.50	67.2 PK	74.0	-6.8	1.09 H	157	33.39	33.81
6	2483.50	49.1 AV	54.0	-4.9	1.09 H	157	15.29	33.81
7	4874.00	57.3 PK	74.0	-16.7	1.96 H	317	14.06	43.24
8	4874.00	45.1 AV	54.0	-8.9	1.96 H	317	1.86	43.24
9	7311.00	54.8 PK	74.0	-19.2	1.90 H	298	6.73	48.07
10	7311.00	42.2 AV	54.0	-11.8	1.90 H	298	-5.87	48.07
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	73.6 PK	74.0	-0.4	1.11 V	140	40.07	33.53
2	2390.00	53.6 AV	54.0	-0.4	1.11 V	140	20.07	33.53
3	*2437.00	114.8 PK			1.11 V	140	81.13	33.67
4	*2437.00	100.8 AV			1.11 V	140	67.13	33.67
5	2483.50	73.8 PK	74.0	-0.2	1.11 V	140	39.99	33.81
6	2483.50	53.8 AV	54.0	-0.2	1.11 V	140	19.99	33.81
7	4874.00	55.2 PK	74.0	-18.8	1.24 V	200	11.96	43.24
8	4874.00	43.1 AV	54.0	-10.9	1.24 V	200	-0.14	43.24
9	7311.00	54.8 PK	74.0	-19.2	1.00 V	122	6.73	48.07
10	7311.00	42.1 AV	54.0	-11.9	1.00 V	122	-5.97	48.07

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 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	102.1 PK			1.07 H	157	68.39	33.71
2	*2452.00	91.4 AV			1.07 H	157	57.69	33.71
3	2483.50	57.9 PK	74.0	-16.1	1.07 H	157	24.09	33.81
4	2483.50	41.0 AV	54.0	-13.0	1.07 H	157	7.19	33.81
5	4904.00	56.9 PK	74.0	-17.1	2.00 H	307	13.63	43.27
6	4904.00	44.7 AV	54.0	-9.3	2.00 H	307	1.43	43.27
7	7356.00	55.2 PK	74.0	-18.8	1.85 H	289	6.93	48.27
8	7356.00	42.6 AV	54.0	-11.4	1.85 H	289	-5.67	48.27
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	*2452.00	108.7 PK			1.10 V	138	74.99	33.71
2	*2452.00	96.3 AV			1.10 V	138	62.59	33.71
3	2483.50	71.2 PK	74.0	-2.8	1.10 V	138	37.39	33.81
4	2483.50	51.1 AV	54.0	-2.9	1.10 V	138	17.29	33.81
5	4904.00	55.4 PK	74.0	-18.6	1.25 V	197	12.13	43.27
6	4904.00	42.8 AV	54.0	-11.2	1.25 V	197	-0.47	43.27
7	7356.00	55.6 PK	74.0	-18.4	1.00 V	131	7.33	48.27
8	7356.00	42.4 AV	54.0	-11.6	1.00 V	131	-5.87	48.27

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.

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
Spectrum Analyzer R&S	FSP 40	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 : Nov. 04, 2013

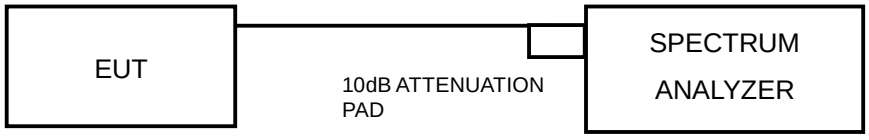
4.3.3 TEST PROCEDURE

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	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.10	0.5	PASS
6	2437	10.12	0.5	PASS
11	2462	10.13	0.5	PASS

802.11g

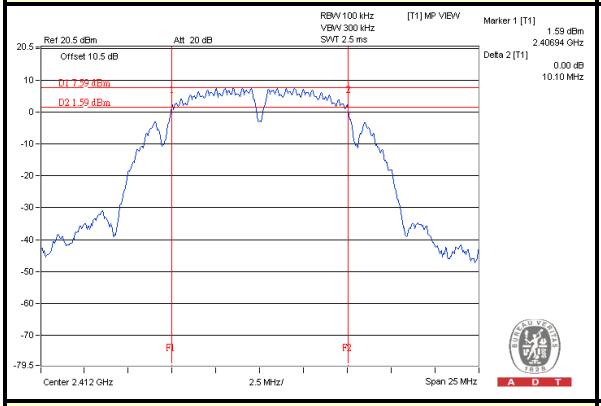
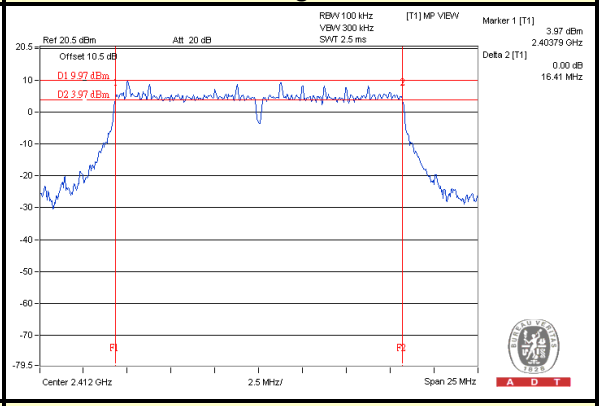
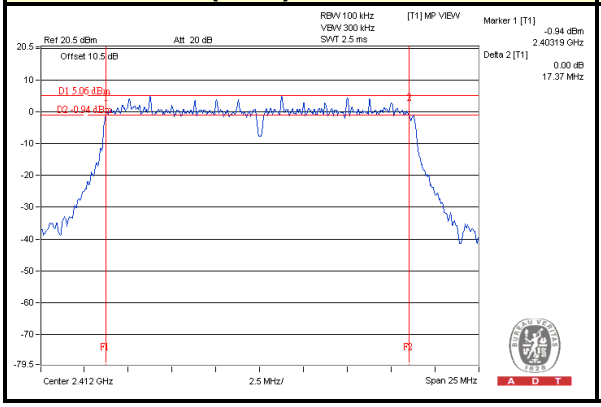
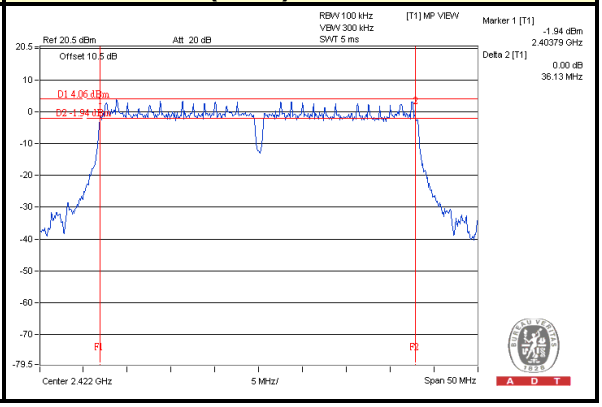
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.41	0.5	PASS
6	2437	16.44	0.5	PASS
11	2462	16.46	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.37	17.38	0.5	PASS
6	2437	17.60	17.69	0.5	PASS
11	2462	17.64	17.55	0.5	PASS

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	36.13	36.42	0.5	PASS
6	2437	36.43	36.14	0.5	PASS
9	2452	36.42	36.45	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11b / CH1	**802.11g / CH1**
	
802.11n (HT20) / CH1 <chain 0>	**802.11n (HT40) / CH3 <chain 0>**
	

4.4 CONDUCTED OUTPUT POWER MEASUREMENT

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

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 Anritsu	ML2495A	0824006	May 20, 2013	May 19, 2014
Power sensor Anritsu	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 : Nov. 04, 2013

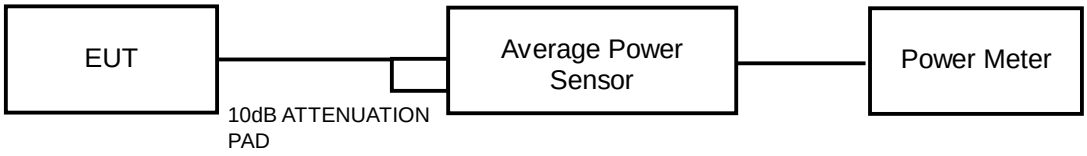
4.4.3 TEST PROCEDURES

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.

4.4.4 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)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	58.345	17.66	30	PASS
6	2437	63.241	18.01	30	PASS
11	2462	80.538	19.06	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	93.111	19.69	30	PASS
6	2437	308.319	24.89	30	PASS
11	2462	93.541	19.71	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	15.03	18.51	102.800	20.12	30	PASS
6	2437	24.41	23.39	494.331	26.94	30	PASS
11	2462	17.47	16.41	99.599	19.98	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	16.67	16.14	87.567	19.42	30	PASS
6	2437	20.54	19.73	207.212	23.16	30	PASS
9	2452	16.52	15.91	83.869	19.24	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	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 : Nov. 04, 2013

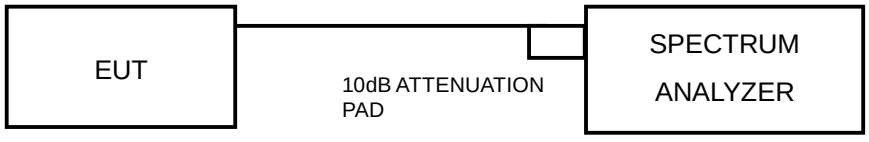
4.5.3 TEST PROCEDURE

1. Set the RBW = 30 kHz, VBW =100 kHz, Detector = power averaging (RMS).
2. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW
3. Sweep time = auto couple,
4. Employ trace averaging (RMS) mode over a minimum of 100 traces.
5. Use the peak marker function to determine the maximum amplitude level.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-9.85	8	PASS
6	2437	-9.85	8	PASS
11	2462	-8.49	8	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-9.09	8	PASS
6	2437	-2.73	8	PASS
11	2462	-8.97	8	PASS

802.11n (HT20)

TX chain	Channel	FREQ. (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-13.85	3.01	-10.84	7.49	PASS
	6	2437	-3.78	3.01	-0.77	7.49	PASS
	11	2462	-11.09	3.01	-8.08	7.49	PASS
1	1	2412	-9.97	3.01	-6.96	7.49	PASS
	6	2437	-4.36	3.01	-1.35	7.49	PASS
	11	2462	-12.17	3.01	-9.16	7.49	PASS

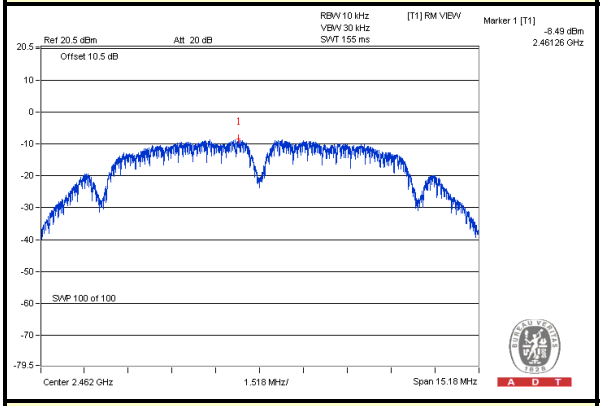
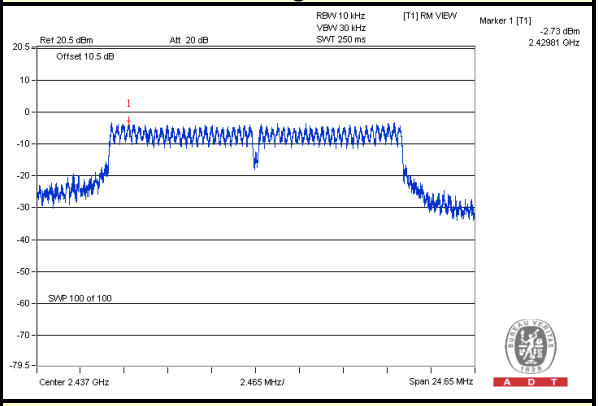
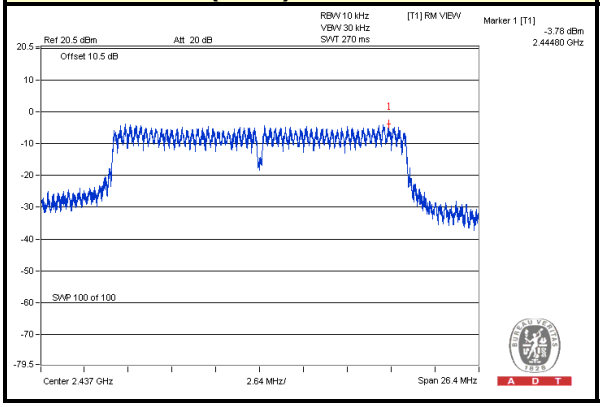
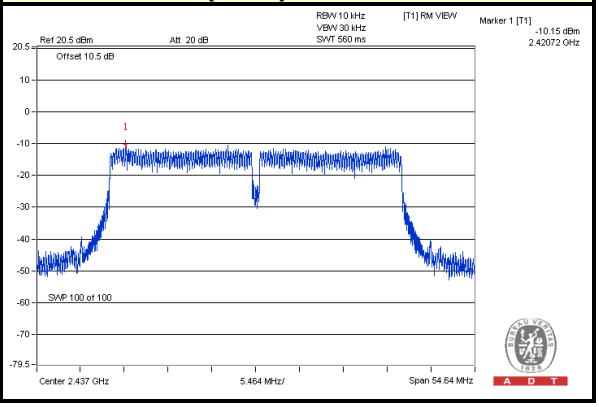
NOTE: 1. Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 8-(6.61-6) = 7.49dBm.

802.11n (HT40)

TX chain	Channel	FREQ. (MHz)	PSD W/O DUTY FACTOR (dBm)	10 log (N=2) dB	DUTY FACTOR (dB)	Total PSD WITH DUTY FACTOR (dBm)	Limit (dBm)	PASS /FAIL
0	3	2422	-14.68	3.01	0.13	-11.54	7.49	PASS
	6	2437	-10.15	3.01	0.13	-7.01	7.49	PASS
	9	2452	-14.34	3.01	0.13	-11.20	7.49	PASS
1	3	2422	-14.95	3.01	0.13	-11.81	7.49	PASS
	6	2437	-11.14	3.01	0.13	-8.00	7.49	PASS
	9	2452	-15.02	3.01	0.13	-11.88	7.49	PASS

NOTE: 1. Directional gain = 3.5dBi + 10log(2) = 6.51dBi > 6dBi , so the power density limit shall be reduced to 8-(6.61-6) = 7.49dBm.

2. Refer to section 3.4 for duty cycle spectrum plot.

SPECTRUM PLOT OF WORST VALUE	
802.11b / CH11	**802.11g / CH6**
	
802.11n (HT20) / CH6 <chain 0>	**802.11n (HT40) / CH6 <chain 0>**
	

4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSP 40	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 : Nov. 04, 2013

4.6.3 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.

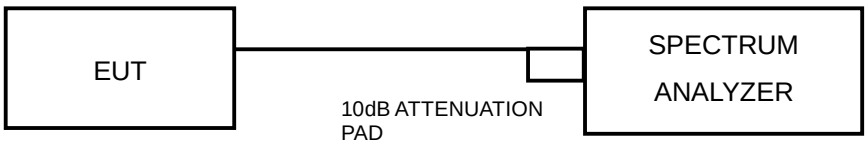
Measurement Procedure –Unwanted Emission Level

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.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP



4.6.6 EUT OPERATING CONDITION

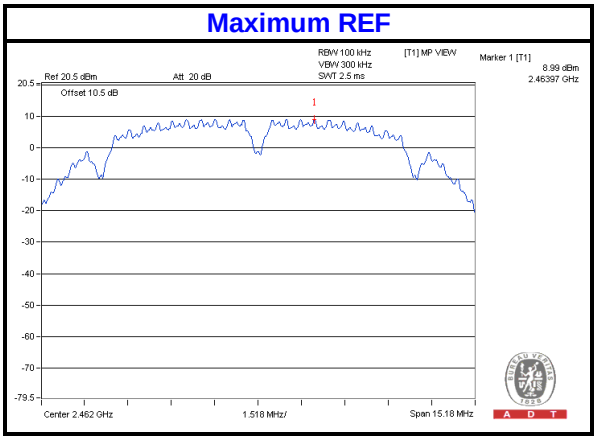
Same as Item 4.3.6

4.6.7 TEST RESULTS

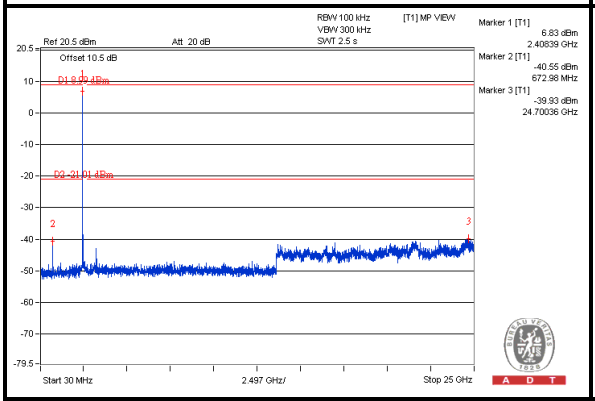
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

802.11b

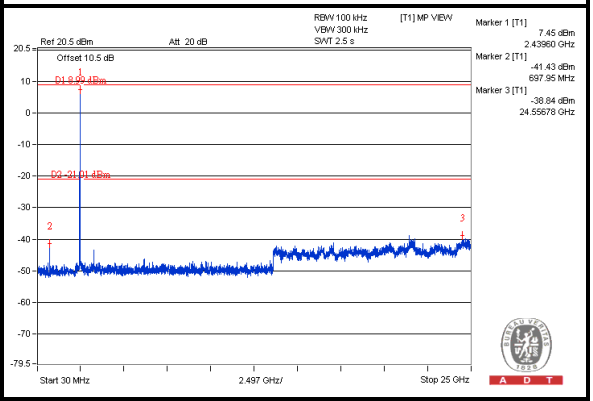
Maximum REF



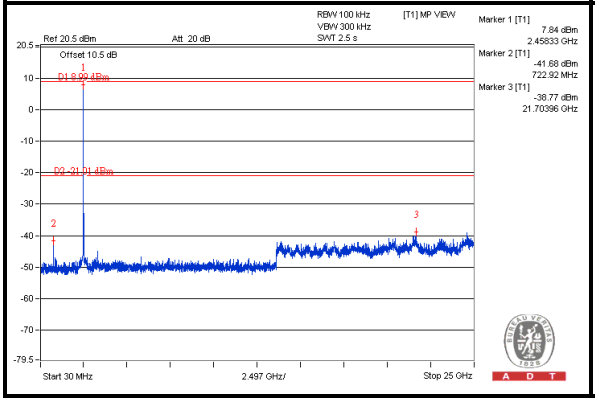
CH 1

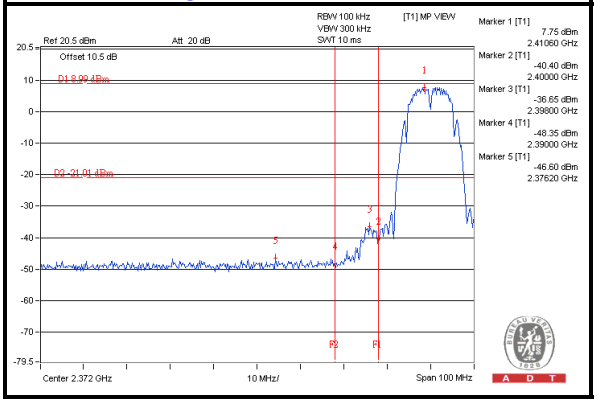
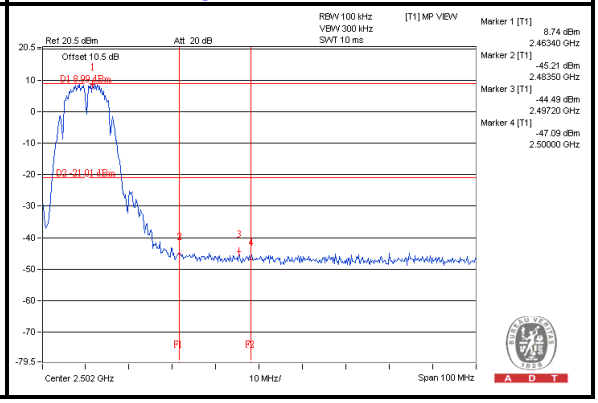


CH 6



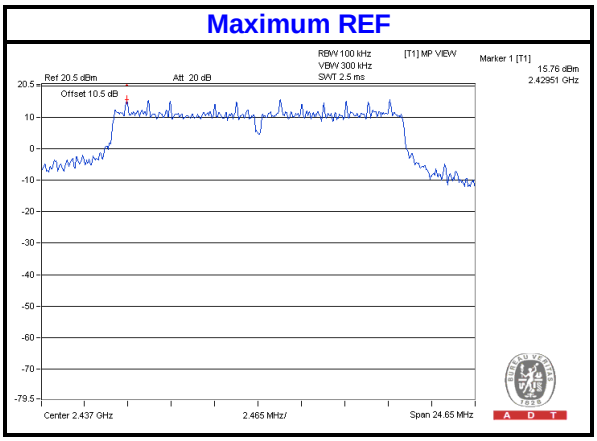
CH 11



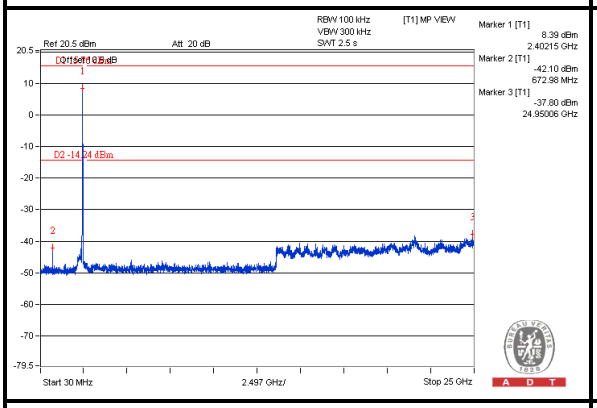
CH 1 Band edge	CH 11 Band edge
	

802.11g

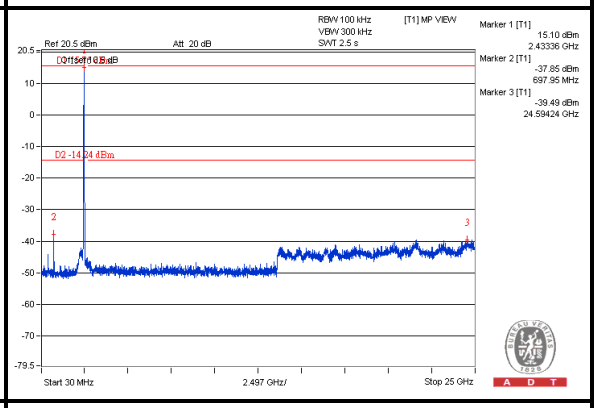
Maximum REF



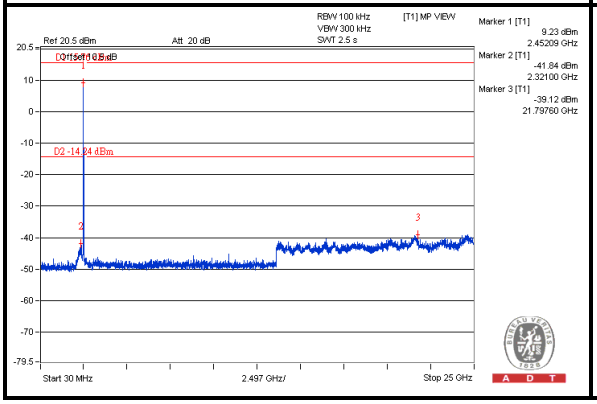
CH 1

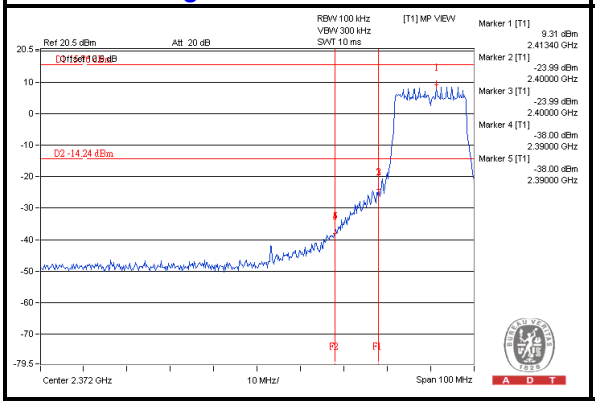
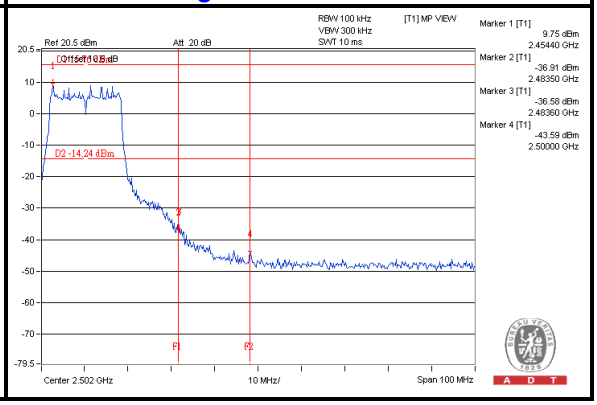


CH 6



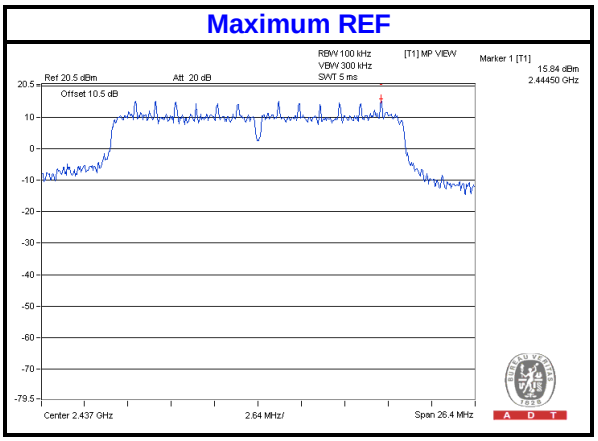
CH 11



CH 1 Band edge	CH 11 Band edge
	

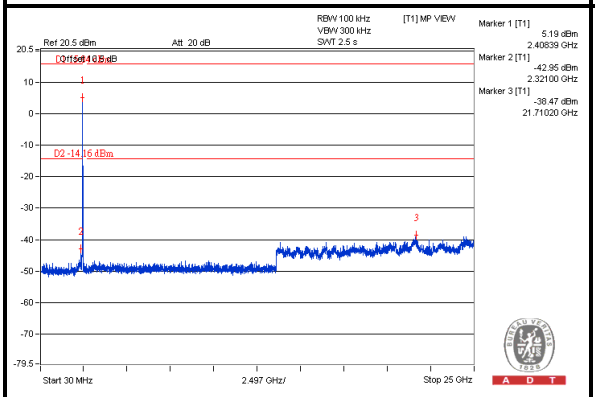
802.11n (HT20)

Maximum REF

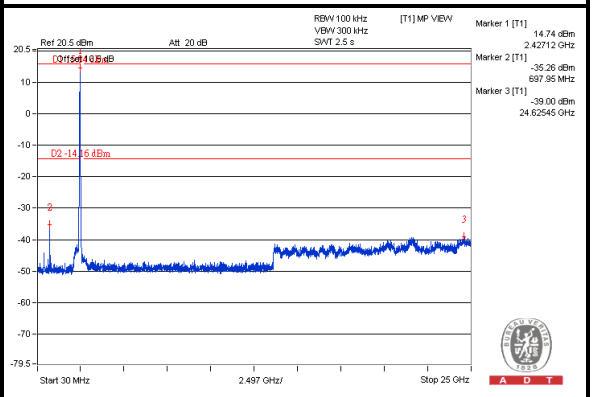


CHAIN (0)

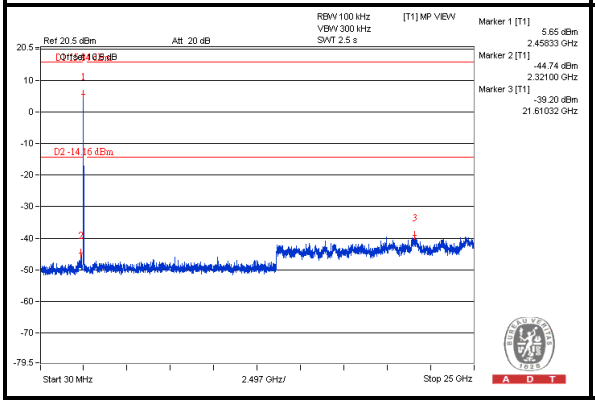
CH 1



CH 6

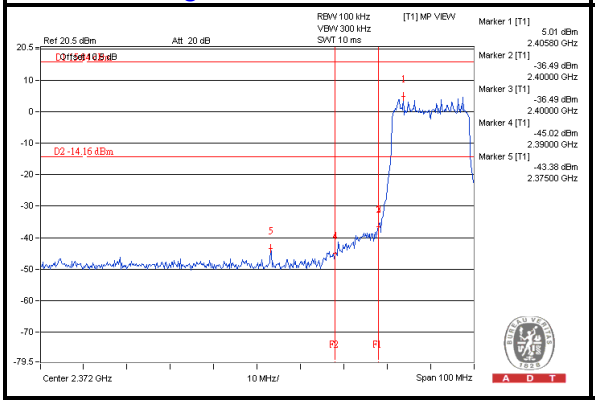


CH 11

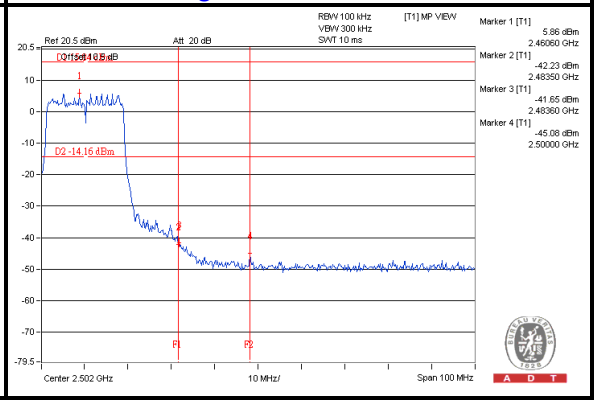


CHAIN (0)

CH 1 Band edge

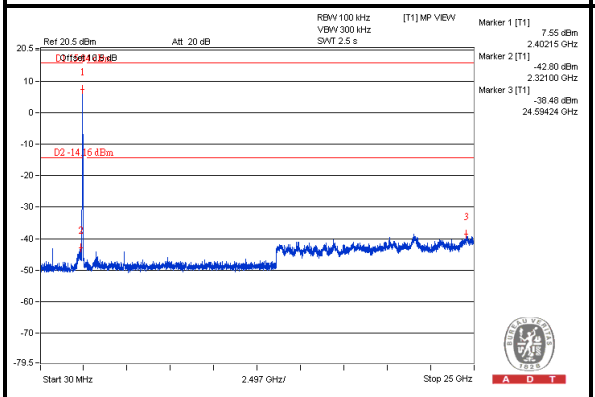


CH 11 Band edge

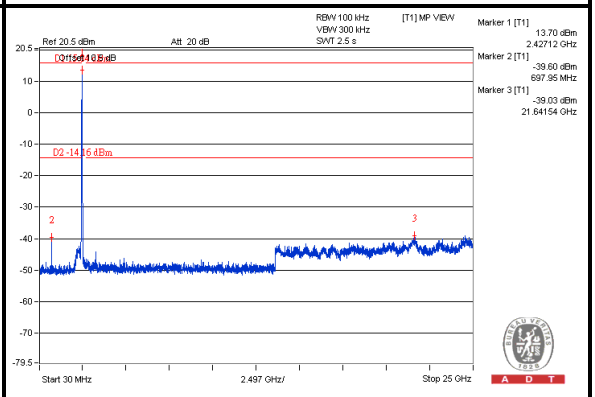


CHAIN (1)

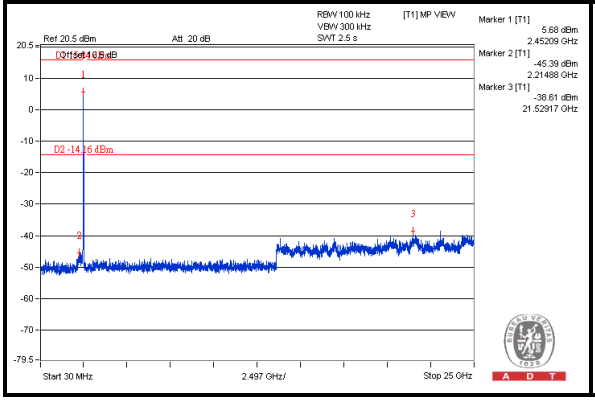
CH 1



CH 6

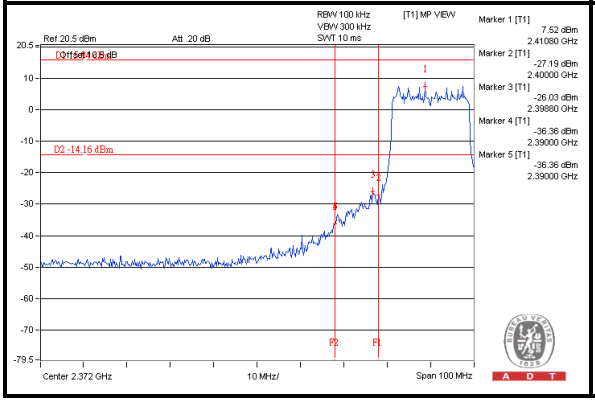


CH 11

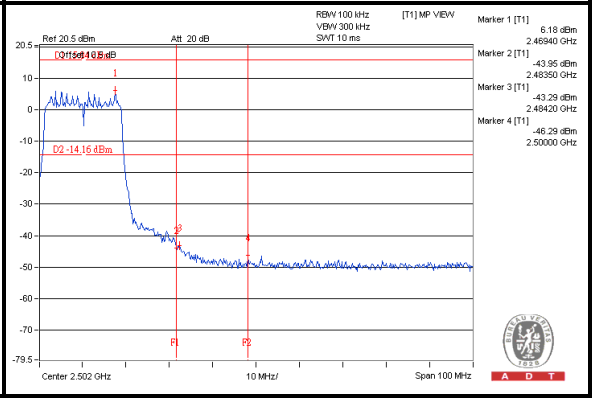


CHAIN (1)

CH 1 Band edge

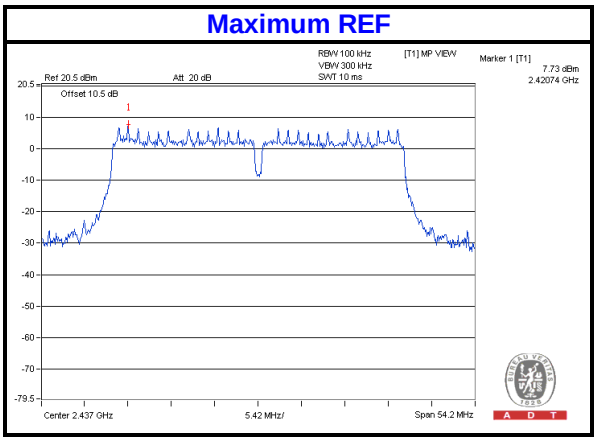


CH 11 Band edge



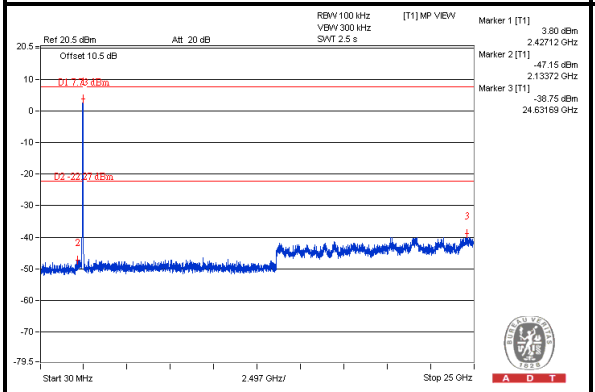
802.11n (HT40)

Maximum REF

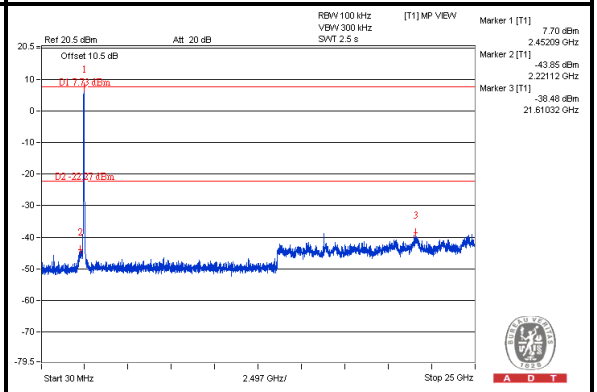


CHAIN (0)

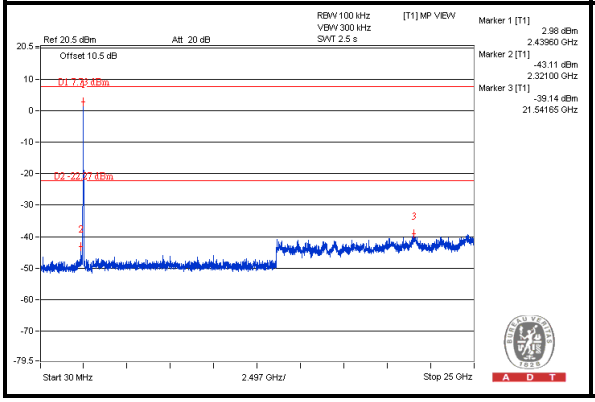
CH 3



CH 6

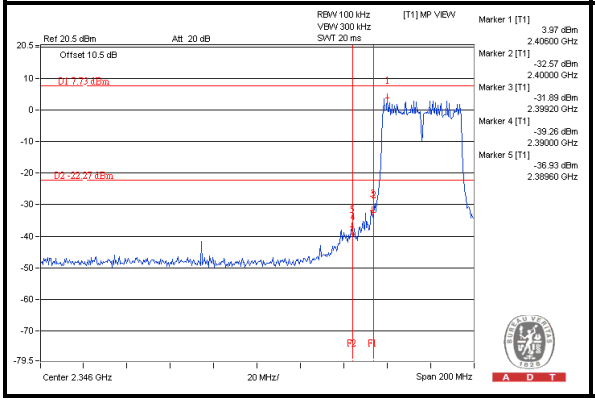


CH 9

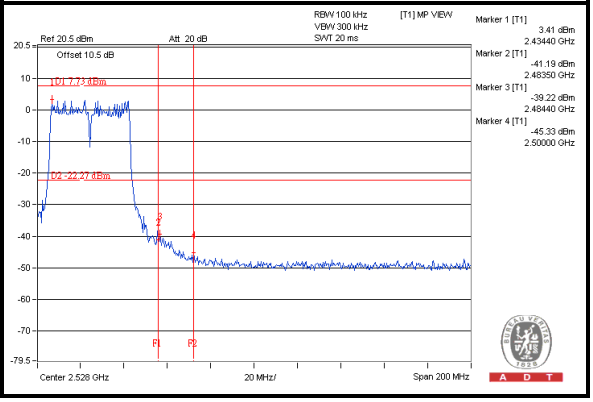


CHAIN (0)

CH 3 Band edge

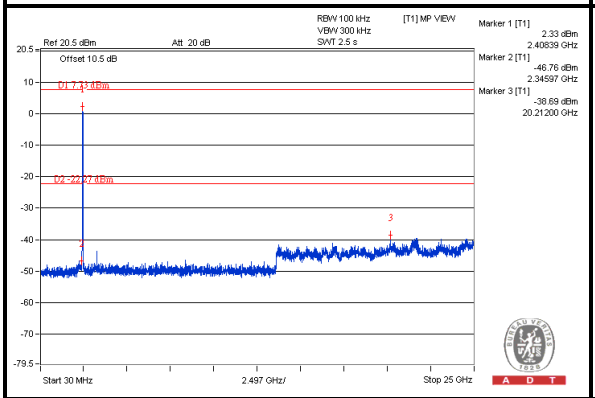


CH 9 Band edge

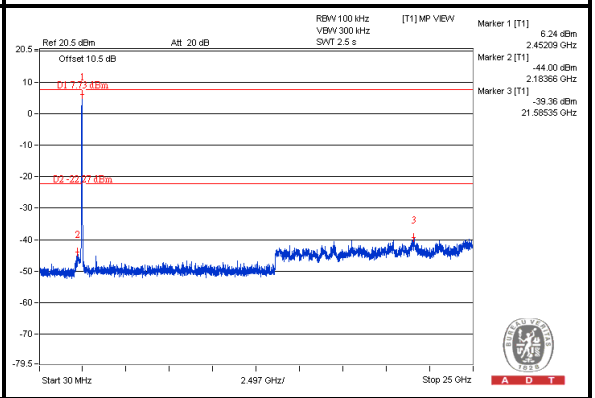


CHAIN (1)

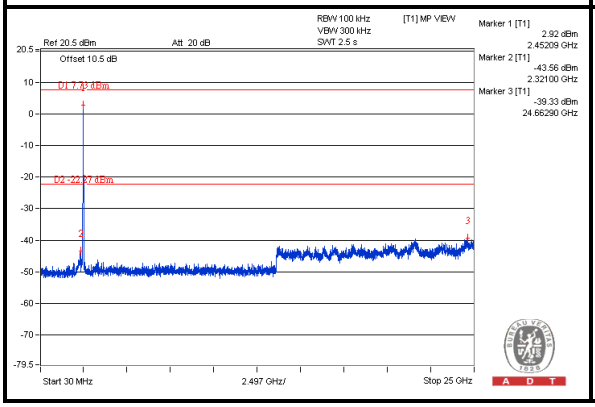
CH 3



CH 6

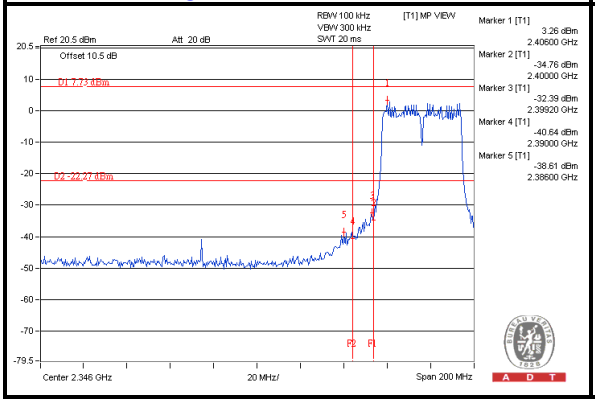


CH 9

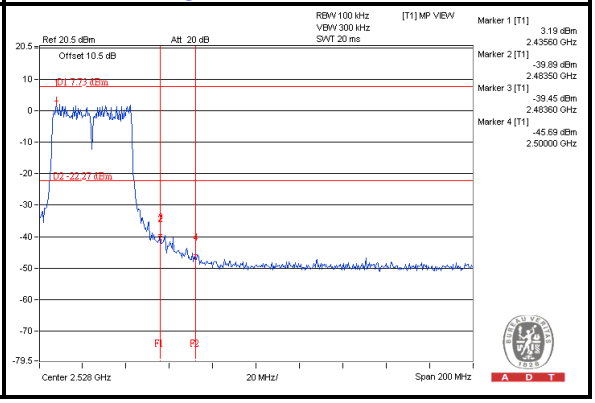


CHAIN (1)

CH 3 Band edge



CH 9 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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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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