FCC TEST REPORT
(WLAN 15.247)

REPORT NO.: RF140626C16A R1

MODEL NO.: C9

FCC ID: TE7C9

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TESTED: Sep. 12 to 19, 2014

ISSUED: Nov. 04, 2014

APPLICANT: TP-LINK TECHNOLOGIES CO., LTD.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140626C16A	Original release	Oct. 09, 2014
RF140626C16A R1	Modified section 3.1.	Nov. 04, 2014

1. CERTIFICATION

PRODUCT:	AC1900 Wireless Dual Band Gigabit Router
BRAND NAME:	TP-LINK
MODEL NO.:	C9
TEST SAMPLE:	PROTOTYPE
APPLICANT:	TP-LINK TECHNOLOGIES CO., LTD.
TESTED:	Sep. 12 to 19, 2014
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (Model: C9) 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. 04, 2014
(Elsie Hsu, Specialist)

APPROVED BY : _____ , **DATE:** Nov. 04, 2014
(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 2.4GHz, 2400~2483.5MHz Band

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 -6.76dB at 0.15000MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2382.00MHz
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.

For 5GHz, 5725~5850MHz Band

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 -8.17dB at 0.15000MHz
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -6.6dB at 11570.00MHz
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.

NOTE: The EUT was operating in 2.400 ~ 2.4835GHz, 5.15~5.25GHz and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2.400 ~ 2.4835GHz and 5.725~5.850GHz. For the 5.15~5.25GHz RF parameters was recorded in another test report.

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	2.86 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.65 dB
Radiated emissions (6GHz -18GHz)	3.88 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	AC1900 Wireless Dual Band Gigabit Router
MODEL NO.	C9
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode only
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 600Mbps 802.11ac: up to 1300Mbps
OPERATING FREQUENCY	**For 15.407** **5GHz:** 5.18 ~ 5.24GHz
	For 15.247 **2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.745 ~ 5.825GHz
NUMBER OF CHANNEL	**For 15.407** 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)
	For 15.247 (2.4GHz) 11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40) **For 15.247 (5GHz)** 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 2 for 802.11n (HT40), 802.11ac (VHT40) 1 for 802.11ac (VHT80)

MAXIMUM OUTPUT POWER	**For 15.407** 802.11a: 183.92mW 802.11ac (VHT20): 178.434mW 802.11ac (VHT40): 108.435mW 802.11ac (VHT80): 91.922mW **For 15.247 (2.4GHz)** 802.11b: 563.777mW 802.11g: 980.641mW 802.11n (HT20): 880.076mW 802.11n (HT40): 352.236mW **For 15.247 (5GHz)** 802.11a: 894.156mW 802.11ac (VHT20): 888.31mW 802.11ac (VHT40): 866.479mW 802.11ac (VHT80): 426.245mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	RJ45 cable x 1 (unshielded, 1.25m)
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1

Note:

1. For WLAN, 2.4GHz and 5GHz technology can transmit at same time.
2. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
3. The EUT must be supplied with a power adapter as following table:

Brand	Model No.	Spec.
Ten Pao	S048CU1200330	Input: 100-240V, 1.5A, 47~63Hz Output: 12.0V, 5.5A DC output cable(1.5m, unshielded)

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

Transmitter Circuit	Peak Gain (dBi)	Frequency range (MHz to MHz)	Ant. Type	Connecter Type
Chain 0	2.4GHz: 2.1 5GHz:1.7	2400~2483.5 5150~5250 5250~5350 5470~5725 5725~585	Omni directional	R-SMA
Chain 1				
Chain 2				

5. The EUT incorporates a MIMO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11a	6 ~ 54Mbps	3TX CDD	3RX
802.11b	1 ~ 11Mbps	3TX CDD	3RX
802.11g	6 ~ 54Mbps	3TX CDD	3RX
802.11n (HT20) (2.4GHz) & 802.11n (HT40) (2.4GHz)	MCS 0~7	3TX CDD	3RX
	MCS 8~15	3TX CDD	3RX
	MCS 16~23	3TX	3RX
802.11n (HT20) (5GHz) & 802.11n (HT40) (5GHz)	MCS 0~7	3TX CDD / Beamforming	3RX
	MCS 8~15	3TX CDD / Beamforming	3RX
	MCS 16~23	3TX / Beamforming	3RX
802.11ac (VHT20) (5GHz)	MCS0~8 Nss= 1	3TX CDD / Beamforming	3RX
	MCS0~8 Nss= 2	3TX CDD / Beamforming	3RX
	MCS0~8 Nss= 3	3TX / Beamforming	3RX
802.11ac (VHT40) (5GHz) & 802.11ac (VHT80) (5GHz)	MCS0~9 Nss= 1	3TX CDD / Beamforming	3RX
	MCS0~9 Nss= 2	3TX CDD / Beamforming	3RX
	MCS0~9 Nss= 3	3TX / Beamforming	3RX

Note: The modulation and bandwidth are similar for 802.11n mode for 20MHz (40MHz) and 802.11ac mode for 20MHz (40MHz), therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

6. The device that can be configured as a master and client mode, which can be switching by Web UI.
7. All of configured as a master and client which power level is no change and compliance.
8. The above EUT information was declared by 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		

Operated in 5725 ~ 5850MHz band:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

CHANNEL	FREQUENCY
151	5755 MHz
159	5795 MHz

1 channel is provided for 802.11ac (VHT80):

CHANNEL	FREQUENCY
155	5775 MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

POWER LINE CONDUCTED EMISSION TEST:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6
802.11a	149 to 165	165	OFDM	BPSK	6

RADIATED EMISSION TEST (BELOW 1 GHz):

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11g	1 to 11	6	OFDM	BPSK	6
802.11a	149 to 165	165	OFDM	BPSK	6

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

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
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

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
For 2.4 GHz 802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
For 2.4 GHz 802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5
802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6
For 5 GHz 802.11ac (VHT20)	149 to 165	149, 157, 165	OFDM	BPSK	6.5
For 5 GHz 802.11ac (VHT40)	151 to 159	151, 159	OFDM	BPSK	13.5
For 5 GHz 802.11ac (VHT80)	155	155	OFDM	BPSK	29.3

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	30deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE<1G	22deg. C, 62%RH	120Vac, 60Hz	Tim Ho
RE³1G	25deg. C, 68%RH	120Vac, 60Hz	Gary Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Tim Ho
OB	25deg. C, 60%RH	120Vac, 60Hz	Tim Ho

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 v02r01

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.

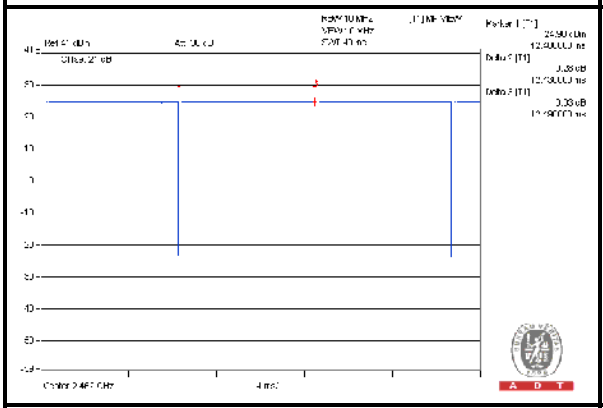
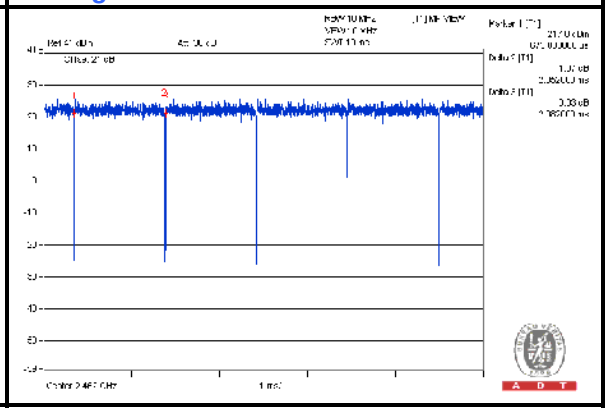
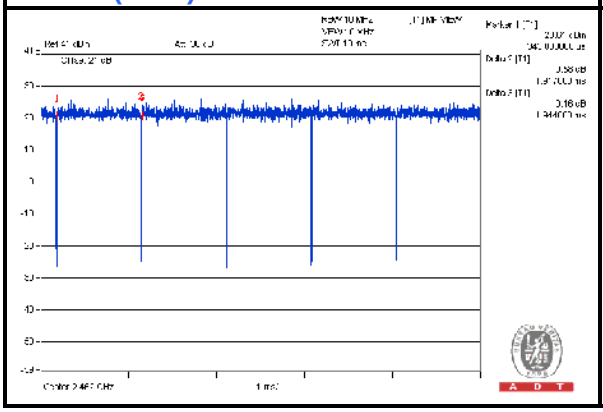
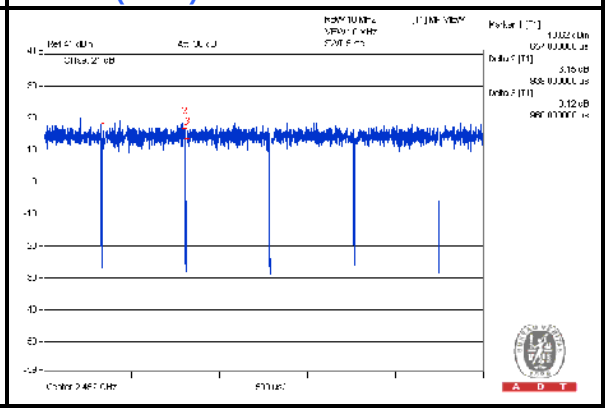
If duty cycle of test signal is < 98%, duty factor shall be considered.

802.11b: Duty cycle = 12.43 ms/12.49 ms = 0.995

802.11g: Duty cycle = 2.052 ms/2.082 ms = 0.986

802.11n (HT20): Duty cycle = 1.917 ms/1.944 ms = 0.986

802.11n (HT40): Duty cycle = 0.939 ms/0.96 ms = 0.97.8, Duty factor = 10 * log(1/0.978) = 0.1

802.11b	802.11g
	
802.11n (HT20)	**802.11n (HT40)**
	

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.

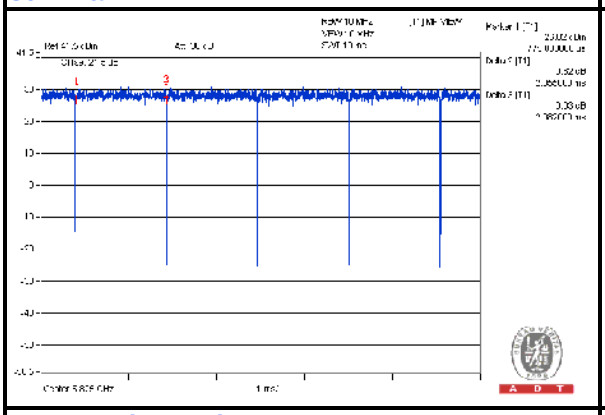
802.11a: Duty cycle = 2.055 ms/2.082 ms = 0.987

802.11ac (VHT20): Duty cycle = 1.917 ms/1.939 ms = 0.989

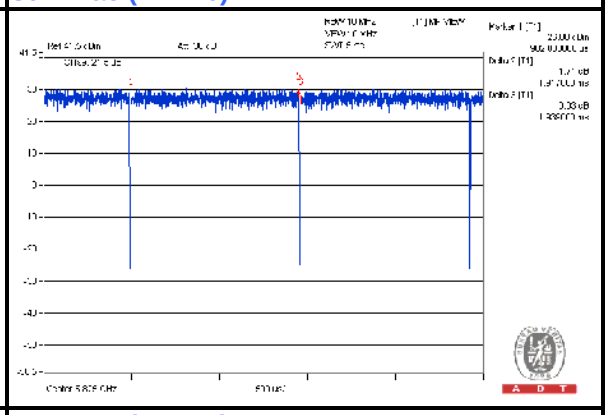
802.11ac (VHT40): Duty cycle = 0.941 ms/0.965 ms = 0.975, Duty factor = 10 * log(1/0.975) = 0.1

802.11ac (VHT80): Duty cycle = 0.46 ms/0.478 ms = 0.962, Duty factor = 10 * log(1/0.962) = 0.2

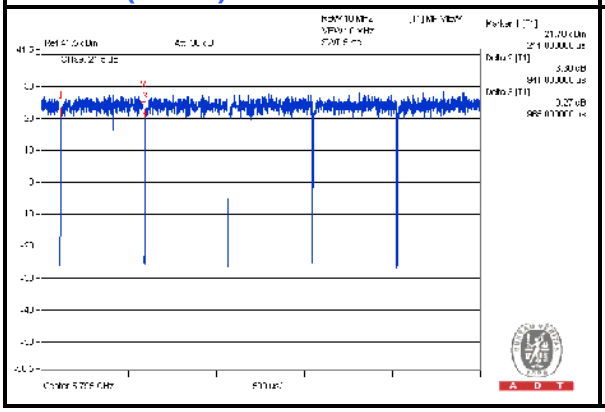
802.11a



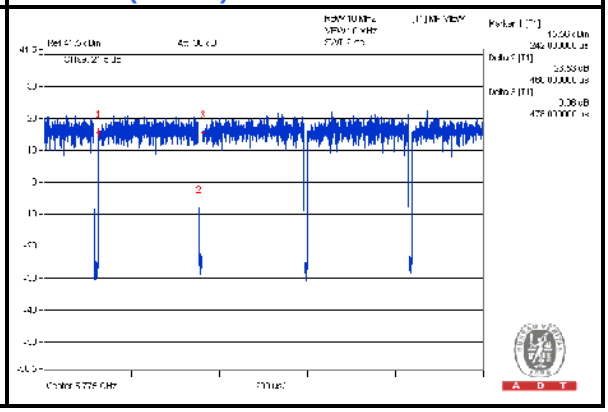
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



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.

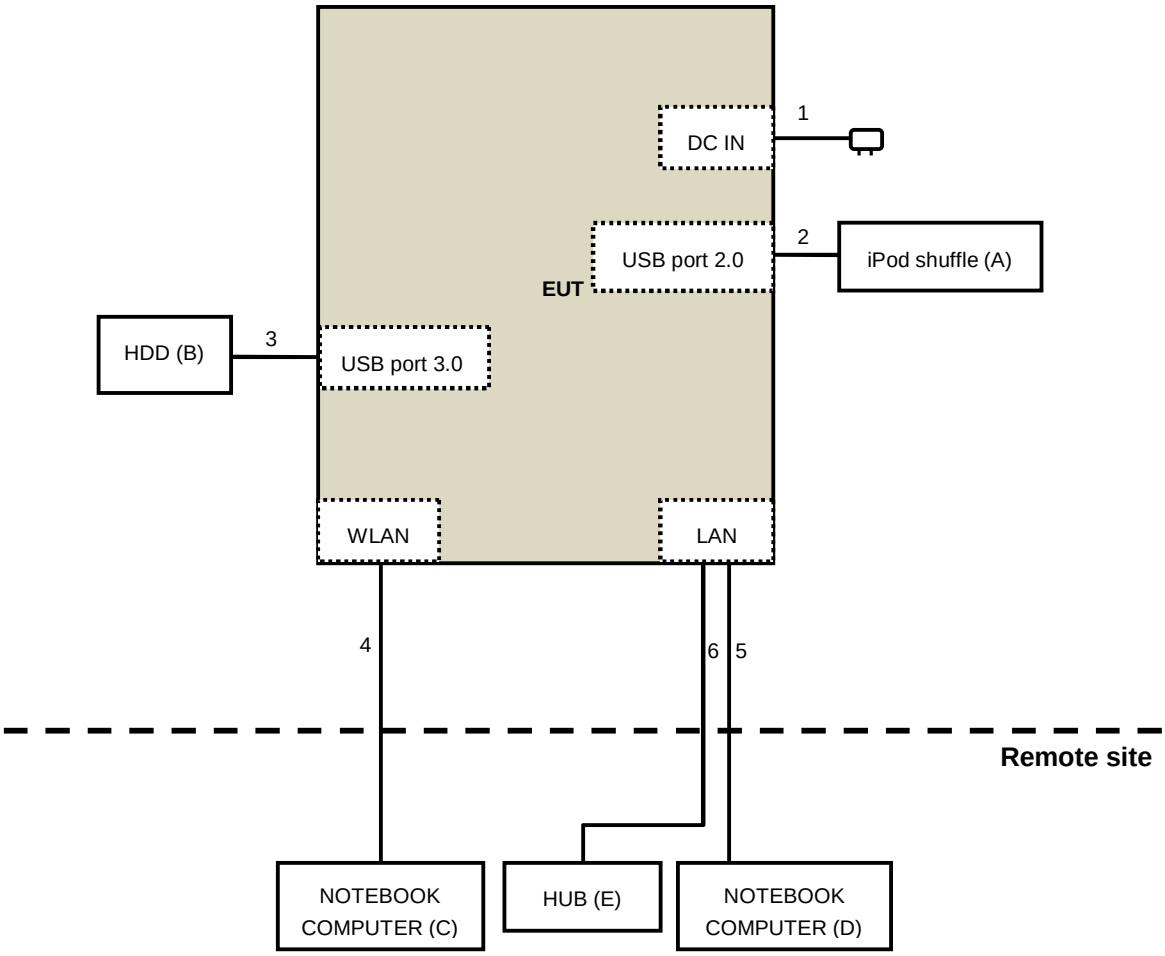
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	iPod shuffle	Apple	MD778TA/A	CC4JMCMXF4T1	NA	Provided by Lab
B	HDD	WD	WDBACW0010HBK-SESN	WCAZAL625787	FCC DoC	Provided by Lab
C	NOTEBOOK COMPUTER	DELL	PP32LA	GSLB32S	FCC DoC	Provided by Lab
D	NOTEBOOK COMPUTER	DELL	E5440	6FC7F12	FCC DoC	Provided by Lab
E	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab

NOTE:

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	DC	1	1.5	No	0	Supplied by client
2.	USB to Audio	1	0.1	No	0	Provided by Lab
3.	USB	1	0.5	No	0	Provided by Lab
4.	RJ45	1	10	No	0	Provided by Lab
5.	RJ45	1	10	No	0	Provided by Lab
6.	RJ45	3	10	No	0	Provided by Lab

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS (FOR 2.4GHz, 2.400 ~ 2.4835GHz Band)

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	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10 , 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 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: Sep. 19, 2014

4.1.3 TEST PROCEDURES

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

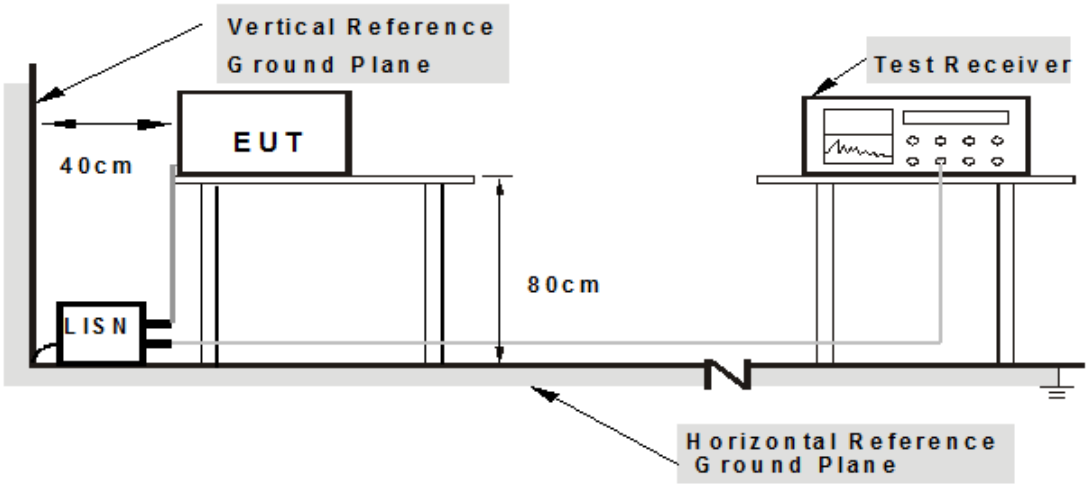
NOTE:

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

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



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

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

4.1.6 EUT OPERATING CONDITIONS

1. Connect the EUT with the support units C-D (Notebook Computer) which is placed on table in remote site.
2. The communication partner run test program “Mtool.exe[2.0.1.1]” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

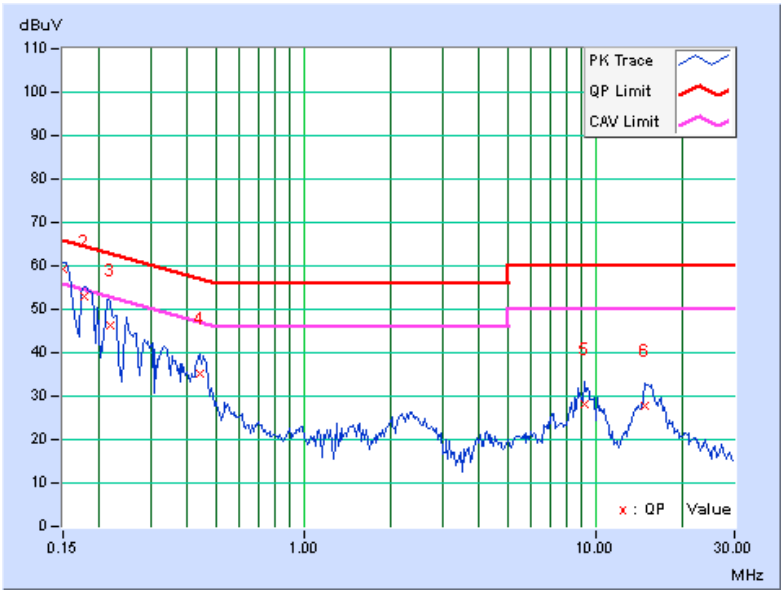
4.1.7 TEST RESULTS

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

	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**	**0.07**	**59.17**	**45.63**	**59.24**	**45.70**	**66.00**	**56.00**	**-6.76**	**-10.30**
2	0.17734	0.07	53.00	37.29	53.07	37.36	64.61	54.61	-11.54	-17.25
3	0.21641	0.07	46.13	31.05	46.20	31.12	62.96	52.96	-16.75	-21.83
4	0.43906	0.09	35.18	18.35	35.27	18.44	57.08	47.08	-21.81	-28.64
5	9.18750	0.42	27.57	19.81	27.99	20.23	60.00	50.00	-32.01	-29.77
6	14.82031	0.58	27.35	22.21	27.93	22.79	60.00	50.00	-32.07	-27.21

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

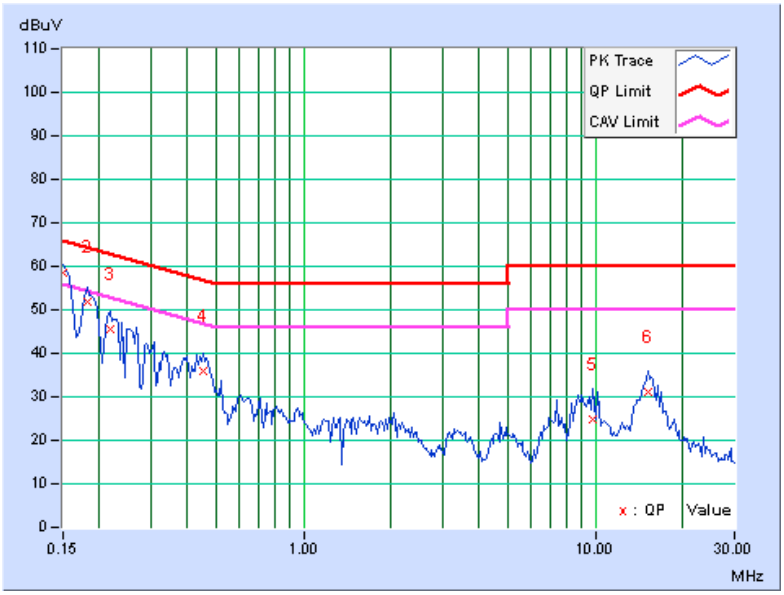


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	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	0.08	58.28	45.69	58.36	45.77	66.00	56.00	-7.64	-10.23
2	0.18125	0.07	51.70	36.73	51.77	36.80	64.43	54.43	-12.66	-17.63
3	0.21641	0.07	45.54	29.32	45.61	29.39	62.96	52.96	-17.34	-23.56
4	0.45078	0.09	35.82	24.53	35.91	24.62	56.86	46.86	-20.95	-22.24
5	9.82422	0.44	24.23	14.20	24.67	14.64	60.00	50.00	-35.33	-35.36
6	15.16406	0.59	30.62	25.65	31.21	26.24	60.00	50.00	-28.79	-23.76

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	MY51210105	Jan. 21,2014	Jan. 20,2015
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 10, 2012	Dec. 09, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
4. The test was performed in 966 Chamber No. G.
5 The FCC Site Registration No. is 966073.
6 The VCCI Site Registration No. is G-137.
7 The CANADA Site Registration No. is IC 7450H-2.
8 Tested Date: Sep. 12, 2014

4.2.3 TEST PROCEDURES

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

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

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

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

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

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

Note:

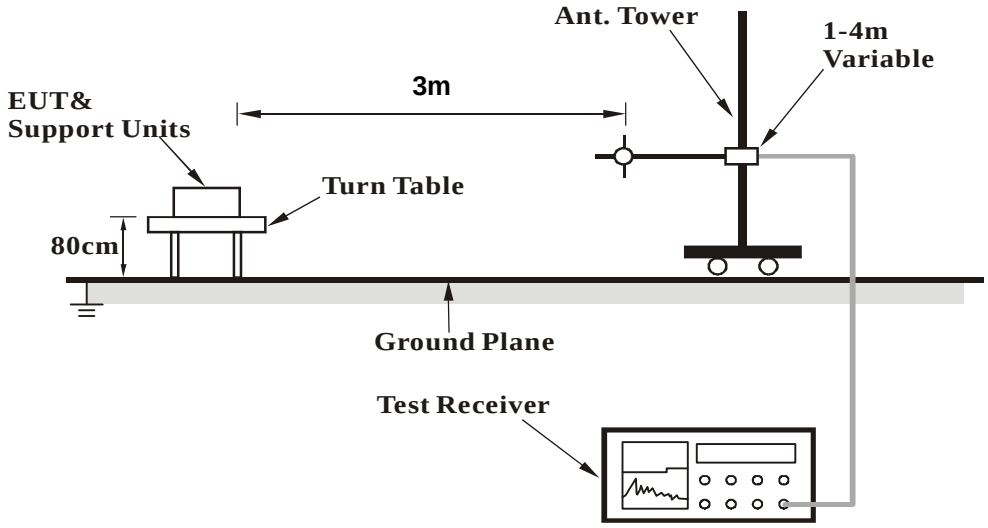
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.2.4 DEVIATION FROM TEST STANDARD

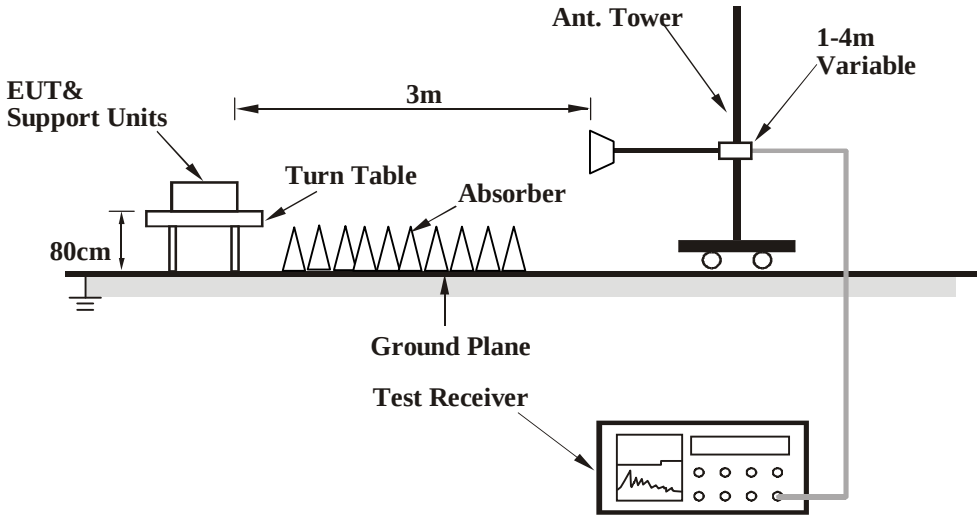
No deviation

4.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11g

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	123.36	30.0 QP	43.5	-13.5	1.50 H	47	44.95	-14.98
2	260.86	31.6 QP	46.0	-14.4	2.00 H	147	45.53	-13.90
3	280.31	31.9 QP	46.0	-14.1	1.00 H	307	44.88	-12.98
4	599.97	39.0 QP	46.0	-7.0	1.50 H	347	43.88	-4.89
5	857.07	35.5 QP	46.0	-10.5	1.50 H	260	36.27	-0.74
6	971.97	34.7 QP	54.0	-19.3	1.50 H	124	33.49	1.17
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	45.42	33.0 QP	40.0	-7.0	1.00 V	44	46.58	-13.58
2	101.88	29.0 QP	43.5	-14.5	1.50 V	360	46.44	-17.43
3	280.36	27.4 QP	46.0	-18.6	1.50 V	313	40.35	-12.98
4	599.97	32.3 QP	46.0	-13.8	1.00 V	65	37.14	-4.89
5	857.07	32.9 QP	46.0	-13.2	1.00 V	224	33.59	-0.74
6	912.41	31.5 QP	46.0	-14.5	1.00 V	240	31.08	0.38

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	54.1 PK	74.0	-19.9	1.17 H	343	56.57	-2.47
2	2390.00	41.5 AV	54.0	-12.5	1.17 H	343	43.97	-2.47
3	*2412.00	108.6 PK			1.17 H	343	110.97	-2.37
4	*2412.00	105.9 AV			1.17 H	343	108.27	-2.37
5	2491.00	56.2 PK	74.0	-17.8	1.17 H	343	58.21	-2.01
6	2491.00	49.9 AV	54.0	-4.1	1.17 H	343	51.91	-2.01
7	4824.00	48.1 PK	74.0	-25.9	1.00 H	62	42.39	5.71
8	4824.00	35.5 AV	54.0	-18.5	1.00 H	62	29.79	5.71
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	58.2 PK	74.0	-15.8	1.00 V	351	60.67	-2.47
2	2390.00	45.7 AV	54.0	-8.3	1.00 V	351	48.17	-2.47
3	*2412.00	118.6 PK			1.37 V	262	120.97	-2.37
4	*2412.00	115.8 AV			1.37 V	262	118.17	-2.37
5	2491.00	60.1 PK	74.0	-13.9	1.00 V	82	62.11	-2.01
6	2491.00	53.8 AV	54.0	-0.2	1.00 V	82	55.81	-2.01
7	4824.00	47.7 PK	74.0	-26.3	1.00 V	55	41.99	5.71
8	4824.00	36.5 AV	54.0	-17.5	1.00 V	55	30.79	5.71

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	2312.00	54.8 PK	74.0	-19.2	1.16 H	334	57.62	-2.82
2	2312.00	49.5 AV	54.0	-4.5	1.16 H	334	52.32	-2.82
3	*2437.00	111.2 PK			1.16 H	334	113.45	-2.25
4	*2437.00	108.6 AV			1.16 H	334	110.85	-2.25
5	4874.00	48.1 PK	74.0	-25.9	1.00 H	65	42.20	5.90
6	4874.00	35.4 AV	54.0	-18.6	1.00 H	65	29.50	5.90
7	7311.00	54.1 PK	74.0	-19.9	1.00 H	125	40.93	13.17
8	7311.00	41.2 AV	54.0	-12.8	1.00 H	125	28.03	13.17
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	2312.00	58.7 PK	74.0	-15.3	1.00 V	177	61.52	-2.82
2	2312.00	53.6 AV	54.0	-0.4	1.00 V	177	56.42	-2.82
3	*2437.00	121.4 PK			1.00 V	177	123.65	-2.25
4	*2437.00	118.9 AV			1.00 V	177	121.15	-2.25
5	4874.00	47.4 PK	74.0	-26.6	1.00 V	64	41.50	5.90
6	4874.00	36.1 AV	54.0	-17.9	1.00 V	64	30.20	5.90
7	7311.00	54.4 PK	74.0	-19.6	1.00 V	124	41.23	13.17
8	7311.00	41.3 AV	54.0	-12.7	1.00 V	124	28.13	13.17

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	2382.00	56.0 PK	74.0	-18.0	1.20 H	336	58.50	-2.50
2	2382.00	49.4 AV	54.0	-4.6	1.20 H	336	51.90	-2.50
3	*2462.00	107.4 PK			1.20 H	336	109.54	-2.14
4	*2462.00	105.1 AV			1.20 H	336	107.24	-2.14
5	2483.50	54.1 PK	74.0	-19.9	1.20 H	336	56.13	-2.03
6	2483.50	42.0 AV	54.0	-12.0	1.20 H	336	44.03	-2.03
7	4924.00	48.1 PK	74.0	-25.9	1.06 H	78	41.99	6.11
8	4924.00	35.6 AV	54.0	-18.4	1.06 H	78	29.49	6.11
9	7386.00	54.6 PK	74.0	-19.4	1.00 H	124	41.42	13.18
10	7386.00	41.6 AV	54.0	-12.4	1.00 H	124	28.42	13.18
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	2382.00	60.7 PK	74.0	-13.3	1.00 V	351	63.20	-2.50
2	**2382.00**	**53.9 AV**	**54.0**	**-0.1**	**1.00 V**	**351**	**56.40**	**-2.50**
3	*2462.00	117.9 PK			1.37 V	262	120.04	-2.14
4	*2462.00	115.4 AV			1.37 V	262	117.54	-2.14
5	2483.50	58.1 PK	74.0	-15.9	1.37 V	262	60.13	-2.03
6	2483.50	46.2 AV	54.0	-7.8	1.37 V	262	48.23	-2.03
7	4924.00	47.6 PK	74.0	-26.4	1.01 V	54	41.49	6.11
8	4924.00	36.3 AV	54.0	-17.7	1.01 V	54	30.19	6.11
9	7386.00	54.6 PK	74.0	-19.4	1.03 V	126	41.42	13.18
10	7386.00	41.7 AV	54.0	-12.3	1.03 V	126	28.52	13.18

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.

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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	53.6 PK	74.0	-20.4	1.20 H	343	56.07	-2.47
2	2390.00	36.7 AV	54.0	-17.3	1.20 H	343	39.17	-2.47
3	*2412.00	107.6 PK			1.20 H	343	109.97	-2.37
4	*2412.00	97.7 AV			1.20 H	343	100.07	-2.37
5	2487.00	50.5 PK	74.0	-23.5	1.20 H	343	52.52	-2.02
6	2487.00	39.0 AV	54.0	-15.0	1.20 H	343	41.02	-2.02
7	4824.00	47.8 PK	74.0	-26.2	1.00 H	68	42.09	5.71
8	4824.00	35.1 AV	54.0	-18.9	1.00 H	68	29.39	5.71
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	72.7 PK	74.0	-1.3	1.00 V	0	75.17	-2.47
2	2390.00	53.5 AV	54.0	-0.5	1.00 V	0	55.97	-2.47
3	*2412.00	117.8 PK			1.00 V	0	120.17	-2.37
4	*2412.00	107.2 AV			1.00 V	0	109.57	-2.37
5	2487.00	59.2 PK	74.0	-14.8	1.38 V	30	61.22	-2.02
6	2487.00	49.1 AV	54.0	-4.9	1.38 V	30	51.12	-2.02
7	4824.00	47.2 PK	74.0	-26.8	1.05 V	61	41.49	5.71
8	4824.00	36.0 AV	54.0	-18.0	1.05 V	61	30.29	5.71

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	69.5 PK	74.0	-4.5	1.25 H	333	71.97	-2.47
2	2390.00	47.6 AV	54.0	-6.4	1.25 H	333	50.07	-2.47
3	*2437.00	116.4 PK			1.25 H	333	118.65	-2.25
4	*2437.00	105.7 AV			1.25 H	333	107.95	-2.25
5	2483.50	67.1 PK	74.0	-6.9	1.25 H	333	69.13	-2.03
6	2483.50	47.9 AV	54.0	-6.1	1.25 H	333	49.93	-2.03
7	4874.00	47.6 PK	74.0	-26.4	1.04 H	74	41.70	5.90
8	4874.00	35.2 AV	54.0	-18.8	1.04 H	74	29.30	5.90
9	7311.00	53.7 PK	74.0	-20.3	1.00 H	117	40.53	13.17
10	7311.00	40.8 AV	54.0	-13.2	1.00 H	117	27.63	13.17
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	73.5 PK	74.0	-0.5	1.00 V	177	75.97	-2.47
2	2390.00	51.9 AV	54.0	-2.1	1.00 V	177	54.37	-2.47
3	*2437.00	126.2 PK			1.00 V	177	128.45	-2.25
4	*2437.00	115.8 AV			1.00 V	177	118.05	-2.25
5	2483.50	71.4 PK	74.0	-2.6	1.00 V	177	73.43	-2.03
6	2483.50	52.1 AV	54.0	-1.9	1.00 V	177	54.13	-2.03
7	4874.00	45.6 PK	74.0	-28.4	1.00 V	121	39.70	5.90
8	4874.00	38.7 AV	54.0	-15.3	1.00 V	121	32.80	5.90
9	7311.00	51.2 PK	74.0	-22.8	1.00 V	147	38.03	13.17
10	7311.00	38.7 AV	54.0	-15.3	1.00 V	147	25.53	13.17

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	2385.00	55.7 PK	74.0	-18.3	1.24 H	352	58.19	-2.49
2	2385.00	43.3 AV	54.0	-10.7	1.24 H	352	45.79	-2.49
3	*2462.00	108.2 PK			1.24 H	352	110.34	-2.14
4	*2462.00	97.7 AV			1.24 H	352	99.84	-2.14
5	2483.50	69.7 PK	74.0	-4.3	1.24 H	352	71.73	-2.03
6	2483.50	48.0 AV	54.0	-6.0	1.24 H	352	50.03	-2.03
7	4924.00	48.3 PK	74.0	-25.7	1.00 H	53	42.19	6.11
8	4924.00	35.7 AV	54.0	-18.3	1.00 H	53	29.59	6.11
9	7386.00	53.8 PK	74.0	-20.2	1.03 H	130	40.62	13.18
10	7386.00	40.7 AV	54.0	-13.3	1.03 H	130	27.52	13.18
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	2385.00	60.2 PK	74.0	-13.8	1.00 V	0	62.69	-2.49
2	2385.00	47.6 AV	54.0	-6.4	1.00 V	0	50.09	-2.49
3	*2462.00	118.1 PK			1.00 V	0	120.24	-2.14
4	*2462.00	107.5 AV			1.00 V	0	109.64	-2.14
5	2483.50	73.6 PK	74.0	-0.4	1.00 V	0	75.63	-2.03
6	2483.50	52.1 AV	54.0	-1.9	1.00 V	0	54.13	-2.03
7	4924.00	47.6 PK	74.0	-26.4	1.01 V	49	41.49	6.11
8	4924.00	36.2 AV	54.0	-17.8	1.01 V	49	30.09	6.11
9	7386.00	54.1 PK	74.0	-19.9	1.04 V	134	40.92	13.18
10	7386.00	41.0 AV	54.0	-13.0	1.04 V	134	27.82	13.18

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.

802.11n (HT20)

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	69.6 PK	74.0	-4.4	1.17 H	342	72.07	-2.47
2	2390.00	48.3 AV	54.0	-5.7	1.17 H	342	50.77	-2.47
3	*2412.00	108.7 PK			1.17 H	342	111.07	-2.37
4	*2412.00	97.7 AV			1.17 H	342	100.07	-2.37
5	4824.00	47.9 PK	74.0	-26.1	1.00 H	50	42.19	5.71
6	4824.00	35.1 AV	54.0	-18.9	1.00 H	50	29.39	5.71
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	73.4 PK	74.0	-0.6	1.00 V	0	75.87	-2.47
2	2390.00	52.2 AV	54.0	-1.8	1.00 V	0	54.67	-2.47
3	*2412.00	118.8 PK			1.00 V	0	121.17	-2.37
4	*2412.00	107.7 AV			1.00 V	0	110.07	-2.37
5	4824.00	47.0 PK	74.0	-27.0	1.00 V	71	41.29	5.71
6	4824.00	35.8 AV	54.0	-18.2	1.00 V	71	30.09	5.71

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	69.4 PK	74.0	-4.6	1.17 H	333	71.87	-2.47
2	2390.00	45.6 AV	54.0	-8.4	1.17 H	333	48.07	-2.47
3	*2437.00	115.5 PK			1.17 H	333	117.75	-2.25
4	*2437.00	104.5 AV			1.17 H	333	106.75	-2.25
5	2483.50	66.0 PK	74.0	-8.0	1.17 H	333	68.03	-2.03
6	2483.50	46.1 AV	54.0	-7.9	1.17 H	333	48.13	-2.03
7	4874.00	48.4 PK	74.0	-25.6	1.04 H	75	42.50	5.90
8	4874.00	35.9 AV	54.0	-18.1	1.04 H	75	30.00	5.90
9	7311.00	53.5 PK	74.0	-20.5	1.00 H	118	40.33	13.17
10	7311.00	40.9 AV	54.0	-13.1	1.00 H	118	27.73	13.17
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	73.2 PK	74.0	-0.8	1.00 V	178	75.67	-2.47
2	2390.00	49.5 AV	54.0	-4.5	1.00 V	178	51.97	-2.47
3	*2437.00	125.2 PK			1.00 V	178	127.45	-2.25
4	*2437.00	114.1 AV			1.00 V	178	116.35	-2.25
5	2483.50	70.1 PK	74.0	-3.9	1.00 V	178	72.13	-2.03
6	2483.50	50.3 AV	54.0	-3.7	1.00 V	178	52.33	-2.03
7	4874.00	47.1 PK	74.0	-26.9	1.00 V	64	41.20	5.90
8	4874.00	36.1 AV	54.0	-17.9	1.00 V	64	30.20	5.90
9	7311.00	54.9 PK	74.0	-19.1	1.01 V	116	41.73	13.17
10	7311.00	41.7 AV	54.0	-12.3	1.01 V	116	28.53	13.17

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	2386.00	56.4 PK	74.0	-17.6	1.23 H	356	58.89	-2.49
2	2386.00	44.8 AV	54.0	-9.2	1.23 H	356	47.29	-2.49
3	*2462.00	108.1 PK			1.23 H	356	110.24	-2.14
4	*2462.00	98.0 AV			1.23 H	356	100.14	-2.14
5	2483.50	69.1 PK	74.0	-4.9	1.23 H	356	71.13	-2.03
6	2483.50	49.2 AV	54.0	-4.8	1.23 H	356	51.23	-2.03
7	4924.00	48.2 PK	74.0	-25.8	1.00 H	62	42.09	6.11
8	4924.00	35.5 AV	54.0	-18.5	1.00 H	62	29.39	6.11
9	7386.00	54.4 PK	74.0	-19.6	1.02 H	139	41.22	13.18
10	7386.00	41.3 AV	54.0	-12.7	1.02 H	139	28.12	13.18
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	2386.00	60.2 PK	74.0	-13.8	1.21 V	188	62.69	-2.49
2	2386.00	48.4 AV	54.0	-5.6	1.21 V	188	50.89	-2.49
3	*2462.00	118.7 PK			1.21 V	188	120.84	-2.14
4	*2462.00	108.4 AV			1.21 V	188	110.54	-2.14
5	2483.50	73.7 PK	74.0	-0.3	1.21 V	188	75.73	-2.03
6	2483.50	53.6 AV	54.0	-0.4	1.21 V	188	55.63	-2.03
7	4924.00	47.6 PK	74.0	-26.4	1.06 V	55	41.49	6.11
8	4924.00	36.3 AV	54.0	-17.7	1.06 V	55	30.19	6.11
9	7386.00	53.8 PK	74.0	-20.2	1.02 V	125	40.62	13.18
10	7386.00	40.9 AV	54.0	-13.1	1.02 V	125	27.72	13.18

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.

802.11n (HT40)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.0 PK	74.0	-7.0	1.20 H	358	69.47	-2.47
2	2390.00	50.1 AV	54.0	-3.9	1.20 H	358	52.57	-2.47
3	*2422.00	102.7 PK			1.20 H	358	105.02	-2.32
4	*2422.00	92.5 AV			1.20 H	358	94.82	-2.32
5	4844.00	48.2 PK	74.0	-25.8	1.05 H	74	42.42	5.78
6	4844.00	35.3 AV	54.0	-18.7	1.05 H	74	29.52	5.78
7	7266.00	53.8 PK	74.0	-20.2	1.00 H	123	40.60	13.20
8	7266.00	41.1 AV	54.0	-12.9	1.00 H	123	27.90	13.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.9 PK	74.0	-3.1	1.00 V	191	73.37	-2.47
2	2390.00	53.7 AV	54.0	-0.3	1.00 V	191	56.17	-2.47
3	*2422.00	112.9 PK			1.00 V	191	115.22	-2.32
4	*2422.00	102.5 AV			1.00 V	191	104.82	-2.32
5	4844.00	47.4 PK	74.0	-26.6	1.03 V	70	41.62	5.78
6	4844.00	36.3 AV	54.0	-17.7	1.03 V	70	30.52	5.78
7	7266.00	54.0 PK	74.0	-20.0	1.01 V	118	40.80	13.20
8	7266.00	40.9 AV	54.0	-13.1	1.01 V	118	27.70	13.20

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.

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	69.5 PK	74.0	-4.5	1.25 H	347	71.97	-2.47
2	2390.00	49.2 AV	54.0	-4.8	1.25 H	347	51.67	-2.47
3	*2437.00	108.2 PK			1.25 H	347	110.45	-2.25
4	*2437.00	97.2 AV			1.25 H	347	99.45	-2.25
5	4874.00	47.9 PK	74.0	-26.1	1.02 H	51	42.00	5.90
6	4874.00	35.4 AV	54.0	-18.6	1.02 H	51	29.50	5.90
7	7311.00	53.7 PK	74.0	-20.3	1.01 H	129	40.53	13.17
8	7311.00	40.7 AV	54.0	-13.3	1.01 H	129	27.53	13.17
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	73.5 PK	74.0	-0.5	1.00 V	189	75.97	-2.47
2	2390.00	53.2 AV	54.0	-0.8	1.00 V	189	55.67	-2.47
3	*2437.00	117.6 PK			1.00 V	189	119.85	-2.25
4	*2437.00	106.7 AV			1.00 V	189	108.95	-2.25
5	4874.00	48.0 PK	74.0	-26.0	1.05 V	54	42.10	5.90
6	4874.00	36.5 AV	54.0	-17.5	1.05 V	54	30.60	5.90
7	7311.00	54.9 PK	74.0	-19.1	1.04 V	130	41.73	13.17
8	7311.00	41.8 AV	54.0	-12.2	1.04 V	130	28.63	13.17

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	103.5 PK			1.23 H	328	105.68	-2.18
2	*2452.00	92.5 AV			1.23 H	328	94.68	-2.18
3	2483.50	65.9 PK	74.0	-8.1	1.23 H	328	67.93	-2.03
4	2483.50	49.5 AV	54.0	-4.5	1.23 H	328	51.53	-2.03
5	4904.00	47.7 PK	74.0	-26.3	1.00 H	71	41.68	6.02
6	4904.00	35.2 AV	54.0	-18.8	1.00 H	71	29.18	6.02
7	7356.00	53.9 PK	74.0	-20.1	1.02 H	140	40.72	13.18
8	7356.00	41.1 AV	54.0	-12.9	1.02 H	140	27.92	13.18
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	*2452.00	113.0 PK			1.25 V	192	115.18	-2.18
2	*2452.00	102.3 AV			1.25 V	192	104.48	-2.18
3	2483.50	70.2 PK	74.0	-3.8	1.25 V	192	72.23	-2.03
4	2483.50	53.8 AV	54.0	-0.2	1.25 V	192	55.83	-2.03
5	4904.00	46.7 PK	74.0	-27.3	1.02 V	65	40.68	6.02
6	4904.00	35.6 AV	54.0	-18.4	1.02 V	65	29.58	6.02
7	7356.00	54.5 PK	74.0	-19.5	1.02 V	114	41.32	13.18
8	7356.00	41.4 AV	54.0	-12.6	1.02 V	114	28.22	13.18

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.

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	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

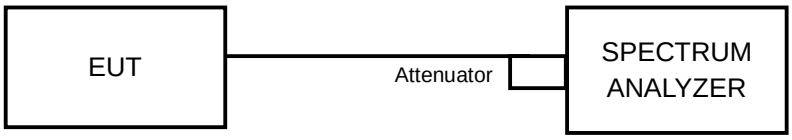
4.3.3 TEST PROCEDURE

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
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	8.58	8.58	9.08	0.5	PASS
6	2437	8.60	8.12	8.62	0.5	PASS
11	2462	8.62	9.07	9.06	0.5	PASS

802.11g

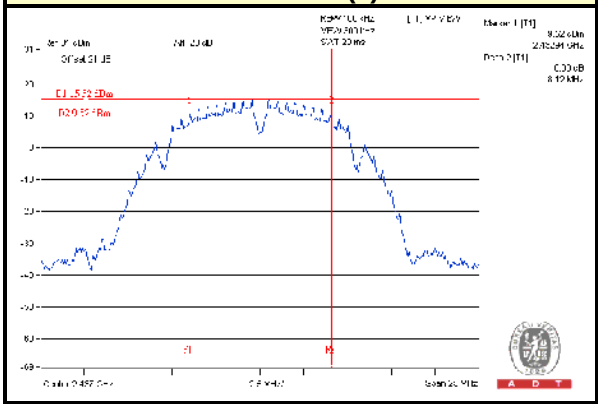
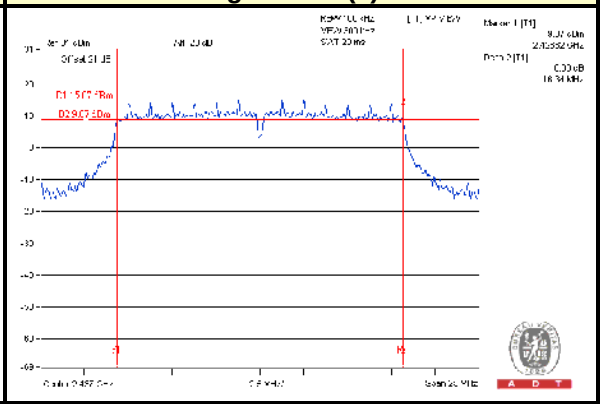
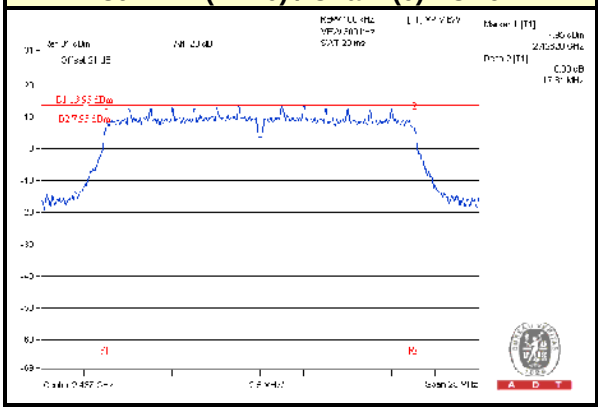
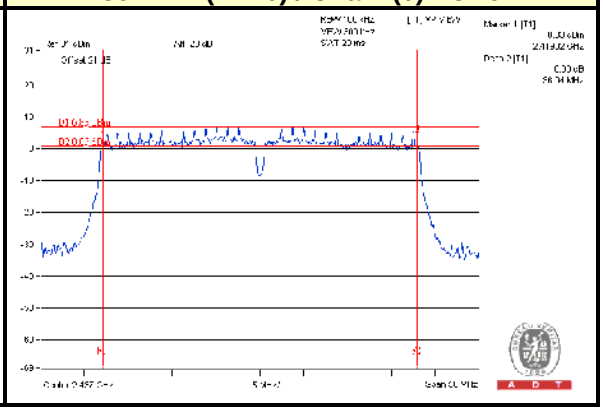
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.40	16.40	16.42	0.5	PASS
6	2437	16.34	16.37	16.41	0.5	PASS
11	2462	16.39	16.43	16.45	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.63	17.66	17.64	0.5	PASS
6	2437	17.61	17.65	17.65	0.5	PASS
11	2462	17.64	17.67	17.64	0.5	PASS

802.11n (HT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	36.16	36.45	36.15	0.5	PASS
6	2437	36.04	36.33	36.35	0.5	PASS
9	2452	36.44	36.48	36.12	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11b / Chain (1) : CH6	**802.11g / Chain (0) : CH6**
	
802.11n (HT20) / Chain (0) : CH6	**802.11n (HT40) / Chain (0) : CH6**
	

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 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 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

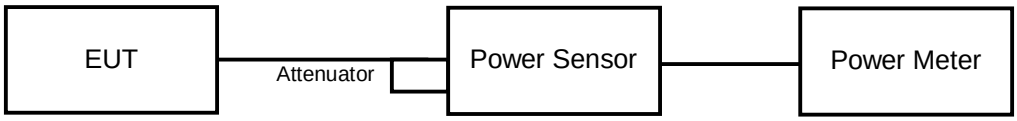
4.4.3 TEST PROCEDURES

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor. Record the average 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)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	21.56	22.02	21.80	453.796	26.57	30	PASS
6	2437	22.64	22.97	22.60	563.777	27.51	30	PASS
11	2462	21.54	21.98	21.73	449.258	26.52	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	18.96	19.39	19.26	249.934	23.98	30	PASS
6	2437	25.23	25.06	25.14	980.641	29.92	30	PASS
11	2462	18.96	19.62	19.14	252.362	24.02	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	CHAIN 2				
1	2412	18.49	18.54	18.43	211.745	23.26	30	PASS
6	2437	24.78	24.62	24.62	880.076	29.45	30	PASS
11	2462	18.70	19.20	18.88	234.575	23.70	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	CHAIN 2				
3	2422	15.27	15.99	15.43	108.284	20.35	30	PASS
6	2437	20.51	20.94	20.63	352.236	25.47	30	PASS
9	2452	15.32	15.86	15.44	107.584	20.32	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	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

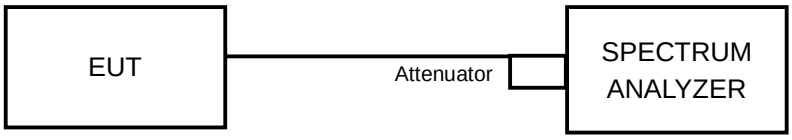
4.5.3 TEST PROCEDURE

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=3) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-5.60	4.77	-0.83	7.13	PASS
	6	2437	-4.82	4.77	-0.05	7.13	PASS
	11	2462	-6.13	4.77	-1.36	7.13	PASS
1	1	2412	-5.13	4.77	-0.36	7.13	PASS
	6	2437	-4.36	4.77	0.41	7.13	PASS
	11	2462	-5.81	4.77	-1.04	7.13	PASS
2	1	2412	-6.02	4.77	-1.25	7.13	PASS
	6	2437	-4.99	4.77	-0.22	7.13	PASS
	11	2462	-5.88	4.77	-1.11	7.13	PASS

NOTE: Directional gain = 2.1dBi + 10log(3) = 6.87dBi > 6dBi , so the power density limit shall be reduced to 8-(6.87-6) = 7.13dBm.

802.11g

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=3) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-9.71	4.77	-4.94	7.13	PASS
	6	2437	-3.33	4.77	1.44	7.13	PASS
	11	2462	-9.70	4.77	-4.93	7.13	PASS
1	1	2412	-8.77	4.77	-4.00	7.13	PASS
	6	2437	-2.46	4.77	2.31	7.13	PASS
	11	2462	-9.26	4.77	-4.49	7.13	PASS
2	1	2412	-9.63	4.77	-4.86	7.13	PASS
	6	2437	-2.44	4.77	2.33	7.13	PASS
	11	2462	-9.43	4.77	-4.66	7.13	PASS

NOTE: Directional gain = 2.1dBi + 10log(3) = 6.87dBi > 6dBi , so the power density limit shall be reduced to 8-(6.87-6) = 7.13dBm.

802.11n (HT20)

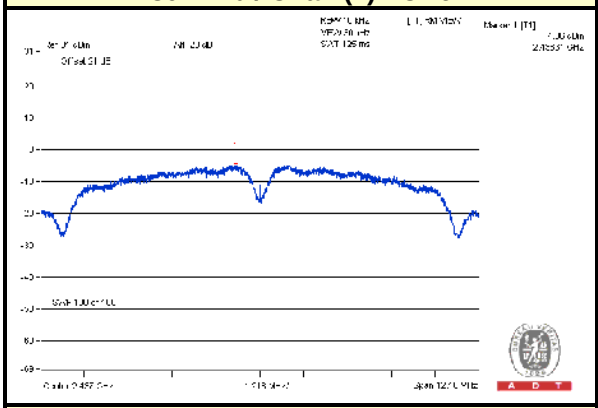
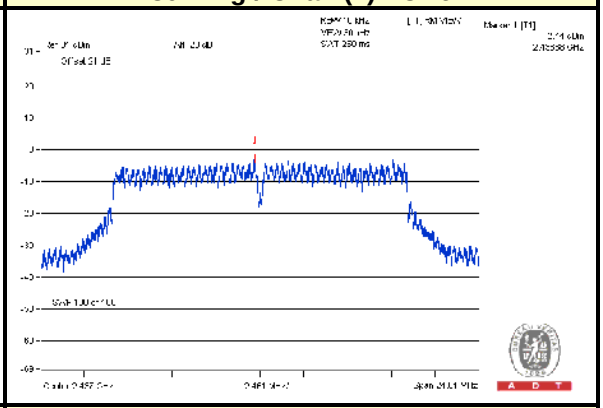
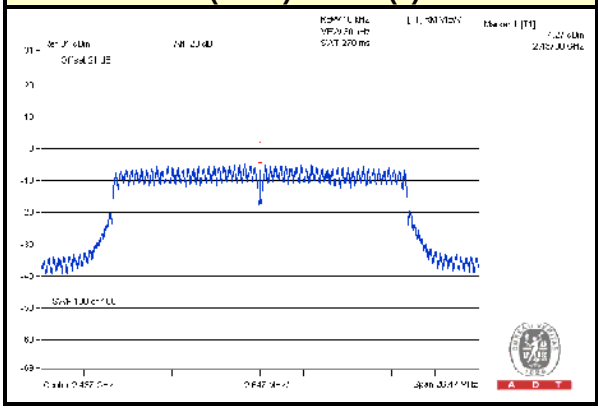
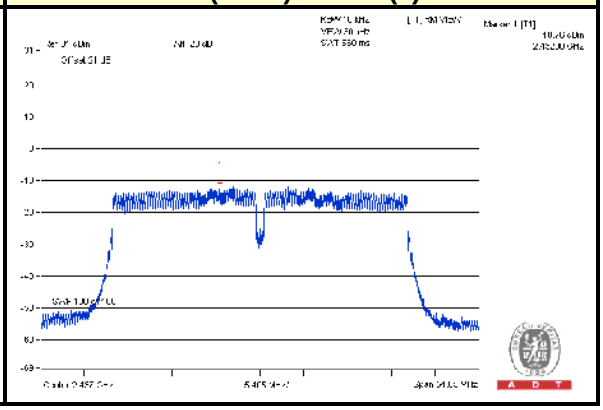
TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=3) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	1	2412	-11.53	4.77	-6.76	7.13	PASS
	6	2437	-5.72	4.77	-0.95	7.13	PASS
	11	2462	-11.69	4.77	-6.92	7.13	PASS
1	1	2412	-8.39	4.77	-3.62	7.13	PASS
	6	2437	-4.27	4.77	0.50	7.13	PASS
	11	2462	-9.42	4.77	-4.65	7.13	PASS
2	1	2412	-11.18	4.77	-6.41	7.13	PASS
	6	2437	-5.21	4.77	-0.44	7.13	PASS
	11	2462	-11.62	4.77	-6.85	7.13	PASS

NOTE: Directional gain = 2.1dBi + 10log(3) = 6.87dBi > 6dBi , so the power density limit shall be reduced to 8-(6.87-6) = 7.13dBm.

802.11n (HT40)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=3) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	3	2412	-16.03	4.77	-11.16	7.13	PASS
	6	2437	-10.76	4.77	-5.89	7.13	PASS
	9	2462	-16.82	4.77	-11.95	7.13	PASS
1	3	2412	-14.79	4.77	-9.92	7.13	PASS
	6	2437	-11.03	4.77	-6.16	7.13	PASS
	9	2462	-15.02	4.77	-10.15	7.13	PASS
2	3	2412	-17.30	4.77	-12.43	7.13	PASS
	6	2437	-11.53	4.77	-6.66	7.13	PASS
	9	2462	-16.53	4.77	-11.66	7.13	PASS

NOTE: Directional gain = 2.1dBi + 10log(3) = 6.87dBi > 6dBi , so the power density limit shall be reduced to 8-(6.87-6) = 7.13dBm.

SPECTRUM PLOT OF WORST VALUE	
802.11b / Chain(1) : CH6	**802.11g / Chain(2) : CH6**
	
802.11n (HT20) / Chain(1) : CH6	**802.11n (HT40) / Chain(0) : CH6**
	

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	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

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.

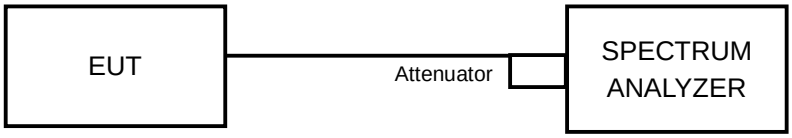
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. 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

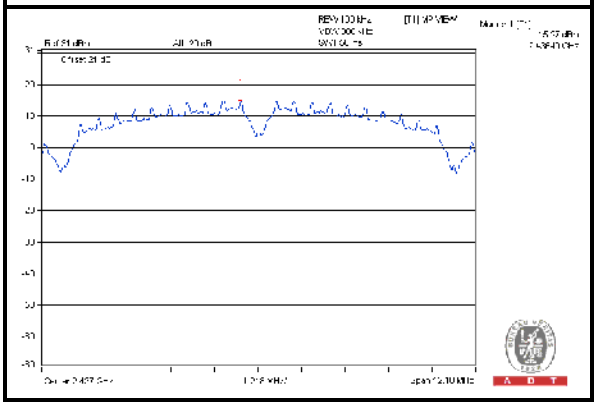
Same as Item 4.3.6

4.6.7 TEST RESULTS

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.

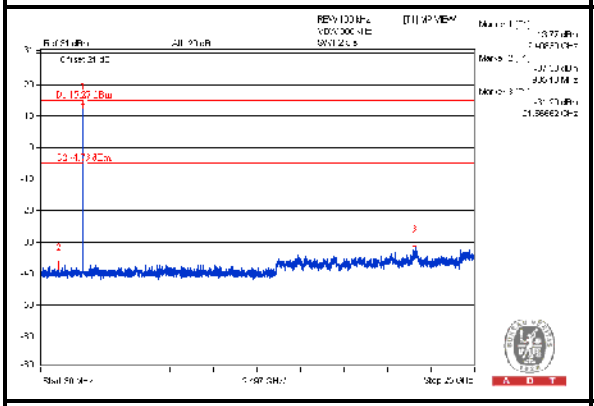
802.11b

Maximum REF

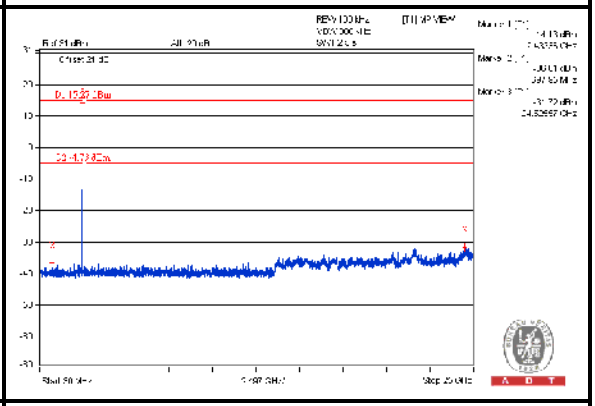


Chain (0)

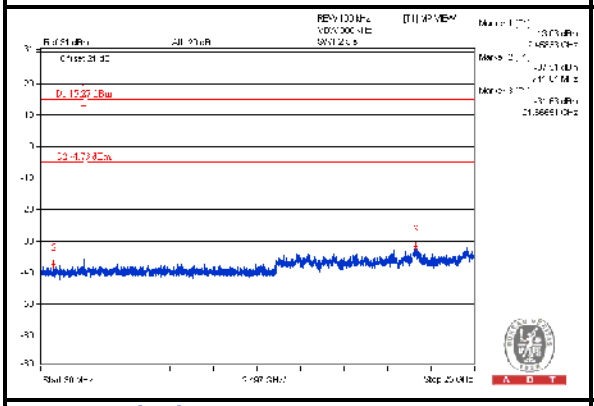
CH 1



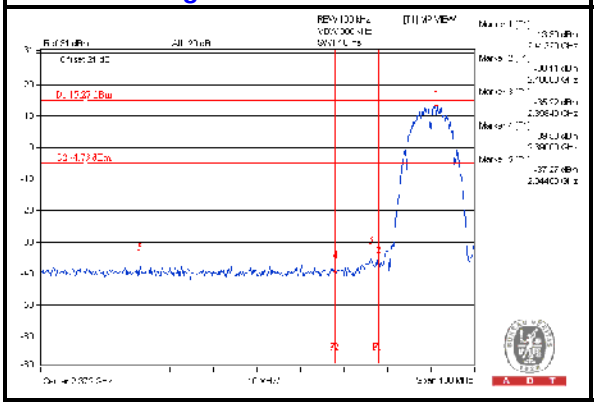
CH 6



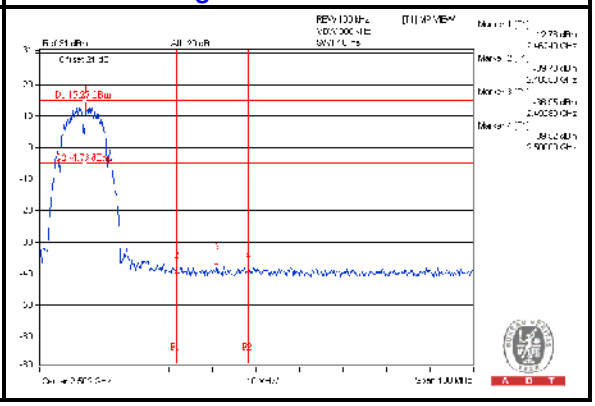
CH 11



CH 1 Band edge

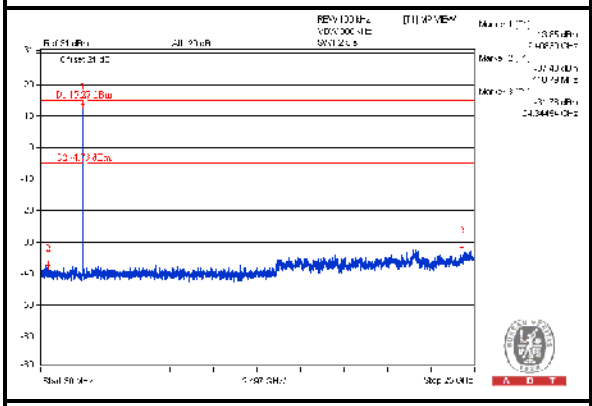


CH 11 Band edge

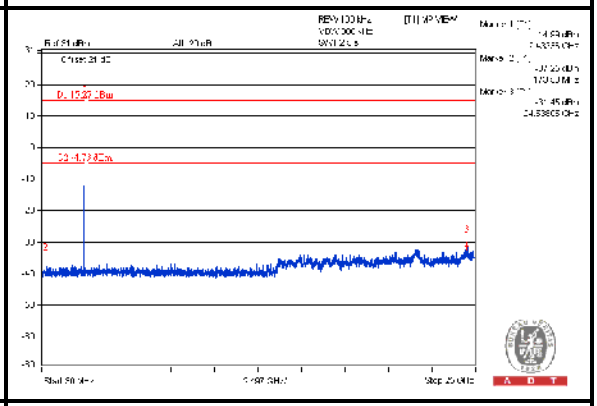


Chain (1)

CH 1



CH 6



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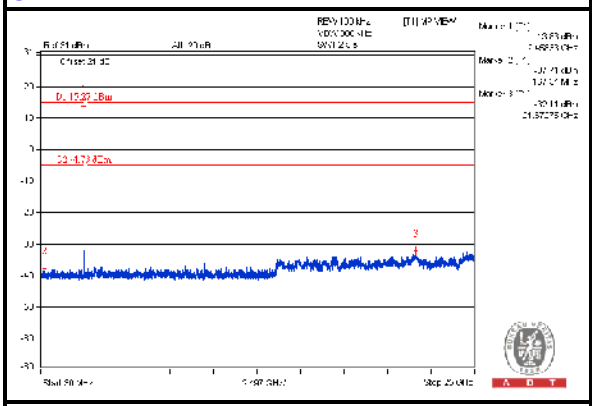

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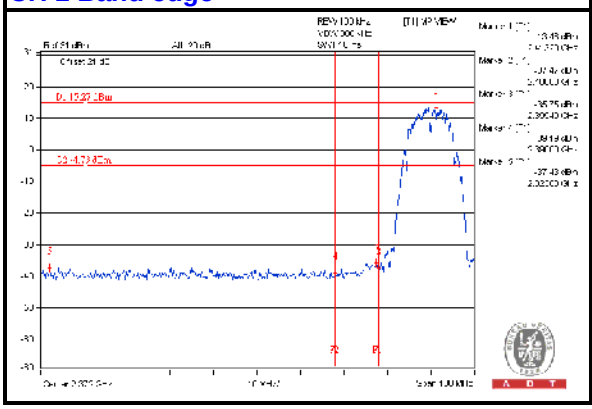
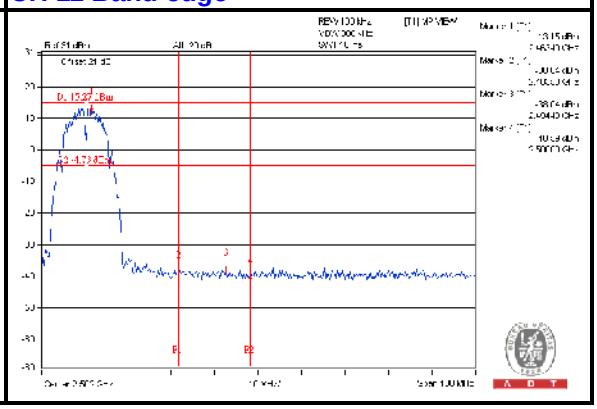
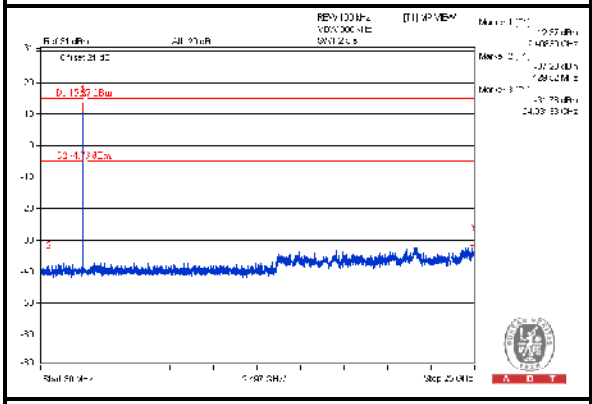


CH 11 Band edge

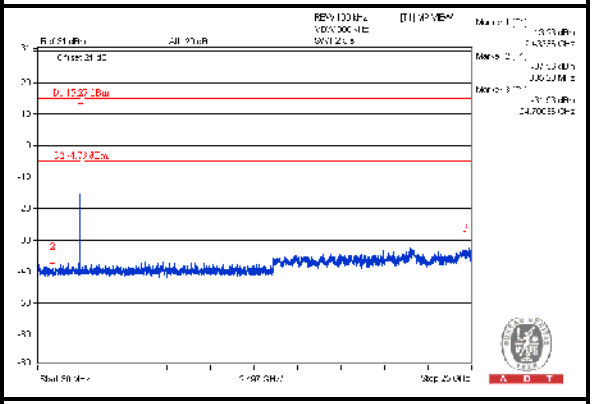


Chain (2)

CH 1



CH 6



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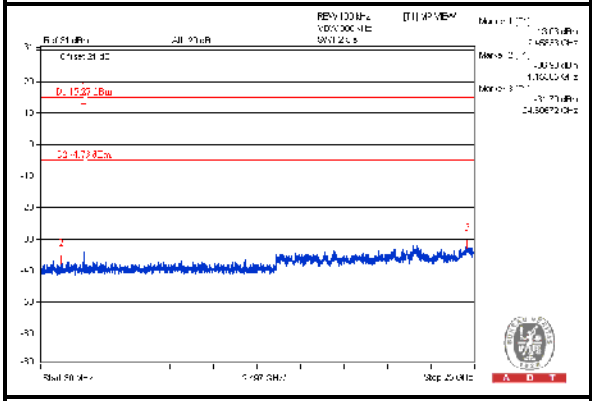

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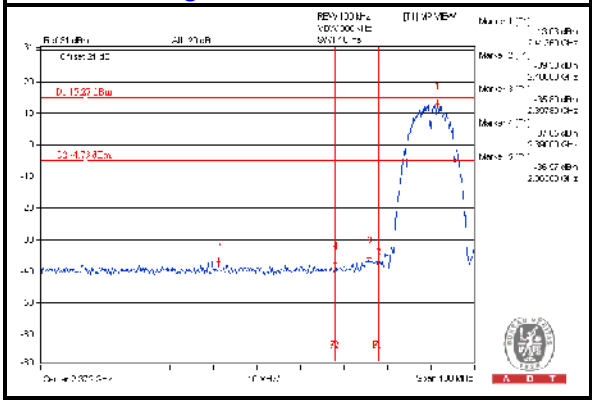

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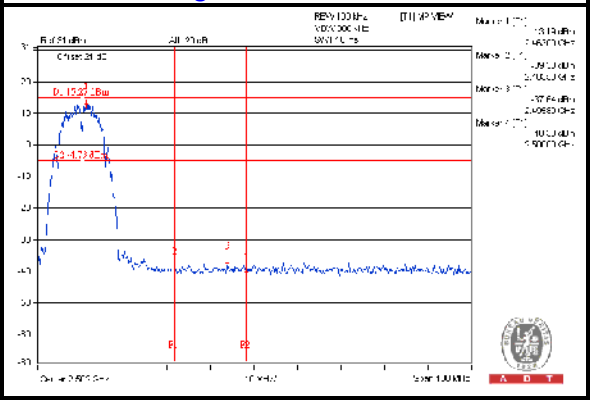
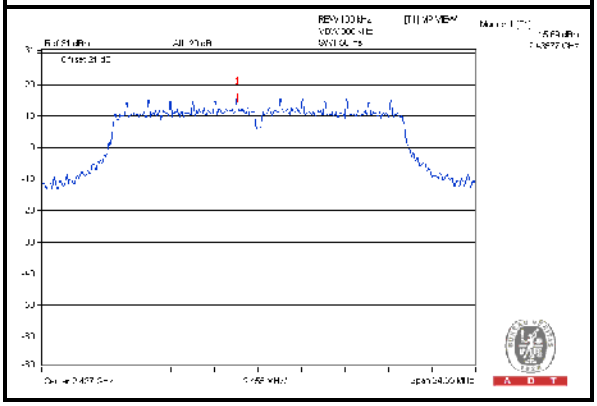


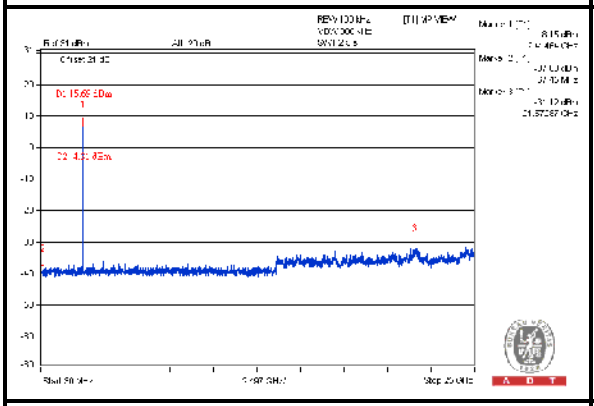
802.11g

Maximum REF

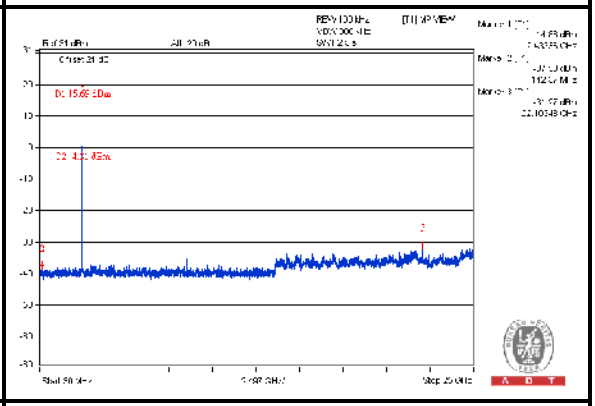


Chain (0)

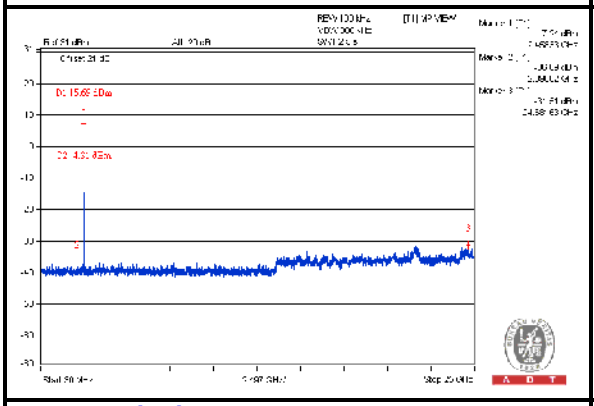
CH 1



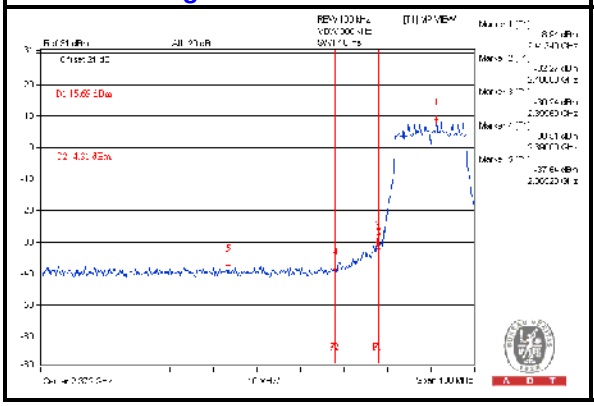
CH 6



CH 11



CH 1 Band edge



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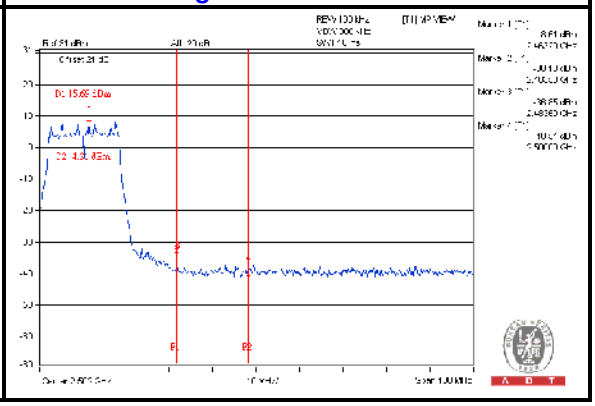
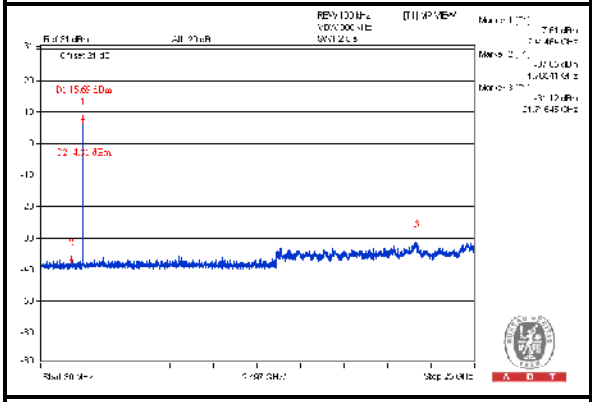
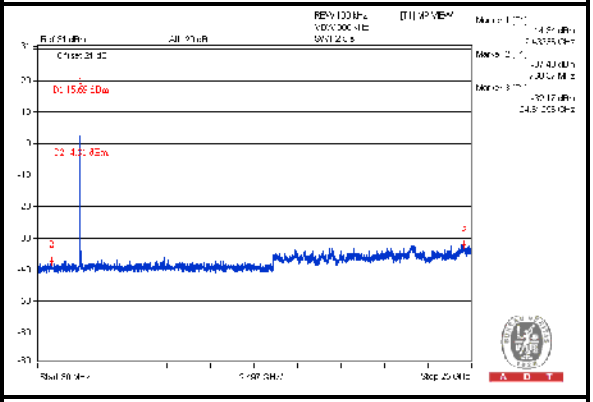


Chain (1)

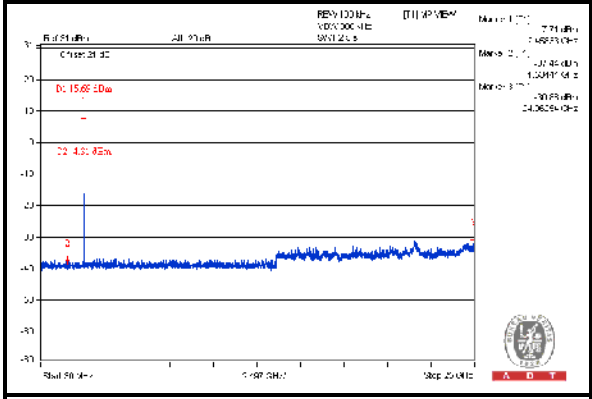
CH 1



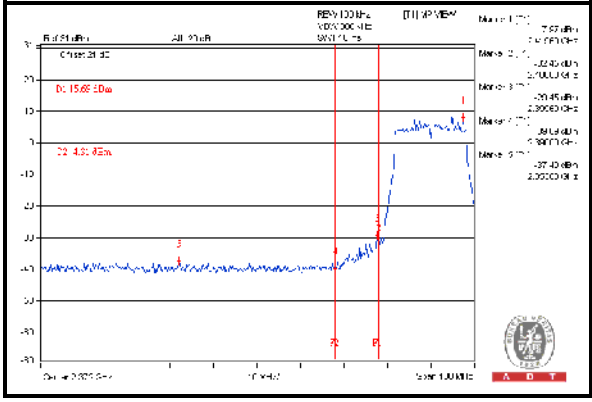
CH 6



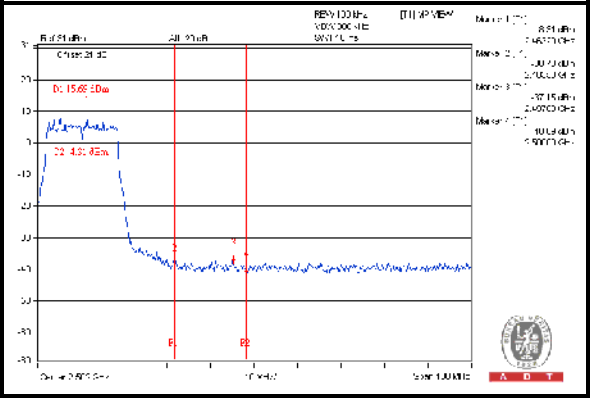
CH 11



CH 1 Band edge

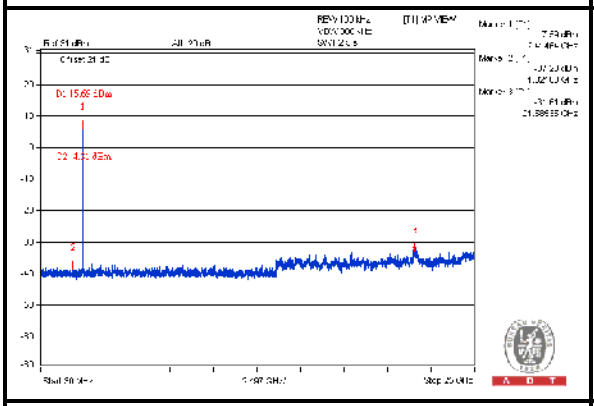


CH 11 Band edge

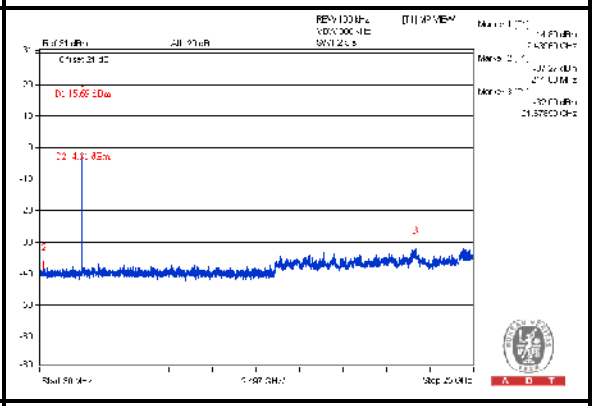


Chain (2)

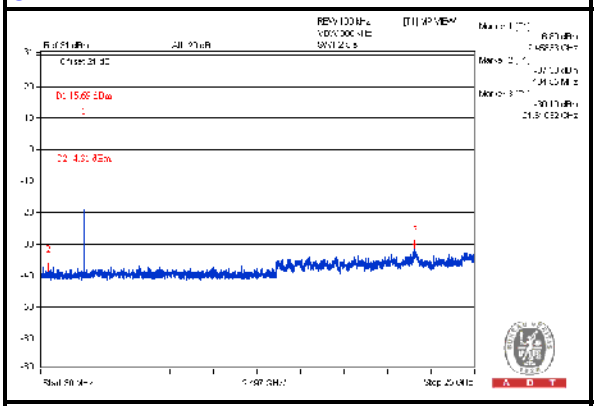
CH 1



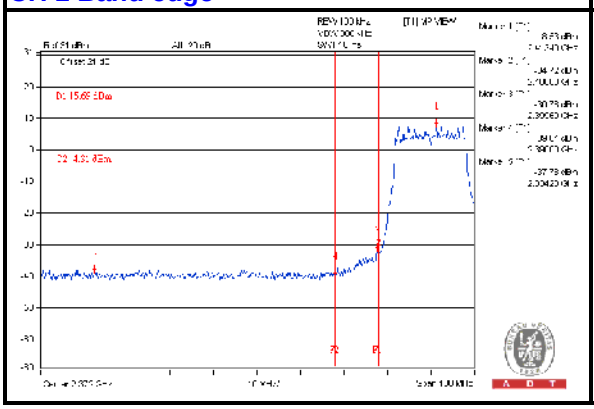
CH 6



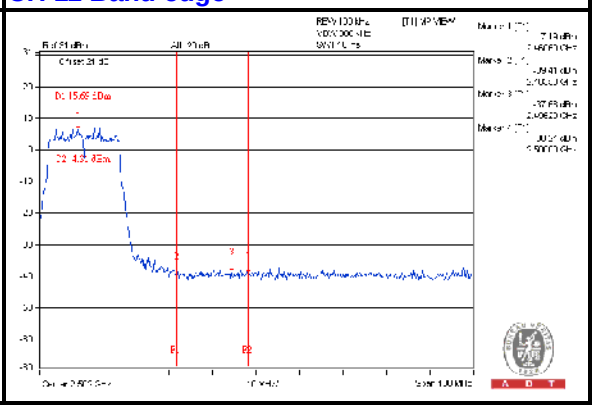
CH 11



CH 1 Band edge

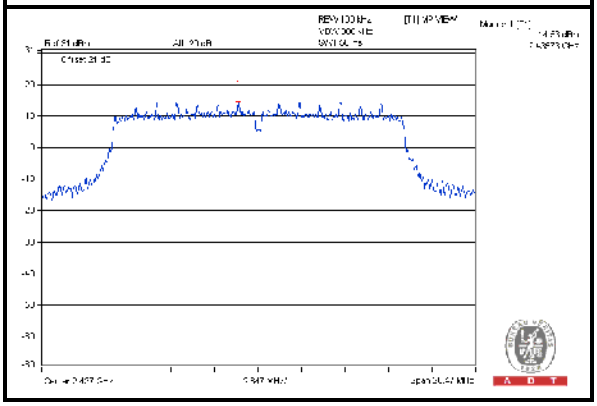


CH 11 Band edge



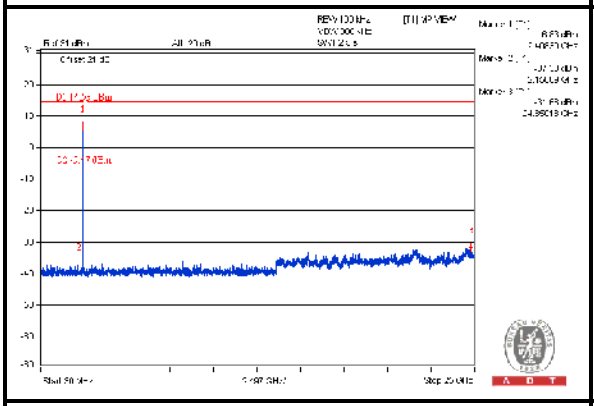
802.11n (HT20)

Maximum REF

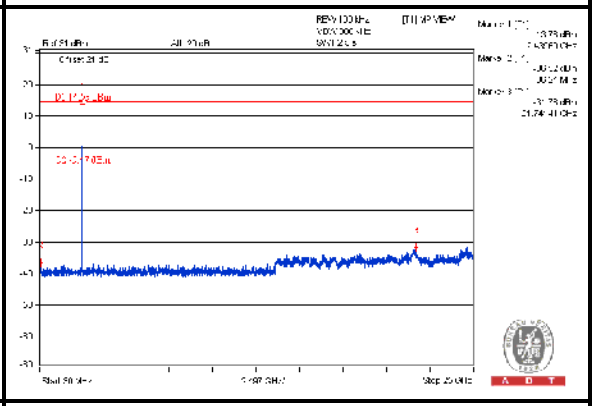


Chain (0)

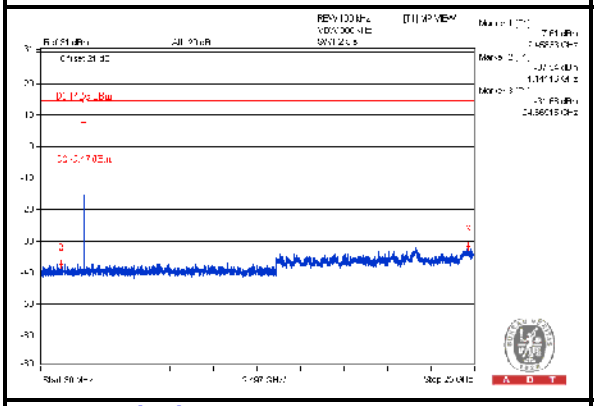
CH 1



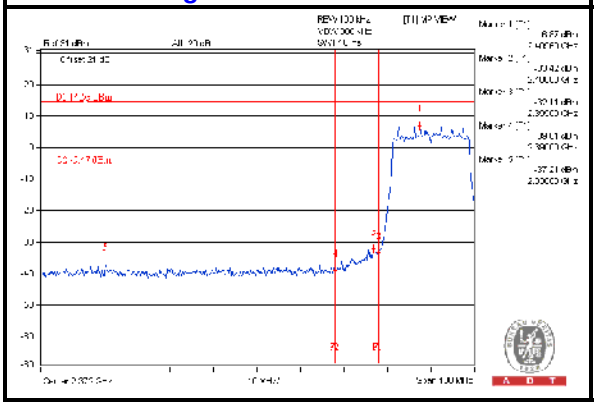
CH 6



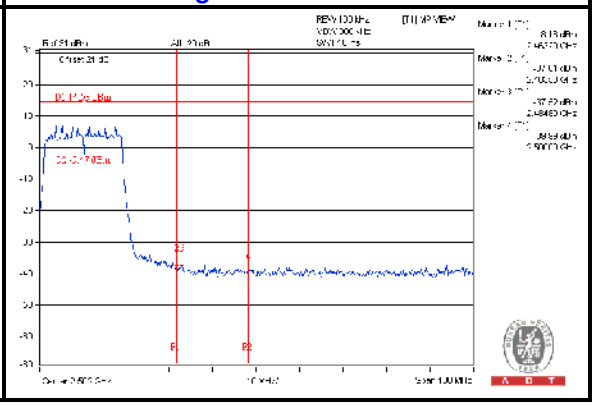
CH 11



CH 1 Band edge

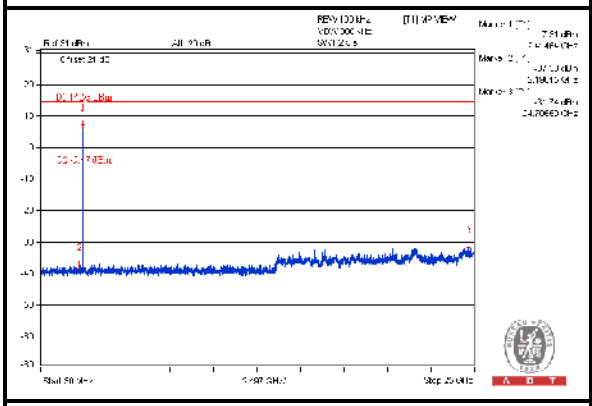


CH 11 Band edge

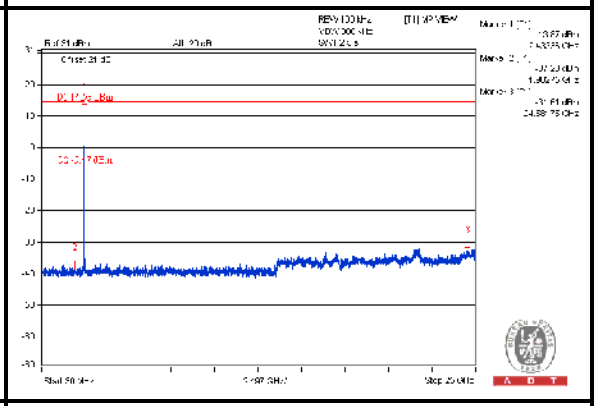


Chain (1)

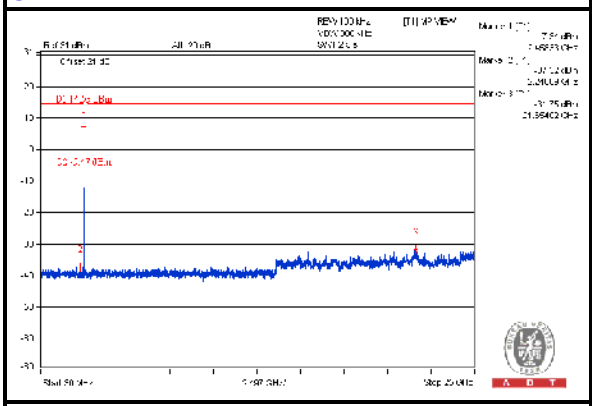
CH 1



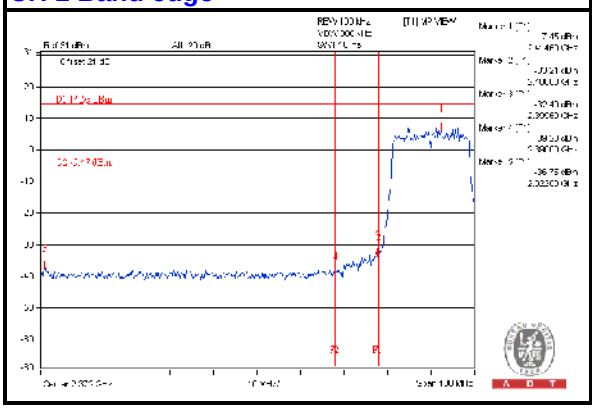
CH 6



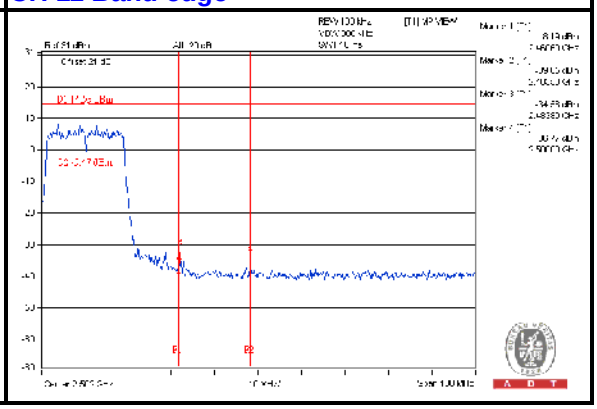
CH 11



CH 1 Band edge

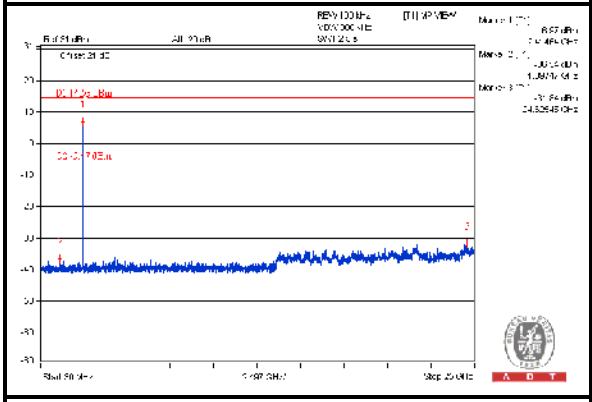


CH 11 Band edge

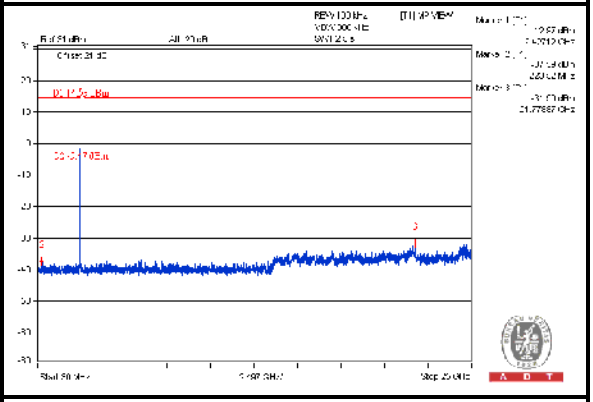


Chain (2)

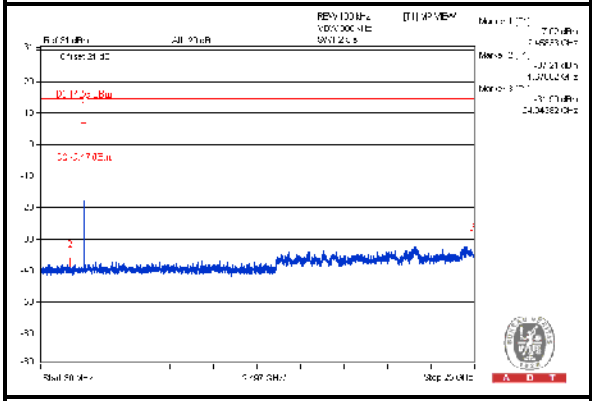
CH 1



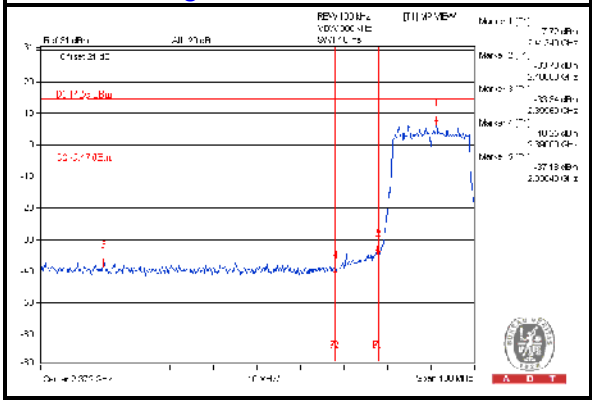
CH 6



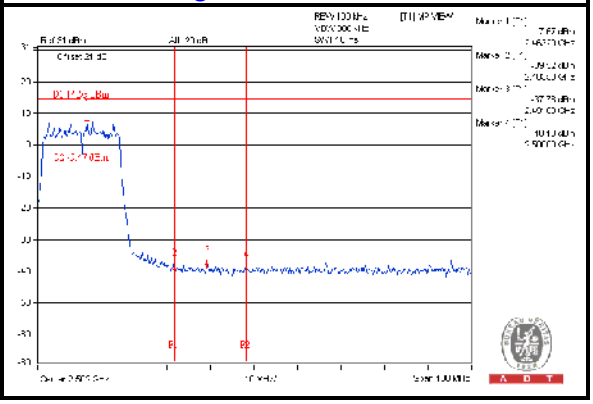
CH 11



CH 1 Band edge

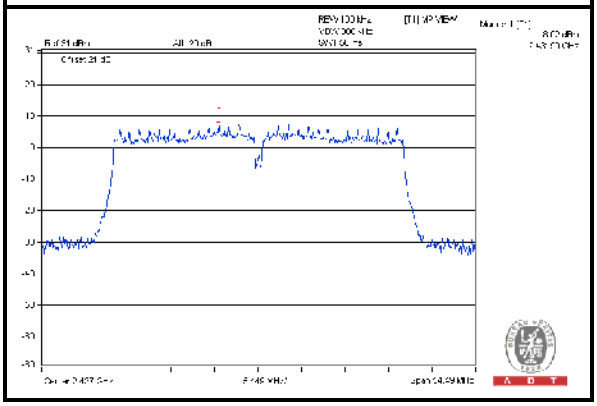


CH 11 Band edge



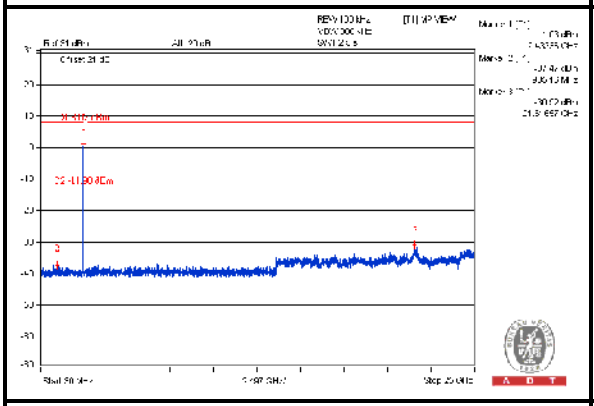
802.11n (HT40)

Maximum REF

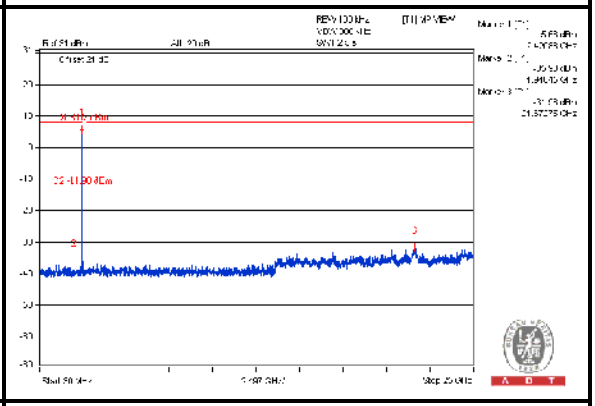


Chain(0)

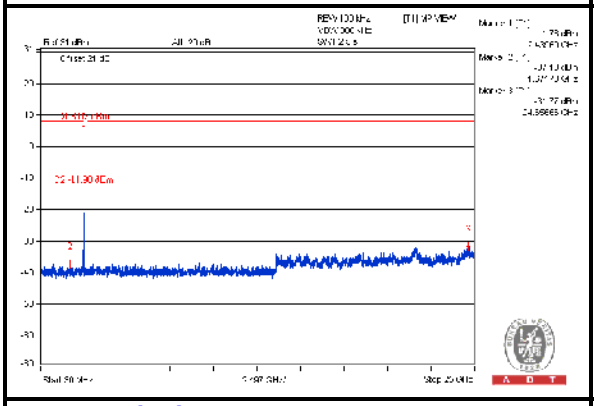
CH 3



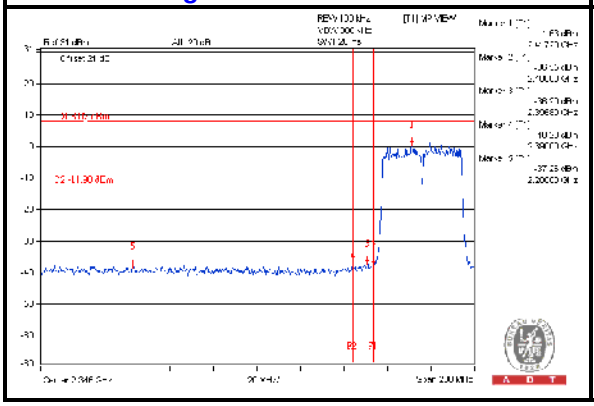
CH 6



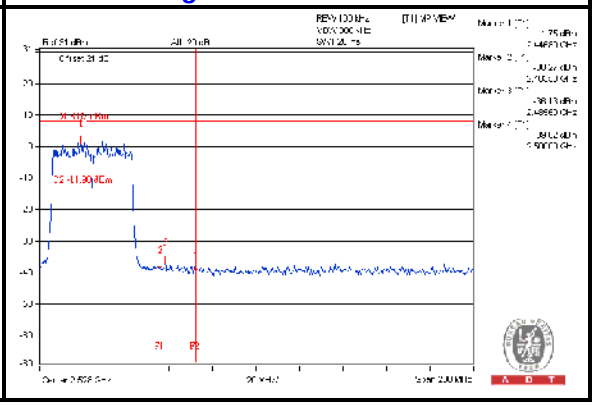
CH 9



CH 3 Band edge

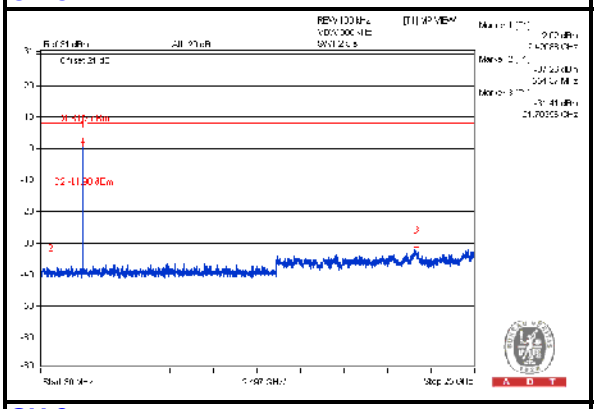


CH 9 Band edge

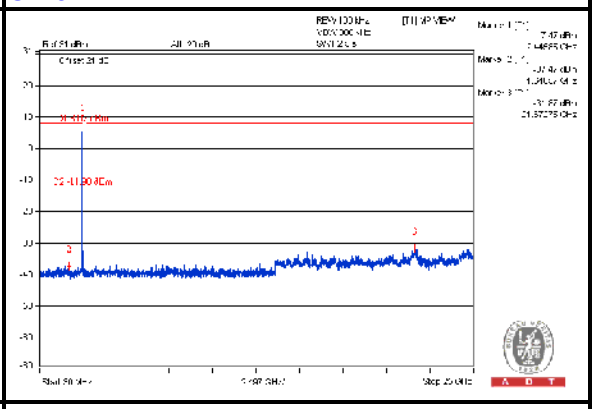


Chain(1)

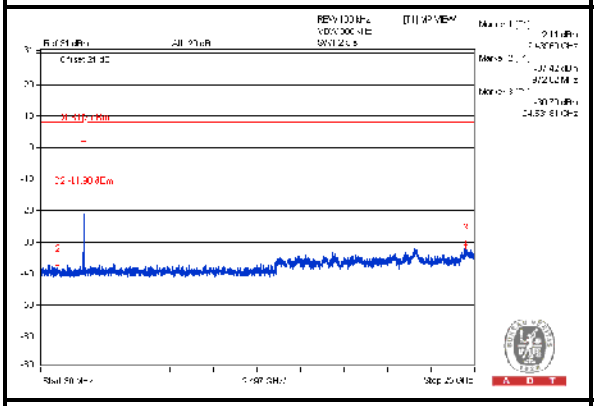
CH 3



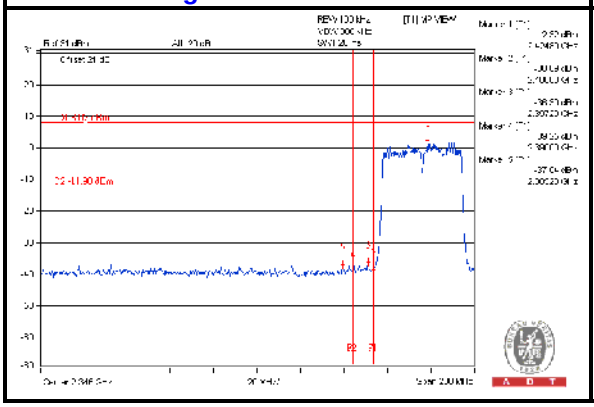
CH 6



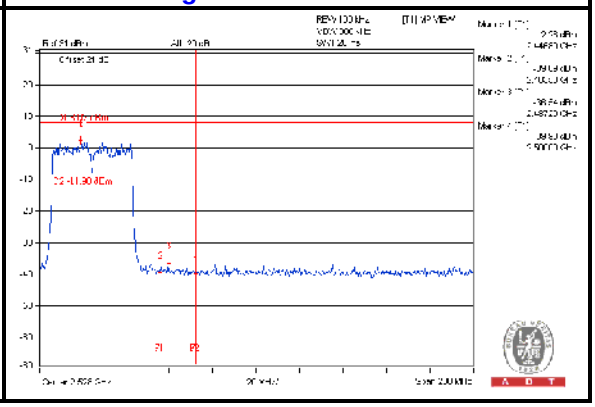
CH 9



CH 3 Band edge

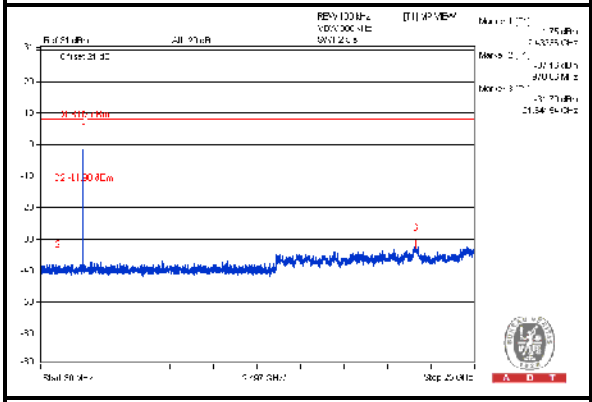


CH 9 Band edge

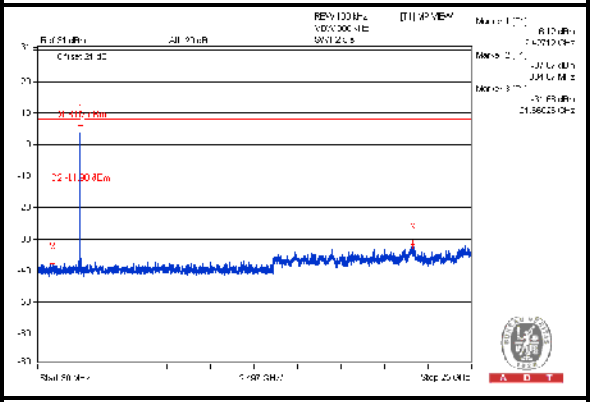


Chain(2)

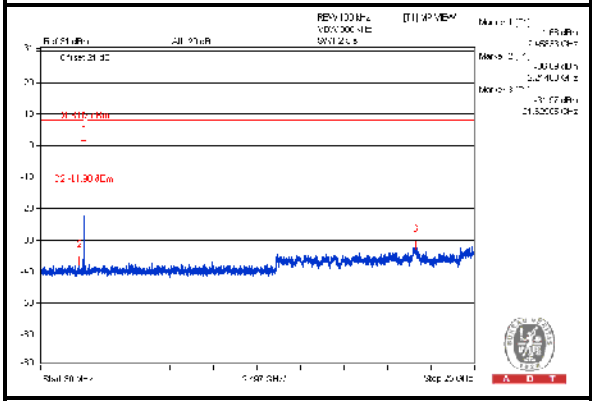
CH 3



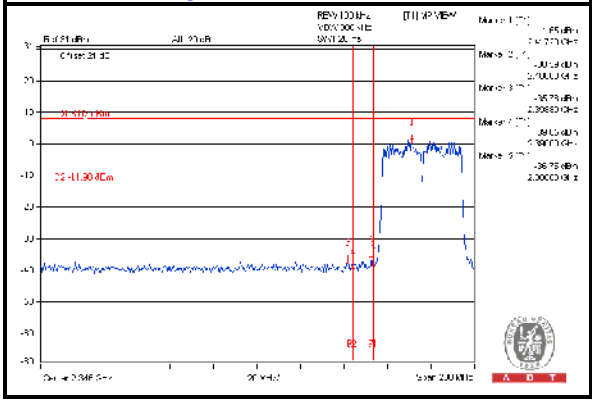
CH 6



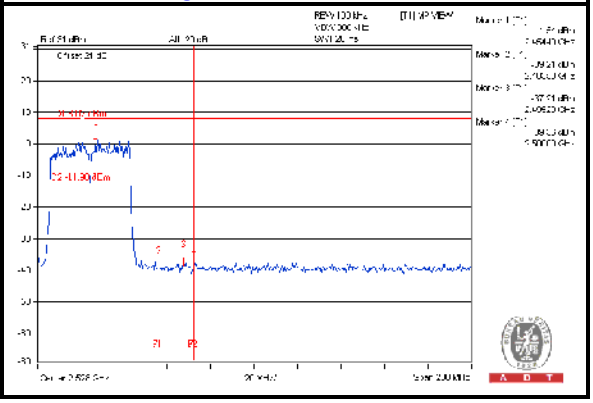
CH 9



CH 3 Band edge



CH 9 Band edge



5. TEST TYPES AND RESULTS (FOR 5GHz, 5.725~5.850GHz Band)

5.1 CONDUCTED EMISSION MEASUREMENT

5.1.1 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.

5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral)	ENV216	100071	Nov. 13, 2013	Nov. 12, 2014
RF Cable (JYEBAO)	5DFB	COCCAB-001	Mar. 10 , 2014	Mar. 09, 2015
50 ohms Terminator	N/A	EMC-03	Sep. 24, 2013	Sep. 23, 2014
50 ohms Terminator	N/A	EMC-02	Oct. 01, 2013	Sep. 30, 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: Sep. 19, 2014

5.1.3 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.

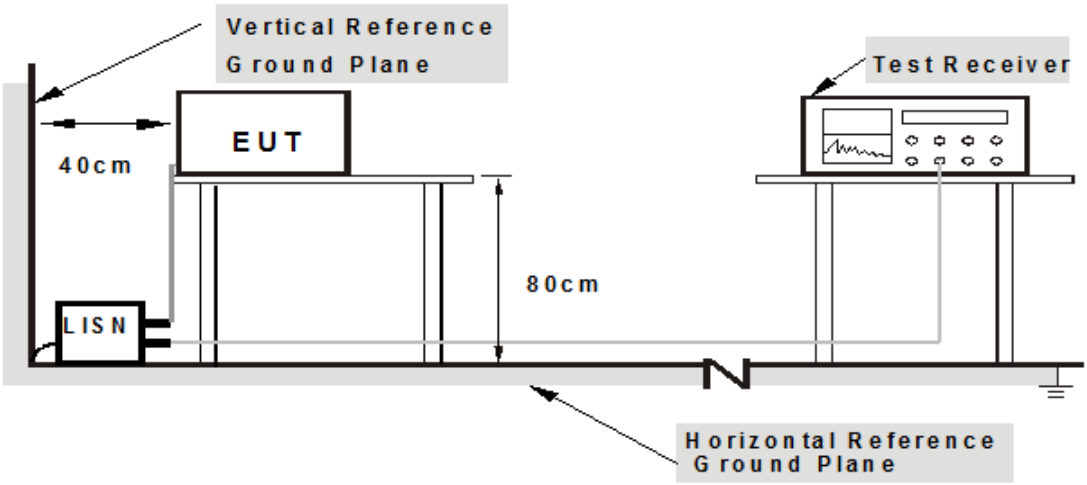
NOTE:

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

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 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.

5.1.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

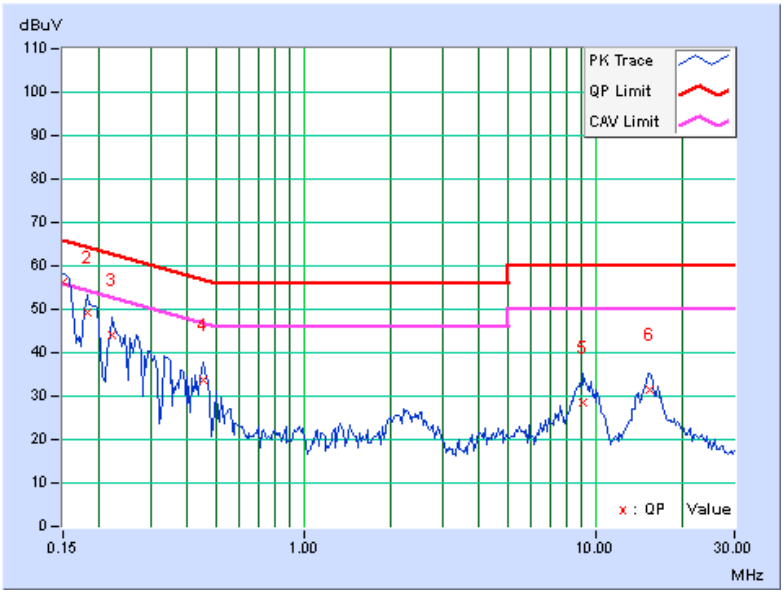
5.1.7 TEST RESULTS

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	0.15000	0.07	56.32	44.26	56.39	44.33	66.00	56.00	-9.61	-11.67
2	0.18125	0.07	49.25	31.01	49.32	31.08	64.43	54.43	-15.11	-23.35
3	0.22031	0.07	43.84	27.77	43.91	27.84	62.81	52.81	-18.90	-24.97
4	0.45078	0.09	33.70	20.68	33.79	20.77	56.86	46.86	-23.07	-26.09
5	9.11328	0.42	28.19	20.05	28.61	20.47	60.00	50.00	-31.39	-29.53
6	15.28906	0.60	30.96	26.02	31.56	26.62	60.00	50.00	-28.44	-23.38

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

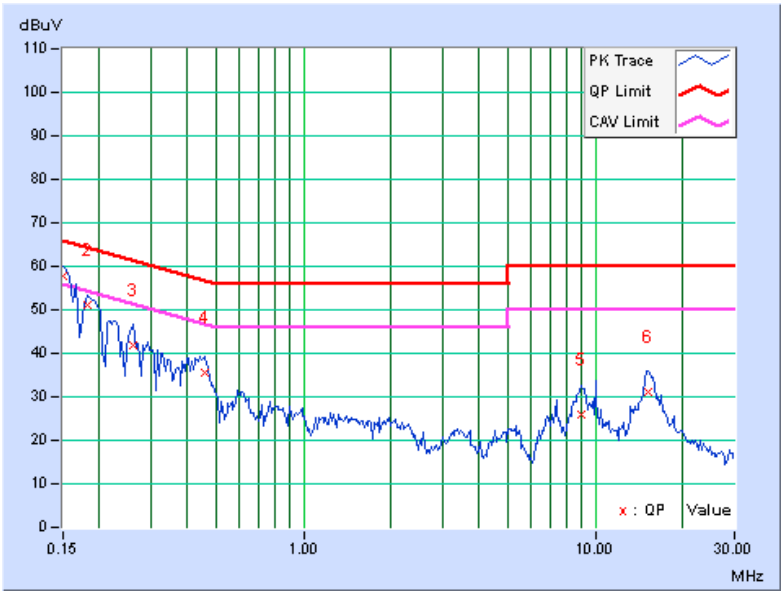


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	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**	**0.08**	**57.75**	**45.36**	**57.83**	**45.44**	**66.00**	**56.00**	**-8.17**	**-10.56**
2	0.18125	0.07	51.12	34.87	51.19	34.94	64.43	54.43	-13.24	-19.49
3	0.25938	0.08	41.83	27.09	41.91	27.17	61.45	51.45	-19.55	-24.29
4	0.45859	0.09	35.29	25.16	35.38	25.25	56.72	46.72	-21.33	-21.46
5	8.98438	0.42	25.54	16.79	25.96	17.21	60.00	50.00	-34.04	-32.79
6	15.12500	0.59	30.56	25.67	31.15	26.26	60.00	50.00	-28.85	-23.74

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



5.2 RADIATED AND BANDEDGE EMISSION MEASUREMENT

5.2.1 LIMITS OF RADIATED AND BANDEDGE EMISSION 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.

5.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY51210105	Jan. 21,2014	Jan. 20,2015
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 10, 2012	Dec. 09, 2014
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Nov. 18, 2013	Nov. 17, 2014
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	RF104-201 RF104-203 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
4. The test was performed in 966 Chamber No. G.
5 The FCC Site Registration No. is 966073.
6 The VCCI Site Registration No. is G-137.
7 The CANADA Site Registration No. is IC 7450H-2.
8 Tested Date: Sep. 12, 2014

5.2.3 TEST PROCEDURES

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

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

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

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

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

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

Note:

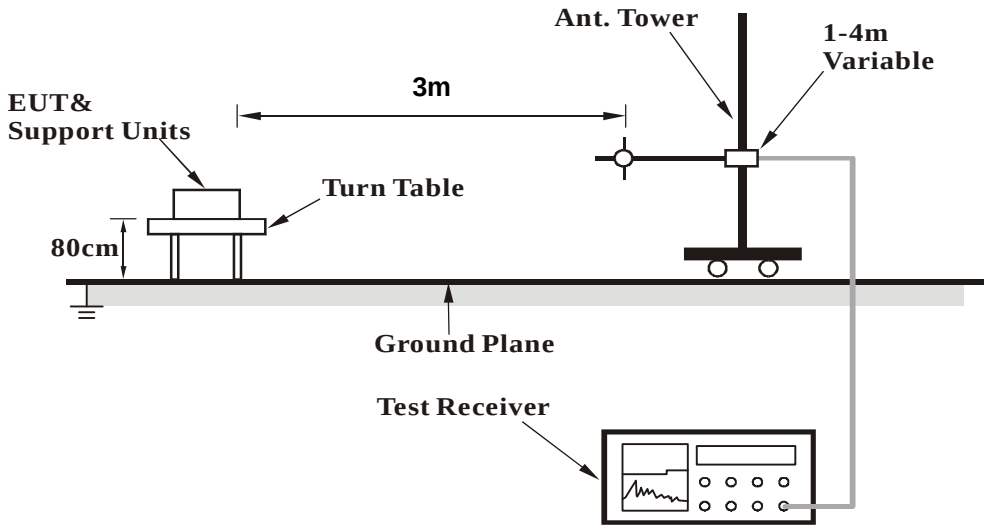
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

5.2.4 DEVIATION FROM TEST STANDARD

No deviation

5.2.5 TEST SETUP

<Frequency Range below 1GHz>



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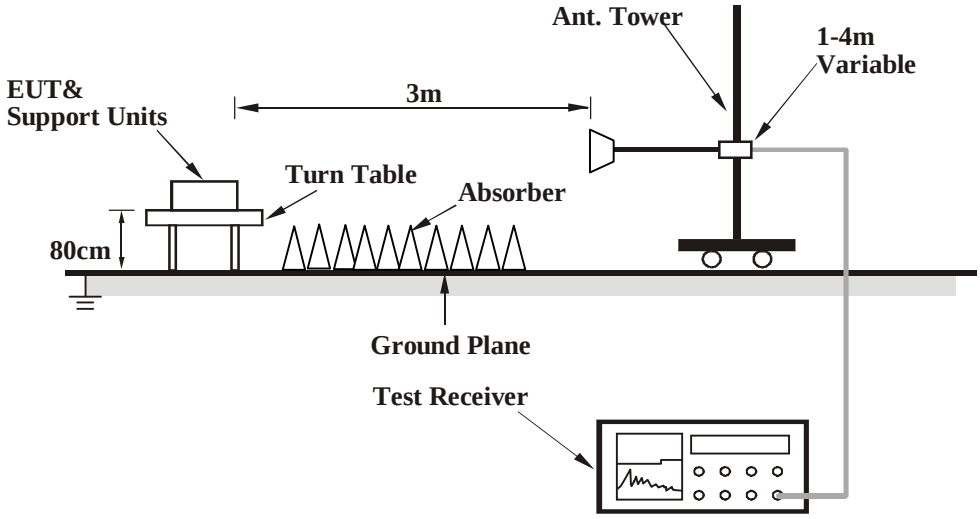


For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.2.6 EUT OPERATING CONDITIONS

Same as the 4.1.6

5.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

802.11a

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 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	123.36	29.8 QP	43.5	-13.7	1.50 H	47	44.82	-14.98
2	260.86	31.8 QP	46.0	-14.2	2.00 H	147	45.68	-13.90
3	280.31	31.7 QP	46.0	-14.3	1.00 H	307	44.71	-12.98
4	599.97	38.8 QP	46.0	-7.2	1.50 H	347	43.70	-4.89
5	857.07	35.4 QP	46.0	-10.6	1.50 H	260	36.13	-0.74
6	971.97	34.6 QP	54.0	-19.5	1.50 H	124	33.38	1.17
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	45.42	33.1 QP	40.0	-6.9	1.00 V	44	46.64	-13.58
2	101.88	29.2 QP	43.5	-14.3	1.50 V	360	46.59	-17.43
3	280.36	27.4 QP	46.0	-18.6	1.50 V	313	40.42	-12.98
4	599.97	32.3 QP	46.0	-13.7	1.00 V	65	37.22	-4.89
5	857.07	32.9 QP	46.0	-13.1	1.00 V	224	33.66	-0.74
6	912.41	31.5 QP	46.0	-14.5	1.00 V	240	31.15	0.38

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

802.11a

CHANNEL	TX Channel 149	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5745.00	112.4 PK			1.49 H	332	103.98	8.42
2	*5745.00	103.4 AV			1.49 H	332	94.98	8.42
3	11490.00	60.1 PK	74.0	-13.9	1.08 H	127	45.75	14.35
4	11490.00	46.7 AV	54.0	-7.3	1.08 H	127	32.35	14.35
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	*5745.00	123.8 PK			1.00 V	329	115.38	8.42
2	*5745.00	114.2 AV			1.00 V	329	105.78	8.42
3	11490.00	60.4 PK	74.0	-13.6	1.06 V	348	46.05	14.35
4	11490.00	47.3 AV	54.0	-6.7	1.06 V	348	32.95	14.35

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 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5785.00	111.6 PK			1.44 H	321	103.11	8.49
2	*5785.00	102.0 AV			1.44 H	321	93.51	8.49
3	11570.00	60.3 PK	74.0	-13.7	1.11 H	121	45.99	14.31
4	11570.00	46.7 AV	54.0	-7.3	1.11 H	121	32.39	14.31
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	*5785.00	123.0 PK			1.00 V	334	114.51	8.49
2	*5785.00	113.2 AV			1.00 V	334	104.71	8.49
3	11570.00	60.7 PK	74.0	-13.3	1.11 V	338	46.39	14.31
4	**11570.00**	**47.4 AV**	**54.0**	**-6.6**	**1.11 V**	**338**	**33.09**	**14.31**

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 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5825.00	110.5 PK			1.42 H	326	101.91	8.59
2	*5825.00	101.3 AV			1.42 H	326	92.71	8.59
3	11650.00	60.6 PK	74.0	-13.4	1.14 H	125	46.22	14.38
4	11650.00	46.9 AV	54.0	-7.1	1.14 H	125	32.52	14.38
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	*5825.00	123.1 PK			1.03 V	336	114.51	8.59
2	*5825.00	113.4 AV			1.03 V	336	104.81	8.59
3	11650.00	60.2 PK	74.0	-13.8	1.02 V	334	45.82	14.38
4	11650.00	47.2 AV	54.0	-6.8	1.02 V	334	32.82	14.38

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.

802.11ac (VHT20)

CHANNEL	TX Channel 149	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5745.00	109.6 PK			1.42 H	311	101.18	8.42
2	*5745.00	100.1 AV			1.42 H	311	91.68	8.42
3	11490.00	57.0 PK	74.0	-17.0	1.32 H	314	42.65	14.35
4	11490.00	44.4 AV	54.0	-9.6	1.32 H	314	30.05	14.35
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	*5745.00	123.6 PK			1.00 V	327	115.18	8.42
2	*5745.00	112.6 AV			1.00 V	327	104.18	8.42
3	11490.00	57.6 PK	74.0	-16.4	1.00 V	20	43.25	14.35
4	11490.00	44.2 AV	54.0	-9.8	1.00 V	20	29.85	14.35

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 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5785.00	111.0 PK			1.39 H	313	102.51	8.49
2	*5785.00	101.6 AV			1.39 H	313	93.11	8.49
3	11570.00	60.3 PK	74.0	-13.7	1.08 H	120	45.99	14.31
4	11570.00	46.8 AV	54.0	-7.2	1.08 H	120	32.49	14.31
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	*5785.00	123.2 PK			1.00 V	327	114.71	8.49
2	*5785.00	113.5 AV			1.00 V	327	105.01	8.49
3	11570.00	60.3 PK	74.0	-13.7	1.07 V	345	45.99	14.31
4	11570.00	47.3 AV	54.0	-6.7	1.07 V	345	32.99	14.31

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 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5825.00	110.8 PK			1.41 H	301	102.21	8.59
2	*5825.00	101.2 AV			1.41 H	301	92.61	8.59
3	11650.00	60.3 PK	74.0	-13.7	1.09 H	113	45.92	14.38
4	11650.00	46.8 AV	54.0	-7.2	1.09 H	113	32.42	14.38
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	*5825.00	123.4 PK			1.06 V	336	114.81	8.59
2	*5825.00	113.6 AV			1.06 V	336	105.01	8.59
3	11650.00	60.4 PK	74.0	-13.6	1.01 V	336	46.02	14.38
4	11650.00	46.5 AV	54.0	-7.5	1.01 V	336	32.12	14.38

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.

802.11ac (VHT40)

CHANNEL	TX Channel 151	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5755.00	101.5 PK			1.68 H	336	93.06	8.44
2	*5755.00	91.4 AV			1.68 H	336	82.96	8.44
3	11510.00	54.4 PK	74.0	-19.6	1.02 H	112	40.06	14.34
4	11510.00	41.0 AV	54.0	-13.0	1.02 H	112	26.66	14.34
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	*5755.00	118.7 PK			1.00 V	326	110.26	8.44
2	*5755.00	107.1 AV			1.00 V	326	98.66	8.44
3	11510.00	55.4 PK	74.0	-18.6	1.13 V	352	41.06	14.34
4	11510.00	42.4 AV	54.0	-11.6	1.13 V	352	28.06	14.34

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 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	*5795.00	106.2 PK			1.34 H	326	97.70	8.50
2	*5795.00	96.5 AV			1.34 H	326	88.00	8.50
3	11590.00	56.5 PK	74.0	-17.5	1.27 H	304	42.20	14.30
4	11590.00	44.0 AV	54.0	-10.0	1.27 H	304	29.70	14.30
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	*5795.00	121.0 PK			1.00 V	328	112.50	8.50
2	*5795.00	110.1 AV			1.00 V	328	101.60	8.50
3	11590.00	57.8 PK	74.0	-16.2	1.00 V	20	43.50	14.30
4	11590.00	44.4 AV	54.0	-9.6	1.00 V	20	30.10	14.30

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.

802.11ac (VHT80)

CHANNEL	TX Channel 155	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*5775.00	102.2 PK			1.70 H	306	93.73	8.47
2	*5775.00	91.3 AV			1.70 H	306	82.83	8.47
3	11550.00	54.4 PK	74.0	-19.6	1.02 H	112	40.08	14.32
4	11550.00	41.0 AV	54.0	-13.0	1.02 H	112	26.68	14.32
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	*5775.00	115.0 PK			1.00 V	326	106.53	8.47
2	*5775.00	103.5 AV			1.00 V	326	95.03	8.47
3	11550.00	55.4 PK	74.0	-18.6	1.13 V	352	41.08	14.32
4	11550.00	42.4 AV	54.0	-11.6	1.13 V	352	28.08	14.32

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.

5.3 6dB BANDWIDTH MEASUREMENT

5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

5.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

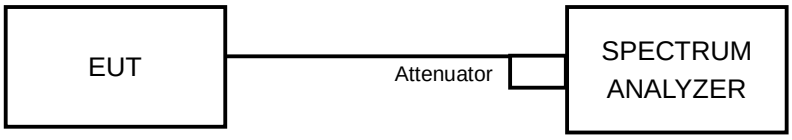
5.3.3 TEST PROCEDURE

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

5.3.4 DEVIATION FROM TEST STANDARD

No deviation

5.3.5 TEST SETUP



5.3.6 EUT OPERATING CONDITIONS

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

5.3.7 TEST RESULTS

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	16.41	16.42	16.44	0.5	PASS
157	5785	16.40	16.41	16.45	0.5	PASS
165	5825	16.41	16.43	16.44	0.5	PASS

802.11ac (VHT20)

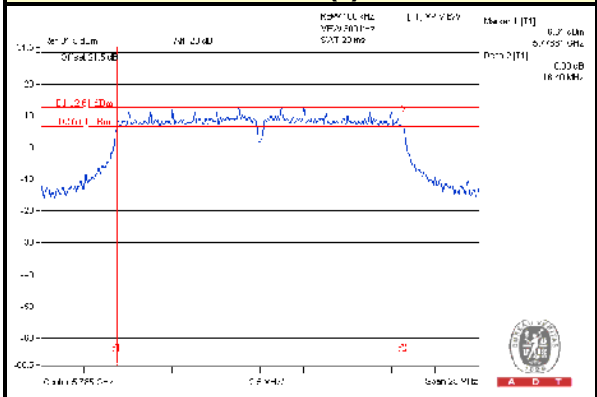
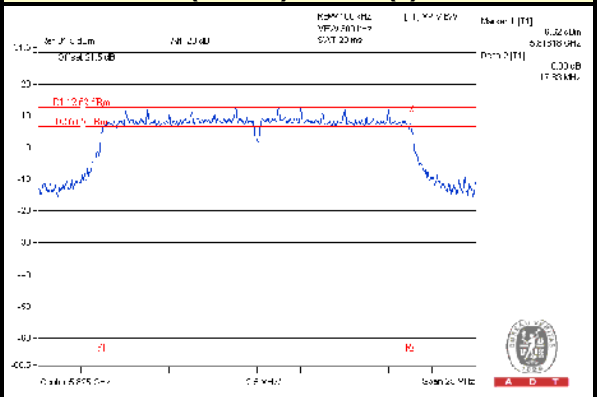
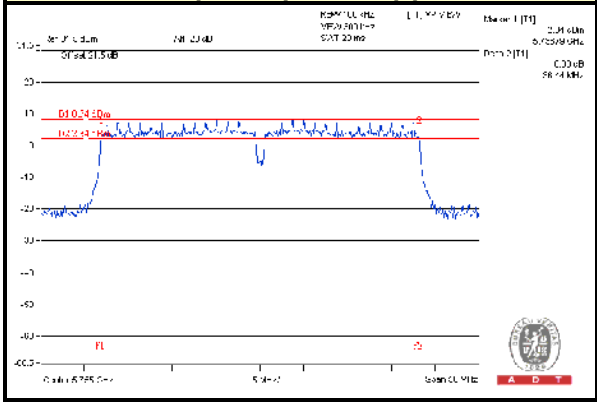
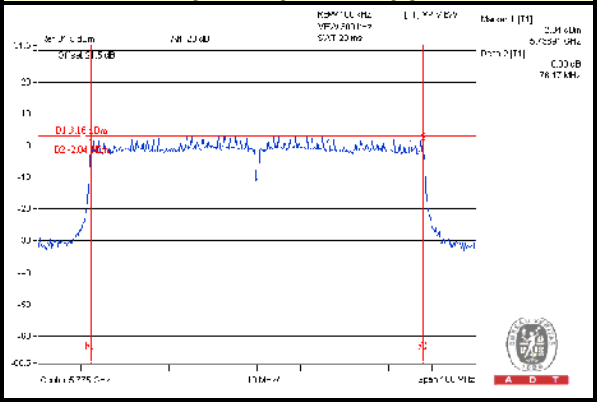
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
149	5745	17.64	17.69	17.70	0.5	PASS
157	5785	17.64	17.67	17.67	0.5	PASS
165	5825	17.63	17.66	17.68	0.5	PASS

802.11ac (VHT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
151	5755	36.44	36.49	36.46	0.5	PASS
159	5795	36.45	36.49	36.46	0.5	PASS

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
155	5775	76.17	76.46	76.43	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(0) : CH157	**802.11ac (VHT20) / Chain(0) : CH165**
	
802.11ac (VHT40) / Chain(0) : CH151	**802.11ac (VHT80) / Chain(0) : CH155**
	

5.4 CONDUCTED OUTPUT POWER MEASUREMENT

5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 5725 –5850 MHz band: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output 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.

5.4.2 INSTRUMENTS

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Power meter Anritsu	ML2495A	1014008	Apr. 30, 2014	Apr. 29, 2015
Power sensor Anritsu	MA2411B	0917122	Apr. 30, 2014	Apr. 29, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

For 802.11ac (VHT80)

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Aug. 06, 2014

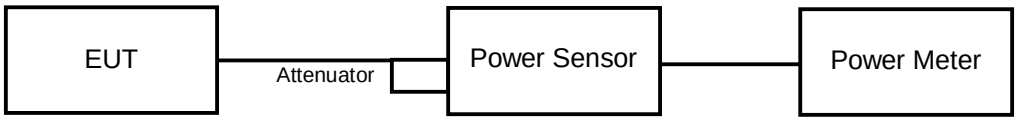
5.4.3 TEST PROCEDURES

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

5.4.4 DEVIATION FROM TEST STANDARD

No deviation.

5.4.5 TEST SETUP



5.4.6 EUT OPERATING CONDITIONS

Same as Item 5.3.6

5.4.7 TEST RESULTS

802.11a

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	24.38	24.32	25.38	889.697	29.49	29.53	PASS
157	5785	24.42	24.44	25.23	888.091	29.48	29.53	PASS
165	5825	24.32	24.40	25.42	894.156	29.51	29.53	PASS

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi > 6dBi , so the power limit shall be reduced to 30-(6.47-6) = 29.53dBm.

802.11ac (VHT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
149	5745	24.57	24.20	25.28	886.732	29.48	29.53	PASS
157	5785	24.43	24.22	25.40	888.31	29.49	29.53	PASS
165	5825	24.33	24.32	24.98	856.19	29.33	29.53	PASS

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi > 6dBi , so the power limit shall be reduced to 30-(6.47-6) = 29.53dBm.

802.11ac (VHT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
151	5755	23.43	23.33	24.19	697.993	28.44	29.53	PASS
159	5795	24.31	24.14	25.28	866.479	29.38	29.53	PASS

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi > 6dBi , so the power limit shall be reduced to 30-(6.47-6) = 29.53dBm.

802.11ac (VHT80)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)			TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2				
155	5775	21.08	21.33	22.10	426.245	26.30	29.53	PASS

NOTE: Directional gain = 1.7dBi + 10log(3) = 6.47dBi > 6dBi , so the power limit shall be reduced to 30-(6.47-6) = 29.53dBm.

5.5 POWER SPECTRAL DENSITY MEASUREMENT

5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

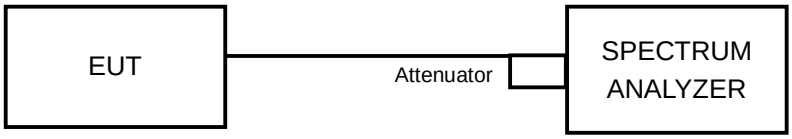
5.5.3 TEST PROCEDURE

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

5.5.4 DEVIATION FROM TEST STANDARD

No deviation

5.5.5 TEST SETUP



5.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

5.5.7 TEST RESULTS

802.11a

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=3) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	149	5745	-5.05	4.77	-0.28	7.53	PASS
	157	5785	-5.17	4.77	-0.40	7.53	PASS
	165	5825	-5.12	4.77	-0.35	7.53	PASS
1	149	5745	-4.47	4.77	0.30	7.53	PASS
	157	5785	-4.49	4.77	0.28	7.53	PASS
	165	5825	-4.39	4.77	0.38	7.53	PASS
2	149	5745	-3.27	4.77	1.50	7.53	PASS
	157	5785	-3.33	4.77	1.44	7.53	PASS
	165	5825	-3.48	4.77	1.29	7.53	PASS

NOTE: 1. Directional gain = 1.7dBi + 10log(3) = 6.47dBi > 6dBi , so the power density limit shall be reduced to 8-(6.47-6) = 7.53dBm.

802.11ac (VHT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=3) dB	TOTAL PSD (dBm)	LIMIT (dBm)	PASS /FAIL
0	149	5745	-6.04	4.77	-1.27	7.53	PASS
	157	5785	-6.51	4.77	-1.74	7.53	PASS
	165	5825	-6.50	4.77	-1.73	7.53	PASS
1	149	5745	-6.16	4.77	-1.39	7.53	PASS
	157	5785	-5.96	4.77	-1.19	7.53	PASS
	165	5825	-6.24	4.77	-1.47	7.53	PASS
2	149	5745	-5.12	4.77	-0.35	7.53	PASS
	157	5785	-4.63	4.77	0.14	7.53	PASS
	165	5825	-4.83	4.77	-0.06	7.53	PASS

NOTE: 1. Directional gain = 1.7dBi + 10log(3) = 6.47dBi > 6dBi , so the power density limit shall be reduced to 8-(6.47-6) = 7.53dBm.

802.11ac (VHT40)

TX CHAIN	CHANNEL	FREQ. (MHz)	PSD W/O DUTY FACTOR (dBm)	10 log (N=3) dB	DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm)	LIMIT (dBm)	PASS /FAIL
0	151	5755	-9.27	4.77	0.11	-4.39	7.53	PASS
	159	5795	-8.57	4.77	0.11	-3.69	7.53	PASS
1	151	5755	-8.21	4.77	0.11	-3.33	7.53	PASS
	159	5795	-8.81	4.77	0.11	-3.93	7.53	PASS
2	151	5755	-8.68	4.77	0.11	-3.80	7.53	PASS
	159	5795	-6.84	4.77	0.11	-1.96	7.53	PASS

NOTE: 1. Refer to section 3.4 for duty cycle spectrum plot.

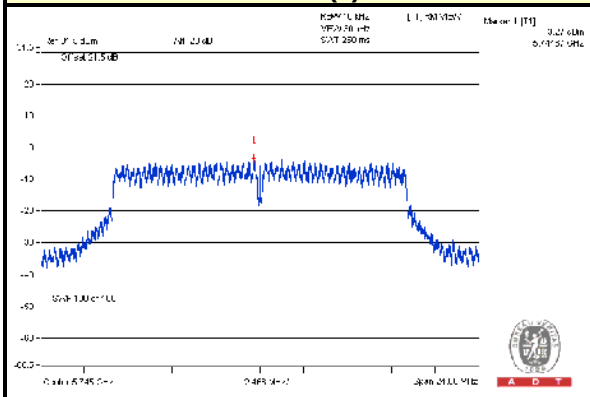
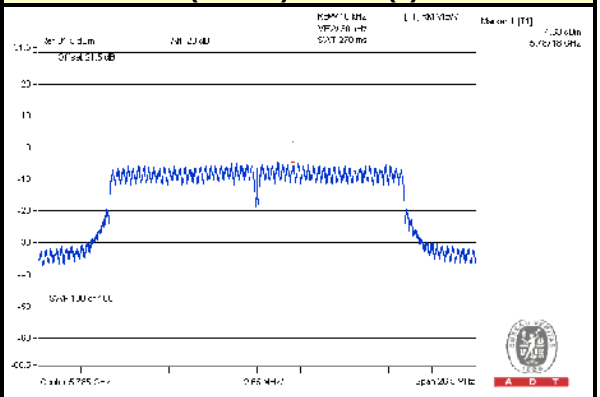
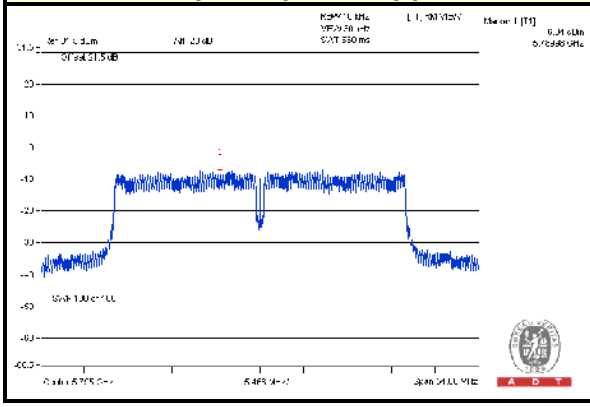
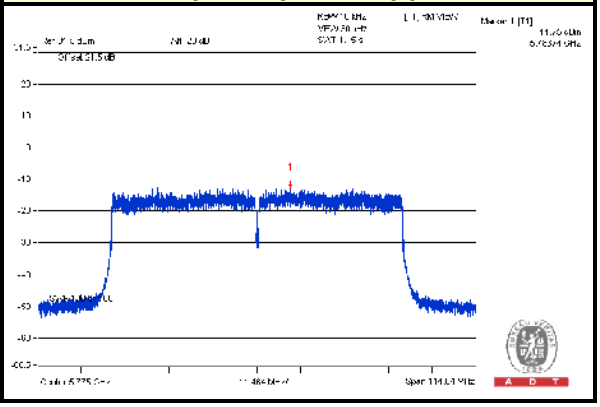
2. Directional gain = 1.7dBi + 10log(3) = 6.47dBi > 6dBi , so the power density limit shall be reduced to 8-(6.47-6) = 7.53dBm.

802.11ac (VHT80)

TX CHAIN	CHANNEL	FREQ. (MHz)	PSD W/O DUTY FACTOR (dBm)	10 log (N=3) dB	DUTY FACTOR (dB)	TOTAL PSD WITH DUTY FACTOR (dBm)	LIMIT (dBm)	PASS /FAIL
0	155	5775	-14.22	4.77	0.17	-9.28	7.53	PASS
1	155	5775	-13.80	4.77	0.17	-8.86	7.53	PASS
2	155	5775	-11.75	4.77	0.17	-6.81	7.53	PASS

NOTE: 1. Refer to section 3.4 for duty cycle spectrum plot.

2. Directional gain = 1.7dBi + 10log(3) = 6.47dBi > 6dBi , so the power density limit shall be reduced to 8-(6.47-6) = 7.53dBm.

SPECTRUM PLOT OF WORST VALUE	
802.11a / Chain(2) : CH149	**802.11ac (VHT20) / Chain(2) : CH157**
	
802.11ac (VHT40) / Chain(2) : CH159	**802.11ac (VHT80) / Chain(2) : CH155**
	

5.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

5.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

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

5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSV 40	100964	July 05, 2014	July 04, 2015

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 18, 2014

5.6.3 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.

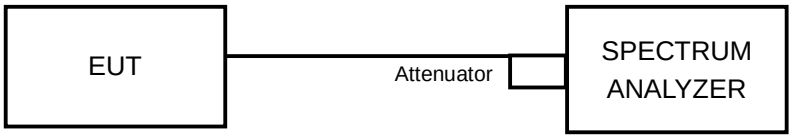
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW ≥ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 TEST SETUP



5.6.6 EUT OPERATING CONDITION

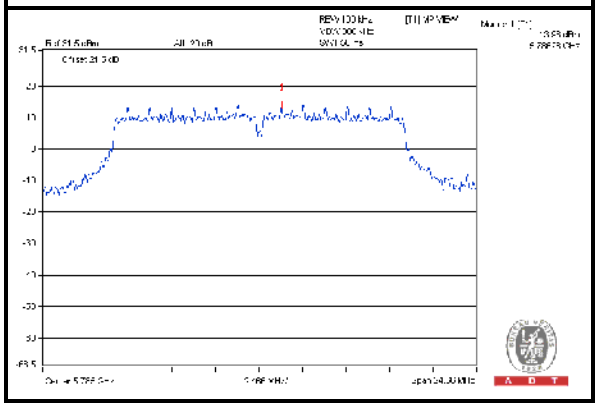
Same as Item 4.3.6

5.6.7 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.

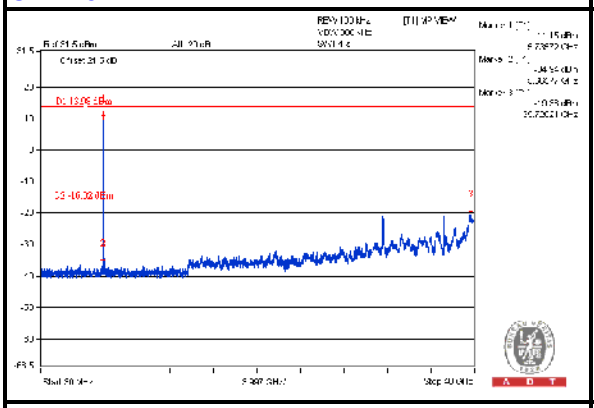
802.11a

Maximum REF

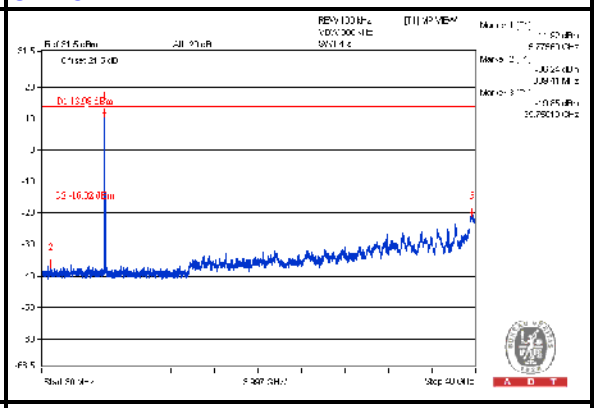


Chain (0)

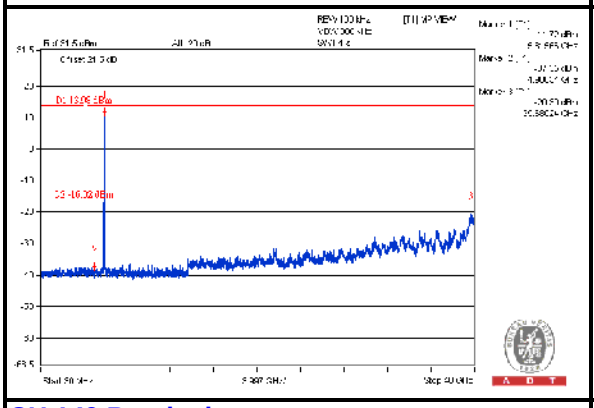
CH 149



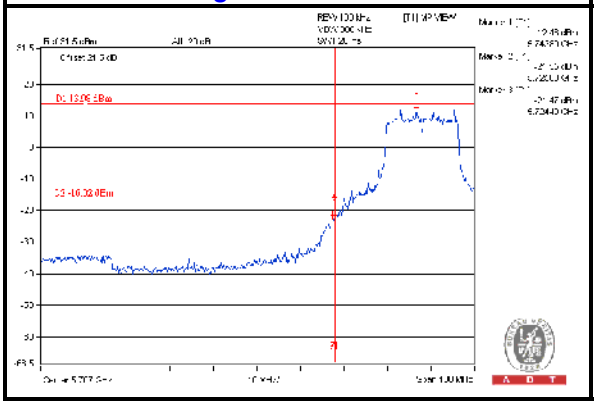
CH 157



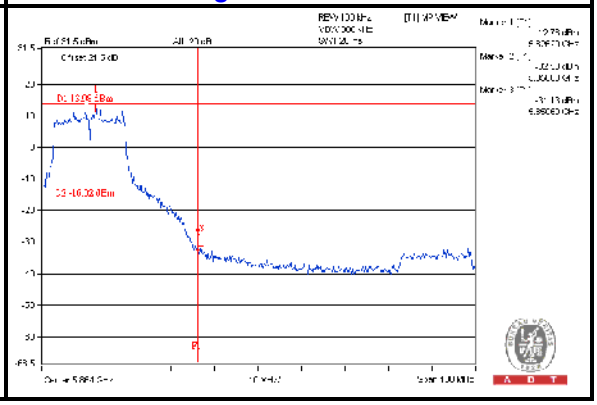
CH 165



CH 149 Band edge

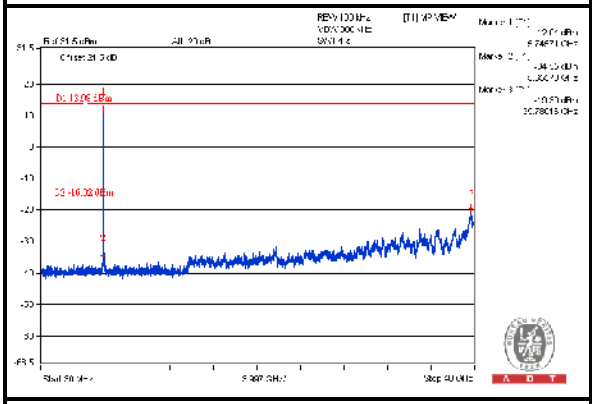


CH 165 Band edge

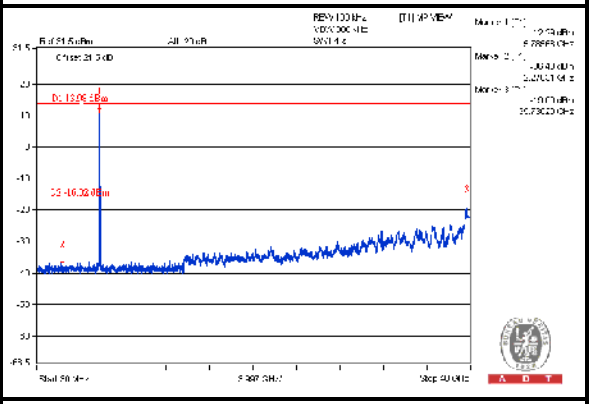


Chain (1)

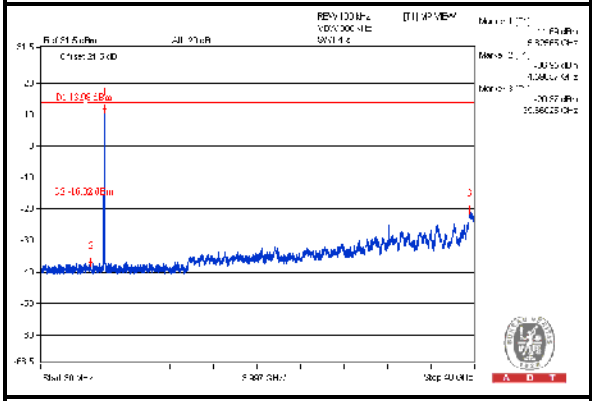
CH 149



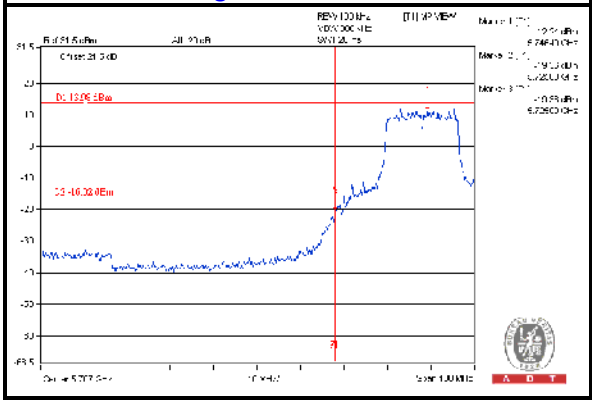
CH 157



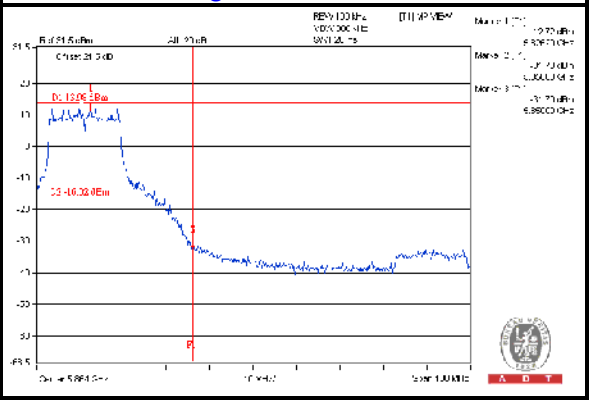
CH 165



CH 149 Band edge

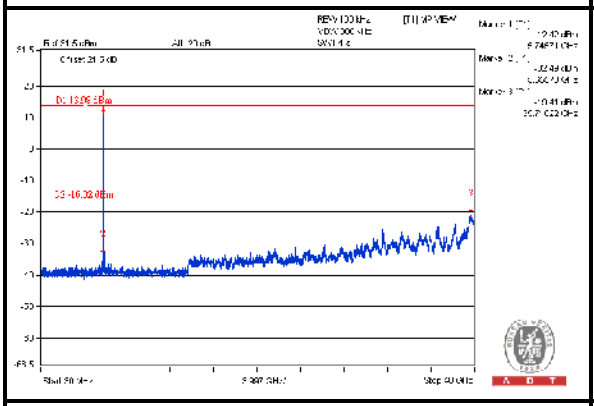


CH 165 Band edge

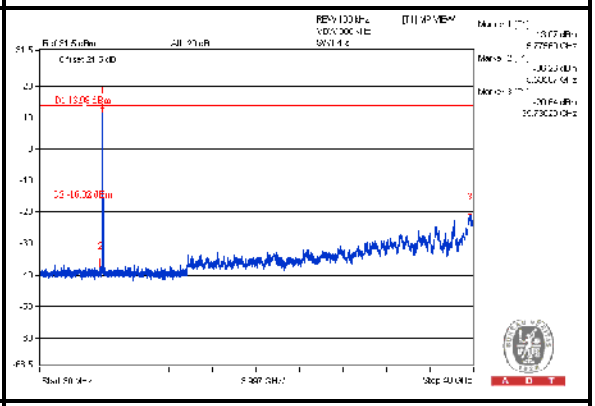


Chain (2)

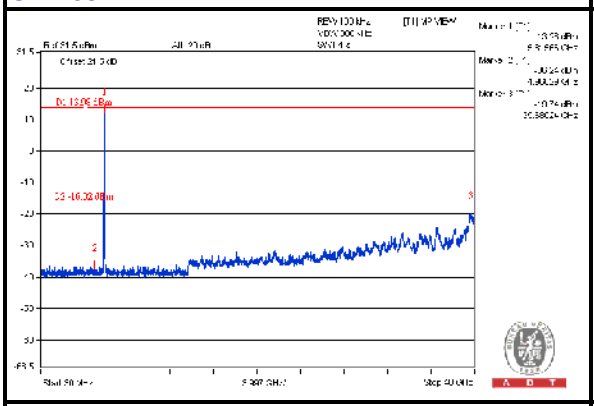
CH 149



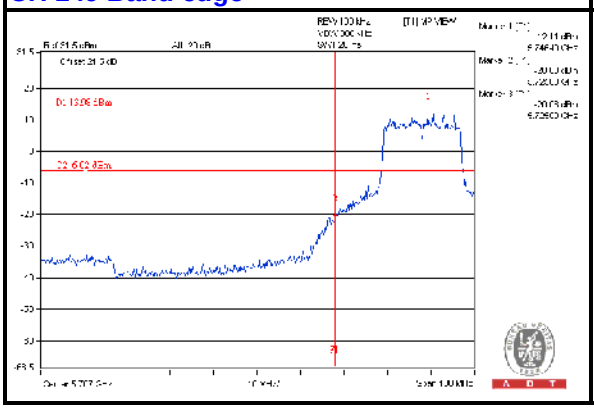
CH 157



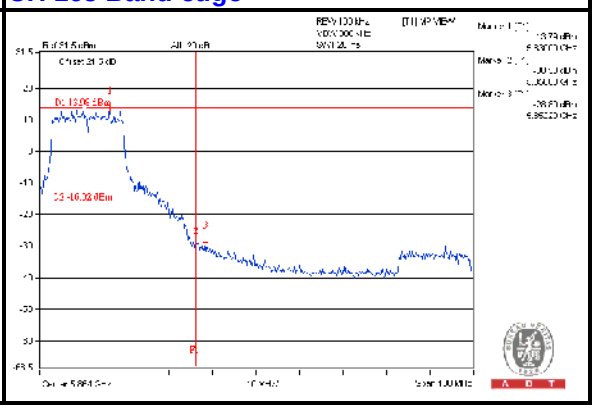
CH 165



CH 149 Band edge

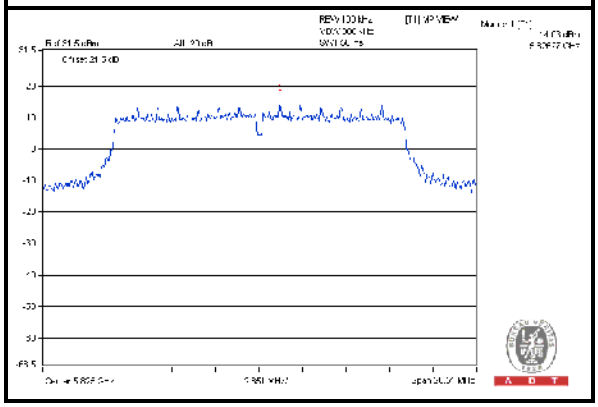


CH 165 Band edge



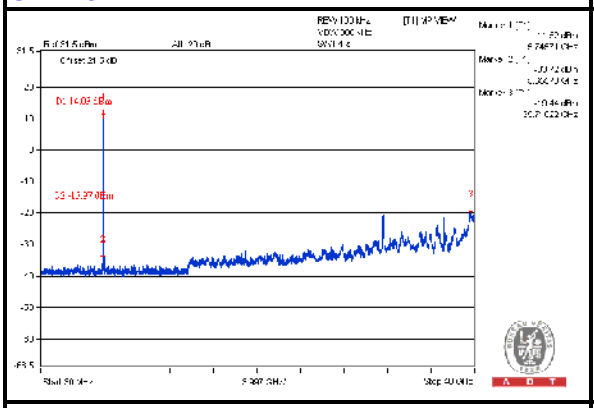
802.11ac (VHT20)

Maximum REF

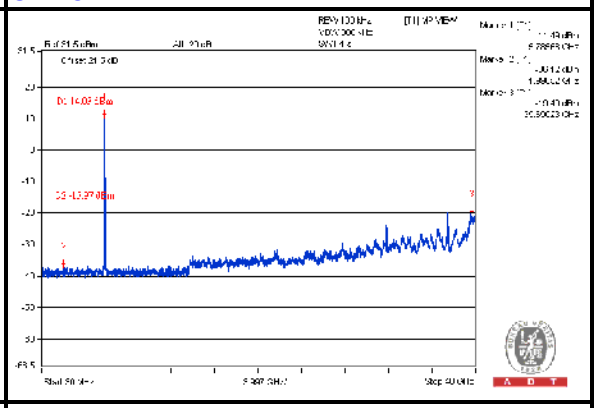


Chain (0)

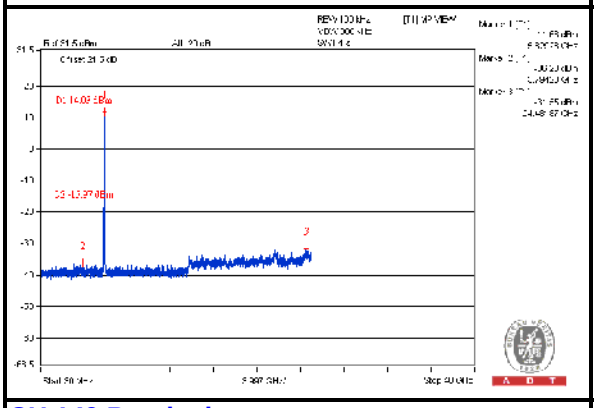
CH 149



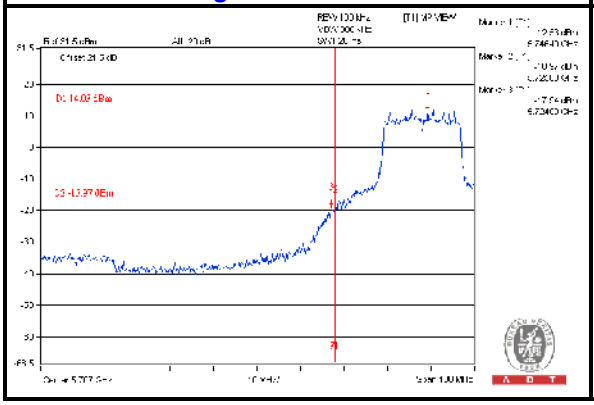
CH 157



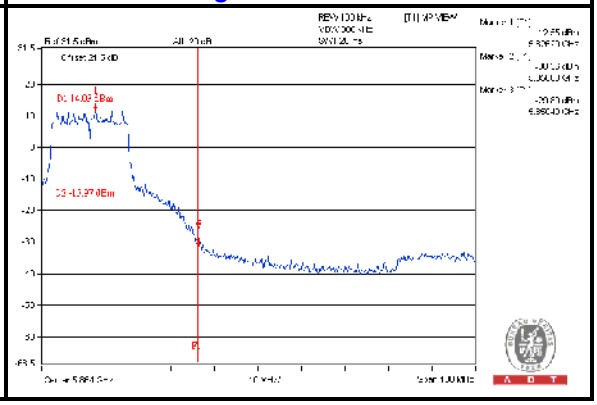
CH 165



CH 149 Band edge

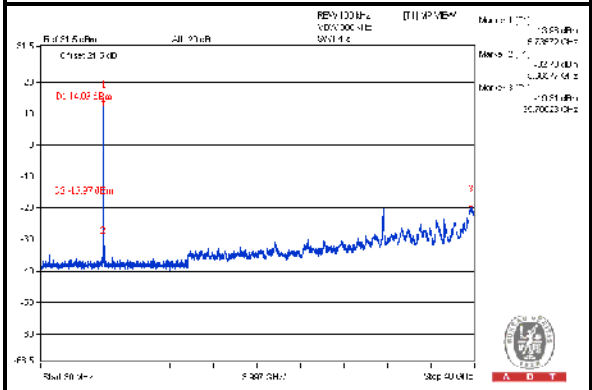


CH 165 Band edge

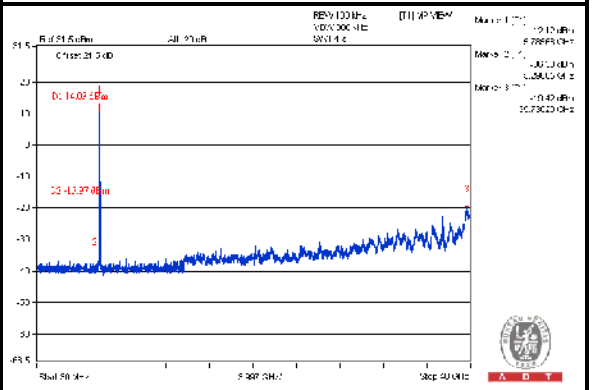


Chain (1)

CH 149



CH 157



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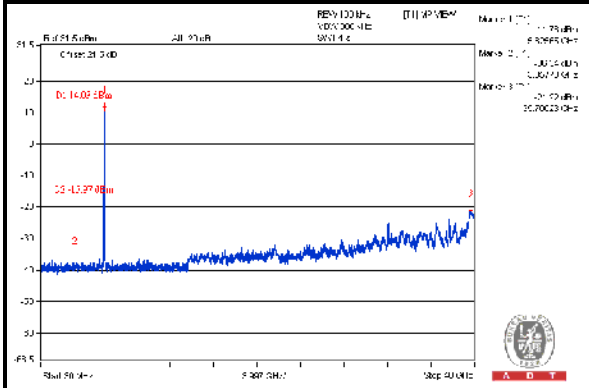
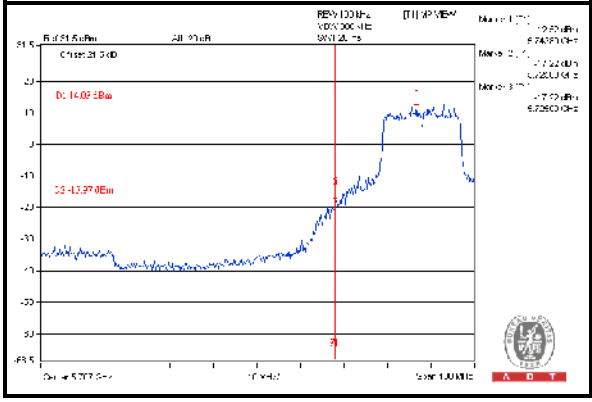
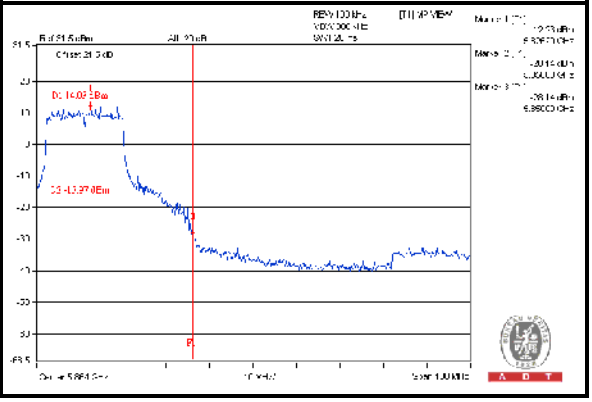


CH 149 Band edge

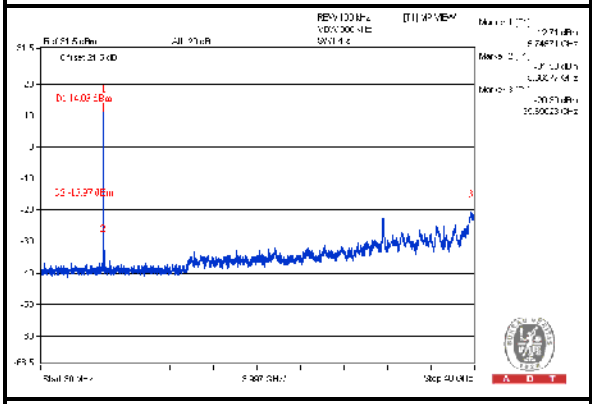


CH 165 Band edge

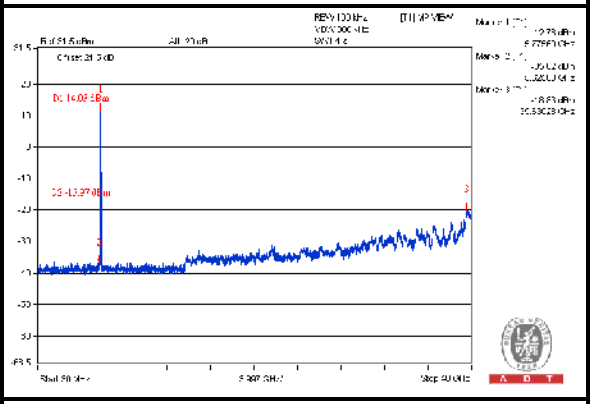


Chain (2)

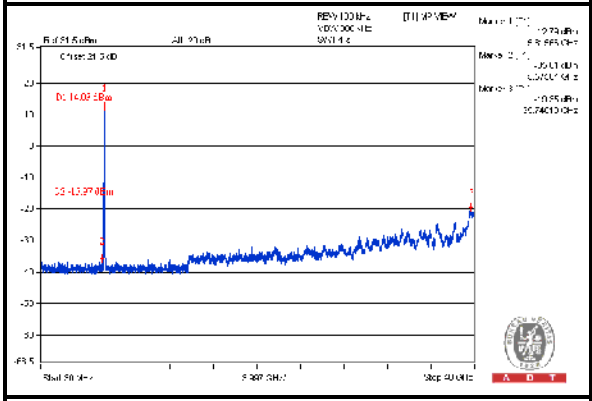
CH 149



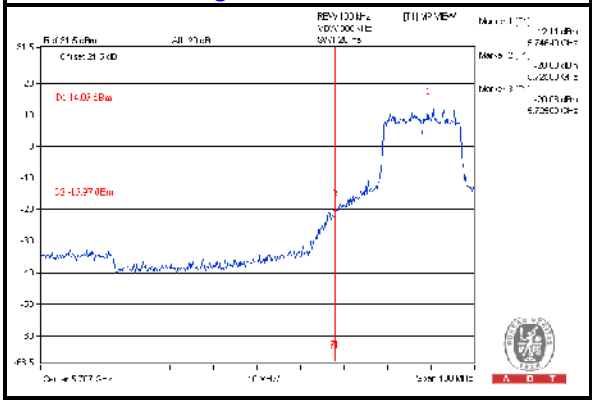
CH 157



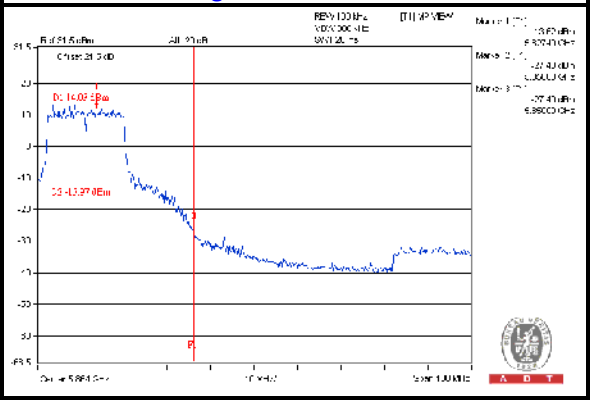
CH 165



CH 149 Band edge

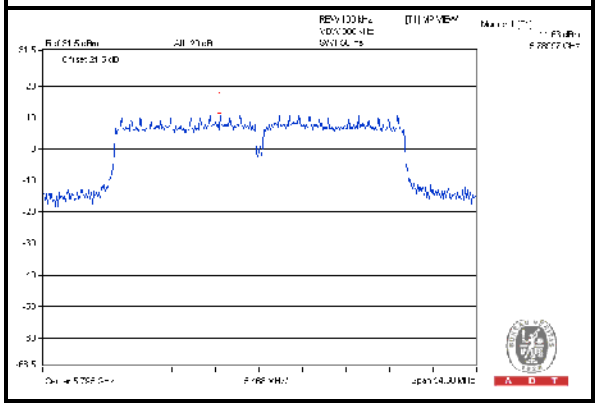


CH 165 Band edge



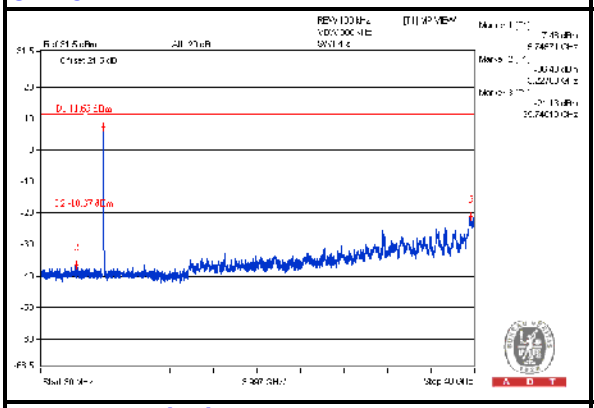
802.11ac (VHT40)

Maximum REF

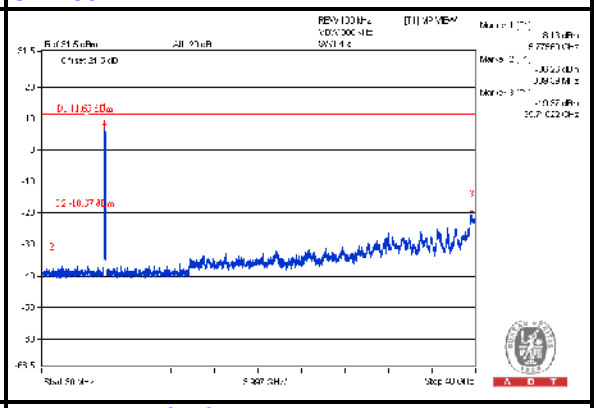


Chain (0)

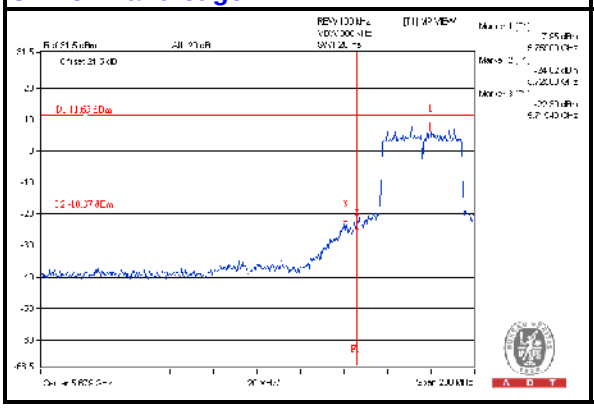
CH 151



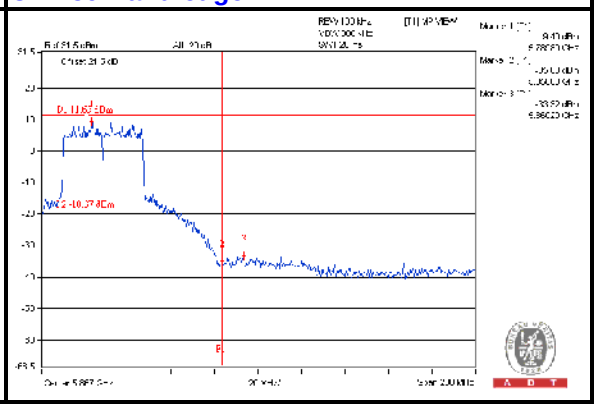
CH 159



CH 151 Band edge

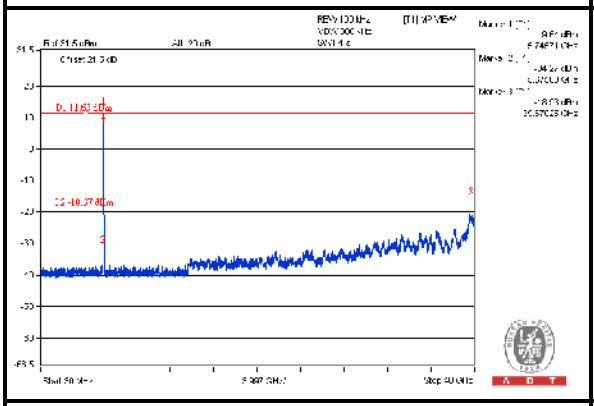


CH 159 Band edge

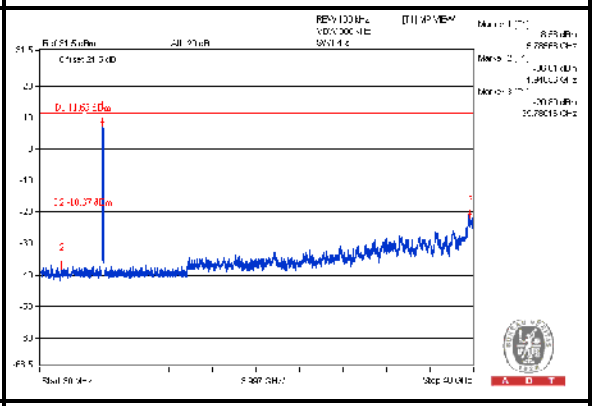


Chain (1)

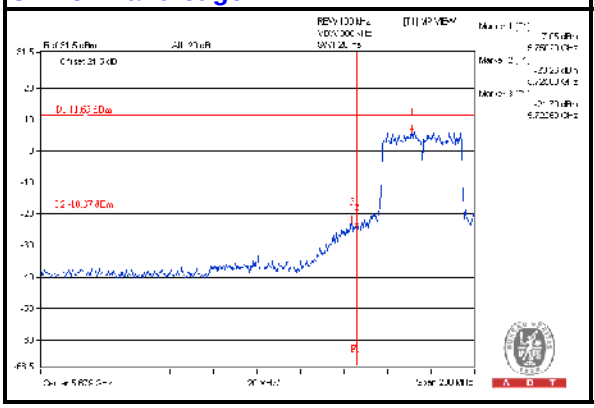
CH 151



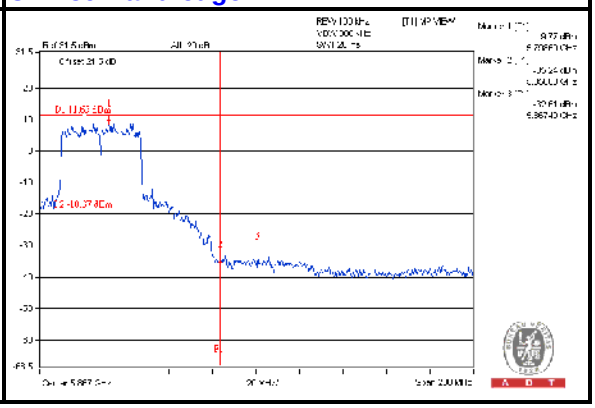
CH 159



CH 151 Band edge

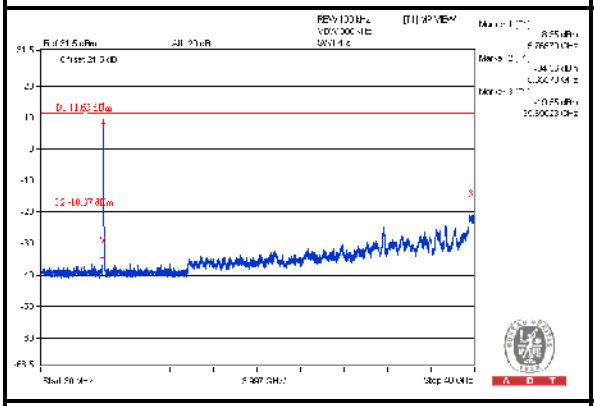


CH 159 Band edge

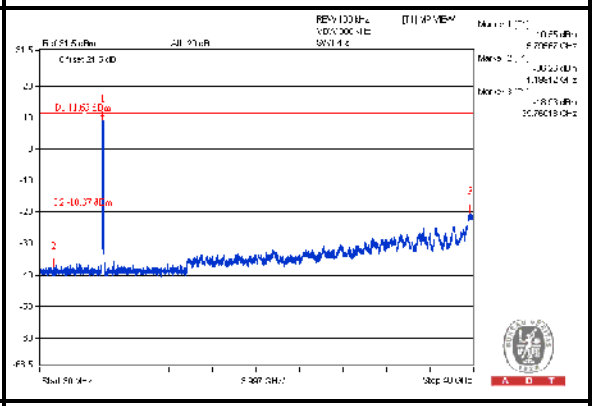


Chain (2)

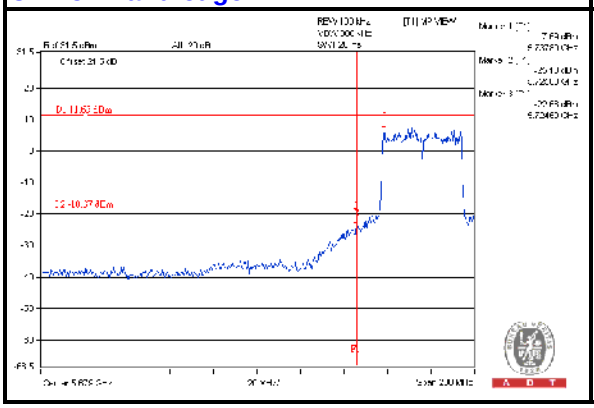
CH 151



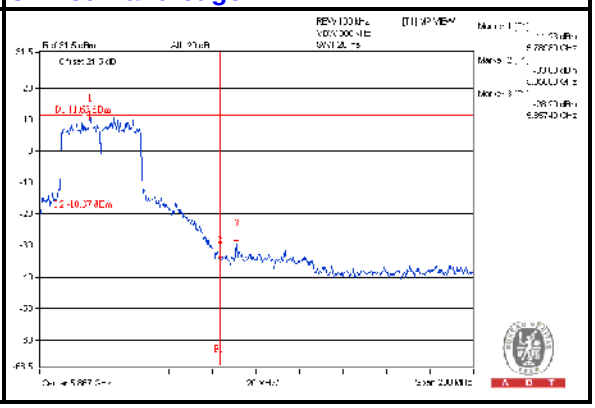
CH 159



CH 151 Band edge

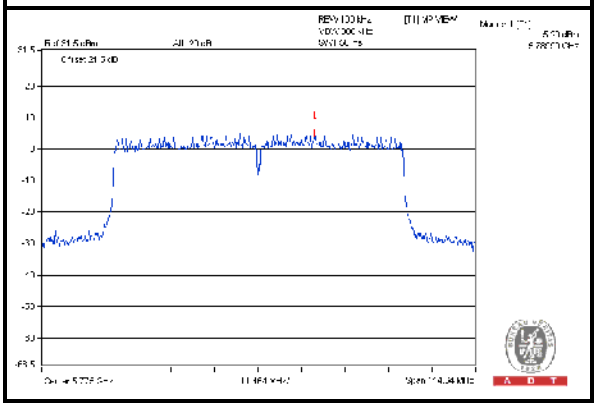


CH 159 Band edge



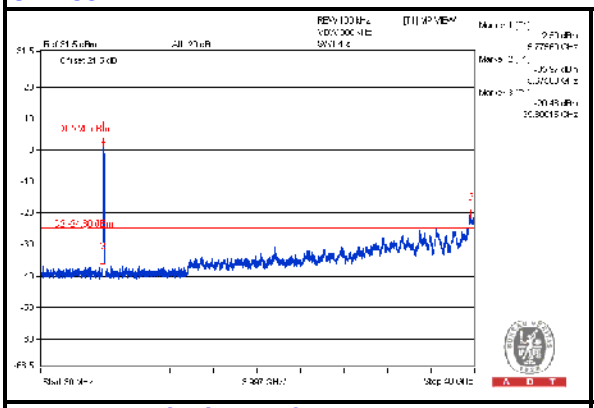
802.11ac (VHT80)

Maximum REF

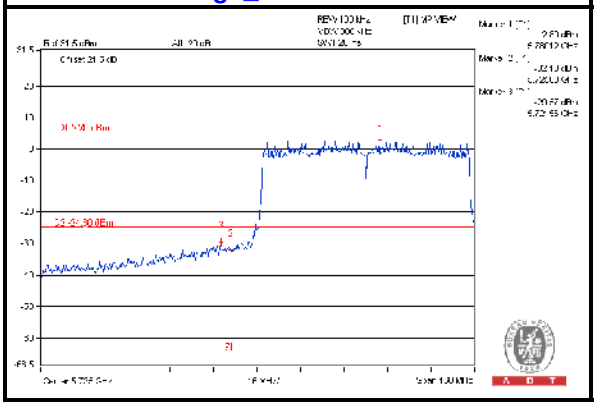


Chain (0)

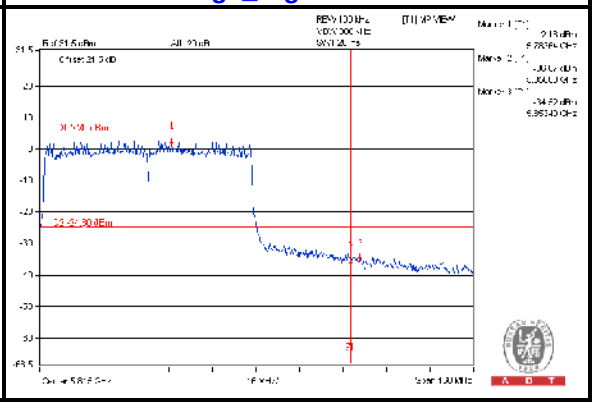
CH 155



CH 155 Band edge_Left

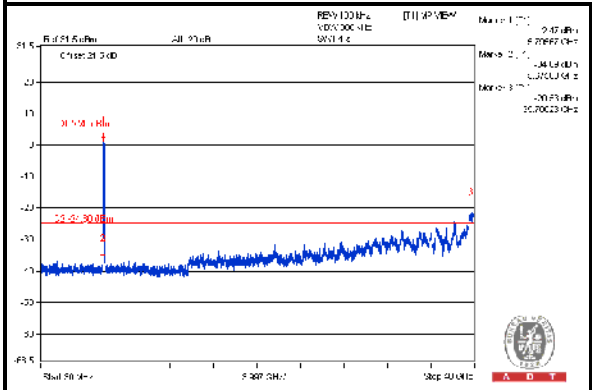


CH 155 Band edge_Right

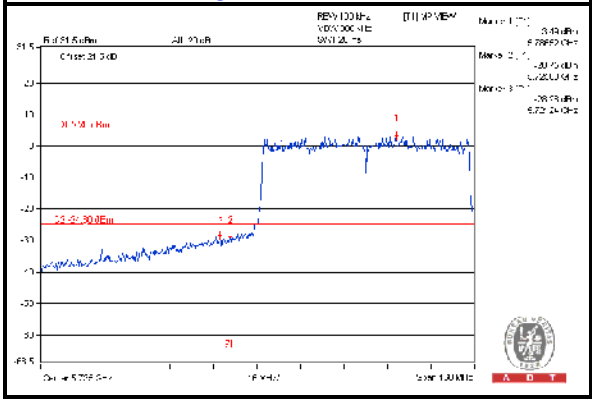


Chain (1)

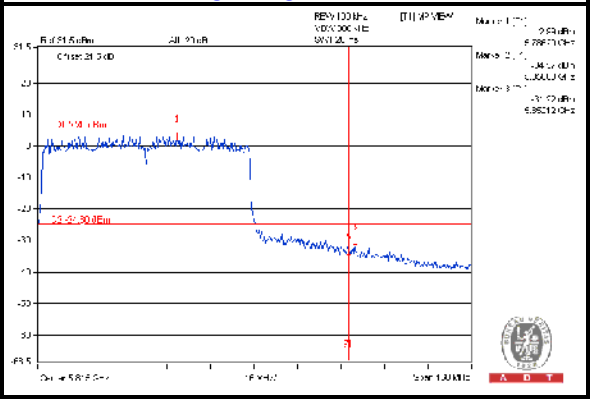
CH 155



CH 155 Band edge_Left

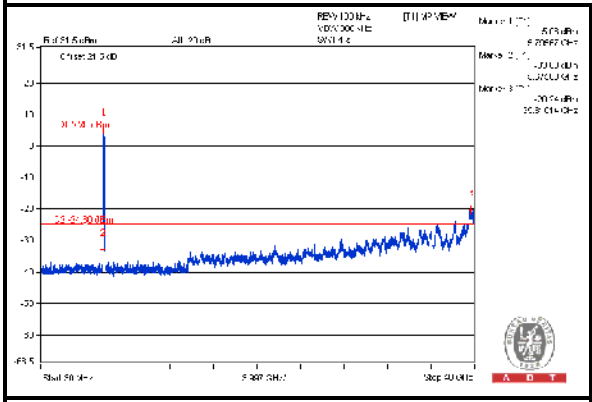


CH 155 Band edge_Right

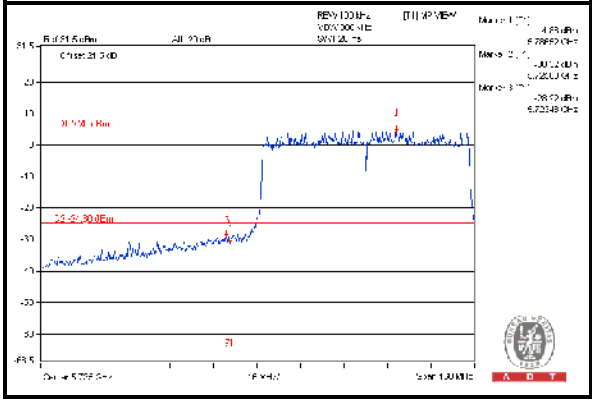


Chain (2)

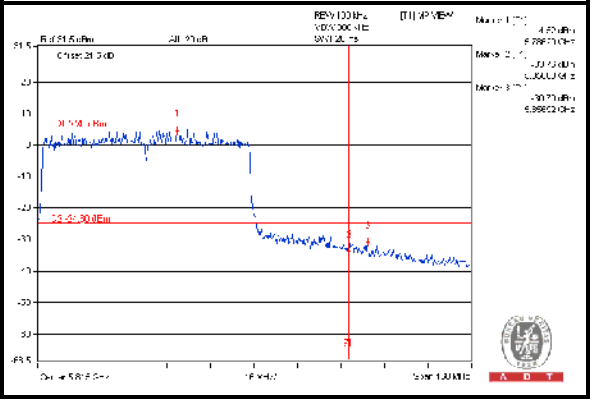
CH 155



CH 155 Band edge_Left



CH 155 Band edge_Right



6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

7. 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:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF/Telecom Lab:
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Hwa Ya EMC/RF/Safety Lab:
Tel: 886-3-3183232
Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

8. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

--- END ---