FCC TEST REPORT(15.247)

REPORT NO.:	RF140812C13
TEST MODEL:	C7000BMX
SERIES MODEL:	C7000BMy-zzzzzz with this note “Where y = X if battery is used, and zzzzzz = a different service provider in the same/different country.
FCC ID:	PY314100252
RECEIVED:	Aug. 12, 2014
TESTED:	Sep. 17 to 19, 2014
ISSUED:	Dec. 10, 2014
APPLICANT:	NETGEAR INC.
ADDRESS:	350 East Plumeria Drive, San Jose CA 96134, USA
ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
LAB ADDRESS :	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (1):	No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.
TEST LOCATION (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan, R.O.C.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF140812C13	Original release	Dec. 10, 2014

1. CERTIFICATION

PRODUCT:	Wireless Cable Data Gateway
BRAND NAME:	NETGEAR
TEST MODEL:	C7000BMX
SERIES MODEL:	C7000BMy-zzzzzz with this note "Where y = X if battery is used, and zzzzzz = a different service provider in the same/different country.
TEST SAMPLE:	ENGINEERING SAMPLE
APPLICANT:	NETGEAR INC.
TESTED:	Sep. 17 to 19, 2014
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)** ANSI C63.10-2009

The above equipment (Model: C7000BMX) 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:** Dec. 10, 2014

(Midoli Peng, Specialist)

Approved by : _____ , **Date:** Dec. 10, 2014

(May Chen, Manager)

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	**TEST TYPE**	**RESULT**	**REMARK**
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -12.12dB at 0.15450MHz
15.247(d) 15.209	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 2390.00MHz
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 i-pex(MHF) not a standard connector.

NOTE: 1. The EUT was operating in 2400 ~ 2483.5MHz, 5.15~5.25GHz, and 5.725~5.850GHz frequencies band. This report was recorded the RF parameters including 2400 ~ 2483.5MHz. For the 5.15~5.25GHz and 5.725~5.850GHz 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	Wireless Cable Data Gateway
TEST MODEL	C7000BMX
SERIES MODEL	C7000BMy-zzzzzz with this note “Where y = X if battery is used, and zzzzzz = a different service provider in the same/different country.
POWER SUPPLY	Internal power supply
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and 11n (BW20), 11n (BW40) mode of 2.4GHz Band
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11a / g: up to 54Mbps 802.11n: up to 450Mbps 802.11ac: up to 1300Mbps
OPERATING FREQUENCY	**For 15.407** 5.18 ~ 5.24GHz, 5.745 ~ 5.825GHz
	For 15.247 2.412 ~ 2.462GHz
NUMBER OF CHANNEL	**For 15.407** 9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20) 4 for 802.11n (HT40), 802.11ac (VHT40) 2 for 802.11ac (VHT80)
	For 15.247 11 for 802.11b, 802.11g, 802.11n (HT20), 802.11n_256QAM(BW20) 7 for 802.11n (HT40), 802.11n_256QAM(BW40)
MAXIMUM OUTPUT POWER	**For 15.407** 802.11a: 607.881mW 802.11ac (VHT20): 603.665mW 802.11ac (VHT40): 184.445mW 802.11ac (VHT80): 33.403mW **For 15.247** 802.11b: 713.576mW 802.11g: 596.785mW 802.11n (HT20): 582.197mW 802.11n (HT40): 172.399mW

ANTENNA TYPE	Please see NOTE
DATA CABLE	RJ45 cable (Unshielded, 1.5m)
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	NA

Note:

1. The EUT must be supplied with an internal power supply:

brand:	PEGATRON
Model:	UPM60N
Input:	100Vac~240Vac
Output:	12V/5A max.
Power Line:	AC cable (Unshielded, 2m)

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

2.4GHz antenna					
No.	**Transmitter Circuit**	**Gain (dBi) (Include cable loss)**	**Frequency range (GHz to GHz)**	**Antenna Type**	**Connecter Type**
1	0	2.07	2.4~2.4835	PIFA	i-pex(MHF)
2	1	2.07	2.4~2.4835	PIFA	i-pex(MHF)
3	2	2.07	2.4~2.4835	PIFA	i-pex(MHF)
5GHz antenna					
No.	**Transmitter Circuit**	**Gain (dBi) (Include cable loss)**	**Frequency range (GHz to GHz)**	**Antenna Type**	**Connecter Type**
4	0	3.33	5.15~5.25	PIFA	i-pex(MHF)
		3.32	5.25~5.35	PIFA	i-pex(MHF)
		3.29	5.47~5.725	PIFA	i-pex(MHF)
		3.28	5.725~5.850	PIFA	i-pex(MHF)
5	1	3.33	5.15~5.25	PIFA	i-pex(MHF)
		3.32	5.25~5.35	PIFA	i-pex(MHF)
		3.29	5.47~5.725	PIFA	i-pex(MHF)
		3.28	5.725~5.850	PIFA	i-pex(MHF)
6	2	3.33	5.15~5.25	PIFA	i-pex(MHF)
		3.32	5.25~5.35	PIFA	i-pex(MHF)
		3.29	5.47~5.725	PIFA	i-pex(MHF)
		3.28	5.725~5.850	PIFA	i-pex(MHF)

3. The EUT incorporates a MIMO function.

MODULATION MODE	DATA RATE (MCS)	TX & RX CONFIGURATION	
802.11b	1 ~ 11Mbps	3TX CDD	3RX
802.11g	6 ~ 54Mbps	3TX CDD	3RX
802.11n (HT20) 802.11n (HT40) (For 2.4GHz)	MCS 0~7	3TX CDD / beamforming	3RX
	MCS 8~15	3TX CDD / beamforming	3RX
	MCS 16~23	3TX / beamforming	3RX
802.11n (BW20) (For 2.4GHz)	MCS 0~8, Nss=1 (256QAM)	3TX CDD / beamforming	3RX
	MCS 0~8, Nss=2 (256QAM)	3TX CDD / beamforming	3RX
	MCS 0~9, Nss=3 (256QAM)	3TX / beamforming	3RX
802.11n (BW40) (For 2.4GHz)	MCS 0~9, Nss=1 (256QAM)	3TX CDD / beamforming	3RX
	MCS 0~9, Nss=2 (256QAM)	3TX CDD / beamforming	3RX
	MCS 0~9, Nss=3 (256QAM)	3TX / beamforming	3RX
802.11a	6 ~ 54Mbps	3TX CDD	3RX
802.11n (HT20), 802.11n (HT40) (For 5GHz)	MCS 0~7	3TX CDD / beamforming	3RX
	MCS 8~15	3TX CDD / beamforming	3RX
	MCS 16~23	3TX / beamforming	3RX
802.11ac (VHT20) (For 5GHz)	MCS 0~8, Nss=1	3TX CDD / beamforming	3RX
	MCS 0~8, Nss=2	3TX CDD / beamforming	3RX
	MCS 0~9, Nss=3	3TX / beamforming	3RX
802.11ac (VHT40) 802.11ac (VHT80) (For 5GHz)	MCS 0~9, Nss=1	3TX CDD / beamforming	3RX
	MCS 0~9, Nss=2	3TX CDD / beamforming	3RX
	MCS 0~9, 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)

4. The emission of the simultaneous operation (2.4GHz & 5GHz) has been evaluated and no non-compliance was found.
5. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20), 802.11n_256QAM(BW20):

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), 802.11n_256QAM(BW40):

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

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

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

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

OB: Conducted Out-Band Emission Measurement

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)
802.11b	1 to 11	6	DSSS	DBPSK	1

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)
802.11b	1 to 11	6	DSSS	DBPSK	1

RADIATED EMISSION TEST (ABOVE 1 GHz):

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

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

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
PLC	30deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE<1G	24deg. C, 70%RH	120Vac, 60Hz	Tim Ho
RE≥1G	23deg. C, 67%RH	120Vac, 60Hz	Gary Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	James Chan
OB	25deg. C, 60%RH	120Vac, 60Hz	James Chan

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 v03r02

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.

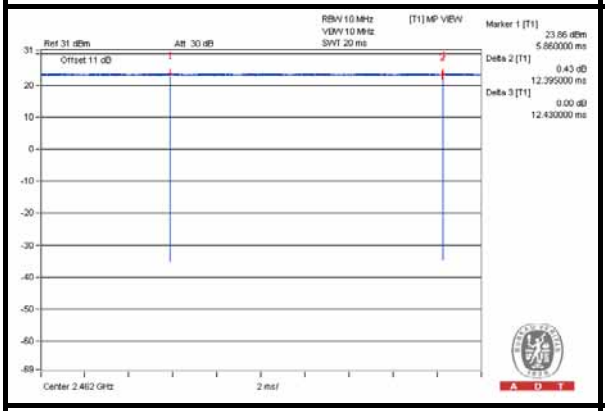
802.11b: Duty cycle = 12.395 ms/12.43 ms = 0.997

802.11g: Duty cycle = 2.059 ms/2.082 ms = 0.989

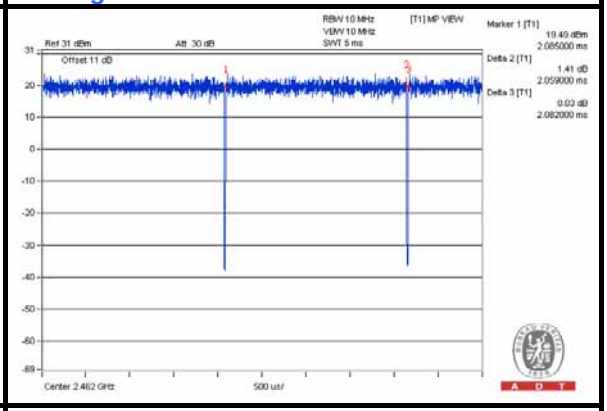
802.11n (HT20): Duty cycle = 1.91 ms/1.935 ms = 0.987

802.11n (HT40): Duty cycle = 0.94 ms/0.961 ms = 0.978, Duty factor = 10 * log(1/0.978) = 0.10

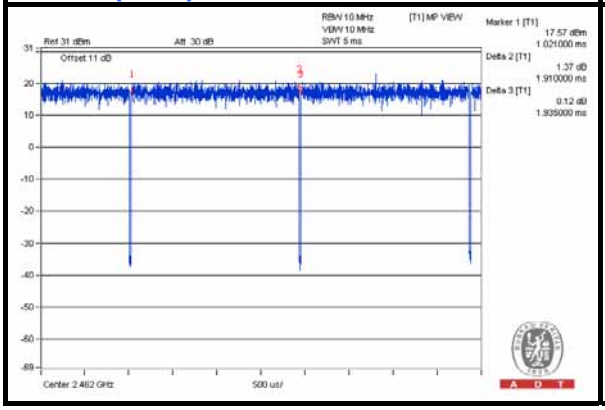
802.11b



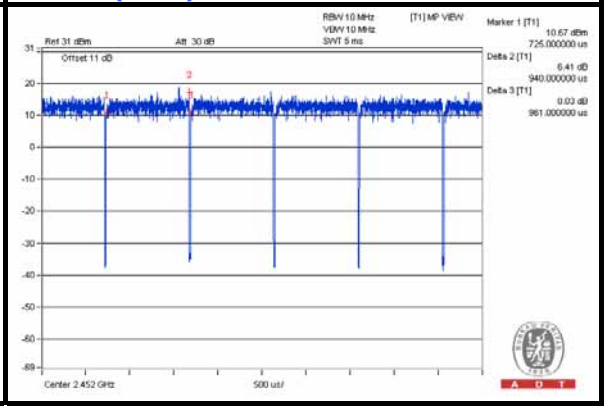
802.11g



802.11n (HT20)



802.11n (HT40)



3.5 DESCRIPTION OF SUPPORT UNITS

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

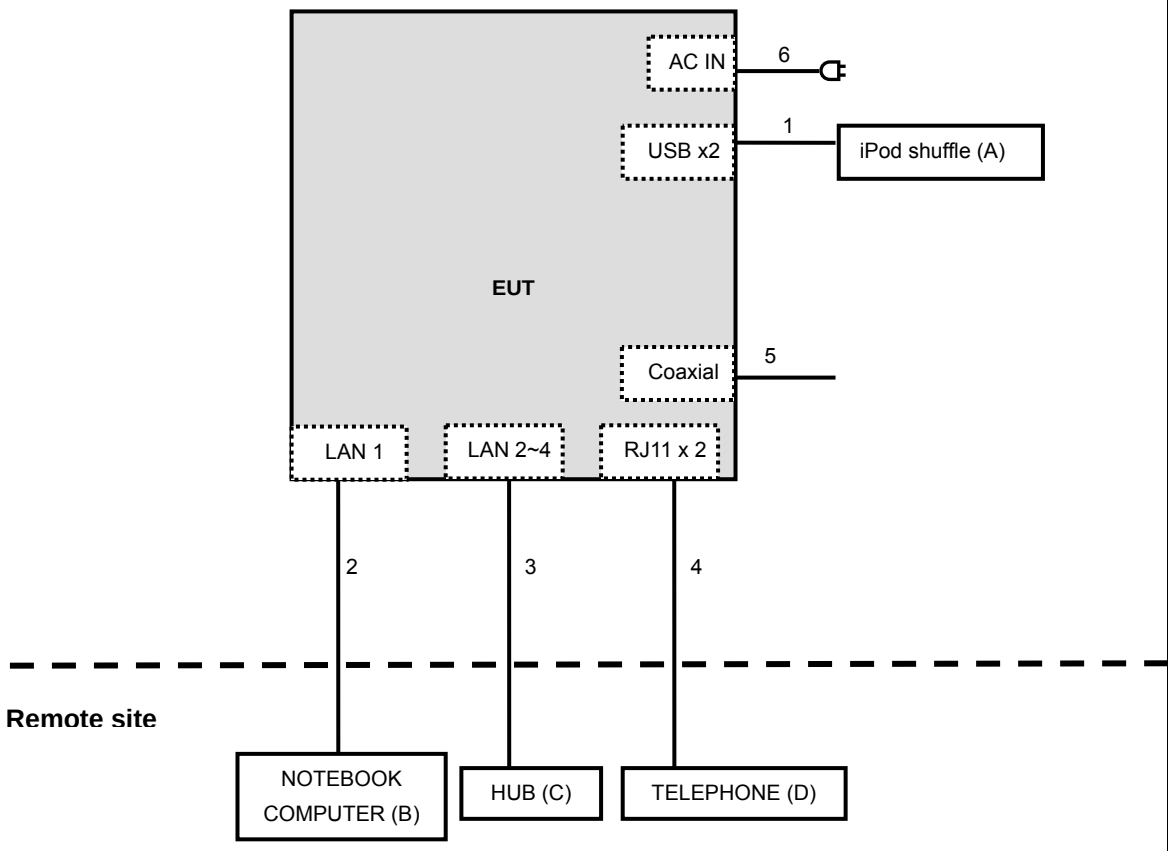
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	iPod shuffle	Apple	MD778TA/A	CC4JMCMXF4T1	NA	Provided by Lab
	iPod shuffle	Apple	MD778TA/A	CC4JMH7LF4T1	NA	Provided by Lab
B	NOTEBOOK COMPUTER	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
C	HUB	ZyXEL	ES-116P	S060H02000215	FCC DoC	Provided by Lab
D	TELEPHONE	WONDER	WD-303	8C17DA02825	NA	Provided by Lab
	TELEPHONE	WONDER	WD-303	8C17DA02763	NA	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.	USB	2	0.1	Yes	0	Provided by Lab
2.	RJ-45	1	10	No	0	Provided by Lab
3.	RJ-45	3	10	No	0	Provided by Lab
4.	RJ-11	2	10	No	0	Provided by Lab
5.	Coaxial	1	10	No	0	Provided by Lab
6.	AC	1	2	No	0	Supplied by client

3.6 CONFIGURATION OF SYSTEM UNDER TEST



4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK-8127	8127-522	Sep. 15, 2014	Sep. 14, 2015
Line-Impedance Stabilization Network (for Peripheral) ROHDE & SCHWARZ	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.

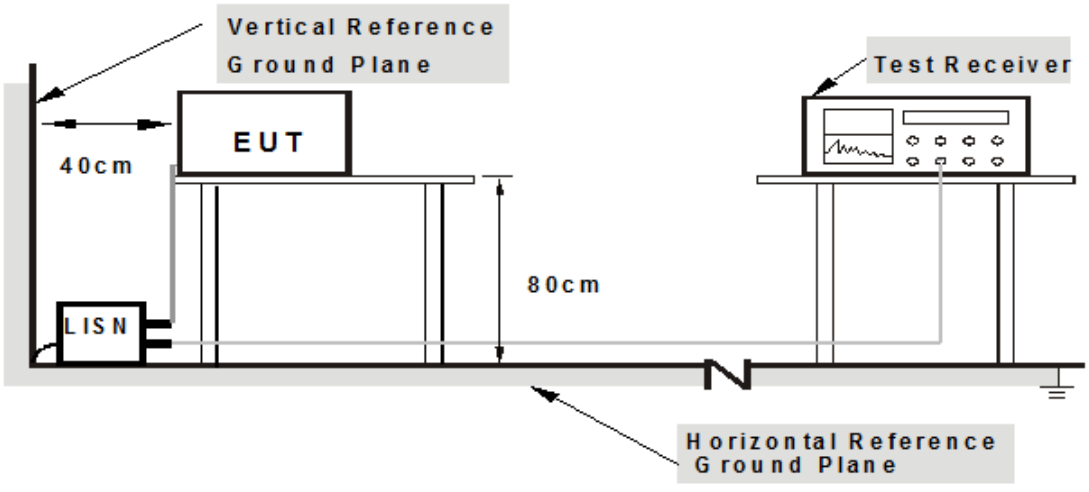
NOTE:

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. Placed the EUT on testing table.
2. Prepared computer system (support unit B) to act as communication partner.
3. The communication partner ran test program “Mtool.exe[2.0.1.1]” to enable EUT under transmission/receiving condition continuously.

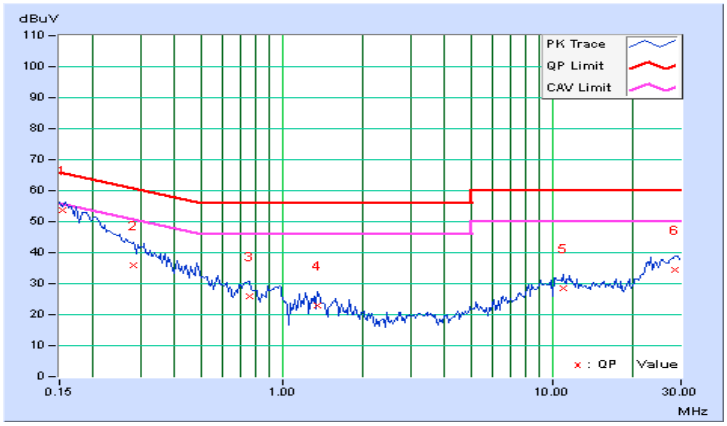
4.1.7 TEST RESULTS

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	**0.15450**	**0.07**	**53.57**	**41.24**	**53.64**	**41.31**	**65.75**	**55.75**	**-12.12**	**-14.45**
2	0.28281	0.08	35.69	22.03	35.77	22.11	60.73	50.73	-24.96	-28.62
3	0.75547	0.11	26.00	16.95	26.11	17.06	56.00	46.00	-29.89	-28.94
4	1.35547	0.14	22.85	14.75	22.99	14.89	56.00	46.00	-33.01	-31.11
5	10.94922	0.48	28.18	23.33	28.66	23.81	60.00	50.00	-31.34	-26.19
6	28.45313	0.95	33.65	28.46	34.60	29.41	60.00	50.00	-25.40	-20.59

REMARKS:

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

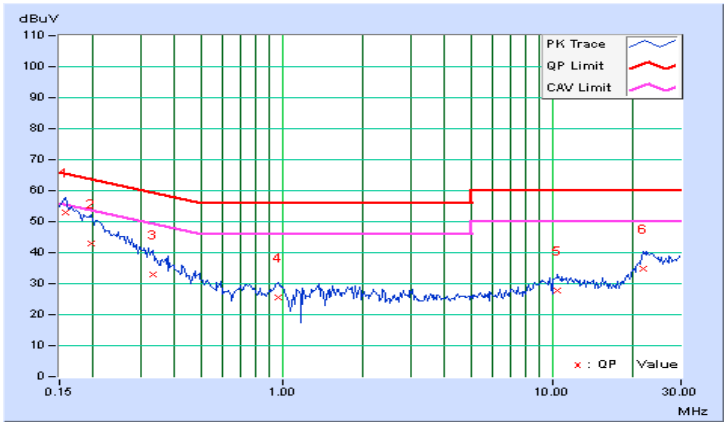


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)

	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	0.07	52.99	42.37	53.06	42.44	65.58	55.58	-12.51	-13.13
2	0.19687	0.07	42.87	26.15	42.94	26.22	63.74	53.74	-20.80	-27.52
3	0.33359	0.08	32.72	21.55	32.80	21.63	59.36	49.36	-26.56	-27.73
4	0.97422	0.13	25.48	15.20	25.61	15.33	56.00	46.00	-30.39	-30.67
5	10.45313	0.46	27.38	22.57	27.84	23.03	60.00	50.00	-32.16	-26.97
6	21.67188	0.75	33.97	28.64	34.72	29.39	60.00	50.00	-25.28	-20.61

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	July 21, 2014	July 20, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-03	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 05, 2013	Oct. 04, 2014
Spectrum Analyzer R&S	FSV40	100964	July 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.
3 The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5 The VCCI Site Registration No. is G-137.
6 The CANADA Site Registration No. is IC 7450H-2.
7 Tested Date: Sep. 17, 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:

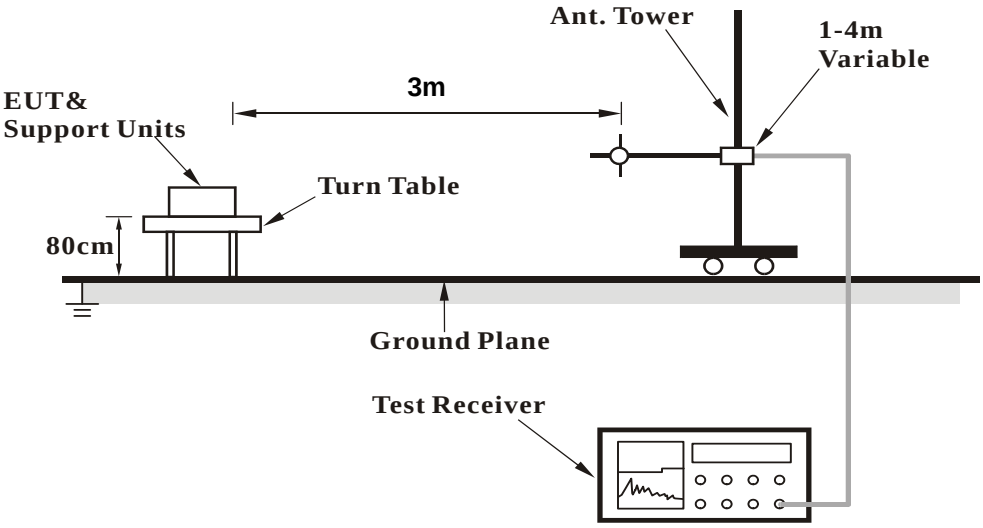
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

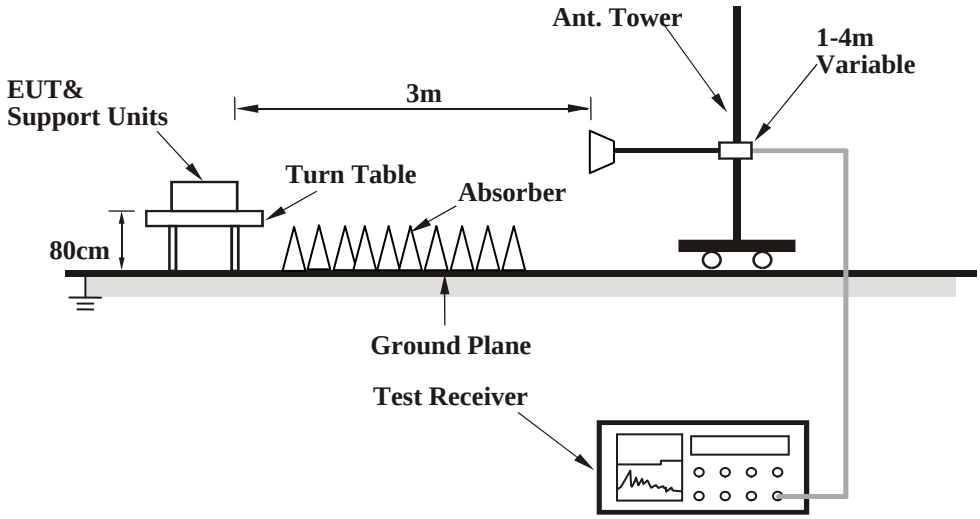
No deviation

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	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	200.82	33.6 QP	43.5	-9.9	1.00 H	276	49.98	-16.34
2	375.03	42.0 QP	46.0	-4.0	1.00 H	307	52.21	-10.23
3	557.92	33.8 QP	46.0	-12.2	1.00 H	113	39.99	-6.23
4	625.00	37.5 QP	46.0	-8.5	1.00 H	93	41.95	-4.41
5	720.01	38.4 QP	46.0	-7.6	1.00 H	28	41.64	-3.26
6	799.99	42.8 QP	46.0	-3.2	1.00 H	72	44.25	-1.41
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	46.43	35.4 QP	40.0	-4.6	1.00 V	168	48.97	-13.61
2	103.87	32.8 QP	43.5	-10.7	1.00 V	65	49.99	-17.18
3	201.01	33.4 QP	43.5	-10.1	1.00 V	299	49.79	-16.35
4	374.98	41.6 QP	46.0	-4.4	1.00 V	334	51.88	-10.24
5	540.03	42.0 QP	46.0	-4.0	1.00 V	49	48.60	-6.59
6	875.02	39.9 QP	46.0	-6.2	1.00 V	279	40.30	-0.45

REMARKS:

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

ABOVE 1GHz DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2387.20	61.4 PK	74.0	-12.6	1.13 H	100	63.89	-2.49
2	2387.20	51.8 AV	54.0	-2.2	1.13 H	100	54.29	-2.49
3	*2412.00	117.4 PK			1.43 H	100	119.77	-2.37
4	*2412.00	114.9 AV			1.43 H	100	117.27	-2.37
5	4824.00	54.0 PK	74.0	-20.0	1.12 H	305	48.29	5.71
6	4824.00	51.4 AV	54.0	-2.6	1.12 H	305	45.69	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	2387.20	62.3 PK	74.0	-11.7	1.34 V	85	64.79	-2.49
2	2387.20	53.1 AV	54.0	-0.9	1.34 V	85	55.59	-2.49
3	*2412.00	117.1 PK			1.34 V	85	119.47	-2.37
4	*2412.00	114.1 AV			1.34 V	85	116.47	-2.37
5	4824.00	53.5 PK	74.0	-20.5	1.13 V	80	47.79	5.71
6	4824.00	50.3 AV	54.0	-3.7	1.13 V	80	44.59	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	53.9 PK	74.0	-20.1	1.00 H	103	56.37	-2.47
2	2390.00	40.5 AV	54.0	-13.5	1.00 H	103	42.97	-2.47
3	*2437.00	115.6 PK			1.00 H	103	117.85	-2.25
4	*2437.00	113.1 AV			1.00 H	103	115.35	-2.25
5	2483.50	54.9 PK	74.0	-19.1	1.00 H	103	56.93	-2.03
6	2483.50	41.8 AV	54.0	-12.2	1.00 H	103	43.83	-2.03
7	4874.00	55.1 PK	74.0	-18.9	1.11 H	306	49.20	5.90
8	4874.00	52.7 AV	54.0	-1.3	1.11 H	306	46.80	5.90
9	7311.00	55.7 PK	74.0	-18.3	1.09 H	311	42.53	13.17
10	7311.00	41.8 AV	54.0	-12.2	1.09 H	311	28.63	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	54.2 PK	74.0	-19.8	1.33 V	83	56.67	-2.47
2	2390.00	41.2 AV	54.0	-12.8	1.33 V	83	43.67	-2.47
3	*2437.00	118.6 PK			1.33 V	83	120.85	-2.25
4	*2437.00	116.0 AV			1.33 V	83	118.25	-2.25
5	2483.50	56.7 PK	74.0	-17.3	1.33 V	83	58.73	-2.03
6	2483.50	43.6 AV	54.0	-10.4	1.33 V	83	45.63	-2.03
7	4874.00	54.2 PK	74.0	-19.8	1.31 V	85	48.30	5.90
8	4874.00	51.0 AV	54.0	-3.0	1.31 V	85	45.10	5.90
9	7311.00	54.3 PK	74.0	-19.7	1.34 V	292	41.13	13.17
10	7311.00	42.7 AV	54.0	-11.3	1.34 V	292	29.53	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	*2462.00	113.6 PK			1.16 H	218	115.74	-2.14
2	*2462.00	110.6 AV			1.16 H	218	112.74	-2.14
3	2483.50	57.4 PK	74.0	-16.6	1.16 H	218	59.43	-2.03
4	2483.50	48.2 AV	54.0	-5.8	1.16 H	218	50.23	-2.03
5	4924.00	54.4 PK	74.0	-19.6	1.10 H	304	48.29	6.11
6	4924.00	50.2 AV	54.0	-3.8	1.10 H	304	44.09	6.11
7	7386.00	56.2 PK	74.0	-17.8	1.08 H	310	43.02	13.18
8	7386.00	42.1 AV	54.0	-11.9	1.08 H	310	28.92	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	*2462.00	117.4 PK			1.31 V	89	119.54	-2.14
2	*2462.00	114.6 AV			1.31 V	89	116.74	-2.14
3	2483.50	60.3 PK	74.0	-13.7	1.31 V	89	62.33	-2.03
4	2483.50	53.5 AV	54.0	-0.5	1.31 V	89	55.53	-2.03
5	4924.00	54.6 PK	74.0	-19.4	1.28 V	76	48.49	6.11
6	4924.00	51.3 AV	54.0	-2.7	1.28 V	76	45.19	6.11
7	7386.00	54.3 PK	74.0	-19.7	1.34 V	289	41.12	13.18
8	7386.00	42.9 AV	54.0	-11.1	1.34 V	289	29.72	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.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2390.00	69.9 PK	74.0	-4.1	1.40 H	103	72.37	-2.47
2	2390.00	53.7 AV	54.0	-0.3	1.40 H	103	56.17	-2.47
3	*2412.00	115.2 PK			1.40 H	103	117.57	-2.37
4	*2412.00	105.1 AV			1.40 H	103	107.47	-2.37
5	4824.00	55.4 PK	74.0	-18.6	1.36 H	282	49.69	5.71
6	4824.00	41.8 AV	54.0	-12.2	1.36 H	282	36.09	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	70.6 PK	74.0	-3.4	1.31 V	90	73.07	-2.47
2	2390.00	50.7 AV	54.0	-3.3	1.31 V	90	53.17	-2.47
3	*2412.00	113.1 PK			1.37 V	92	115.47	-2.37
4	*2412.00	103.2 AV			1.37 V	92	105.57	-2.37
5	4824.00	53.8 PK	74.0	-20.2	1.30 V	75	48.09	5.71
6	4824.00	40.8 AV	54.0	-13.2	1.30 V	75	35.09	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	70.1 PK	74.0	-3.9	1.36 H	100	72.57	-2.47
2	2390.00	46.4 AV	54.0	-7.6	1.36 H	100	48.87	-2.47
3	*2437.00	120.4 PK			1.36 H	100	122.65	-2.25
4	*2437.00	110.2 AV			1.36 H	100	112.45	-2.25
5	2483.50	70.5 PK	74.0	-3.5	1.36 H	100	72.53	-2.03
6	2483.50	48.8 AV	54.0	-5.2	1.36 H	100	50.83	-2.03
7	4874.00	55.4 PK	74.0	-18.6	1.25 H	285	49.50	5.90
8	4874.00	41.9 AV	54.0	-12.1	1.25 H	285	36.00	5.90
9	7311.00	53.8 PK	74.0	-20.2	1.28 H	93	40.63	13.17
10	7311.00	42.7 AV	54.0	-11.3	1.28 H	93	29.53	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	71.5 PK	74.0	-2.5	1.35 V	82	73.97	-2.47
2	2390.00	46.0 AV	54.0	-8.0	1.35 V	82	48.47	-2.47
3	*2437.00	119.4 PK			1.35 V	82	121.65	-2.25
4	*2437.00	109.7 AV			1.35 V	82	111.95	-2.25
5	2483.50	72.4 PK	74.0	-1.6	1.35 V	82	74.43	-2.03
6	2483.50	49.6 AV	54.0	-4.4	1.35 V	82	51.63	-2.03
7	4874.00	54.4 PK	74.0	-19.6	1.32 V	88	48.50	5.90
8	4874.00	41.2 AV	54.0	-12.8	1.32 V	88	35.30	5.90
9	7311.00	54.8 PK	74.0	-19.2	1.33 V	275	41.63	13.17
10	7311.00	43.2 AV	54.0	-10.8	1.33 V	275	30.03	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	*2462.00	115.5 PK			1.38 H	102	117.64	-2.14
2	*2462.00	105.4 AV			1.38 H	102	107.54	-2.14
3	2483.50	71.3 PK	74.0	-2.7	1.38 H	102	73.33	-2.03
4	2483.50	49.3 AV	54.0	-4.7	1.38 H	102	51.33	-2.03
5	4924.00	55.1 PK	74.0	-18.9	1.30 H	275	48.99	6.11
6	4924.00	41.6 AV	54.0	-12.4	1.30 H	275	35.49	6.11
7	7386.00	53.8 PK	74.0	-20.2	1.26 H	98	40.62	13.18
8	7386.00	42.7 AV	54.0	-11.3	1.26 H	98	29.52	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	*2462.00	114.4 PK			1.32 V	87	116.54	-2.14
2	*2462.00	104.9 AV			1.32 V	87	107.04	-2.14
3	2483.50	73.3 PK	74.0	-0.7	1.32 V	87	75.33	-2.03
4	2483.50	53.6 AV	54.0	-0.4	1.32 V	87	55.63	-2.03
5	4924.00	54.4 PK	74.0	-19.6	1.29 V	90	48.29	6.11
6	4924.00	41.1 AV	54.0	-12.9	1.29 V	90	34.99	6.11
7	7386.00	54.4 PK	74.0	-19.6	1.36 V	264	41.22	13.18
8	7386.00	42.8 AV	54.0	-11.2	1.36 V	264	29.62	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)
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	71.5 PK	74.0	-2.5	1.39 H	99	73.97	-2.47
2	**2390.00**	**53.8 AV**	**54.0**	**-0.2**	**1.39 H**	**99**	**56.27**	**-2.47**
3	*2412.00	113.7 PK			1.39 H	99	116.07	-2.37
4	*2412.00	102.5 AV			1.39 H	99	104.87	-2.37
5	4824.00	54.9 PK	74.0	-19.1	1.30 H	272	49.19	5.71
6	4824.00	41.6 AV	54.0	-12.4	1.30 H	272	35.89	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	73.2 PK	74.0	-0.8	1.33 V	85	75.67	-2.47
2	2390.00	52.5 AV	54.0	-1.5	1.33 V	85	54.97	-2.47
3	*2412.00	113.1 PK			1.33 V	85	115.47	-2.37
4	*2412.00	102.1 AV			1.33 V	85	104.47	-2.37
5	4824.00	54.4 PK	74.0	-19.6	1.26 V	93	48.69	5.71
6	4824.00	40.9 AV	54.0	-13.1	1.26 V	93	35.19	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	73.0 PK	74.0	-1.0	1.35 H	103	75.47	-2.47
2	2390.00	47.2 AV	54.0	-6.8	1.35 H	103	49.67	-2.47
3	*2437.00	119.5 PK			1.35 H	103	121.75	-2.25
4	*2437.00	108.4 AV			1.35 H	103	110.65	-2.25
5	2483.50	72.7 PK	74.0	-1.3	1.35 H	103	74.73	-2.03
6	2483.50	50.0 AV	54.0	-4.0	1.35 H	103	52.03	-2.03
7	4874.00	55.2 PK	74.0	-18.8	1.34 H	284	49.30	5.90
8	4874.00	41.7 AV	54.0	-12.3	1.34 H	284	35.80	5.90
9	7311.00	53.9 PK	74.0	-20.1	1.22 H	110	40.73	13.17
10	7311.00	42.7 AV	54.0	-11.3	1.22 H	110	29.53	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	72.3 PK	74.0	-1.7	1.37 V	87	74.77	-2.47
2	2390.00	48.2 AV	54.0	-5.8	1.37 V	87	50.67	-2.47
3	*2437.00	120.2 PK			1.37 V	87	122.45	-2.25
4	*2437.00	108.9 AV			1.37 V	87	111.15	-2.25
5	2483.50	72.4 PK	74.0	-1.6	1.37 V	87	74.43	-2.03
6	2483.50	51.7 AV	54.0	-2.3	1.37 V	87	53.73	-2.03
7	4874.00	54.7 PK	74.0	-19.3	1.33 V	96	48.80	5.90
8	4874.00	41.3 AV	54.0	-12.7	1.33 V	96	35.40	5.90
9	7311.00	54.1 PK	74.0	-19.9	1.35 V	251	40.93	13.17
10	7311.00	42.7 AV	54.0	-11.3	1.35 V	251	29.53	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	*2462.00	112.7 PK			1.37 H	95	114.84	-2.14
2	*2462.00	101.5 AV			1.37 H	95	103.64	-2.14
3	2483.50	71.6 PK	74.0	-2.4	1.37 H	95	73.63	-2.03
4	2483.50	53.6 AV	54.0	-0.4	1.37 H	95	55.63	-2.03
5	4924.00	54.6 PK	74.0	-19.4	1.35 H	273	48.49	6.11
6	4924.00	41.2 AV	54.0	-12.8	1.35 H	273	35.09	6.11
7	7386.00	53.6 PK	74.0	-20.4	1.28 H	86	40.42	13.18
8	7386.00	42.3 AV	54.0	-11.7	1.28 H	86	29.12	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	*2462.00	113.4 PK			1.32 V	89	115.54	-2.14
2	*2462.00	102.3 AV			1.32 V	89	104.44	-2.14
3	2483.50	70.4 PK	74.0	-3.6	1.32 V	89	72.43	-2.03
4	2483.50	50.9 AV	54.0	-3.1	1.32 V	89	52.93	-2.03
5	4924.00	54.7 PK	74.0	-19.3	1.24 V	84	48.59	6.11
6	4924.00	41.4 AV	54.0	-12.6	1.24 V	84	35.29	6.11
7	7386.00	54.6 PK	74.0	-19.4	1.36 V	272	41.42	13.18
8	7386.00	43.0 AV	54.0	-11.0	1.36 V	272	29.82	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 (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	67.7 PK	74.0	-6.3	1.08 H	244	70.17	-2.47
2	2390.00	52.4 AV	54.0	-1.6	1.08 H	244	54.87	-2.47
3	*2422.00	108.1 PK			1.08 H	244	110.42	-2.32
4	*2422.00	96.5 AV			1.08 H	244	98.82	-2.32
5	4844.00	54.6 PK	74.0	-19.4	1.32 H	265	48.82	5.78
6	4844.00	41.0 AV	54.0	-13.0	1.32 H	265	35.22	5.78
7	7266.00	53.4 PK	74.0	-20.6	1.25 H	85	40.20	13.20
8	7266.00	41.9 AV	54.0	-12.1	1.25 H	85	28.70	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	68.4 PK	74.0	-5.6	1.00 V	80	70.87	-2.47
2	**2390.00**	**53.8 AV**	**54.0**	**-0.2**	**1.00 V**	**80**	**56.27**	**-2.47**
3	*2422.00	108.3 PK			1.00 V	80	110.62	-2.32
4	*2422.00	97.1 AV			1.00 V	80	99.42	-2.32
5	4844.00	55.1 PK	74.0	-18.9	1.33 V	87	49.32	5.78
6	4844.00	41.6 AV	54.0	-12.4	1.33 V	87	35.82	5.78
7	7266.00	54.1 PK	74.0	-19.9	1.36 V	258	40.90	13.20
8	7266.00	42.6 AV	54.0	-11.4	1.36 V	258	29.40	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	67.8 PK	74.0	-6.2	1.14 H	236	70.27	-2.47
2	2390.00	49.9 AV	54.0	-4.1	1.14 H	236	52.37	-2.47
3	*2437.00	110.1 PK			1.14 H	236	112.35	-2.25
4	*2437.00	98.0 AV			1.14 H	236	100.25	-2.25
5	2483.50	70.6 PK	74.0	-3.4	1.14 H	236	72.63	-2.03
6	2483.50	52.1 AV	54.0	-1.9	1.14 H	236	54.13	-2.03
7	4874.00	54.5 PK	74.0	-19.5	1.30 H	268	48.60	5.90
8	4874.00	41.6 AV	54.0	-12.4	1.30 H	268	35.70	5.90
9	7311.00	54.2 PK	74.0	-19.8	1.31 H	87	41.03	13.17
10	7311.00	42.4 AV	54.0	-11.6	1.31 H	87	29.23	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	68.6 PK	74.0	-5.4	1.00 V	100	71.07	-2.47
2	2390.00	50.5 AV	54.0	-3.5	1.00 V	100	52.97	-2.47
3	*2437.00	110.8 PK			1.00 V	100	113.05	-2.25
4	*2437.00	98.8 AV			1.00 V	100	101.05	-2.25
5	2483.50	72.0 PK	74.0	-2.0	1.00 V	100	74.03	-2.03
6	2483.50	53.5 AV	54.0	-0.5	1.00 V	100	55.53	-2.03
7	4874.00	54.7 PK	74.0	-19.3	1.29 V	101	48.80	5.90
8	4874.00	41.4 AV	54.0	-12.6	1.29 V	101	35.50	5.90
9	7311.00	54.6 PK	74.0	-19.4	1.38 V	271	41.43	13.17
10	7311.00	42.7 AV	54.0	-11.3	1.38 V	271	29.53	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 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	106.4 PK			1.11 H	232	108.58	-2.18
2	*2452.00	94.6 AV			1.11 H	232	96.78	-2.18
3	2483.50	70.2 PK	74.0	-3.8	1.11 H	232	72.23	-2.03
4	2483.50	52.7 AV	54.0	-1.3	1.11 H	232	54.73	-2.03
5	4904.00	54.6 PK	74.0	-19.4	1.31 H	260	48.58	6.02
6	4904.00	41.5 AV	54.0	-12.5	1.31 H	260	35.48	6.02
7	7356.00	54.8 PK	74.0	-19.2	1.28 H	82	41.62	13.18
8	7356.00	43.1 AV	54.0	-10.9	1.28 H	82	29.92	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	106.9 PK			1.00 V	107	109.08	-2.18
2	*2452.00	95.4 AV			1.00 V	107	97.58	-2.18
3	2483.50	70.8 PK	74.0	-3.2	1.00 V	107	72.83	-2.03
4	2483.50	53.6 AV	54.0	-0.4	1.00 V	107	55.63	-2.03
5	4904.00	54.1 PK	74.0	-19.9	1.28 V	104	48.08	6.02
6	4904.00	40.6 AV	54.0	-13.4	1.28 V	104	34.58	6.02
7	7356.00	54.3 PK	74.0	-19.7	1.36 V	258	41.12	13.18
8	7356.00	42.8 AV	54.0	-11.2	1.36 V	258	29.62	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. 19, 2014

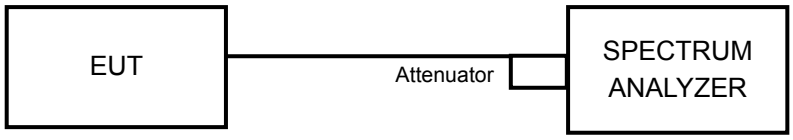
4.3.3 TEST PROCEDURE

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	9.07	8.60	9.08	0.5	PASS
6	2437	9.07	9.10	9.09	0.5	PASS
11	2462	9.08	9.08	9.05	0.5	PASS

802.11g

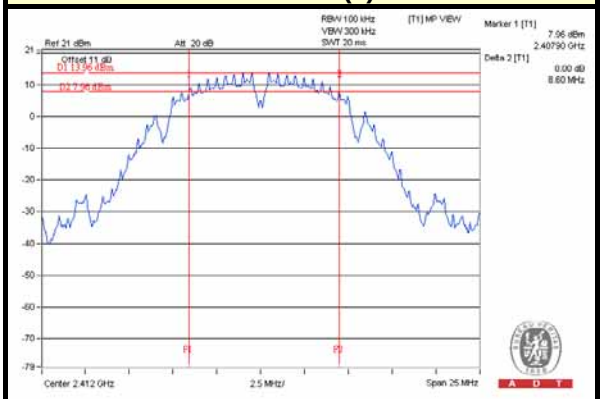
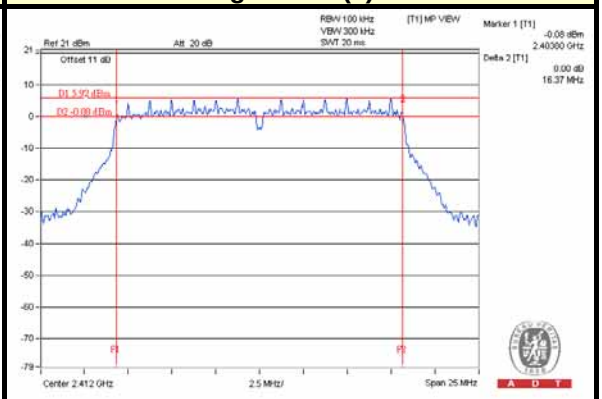
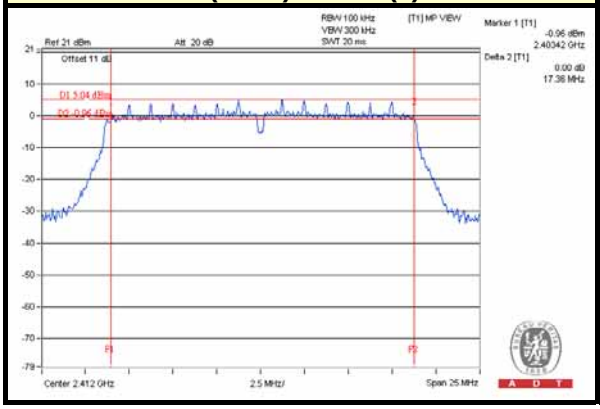
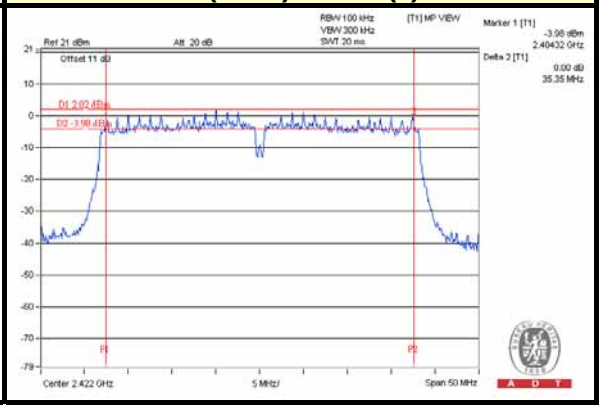
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	16.37	16.37	16.41	0.5	PASS
6	2437	16.38	16.40	16.39	0.5	PASS
11	2462	16.40	16.37	16.41	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.36	17.66	17.63	0.5	PASS
6	2437	17.59	17.66	17.62	0.5	PASS
11	2462	17.61	17.65	17.63	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	36.19	35.35	36.34	0.5	PASS
6	2437	35.86	36.46	36.45	0.5	PASS
9	2452	36.45	35.92	35.89	0.5	PASS

SPECTRUM PLOT OF WORST VALUE	
802.11b / Chain(1) : CH1	**802.11g / Chain(1) : CH1**
	
802.11n (HT20) / Chain(0) : CH1	**802.11n (HT40) / Chain(1) : CH3**
	

4.4 CONDUCTED OUTPUT POWER MEASUREMENT

4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

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. 19, 2014

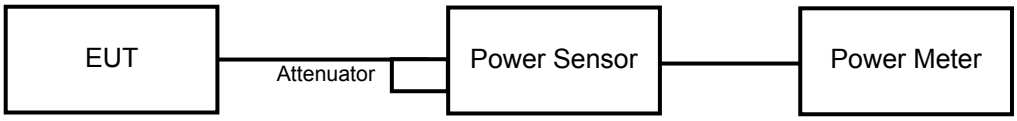
4.4.3 TEST PROCEDURES

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	21.60	22.53	22.63	506.836	27.05	29.16	PASS
6	2437	23.05	24.12	24.04	713.576	28.53	29.16	PASS
11	2462	20.23	21.06	20.75	351.933	25.46	29.16	PASS

NOTE: Directional gain = 2.07dBi + 10log(3) = 6.84dBi > 6dBi , so the power limit shall be reduced to 30-(6.84-6) = 29.16dBm.

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	16.48	16.96	17.42	149.33	21.74	29.16	PASS
6	2437	22.55	23.19	23.19	596.785	27.76	29.16	PASS
11	2462	17.18	17.51	17.56	165.62	22.19	29.16	PASS

NOTE: Directional gain = 2.07dBi + 10log(3) = 6.84dBi > 6dBi , so the power limit shall be reduced to 30-(6.84-6) = 29.16dBm.

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	16.02	16.88	17.09	139.915	21.46	29.16	PASS
6	2437	22.19	23.05	23.32	582.197	27.65	29.16	PASS
11	2462	14.68	15.86	15.79	105.855	20.25	29.16	PASS

NOTE: Directional gain = 2.07dBi + 10log(3) = 6.84dBi > 6dBi , so the power limit shall be reduced to 30-(6.84-6) = 29.16dBm.

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	14.28	14.85	15.42	92.175	19.65	29.16	PASS
6	2437	17.04	17.72	17.97	172.399	22.37	29.16	PASS
9	2452	13.42	13.54	14.35	71.8	18.56	29.16	PASS

NOTE: Directional gain = 2.07dBi + 10log(3) = 6.84dBi > 6dBi , so the power limit shall be reduced to 30-(6.84-6) = 29.16dBm.

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. 19, 2014

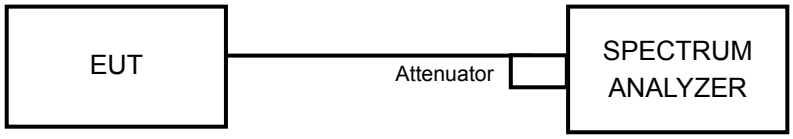
4.5.3 TEST PROCEDURE

1. Set the RBW = 10 kHz, VBW =30 kHz, Detector = power averaging (RMS).
2. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW
3. Sweep time = auto couple.
4. Employ trace averaging (RMS) mode over a minimum of 100 traces.
5. Use the peak marker function to determine the maximum amplitude level.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

4.5.7 TEST RESULTS

802.11b

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-6.11	4.77	-1.34	7.16	PASS
	6	2437	-4.61	4.77	0.16	7.16	PASS
	11	2462	-7.93	4.77	-3.16	7.16	PASS
1	1	2412	-5.56	4.77	-0.79	7.16	PASS
	6	2437	-4.83	4.77	-0.06	7.16	PASS
	11	2462	-7.44	4.77	-2.67	7.16	PASS
2	1	2412	-5.58	4.77	-0.81	7.16	PASS
	6	2437	-4.27	4.77	0.50	7.16	PASS
	11	2462	-7.20	4.77	-2.43	7.16	PASS

NOTE: Directional gain = 2.07dBi + 10log(3) = 6.84dBi > 6dBi , so the power density limit shall be reduced to 8-(6.84-6) =7.16dBm.

802.11g

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=3) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-13.14	4.77	-8.37	7.16	PASS
	6	2437	-7.09	4.77	-2.32	7.16	PASS
	11	2462	-12.28	4.77	-7.51	7.16	PASS
1	1	2412	-12.68	4.77	-7.91	7.16	PASS
	6	2437	-4.98	4.77	-0.21	7.16	PASS
	11	2462	-11.84	4.77	-7.07	7.16	PASS
2	1	2412	-11.78	4.77	-7.01	7.16	PASS
	6	2437	-6.06	4.77	-1.29	7.16	PASS
	11	2462	-11.72	4.77	-6.95	7.16	PASS

NOTE: Directional gain = 2.07dBi + 10log(3) = 6.84dBi > 6dBi , so the power density limit shall be reduced to 8-(6.84-6) =7.16dBm.

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	-14.12	4.77	-9.35	7.16	PASS
	6	2437	-8.09	4.77	-3.32	7.16	PASS
	11	2462	-16.13	4.77	-11.36	7.16	PASS
1	1	2412	-13.00	4.77	-8.23	7.16	PASS
	6	2437	-6.47	4.77	-1.70	7.16	PASS
	11	2462	-15.30	4.77	-10.53	7.16	PASS
2	1	2412	-13.21	4.77	-8.44	7.16	PASS
	6	2437	-7.40	4.77	-2.63	7.16	PASS
	11	2462	-14.59	4.77	-9.82	7.16	PASS

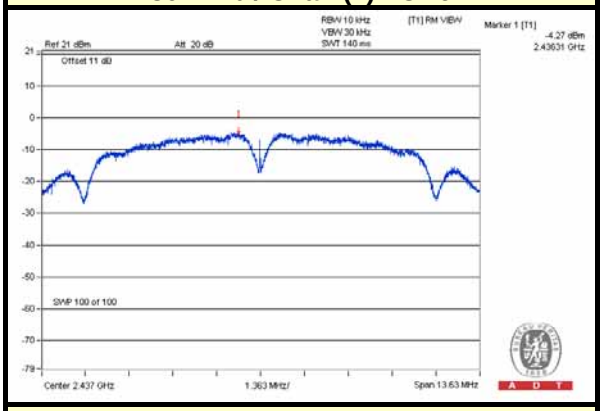
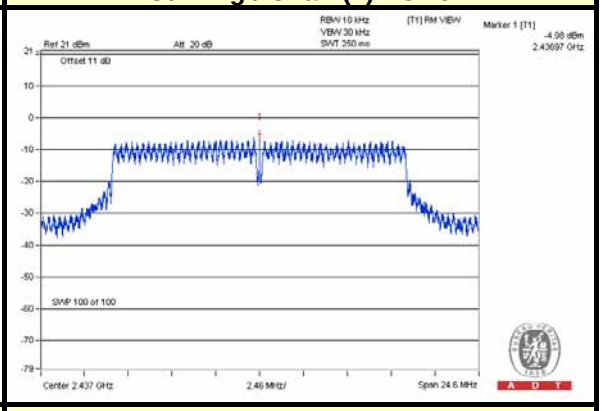
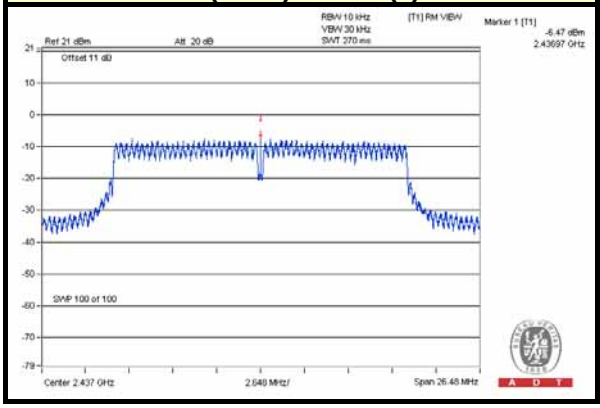
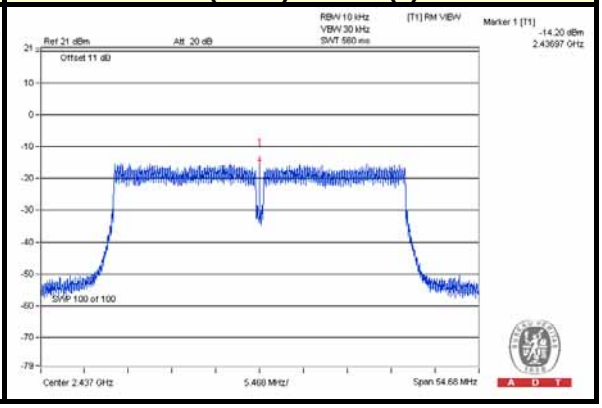
NOTE: Directional gain = 2.07dBi + 10log(3) = 6.84dBi > 6dBi , so the power density limit shall be reduced to 8-(6.84-6) =7.16dBm.

802.11n (HT40)

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	1	2412	-18.65	4.77	0.10	-13.78	7.16	PASS
	6	2437	-15.42	4.77	0.10	-10.55	7.16	PASS
	11	2462	-19.49	4.77	0.10	-14.62	7.16	PASS
1	1	2412	-17.06	4.77	0.10	-12.19	7.16	PASS
	6	2437	-14.20	4.77	0.10	-9.33	7.16	PASS
	11	2462	-18.95	4.77	0.10	-14.08	7.16	PASS
2	1	2412	-16.67	4.77	0.10	-11.80	7.16	PASS
	6	2437	-14.27	4.77	0.10	-9.40	7.16	PASS
	11	2462	-17.84	4.77	0.10	-12.97	7.16	PASS

NOTE: 1. Directional gain = 2.07dBi + 10log(3) = 6.84dBi > 6dBi , so the power density limit shall be reduced to 8-(6.84-6) =7.16dBm.

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

SPECTRUM PLOT OF WORST VALUE	
802.11b / Chain(2) : CH6	**802.11g / Chain(1) : CH6**
	
802.11n (HT20) / Chain(1) : CH6	**802.11n (HT40) / Chain(1) : 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. 19, 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.

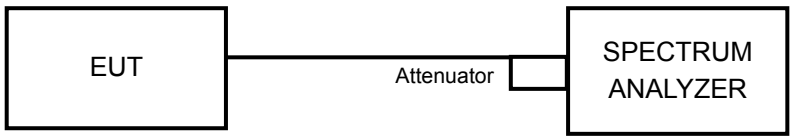
Measurement Procedure –Unwanted Emission Level

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

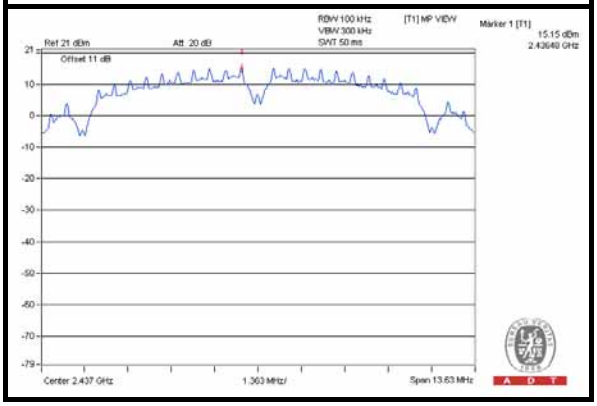
Same as Item 4.3.6

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.

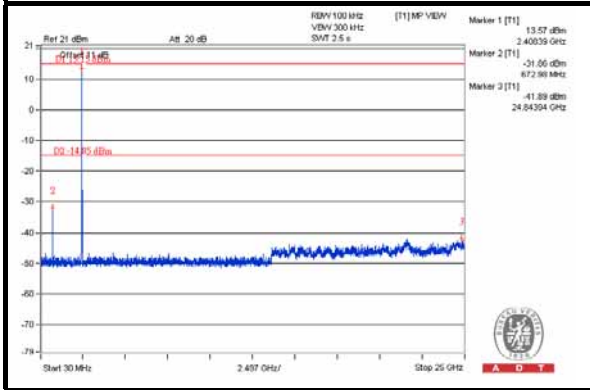
802.11b

Maximum REF

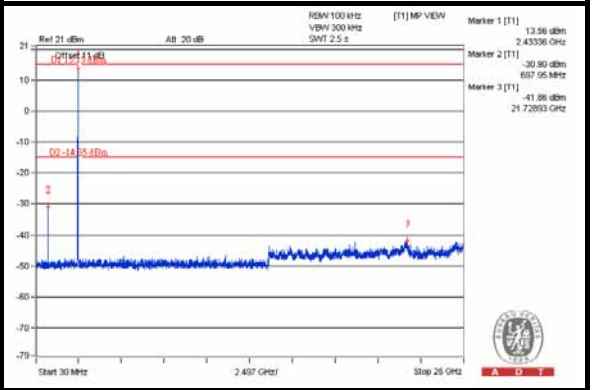


Chain 0

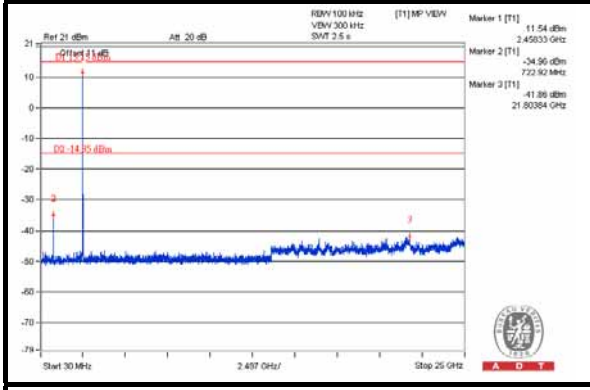
CH 1



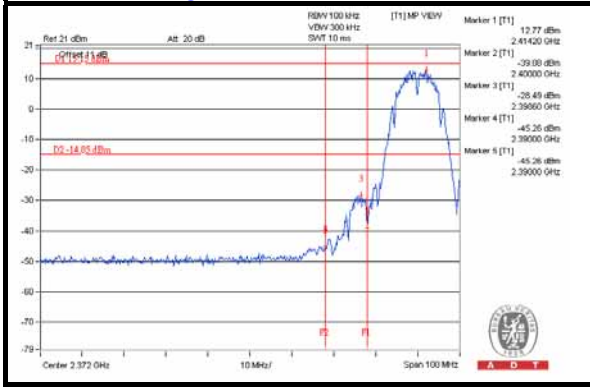
CH 6



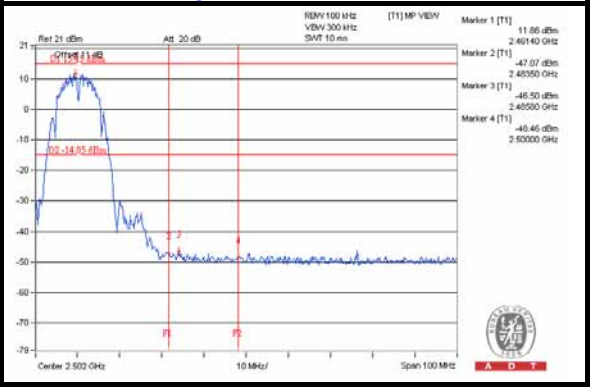
CH 11



CH 1 Band edge

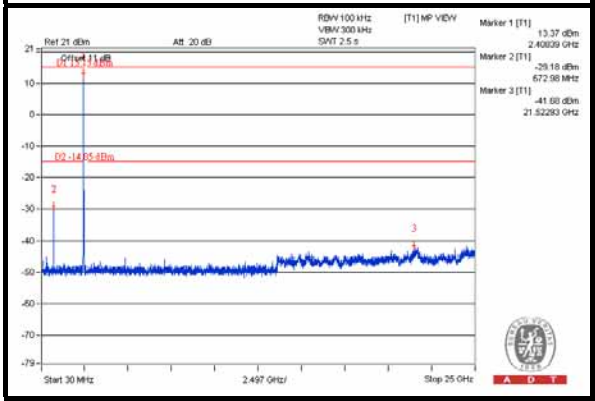


CH 11 Band edge

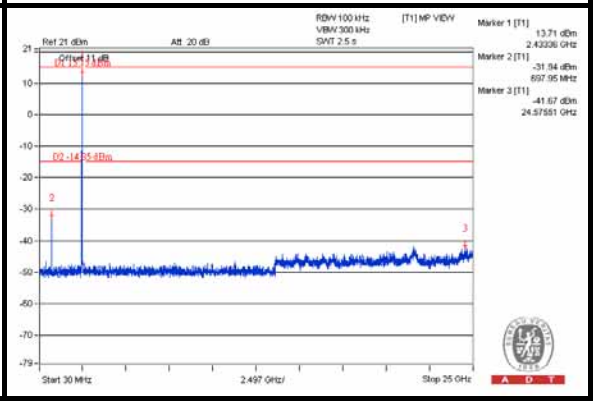


Chain 1

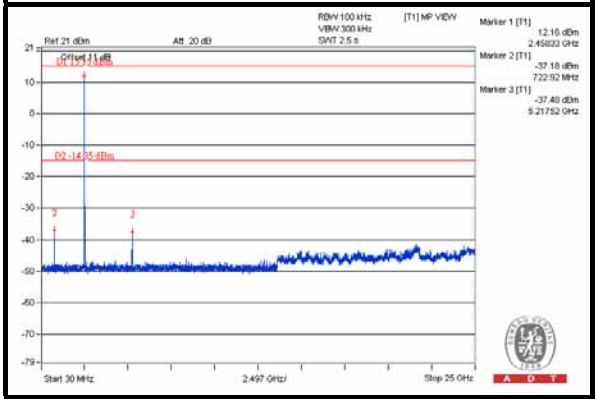
CH 1



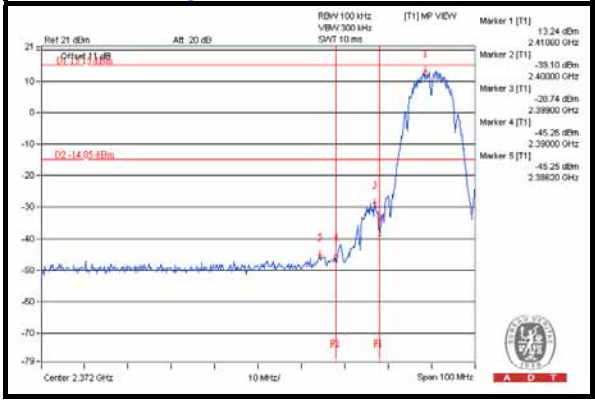
CH 6



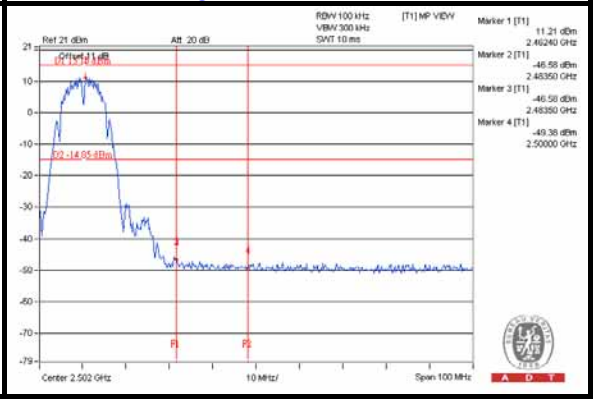
CH 11



CH 1 Band edge

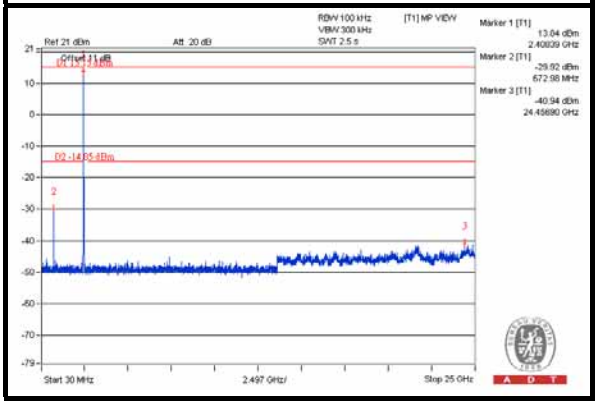


CH 11 Band edge

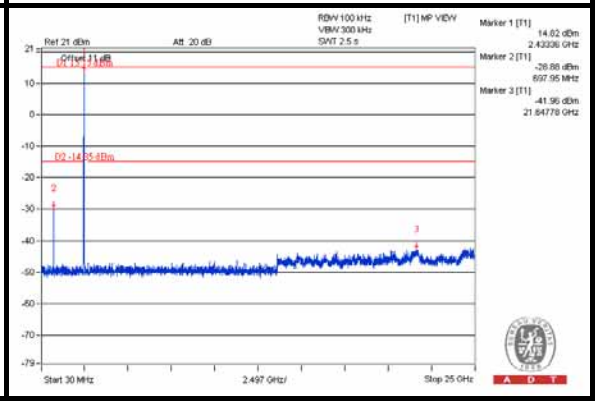


Chain 2

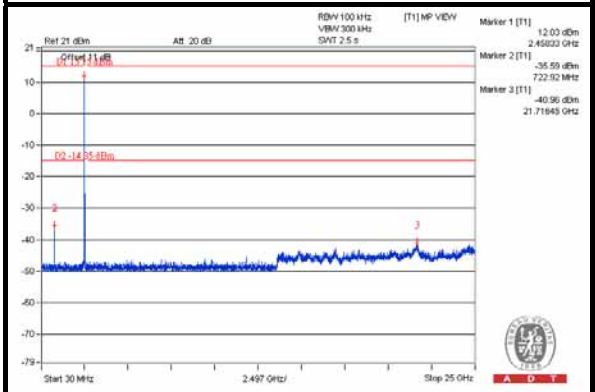
CH 1



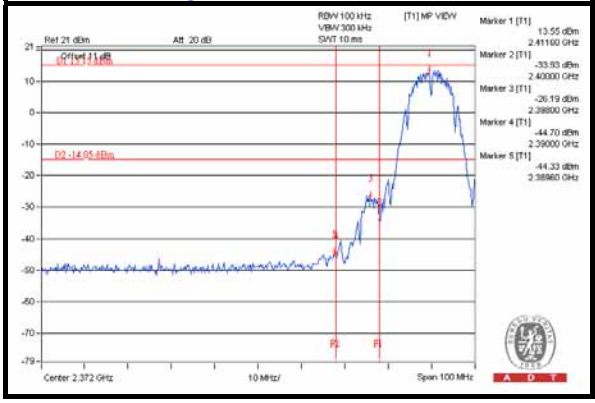
CH 6



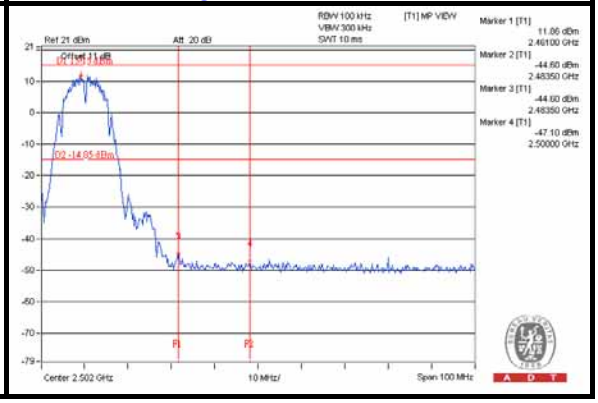
CH 11



CH 1 Band edge

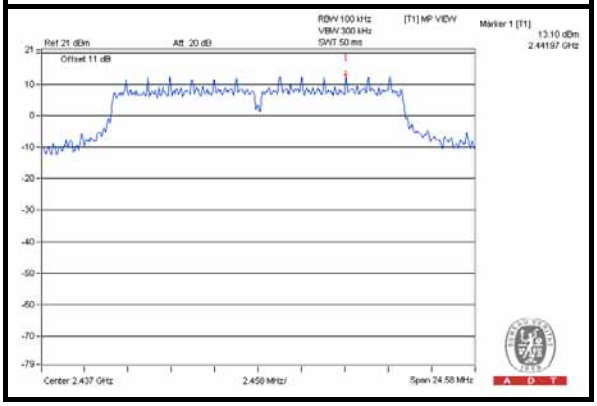


CH 11 Band edge



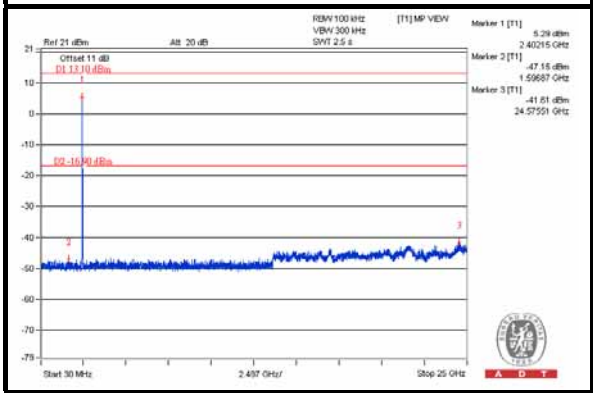
802.11g

Maximum REF

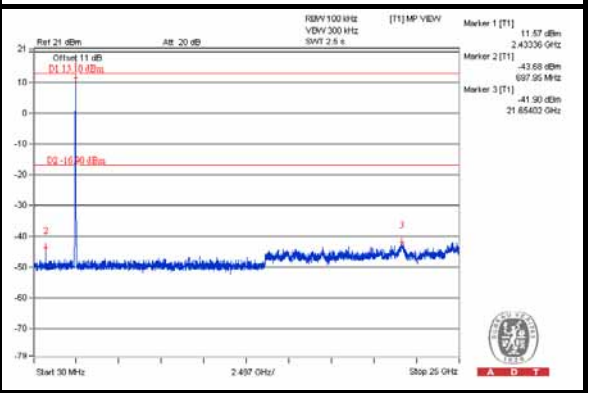


Chain 0

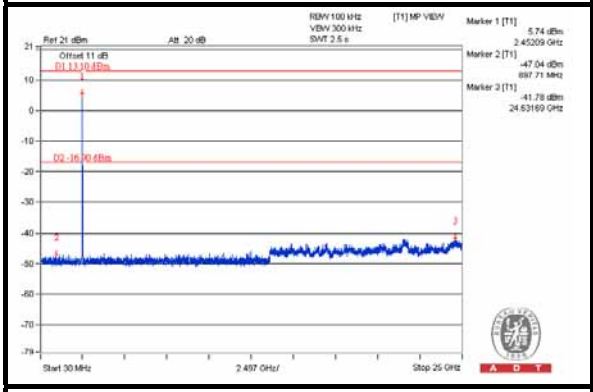
CH 1



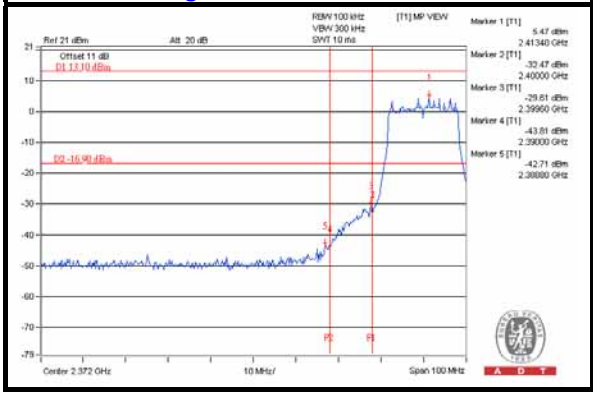
CH 6



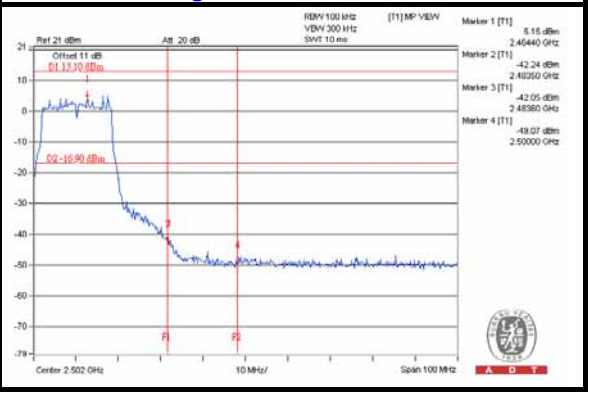
CH 11



CH 1 Band edge

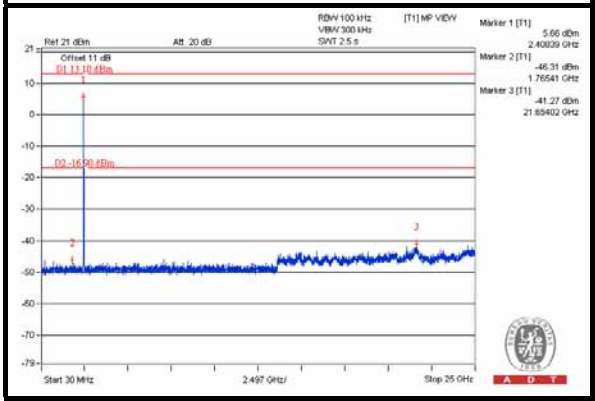


CH 11 Band edge

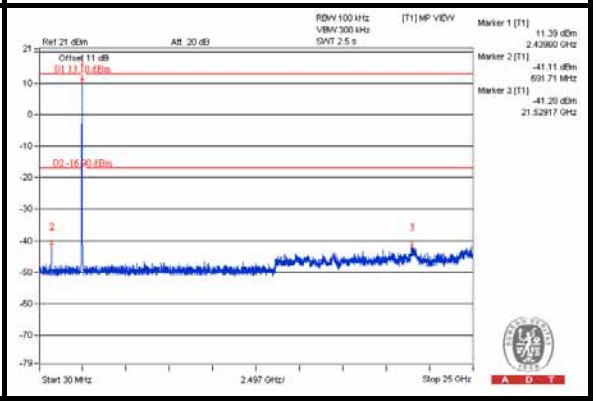


Chain 1

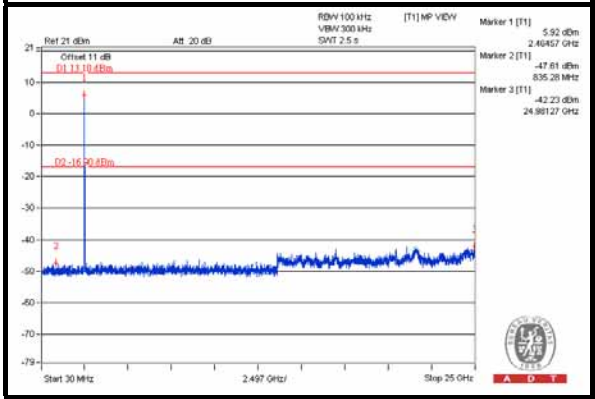
CH 1



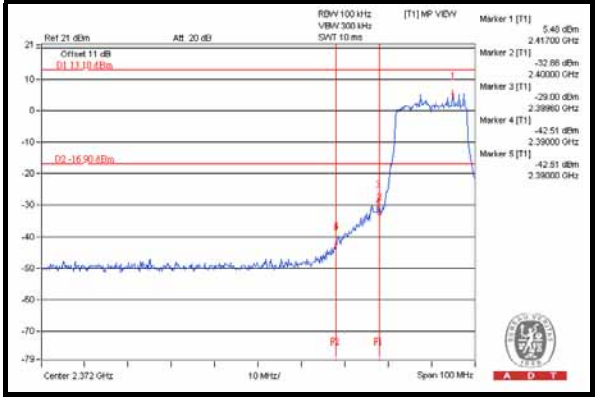
CH 6



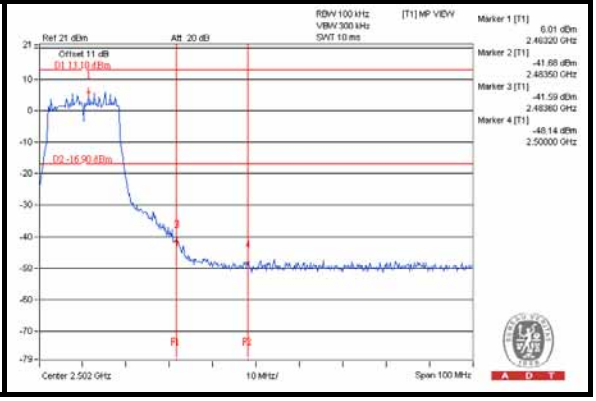
CH 11



CH 1 Band edge

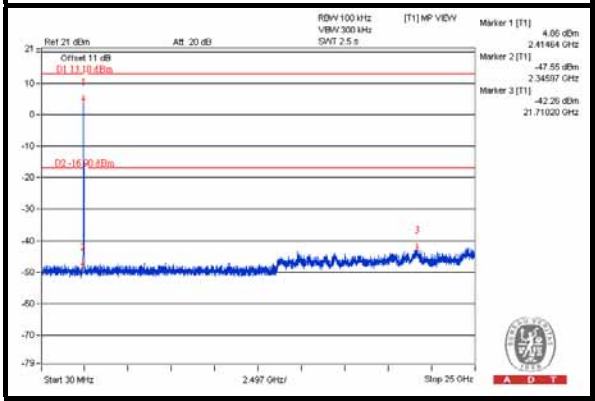


CH 11 Band edge

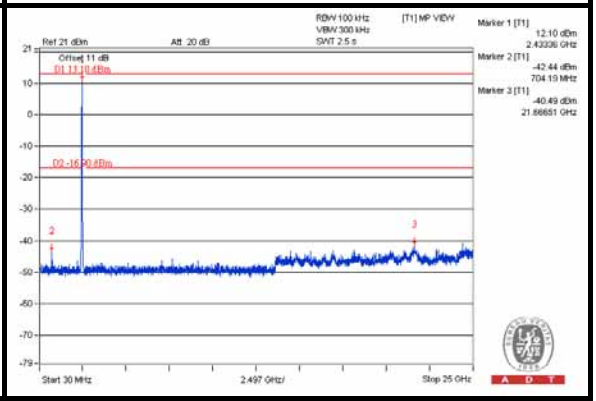


Chain 2

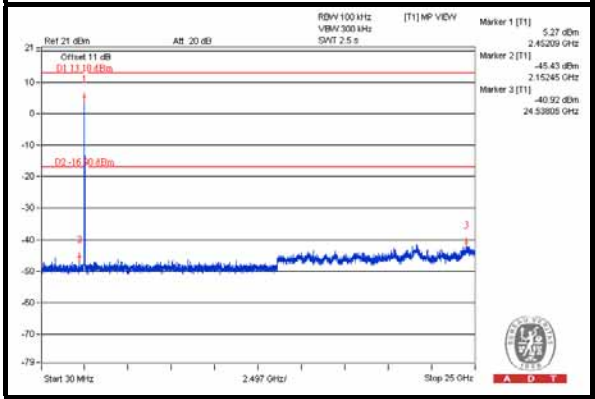
CH 1



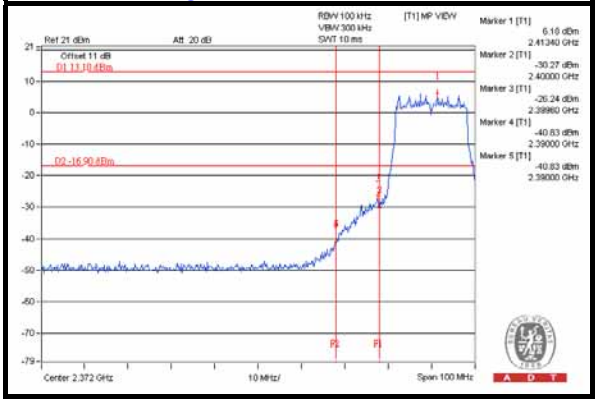
CH 6



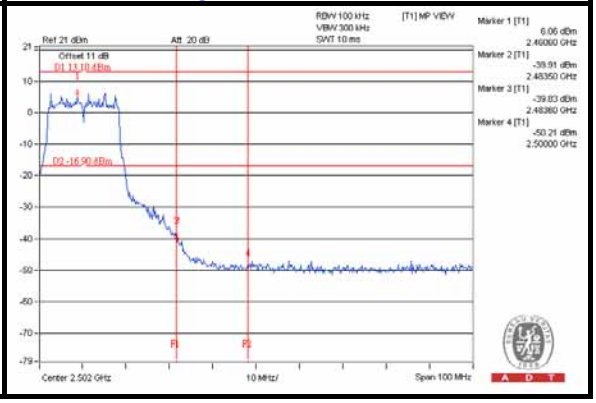
CH 11



CH 1 Band edge



CH 11 Band edge



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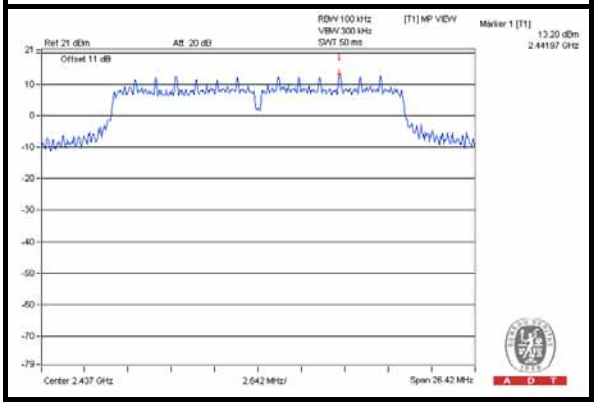
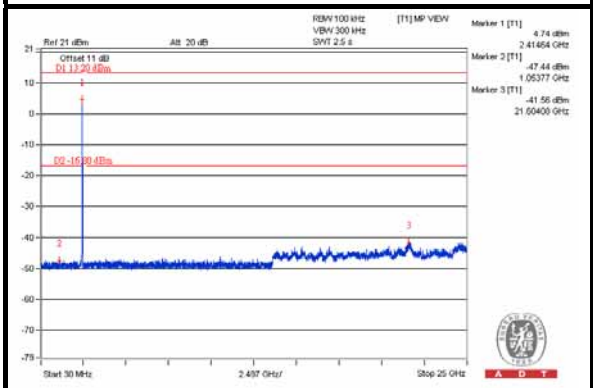
Maximum REF

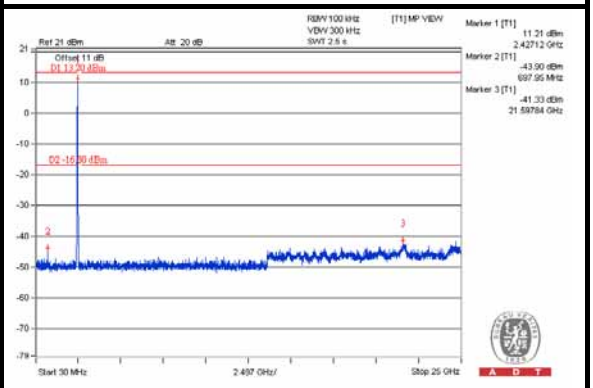


Chain 0

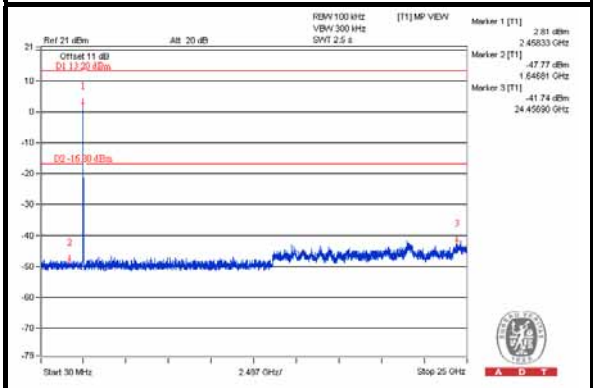
CH 1



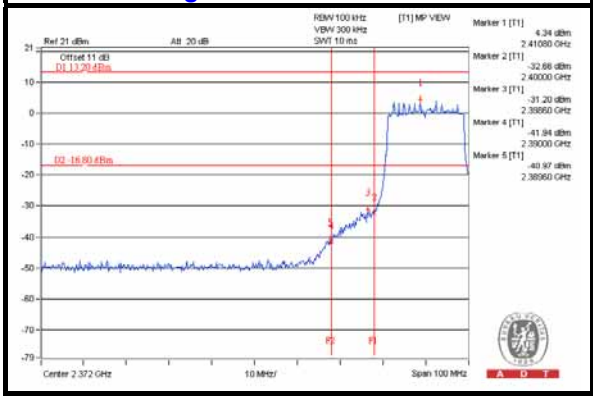
CH 6



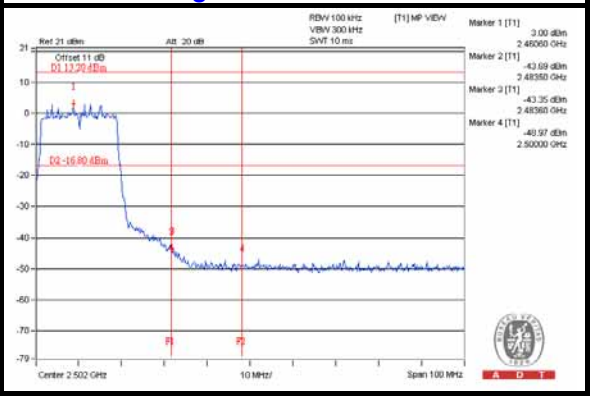
CH 11



CH 1 Band edge

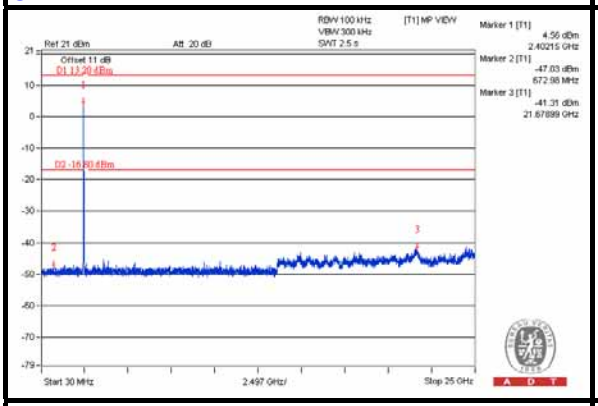


CH 11 Band edge

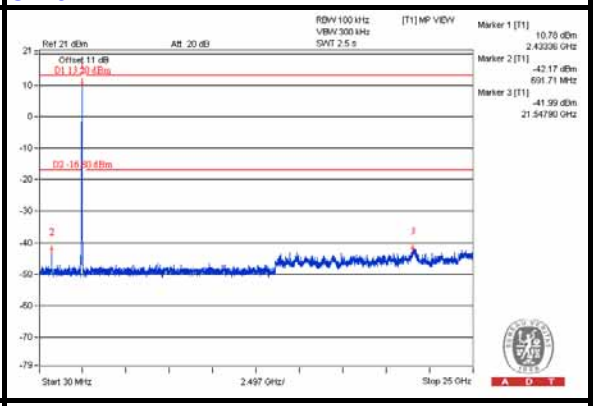


Chain 1

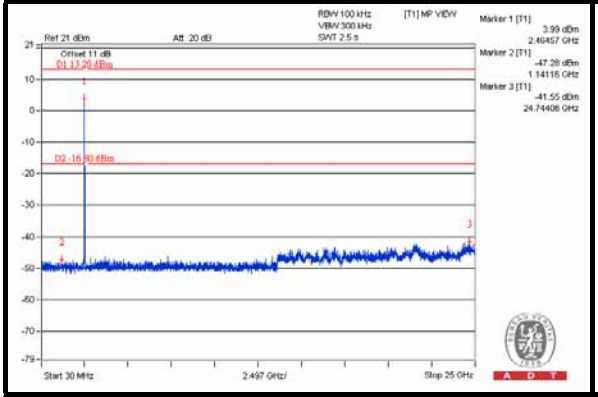
CH 1



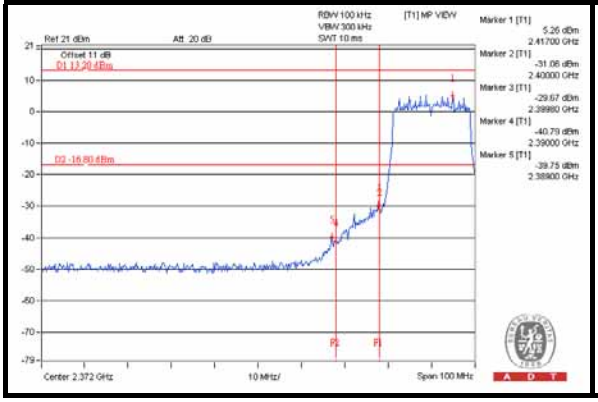
CH 6



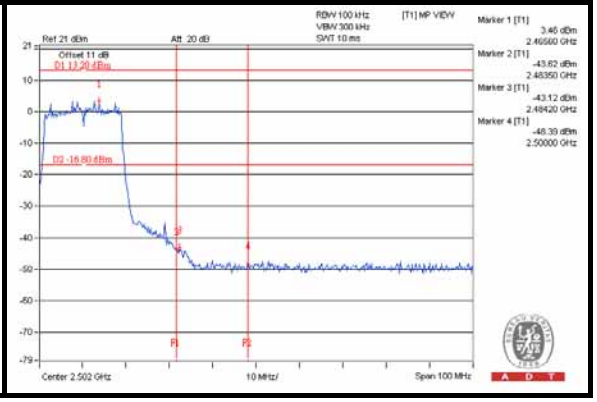
CH 11



CH 1 Band edge

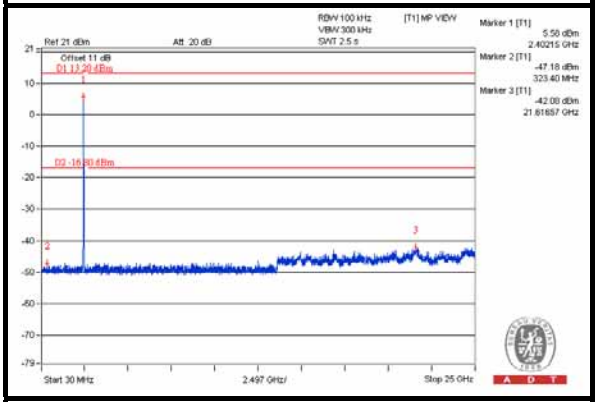


CH 11 Band edge

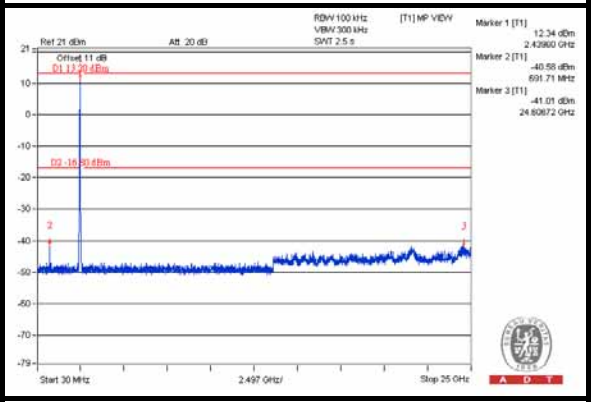


Chain 2

CH 1



CH 6



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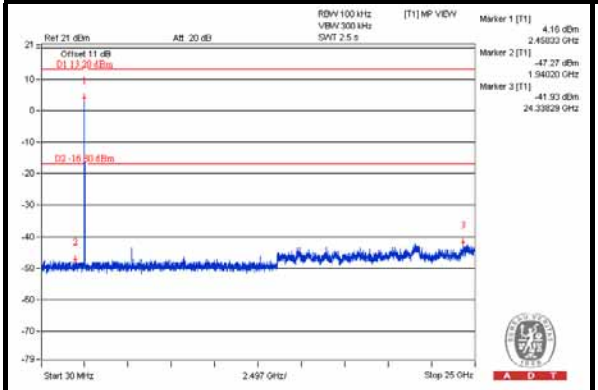
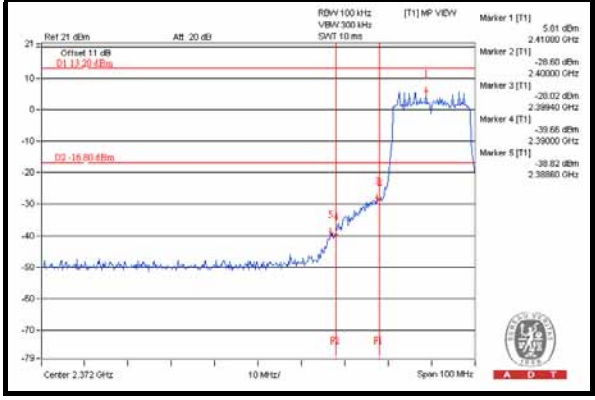
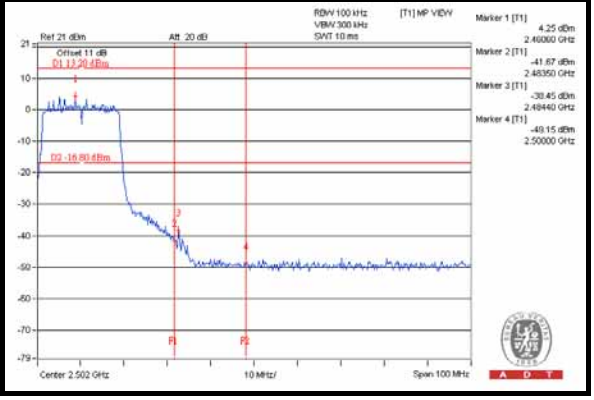


CH 1 Band edge

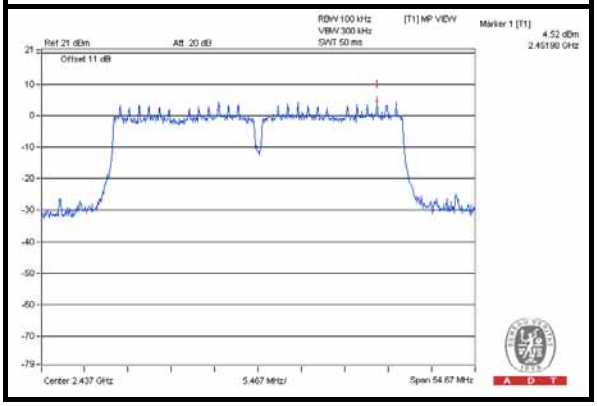


CH 11 Band edge



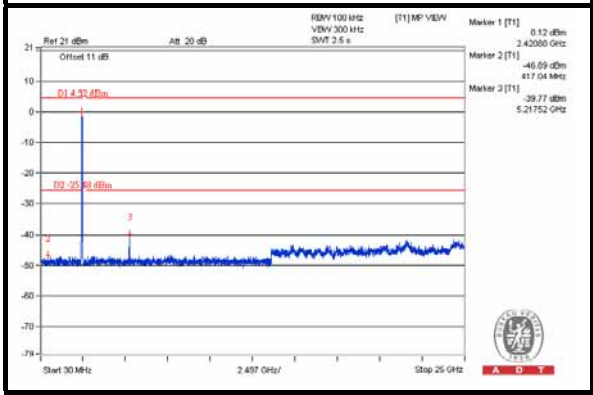
802.11n(HT40)

Maximum REF

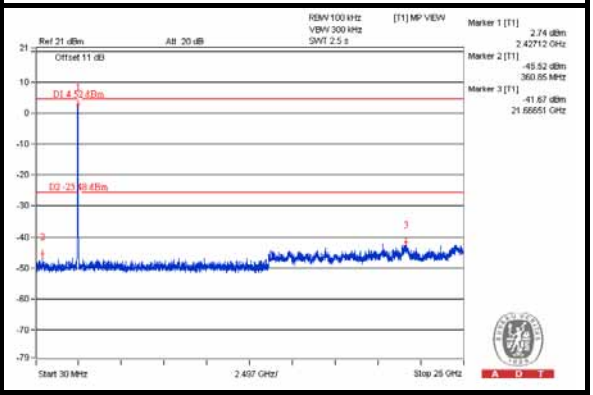


Chain 0

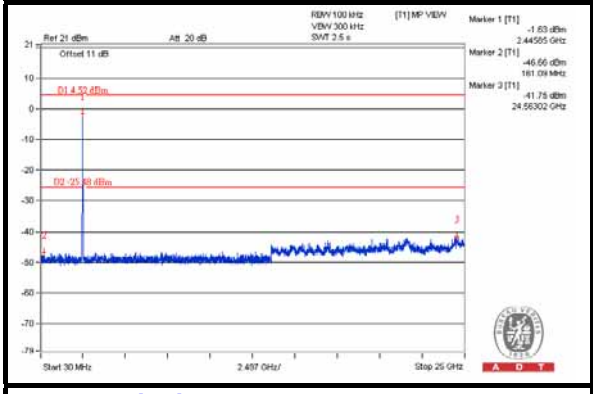
CH 3



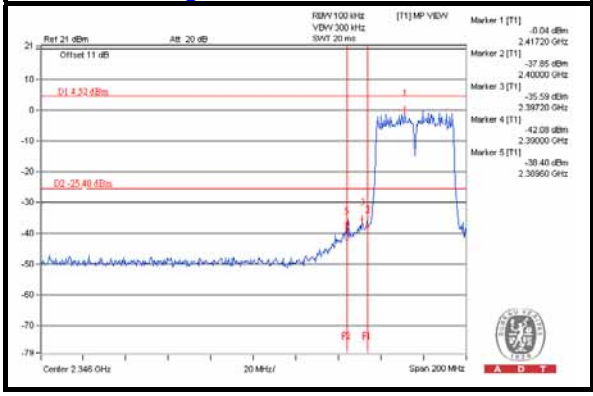
CH 6



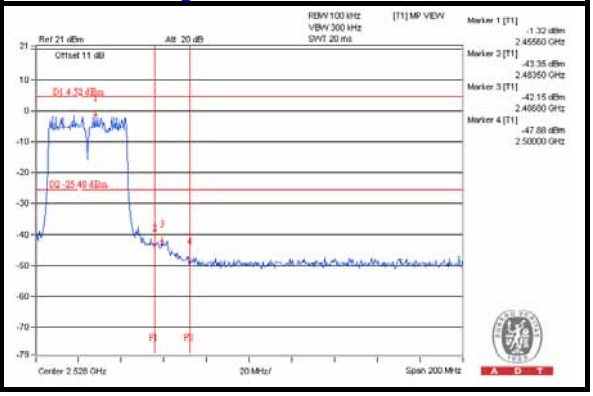
CH 9



CH 3 Band edge

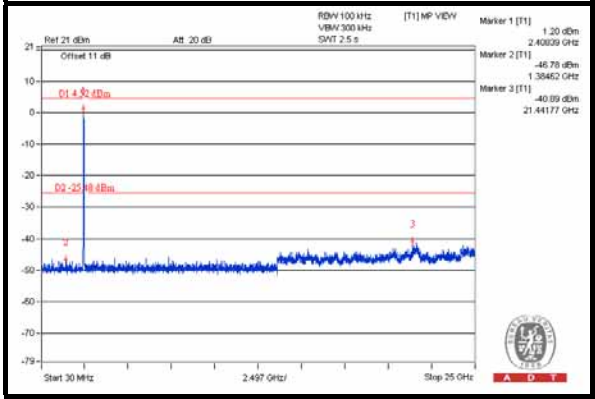


CH 9 Band edge

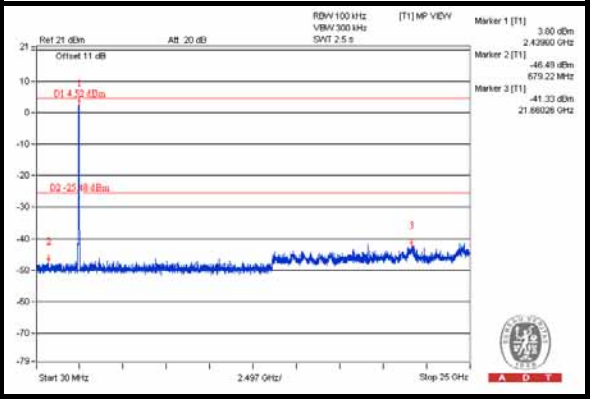


Chain 1

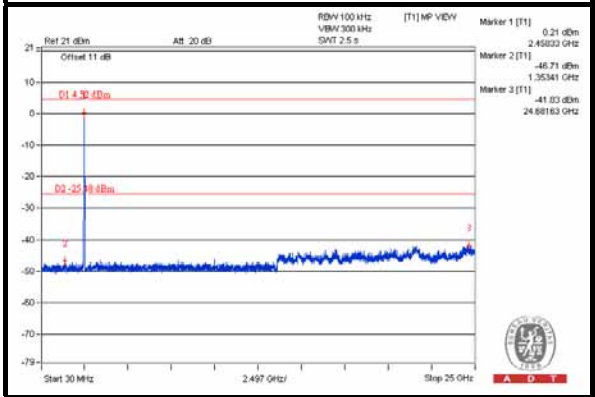
CH 3



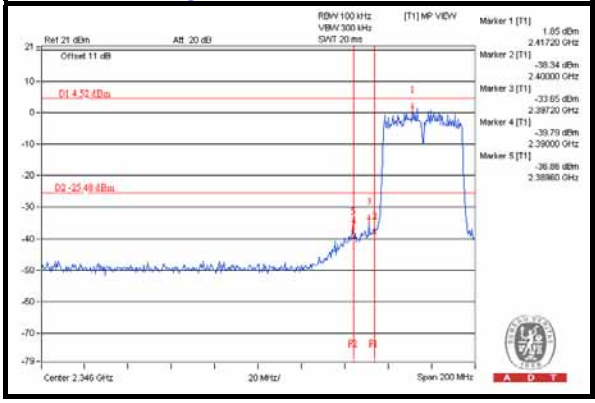
CH 6



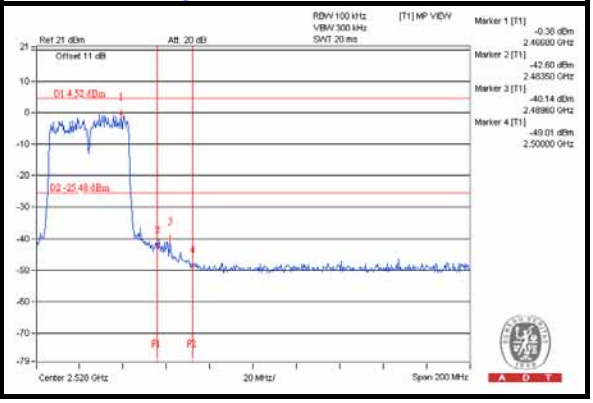
CH 9



CH 3 Band edge

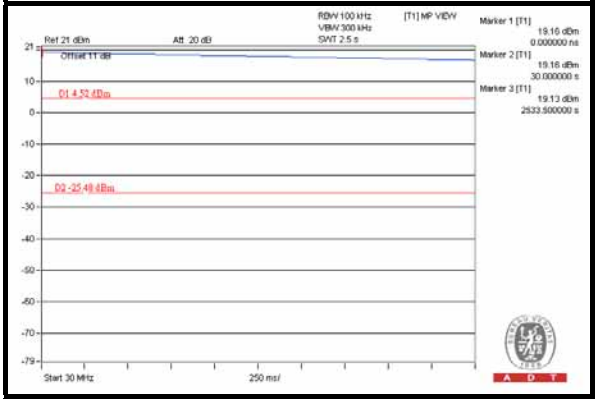


CH 9 Band edge



Chain 2

CH 1



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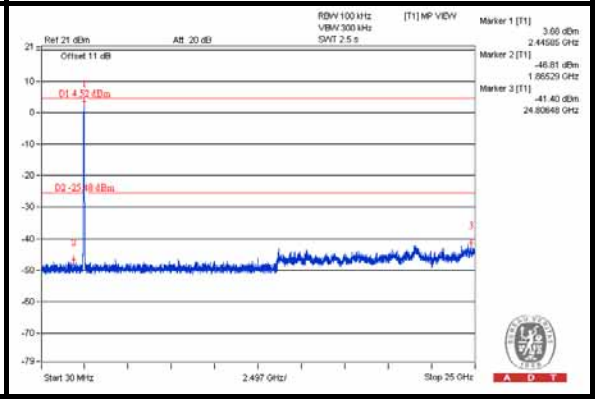
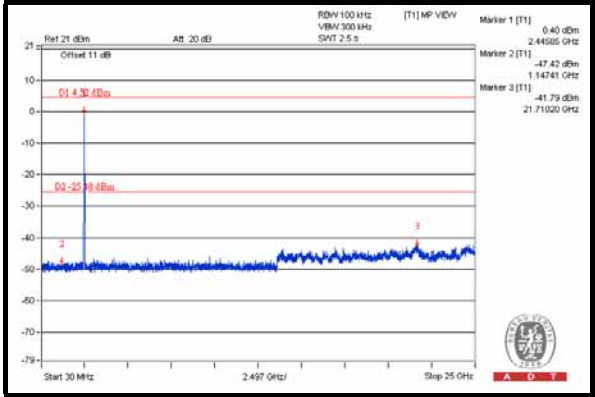
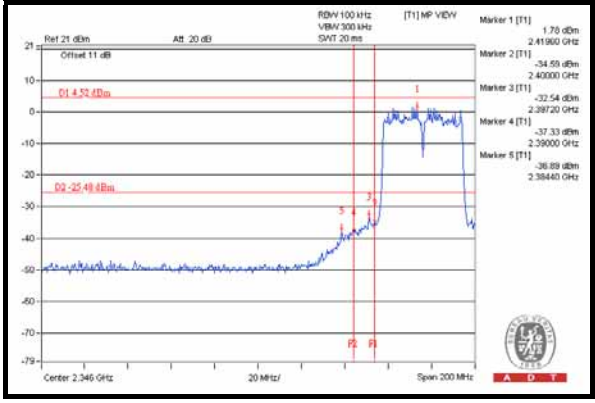


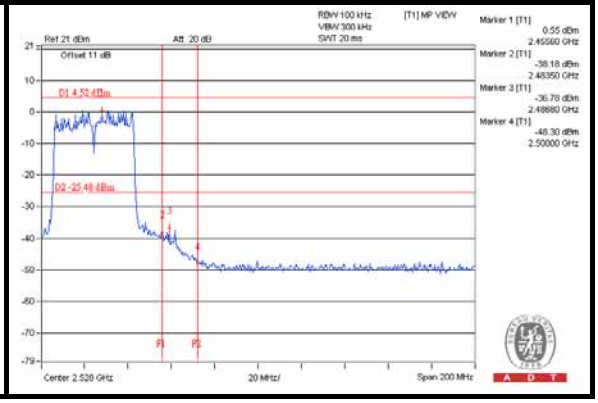
CH 11



CH 1 Band edge



CH 11 Band edge



5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. INFORMATION ON THE TESTING LABORATORIES

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

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

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

Hsin Chu EMC/RF/Telecom Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

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.

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

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

--- END ---