

FCC TEST REPORT

REPORT NO.: RF141002E03

MODEL NO.: TC7110.02, TC7110xxxxxx (x = 0~9, A-Z, a-z,
“-“, “.”, or blank for marketing)

FCC ID: H8N-TC711002

RECEIVED: Oct. 02, 2014

TESTED: Oct. 09 to Nov. 20, 2014

ISSUED: Nov. 28, 2014

APPLICANT: ASKEY COMPUTER CORP.

ADDRESS: 10F, NO.119, JIANKANG RD., ZHONGHE
DIST., NEW TAIPEI CITY 23585, TAIWAN,
R.O.C.

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.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF141002E03	Original release	Nov. 28, 2014

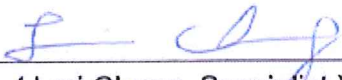


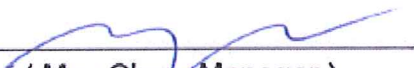
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1. CERTIFICATION

PRODUCT: Cable Modem
BRAND NAME: TECHNICOLOR
MODEL NO.: TC7110.02, TC7110xxxxxx (x = 0~9, A-Z, a-z, "-", ".", or blank for marketing)
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: ASKEY COMPUTER CORP.
TESTED: Oct. 09 to Nov. 20, 2014
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (Model: TC7110.02) 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. 28, 2014
(Lori Chung, Specialist)

Approved By :  , **Date:** Nov. 28, 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 -16.25dB at 3.89453MHz
15.247(d) 15.209	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 4874.00MHz & 4924.00MHz & 2390.00MHz & 2483.50MHz.
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 MHF not a standard connector.

2.1 MEASUREMENT UNCERTAINTY

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

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

Measurement	Value
Conducted emissions	2.86 dB
Radiated emissions (30MHz-1GHz)	5.37 dB
Radiated emissions (1GHz -6GHz)	3.72 dB
Radiated emissions (6GHz -18GHz)	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Cable Modem
MODEL NO.	TC7110.02, TC7110xxxxxx (x = 0~9, A-Z, a-z, "-", ".", or blank for marketing)
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS,OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 72.2Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11
MAXIMUM OUTPUT POWER	802.11b: 58.614mW 802.11g: 331.894mW 802.11n (HT20): 331.894mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	NA
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x 1

NOTE:

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

Brand Name	Model Name	Difference
Technicolor	TC7110.02	for marketing
	TC7110xxxxxx	x = 0~9, A-Z, a-z, "-", ".", or blank for marketing

From the above models, model: TC7110.02 was selected as representative model for the test and its data was recorded in this report.

2. The EUT must be supplied with a power adapter and the following different models could be chosen:

Adapter 1	
Brand:	LEI
Model No.:	ML12-7120100-A1
Input power :	120V, 60Hz, 0.3A
Output power :	12V, 1A DC output cable (Unshielded, 1.4m)
Adapter 2	
Brand:	OEM
Model No.:	ADS0128-W 120100
Input power :	100-240V~, 50-60Hz, 0.5A
Output power :	12V, 1A DC output cable (Unshielded, 1.5m)

For radiated test, the EUT was pre-tested with above adapters, the worse case was found in adapter 1. Therefore only the test data of the adapter was recorded in this report.

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

Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (MHz to MHz)	Cable Loss (dB)	Cable Length (mm)
WANSIH	1415-01G2000	3.95	PCB	MHF	2400-2500	NA	80

4. The EUT incorporates a SISO function.

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX / 1RX
802.11g	1TX / 1RX
802.11n (HT20)	1TX / 1RX

5. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 7.
6. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

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

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

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

Where **PLC**: Power Line Conducted Emission **RE < 1G**: Radiated Emission below 1GHz
RE ≥ 1G: Radiated Emission above 1GHz **APCM**: Antenna Port Conducted Measurement
OB: Conducted Out-Band Emission Measurement

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

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

RADIATED EMISSION TEST (ABOVE 1 GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

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

ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

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

CONDUCTED OUT-BAND EMISSION MEASUREMENT:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

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



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TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	30deg. C, 70%RH	120Vac, 60Hz	Mike Hsieh
RE<1G	24deg. C, 69%RH	120Vac, 60Hz	Tim Ho
RE≥1G	25deg. C, 74%RH	120Vac, 60Hz	Robert Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Andy Ho
OB	25deg. C, 60%RH	120Vac, 60Hz	Andy 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 v03r02

ANSI C63.10-2009

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

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

3.4 DUTY CYCLE OF TEST SIGNAL

Duty cycle of test signal is $\geq 98\%$, duty factor is not required.

802.11b: Duty cycle = $12.375 \text{ ms} / 12.475 \text{ ms} = 0.992$

802.11g: Duty cycle = $2.06 \text{ ms} / 2.102 \text{ ms} = 0.980$

802.11n (HT20): Duty cycle = $1.917 \text{ ms} / 1.939 \text{ ms} = 0.989$



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.

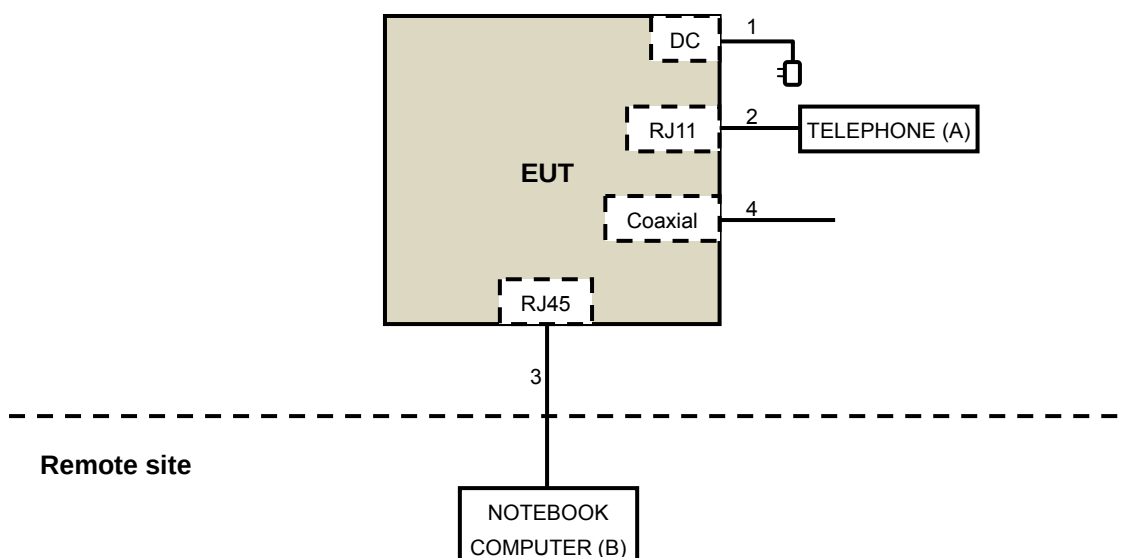
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	TELEPHONE (For conducted emission test)	WONDER	WD-303	8C17DA02763	NA	Provided by Lab
	TELEPHONE (For other test items)	WONDER	WD-303	7C17KA04011	NA	Provided by Lab
B	NOTEBOOK COMPUTER	DELL	E5440	6FC7F12	FCC DoC	Provided by Lab

NOTE:

- 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	RJ11	1	1.5	No	0	Provided by Lab
3	RJ45	1	10	No	0	Provided by Lab
4	Coaxial	1	10	No	0	Provided by Lab

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. 22, 2014	Sep. 21, 2015
50 ohms Terminator	N/A	EMC-02	Sep. 30, 2014	Sep. 29, 2015
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: Oct. 09, 2014

4.1.3 TEST PROCEDURES

- 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.
- The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

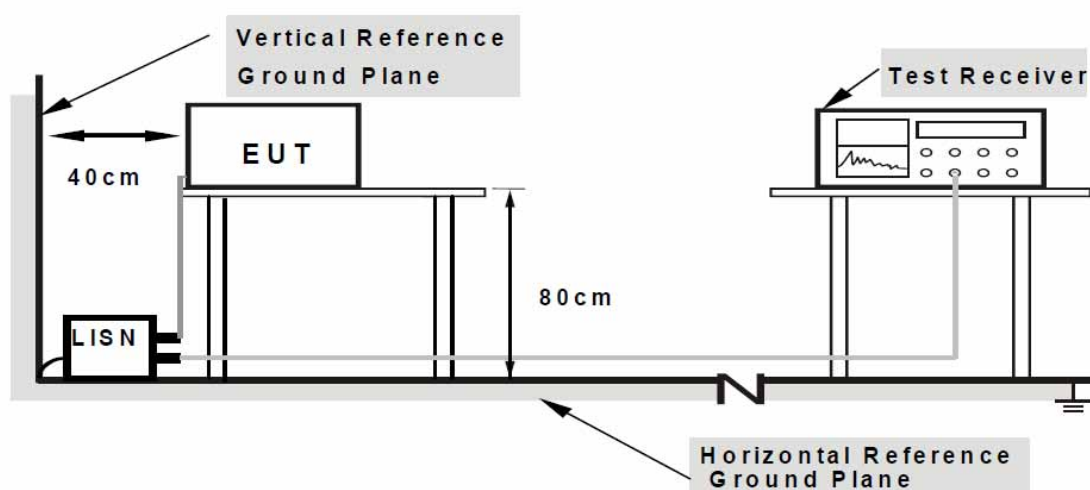
NOTE:

- 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. Controlling software (HyperTerminal paste 1415-01G2000 wifi command.txt command) has been activated to set the EUT under transmission/receiving condition continuously.

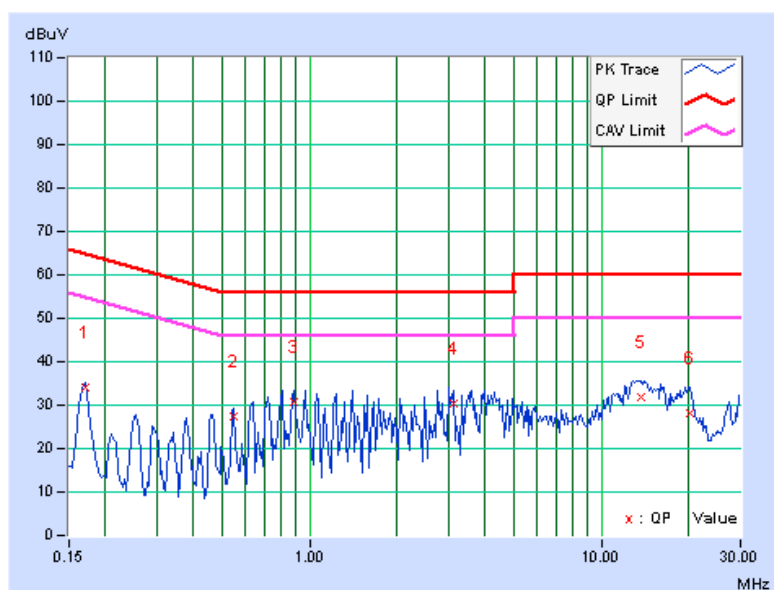
4.1.7 TEST RESULTS (MODE 1)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	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	0.16953	0.07	33.86	25.46	33.93	25.53	64.98	54.98	-31.06	-29.46
2	0.55234	0.10	27.37	18.94	27.47	19.04	56.00	46.00	-28.53	-26.96
3	0.88828	0.12	30.44	19.75	30.56	19.87	56.00	46.00	-25.44	-26.13
4	3.11328	0.22	30.26	14.34	30.48	14.56	56.00	46.00	-25.52	-31.44
5	13.63672	0.55	31.25	19.57	31.80	20.12	60.00	50.00	-28.20	-29.88
6	20.19141	0.70	27.55	16.22	28.25	16.92	60.00	50.00	-31.75	-33.08

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

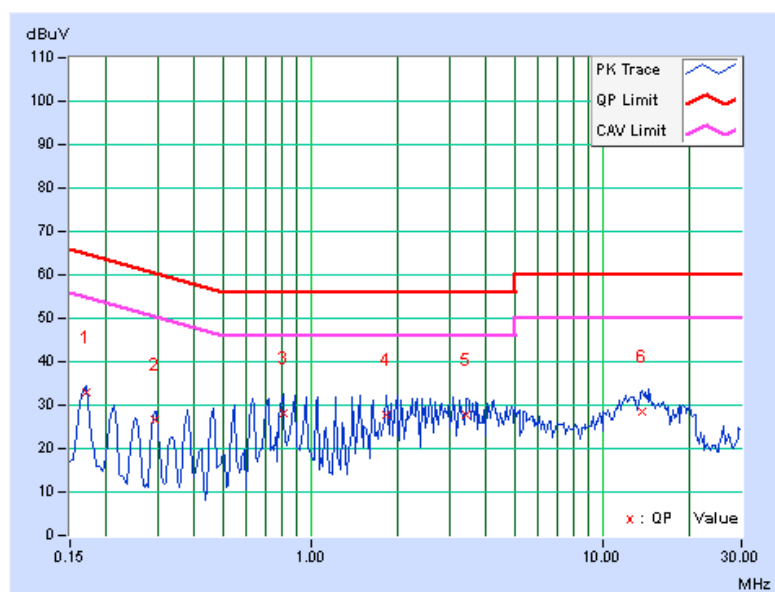


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16953	0.06	32.72	23.47	32.78	23.53	64.98	54.98	-32.20	-31.45
2	0.29453	0.07	26.44	18.88	26.51	18.95	60.40	50.40	-33.88	-31.44
3	0.80625	0.12	27.92	16.39	28.04	16.51	56.00	46.00	-27.96	-29.49
4	1.82031	0.17	27.72	16.17	27.89	16.34	56.00	46.00	-28.11	-29.66
5	3.41797	0.24	27.68	12.62	27.92	12.86	56.00	46.00	-28.08	-33.14
6	13.77734	0.57	27.93	16.32	28.50	16.89	60.00	50.00	-31.50	-33.11

REMARKS:

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



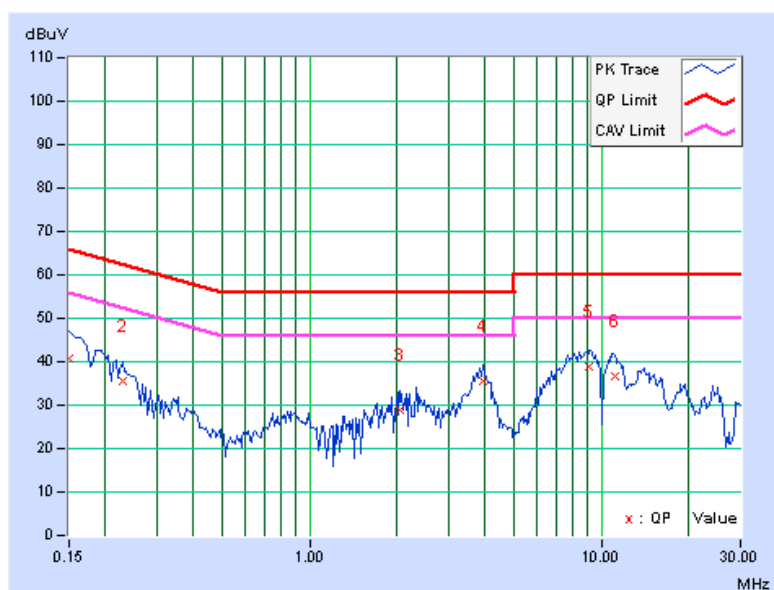
4.1.8 TEST RESULTS (MODE 2)

PHASE	Line (L)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	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	40.67	22.61	40.74	22.68	66.00	56.00	-25.26	-33.32
2	0.22812	0.07	35.66	23.43	35.73	23.50	62.52	52.52	-26.79	-29.02
3	2.05078	0.18	28.56	21.12	28.74	21.30	56.00	46.00	-27.26	-24.70
4	3.91797	0.25	35.28	28.98	35.53	29.23	56.00	46.00	-20.47	-16.77
5	9.12500	0.42	38.45	32.84	38.87	33.26	60.00	50.00	-21.13	-16.74
6	11.08594	0.48	36.22	30.26	36.70	30.74	60.00	50.00	-23.30	-19.26

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

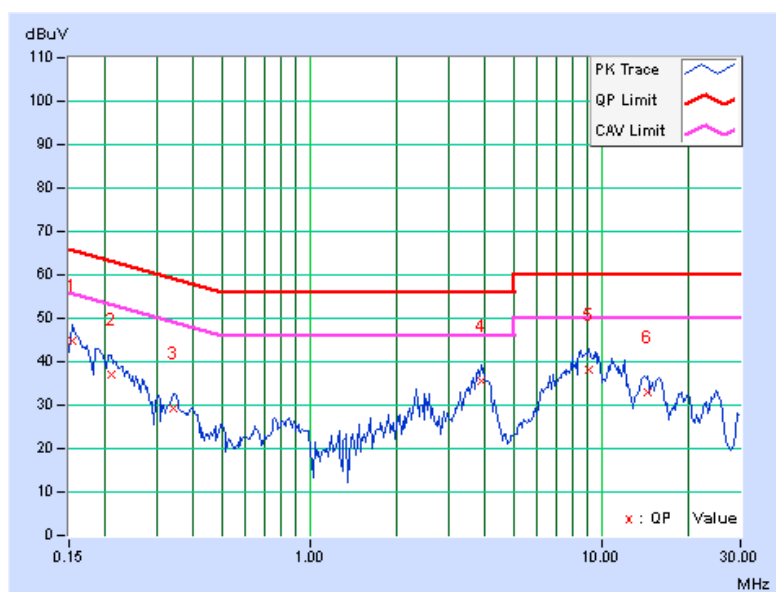


PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
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	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
No		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15391	0.06	44.91	31.87	44.97	31.93	65.79	55.79	-20.81	-23.85
2	0.20859	0.06	37.09	21.25	37.15	21.31	63.26	53.26	-26.11	-31.95
3	0.34141	0.08	29.31	19.73	29.39	19.81	59.17	49.17	-29.78	-29.36
4	3.89453	0.26	35.31	29.49	35.57	29.75	56.00	46.00	-20.43	-16.25
5	9.01953	0.43	37.70	32.09	38.13	32.52	60.00	50.00	-21.87	-17.48
6	14.41016	0.59	32.20	26.04	32.79	26.63	60.00	50.00	-27.21	-23.37

REMARKS:

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



4.2 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

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

NOTE:

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



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4.2.2 TEST INSTRUMENTS

For Below 1GHz test:

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. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-360	Feb. 26, 2014	Feb. 25, 2015
RF Cable	NA	CHGCAB_001	Oct. 04, 2014	Oct. 03, 2015
Horn_Antenna AISI	AIH.8018	0000320091110	Aug. 27, 2014	Aug. 26, 2015
Pre-Amplifier Agilent	8449B	3008A02578	June 24, 2014	June 23, 2015
RF Cable	NA	131205 131214 SNMY23684/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Nov. 17, 2014



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For Above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Aug. 26, 2014	Aug. 25, 2015
Pre-Amplifier Agilent	8449B	300801923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131215 SNMY23685/4	Jan. 17, 2014	Jan. 16, 2015
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Pre-Amplifier EMCI	EMC184045	980143	Jan. 17, 2014	Jan. 16, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Aug. 26, 2014	Aug. 25, 2015
RF Cable	NA	RF104-121 RF104-204	Dec. 12, 2013	Dec. 11, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

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

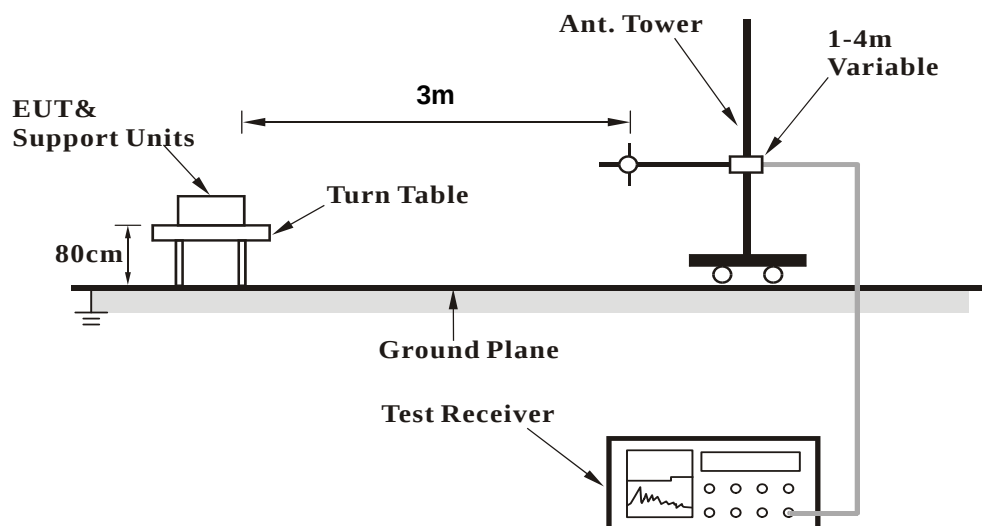
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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 ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle $\geq 98\%$) 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

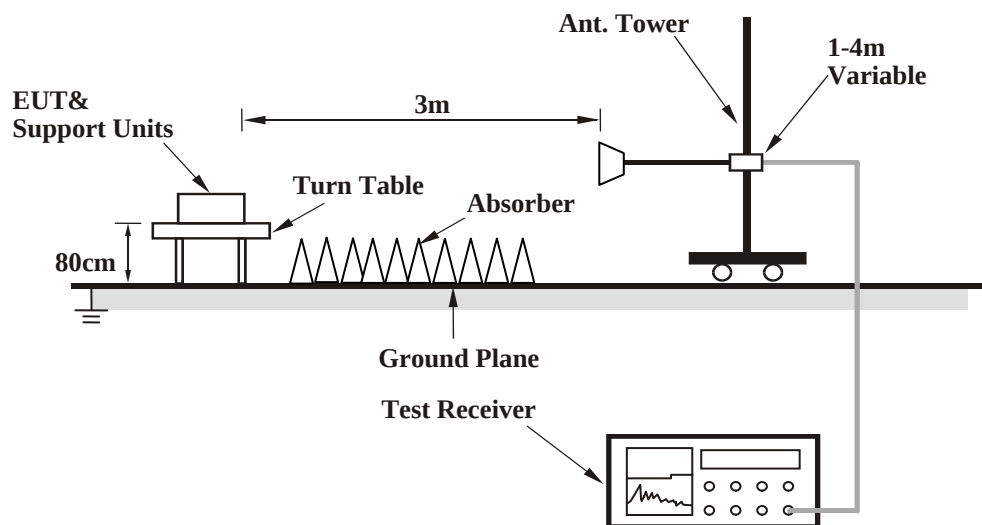
No deviation

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	Below 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	101.93	31.1 QP	43.5	-12.4	1.50 H	51	48.20	-17.06
2	250.00	32.6 QP	46.0	-13.5	1.00 H	79	46.47	-13.92
3	500.01	35.0 QP	46.0	-11.0	2.00 H	49	41.72	-6.75
4	625.00	33.6 QP	46.0	-12.4	1.50 H	33	37.29	-3.68
5	749.98	40.9 QP	46.0	-5.1	1.00 H	81	42.07	-1.21
6	832.92	40.4 QP	46.0	-5.6	1.50 H	225	40.49	-0.13
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	34.32	38.5 QP	40.0	-1.5	1.00 V	75	52.50	-14.03
2	500.01	33.1 QP	46.0	-12.9	2.00 V	11	39.81	-6.75
3	625.00	35.5 QP	46.0	-10.5	1.50 V	1	39.17	-3.68
4	647.99	34.7 QP	46.0	-11.3	1.00 V	209	38.06	-3.35
5	749.98	40.2 QP	46.0	-5.8	1.00 V	360	41.42	-1.21
6	972.02	34.9 QP	54.0	-19.1	2.00 V	360	33.06	1.86

REMARKS:

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



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ABOVE 1GHz DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	51.4 PK	74.0	-22.6	1.33 H	100	57.00	-5.60
2	2390.00	51.3 AV	54.0	-2.7	1.33 H	100	56.90	-5.60
3	*2412.00	103.6 PK			1.33 H	100	109.13	-5.53
4	*2412.00	102.1 AV			1.33 H	100	107.63	-5.53
5	4824.00	53.6 PK	74.0	-20.4	1.02 H	281	49.74	3.86
6	4824.00	51.4 AV	54.0	-2.6	1.02 H	281	47.54	3.86
7	5000.00	50.2 PK	74.0	-23.8	1.10 H	142	46.33	3.87
8	5000.00	43.4 AV	54.0	-10.6	1.10 H	142	39.53	3.87
9	7500.00	54.2 PK	74.0	-19.8	1.21 H	260	45.40	8.80
10	7500.00	43.2 AV	54.0	-10.8	1.21 H	260	34.40	8.80
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	54.3 PK	74.0	-19.7	1.20 V	200	59.90	-5.60
2	2390.00	52.1 AV	54.0	-1.9	1.20 V	200	57.70	-5.60
3	*2412.00	105.9 PK			1.20 V	200	111.43	-5.53
4	*2412.00	103.9 AV			1.20 V	200	109.43	-5.53
5	4824.00	57.1 PK	74.0	-16.9	1.00 V	190	53.24	3.86
6	4824.00	53.7 AV	54.0	-0.3	1.00 V	190	49.84	3.86
7	5000.00	56.2 PK	74.0	-17.8	1.46 V	127	52.33	3.87
8	5000.00	52.7 AV	54.0	-1.3	1.46 V	127	48.83	3.87
9	7500.00	58.3 PK	74.0	-15.7	1.39 V	161	49.50	8.80
10	7500.00	53.5 AV	54.0	-0.5	1.39 V	161	44.70	8.80

REMARKS:

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.9 PK			1.30 H	110	110.32	-5.42
2	*2437.00	101.4 AV			1.30 H	110	106.82	-5.42
3	4874.00	52.8 PK	74.0	-21.2	1.01 H	292	48.99	3.81
4	4874.00	48.8 AV	54.0	-5.2	1.01 H	292	44.99	3.81
5	5000.00	50.6 PK	74.0	-23.4	1.15 H	132	46.73	3.87
6	5000.00	43.0 AV	54.0	-11.0	1.15 H	132	39.13	3.87
7	7311.00	53.7 PK	74.0	-20.3	1.00 H	41	45.47	8.23
8	7311.00	40.3 AV	54.0	-13.7	1.00 H	41	32.07	8.23
9	7500.00	53.6 PK	74.0	-20.4	1.23 H	273	44.80	8.80
10	7500.00	43.0 AV	54.0	-11.0	1.23 H	273	34.20	8.80

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	*2437.00	103.4 PK			1.21 V	210	108.82	-5.42
2	*2437.00	102.9 AV			1.21 V	210	108.32	-5.42
3	4874.00	57.1 PK	74.0	-16.9	1.00 V	190	53.29	3.81
4	4874.00	53.9 AV	54.0	-0.1	1.00 V	190	50.09	3.81
5	5000.00	54.9 PK	74.0	-19.1	1.63 V	114	51.03	3.87
6	5000.00	52.6 AV	54.0	-1.4	1.63 V	114	48.73	3.87
7	7311.00	52.5 PK	74.0	-21.5	1.34 V	38	44.27	8.23
8	7311.00	40.4 AV	54.0	-13.6	1.34 V	38	32.17	8.23
9	7500.00	57.9 PK	74.0	-16.1	1.36 V	133	49.10	8.80
10	7500.00	53.0 AV	54.0	-1.0	1.36 V	133	44.20	8.80

REMARKS:

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.9 PK			1.29 H	112	109.21	-5.31
2	*2462.00	101.9 AV			1.29 H	112	107.21	-5.31
3	2483.50	51.9 PK	74.0	-22.1	1.29 H	112	57.10	-5.20
4	2483.50	50.4 AV	54.0	-3.6	1.29 H	112	55.60	-5.20
5	4924.00	53.1 PK	74.0	-20.9	1.00 H	282	49.30	3.80
6	4924.00	49.1 AV	54.0	-4.9	1.00 H	282	45.30	3.80
7	5000.00	49.9 PK	74.0	-24.1	1.11 H	141	46.03	3.87
8	5000.00	42.5 AV	54.0	-11.5	1.11 H	141	38.63	3.87
9	7386.00	53.1 PK	74.0	-20.9	1.00 H	53	44.55	8.55
10	7386.00	39.8 AV	54.0	-14.2	1.00 H	53	31.25	8.55
11	7500.00	54.2 PK	74.0	-19.8	1.21 H	261	45.40	8.80
12	7500.00	43.3 AV	54.0	-10.7	1.21 H	261	34.50	8.80

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	102.6 PK			1.20 V	198	107.91	-5.31
2	*2462.00	102.1 AV			1.20 V	198	107.41	-5.31
3	4924.00	56.9 PK	74.0	-17.1	1.37 V	190	53.10	3.80
4	4924.00	53.9 AV	54.0	-0.1	1.37 V	190	50.10	3.80
5	7386.00	52.6 PK	74.0	-21.4	1.33 V	49	44.05	8.55
6	7386.00	40.6 AV	54.0	-13.4	1.33 V	49	32.05	8.55

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)
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	71.4 PK	74.0	-2.6	1.33 H	107	77.00	-5.60
2	2390.00	52.3 AV	54.0	-1.7	1.33 H	107	57.90	-5.60
3	*2412.00	105.2 PK			1.33 H	107	110.73	-5.53
4	*2412.00	93.4 AV			1.33 H	107	98.93	-5.53
5	4824.00	52.3 PK	74.0	-21.7	1.00 H	280	48.44	3.86
6	4824.00	38.4 AV	54.0	-15.6	1.00 H	280	34.54	3.86
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	72.6 PK	74.0	-1.4	1.19 V	212	78.20	-5.60
2	2390.00	53.9 AV	54.0	-0.1	1.19 V	212	59.50	-5.60
3	*2412.00	107.2 PK			1.19 V	212	112.73	-5.53
4	*2412.00	94.9 AV			1.19 V	212	100.43	-5.53
5	4824.00	54.3 PK	74.0	-19.7	1.00 V	187	50.44	3.86
6	4824.00	40.2 AV	54.0	-13.8	1.00 V	187	36.34	3.86

REMARKS:

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	71.4 PK	74.0	-2.6	1.32 H	101	77.00	-5.60
2	2390.00	49.2 AV	54.0	-4.8	1.32 H	101	54.80	-5.60
3	*2437.00	111.4 PK			1.32 H	101	116.82	-5.42
4	*2437.00	100.2 AV			1.32 H	101	105.62	-5.42
5	2483.50	69.2 PK	74.0	-4.8	1.04 H	135	74.40	-5.20
6	2483.50	51.6 AV	54.0	-2.4	1.04 H	135	56.80	-5.20
7	4874.00	52.2 PK	74.0	-21.8	1.02 H	302	48.39	3.81
8	4874.00	38.2 AV	54.0	-15.8	1.02 H	302	34.39	3.81
9	5000.00	53.0 PK	74.0	-21.0	1.25 H	109	49.13	3.87
10	5000.00	50.8 AV	54.0	-3.2	1.25 H	109	46.93	3.87
11	7311.00	48.2 PK	74.0	-25.8	1.02 H	39	39.97	8.23
12	7311.00	35.8 AV	54.0	-18.2	1.02 H	39	27.57	8.23
13	7500.00	55.9 PK	74.0	-18.1	1.13 H	129	47.10	8.80
14	7500.00	51.6 AV	54.0	-2.4	1.13 H	129	42.80	8.80
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	1.22 V	214	78.80	-5.60
2	2390.00	50.8 AV	54.0	-3.2	1.22 V	214	56.40	-5.60
3	*2437.00	112.1 PK			1.22 V	214	117.52	-5.42
4	*2437.00	101.7 AV			1.22 V	214	107.12	-5.42
5	2483.50	70.8 PK	74.0	-3.2	1.22 V	214	76.00	-5.20
6	2483.50	53.5 AV	54.0	-0.5	1.22 V	214	58.70	-5.20
7	4874.00	58.6 PK	74.0	-15.4	1.00 V	190	54.79	3.81
8	4874.00	45.2 AV	54.0	-8.8	1.00 V	190	41.39	3.81
9	5000.00	56.2 PK	74.0	-17.8	1.47 V	120	52.33	3.87
10	5000.00	53.0 AV	54.0	-1.0	1.47 V	120	49.13	3.87
11	7311.00	50.2 PK	74.0	-23.8	1.39 V	43	41.97	8.23
12	7311.00	38.4 AV	54.0	-15.6	1.39 V	43	30.17	8.23
13	7500.00	58.1 PK	74.0	-15.9	1.40 V	162	49.30	8.80
14	7500.00	53.4 AV	54.0	-0.6	1.40 V	162	44.60	8.80

REMARKS:

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.2 PK			1.37 H	105	111.51	-5.31
2	*2462.00	94.5 AV			1.37 H	105	99.81	-5.31
3	2483.50	69.6 PK	74.0	-4.4	1.37 H	105	74.80	-5.20
4	2483.50	52.2 AV	54.0	-1.8	1.37 H	105	57.40	-5.20
5	4924.00	52.5 PK	74.0	-21.5	1.03 H	288	48.70	3.80
6	4924.00	38.5 AV	54.0	-15.5	1.03 H	288	34.70	3.80
7	7386.00	47.6 PK	74.0	-26.4	1.02 H	50	39.05	8.55
8	7386.00	35.4 AV	54.0	-18.6	1.02 H	50	26.85	8.55

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	108.0 PK			1.18 V	214	113.31	-5.31
2	*2462.00	96.6 AV			1.18 V	214	101.91	-5.31
3	2483.50	71.1 PK	74.0	-2.9	1.18 V	214	76.30	-5.20
4	2483.50	53.9 AV	54.0	-0.1	1.18 V	214	59.10	-5.20
5	4924.00	54.4 PK	74.0	-19.6	1.05 V	202	50.60	3.80
6	4924.00	40.0 AV	54.0	-14.0	1.05 V	202	36.20	3.80
7	7386.00	49.6 PK	74.0	-24.4	1.35 V	33	41.05	8.55
8	7386.00	37.9 AV	54.0	-16.1	1.35 V	33	29.35	8.55

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	70.6 PK	74.0	-3.4	1.32 H	100	76.20	-5.60
2	2390.00	52.1 AV	54.0	-1.9	1.32 H	100	57.70	-5.60
3	*2412.00	103.1 PK			1.32 H	100	108.63	-5.53
4	*2412.00	92.9 AV			1.32 H	100	98.43	-5.53
5	4824.00	52.7 PK	74.0	-21.3	1.02 H	281	48.84	3.86
6	4824.00	38.7 AV	54.0	-15.3	1.02 H	281	34.84	3.86
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	71.3 PK	74.0	-2.7	1.25 V	215	76.90	-5.60
2	2390.00	53.8 AV	54.0	-0.2	1.25 V	215	59.40	-5.60
3	*2412.00	104.8 PK			1.25 V	215	110.33	-5.53
4	*2412.00	94.1 AV			1.25 V	215	99.63	-5.53
5	4824.00	54.0 PK	74.0	-20.0	1.02 V	190	50.14	3.86
6	4824.00	39.9 AV	54.0	-14.1	1.02 V	190	36.04	3.86

REMARKS:

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	67.4 PK	74.0	-6.6	1.27 H	101	73.00	-5.60
2	2390.00	47.6 AV	54.0	-6.4	1.27 H	101	53.20	-5.60
3	*2437.00	109.2 PK			1.27 H	101	114.62	-5.42
4	*2437.00	99.2 AV			1.27 H	101	104.62	-5.42
5	2483.50	71.6 PK	74.0	-2.4	1.27 H	101	76.80	-5.20
6	2483.50	52.4 AV	54.0	-1.6	1.27 H	101	57.60	-5.20
7	4874.00	51.6 PK	74.0	-22.4	1.03 H	294	47.79	3.81
8	4874.00	37.8 AV	54.0	-16.2	1.03 H	294	33.99	3.81
9	7311.00	48.2 PK	74.0	-25.8	1.04 H	46	39.97	8.23
10	7311.00	35.7 AV	54.0	-18.3	1.04 H	46	27.47	8.23

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	69.3 PK	74.0	-4.7	1.18 V	218	74.90	-5.60
2	2390.00	49.1 AV	54.0	-4.9	1.18 V	218	54.70	-5.60
3	*2437.00	111.0 PK			1.18 V	218	116.42	-5.42
4	*2437.00	100.5 AV			1.18 V	218	105.92	-5.42
5	2483.50	72.8 PK	74.0	-1.2	1.18 V	218	78.00	-5.20
6	2483.50	53.7 AV	54.0	-0.3	1.18 V	218	58.90	-5.20
7	4874.00	59.3 PK	74.0	-14.7	1.04 V	192	55.49	3.81
8	4874.00	45.7 AV	54.0	-8.3	1.04 V	192	41.89	3.81
9	7311.00	50.3 PK	74.0	-23.7	1.39 V	38	42.07	8.23
10	7311.00	38.8 AV	54.0	-15.2	1.39 V	38	30.57	8.23

REMARKS:

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.2 PK			1.27 H	102	109.51	-5.31
2	*2462.00	94.1 AV			1.27 H	102	99.41	-5.31
3	2483.50	70.6 PK	74.0	-3.4	1.27 H	102	75.80	-5.20
4	2483.50	52.3 AV	54.0	-1.7	1.27 H	102	57.50	-5.20
5	4924.00	52.9 PK	74.0	-21.1	1.07 H	303	49.10	3.80
6	4924.00	38.7 AV	54.0	-15.3	1.07 H	303	34.90	3.80
7	7386.00	48.1 PK	74.0	-25.9	1.04 H	53	39.55	8.55
8	7386.00	35.8 AV	54.0	-18.2	1.04 H	53	27.25	8.55

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	105.6 PK			1.20 V	217	110.91	-5.31
2	*2462.00	95.4 AV			1.20 V	217	100.71	-5.31
3	2483.50	72.4 PK	74.0	-1.6	1.20 V	217	77.60	-5.20
4	2483.50	53.9 AV	54.0	-0.1	1.20 V	217	59.10	-5.20
5	4924.00	53.6 PK	74.0	-20.4	1.09 V	186	49.80	3.80
6	4924.00	39.5 AV	54.0	-14.5	1.09 V	186	35.70	3.80
7	7386.00	50.0 PK	74.0	-24.0	1.38 V	24	41.45	8.55
8	7386.00	38.0 AV	54.0	-16.0	1.38 V	24	29.45	8.55

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 : Nov. 20, 2014

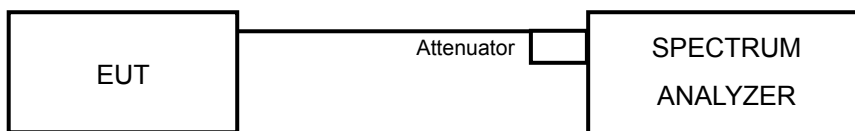
4.3.3 TEST PROCEDURE

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

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

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

4.3.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	7.55	0.5	PASS
6	2437	7.09	0.5	PASS
11	2462	7.58	0.5	PASS

802.11g

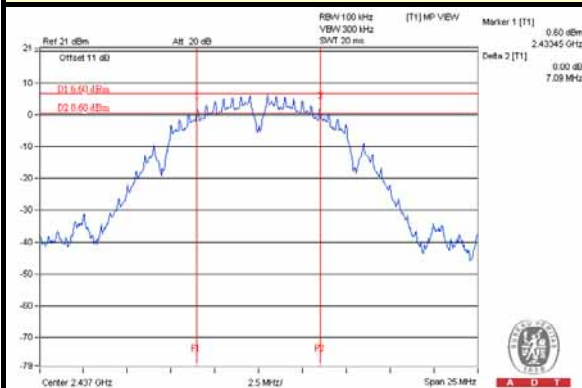
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.16	0.5	PASS
6	2437	15.16	0.5	PASS
11	2462	15.14	0.5	PASS

802.11n (HT20)

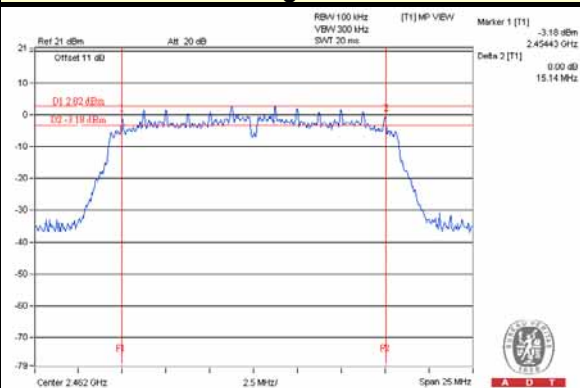
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.17	0.5	PASS
6	2437	15.17	0.5	PASS
11	2462	15.13	0.5	PASS

SPECTRUM PLOT OF WORST VALUE

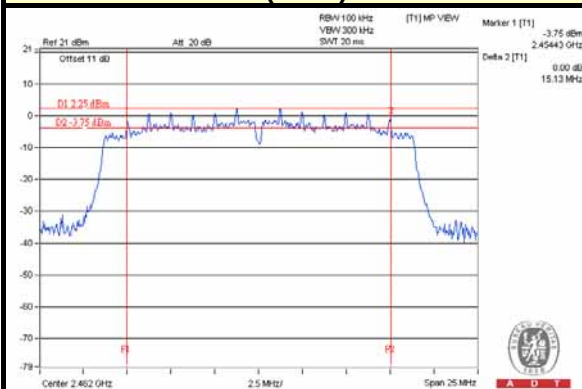
802.11b / CH6



802.11g / CH11



802.11n (HT20) / CH11



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)

4.4.2 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 : Nov. 20, 2014

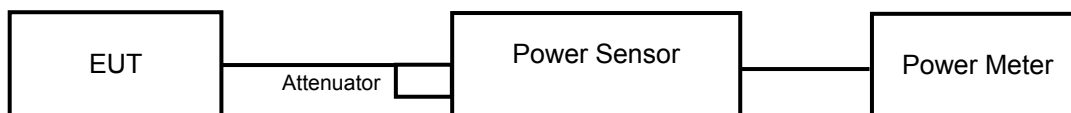
4.4.3 TEST PROCEDURES

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

4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

4.4.5 TEST SETUP



4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6

4.4.7 TEST RESULTS

FOR PEAK POWER

802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	58.614	17.68	30	PASS
6	2437	46.881	16.71	30	PASS
11	2462	37.67	15.76	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	171.396	22.34	30	PASS
6	2437	331.894	25.21	30	PASS
11	2462	140.929	21.49	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	176.198	22.46	30	PASS
6	2437	331.894	25.21	30	PASS
11	2462	120.781	20.82	30	PASS

FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	29.717	14.73
6	2437	23.496	13.71
11	2462	18.535	12.68

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	24.889	13.96
6	2437	79.616	19.01
11	2462	17.418	12.41

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)
1	2412	19.999	13.01
6	2437	78.705	18.96
11	2462	14.028	11.47

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 : Nov. 20, 2014

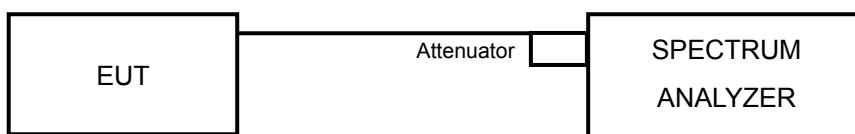
4.5.3 TEST PROCEDURE

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

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-6.04	8	PASS
6	2437	-6.67	8	PASS
11	2462	-8.86	8	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-10.56	8	PASS
6	2437	-5.08	8	PASS
11	2462	-12.41	8	PASS

802.11n (HT20)

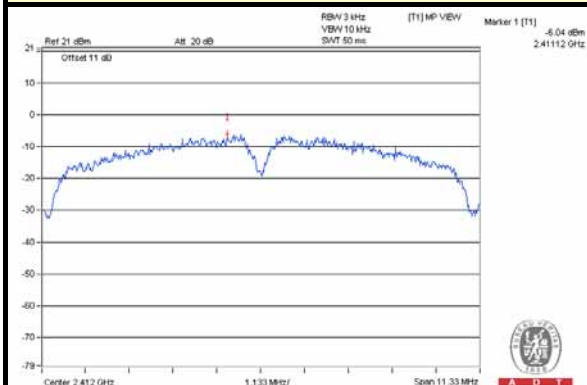
CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-11.58	8	PASS
6	2437	-5.59	8	PASS
11	2462	-13.21	8	PASS



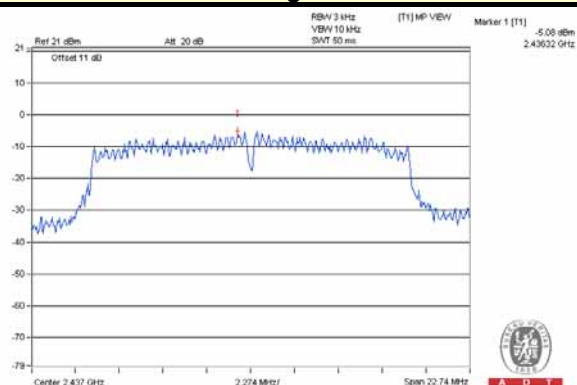
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SPECTRUM PLOT OF WORST VALUE

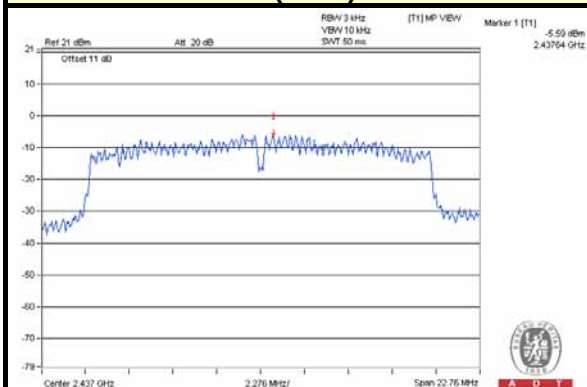
802.11b / CH1



802.11g / CH6



802.11n (HT20) / CH6





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4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below 20dB 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 : Nov. 20, 2014

4.6.3 TEST PROCEDURE

Measurement Procedure - Reference Level

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

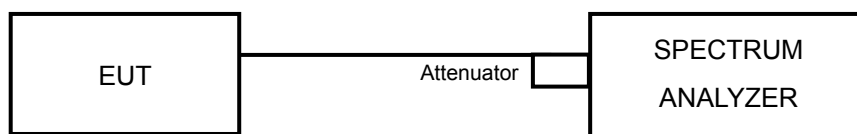
Measurement Procedure –Unwanted Emission Level

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. 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

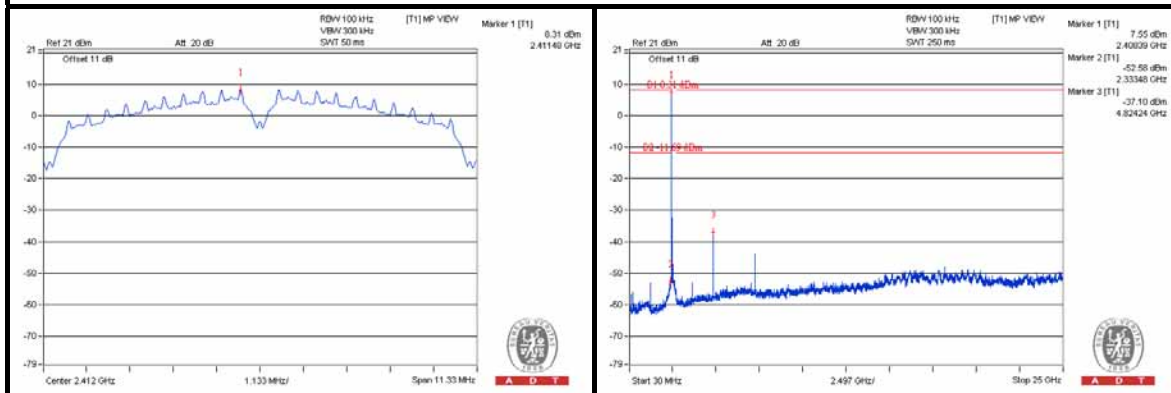
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



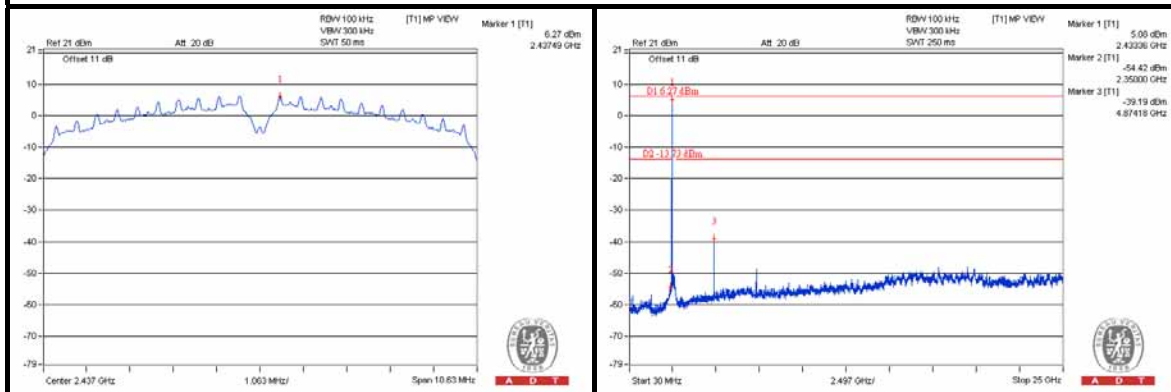
A D T

802.11b:

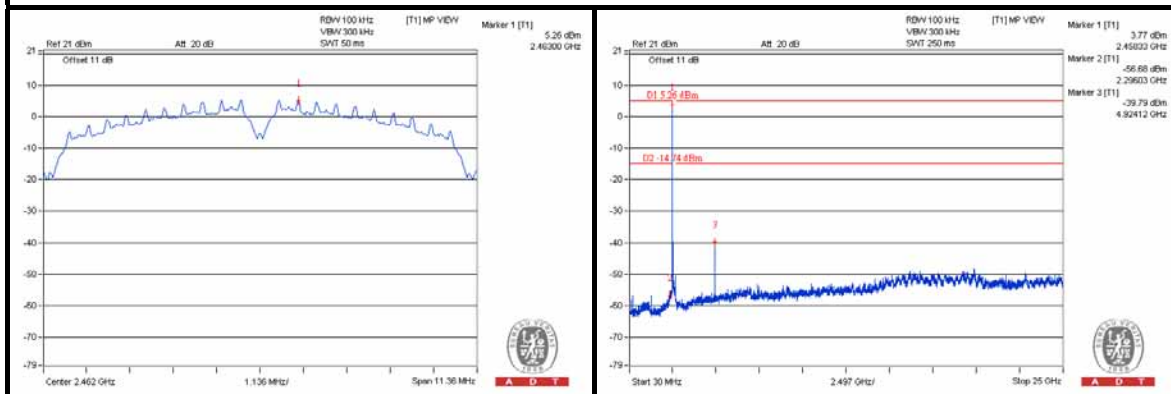
CH 1



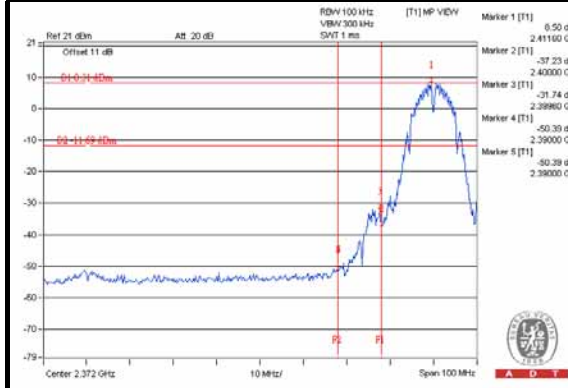
CH 6



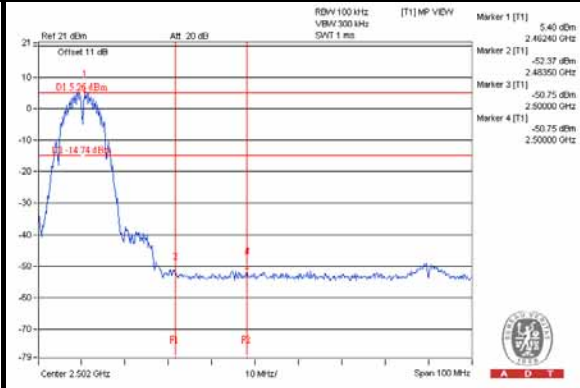
CH 11



CH 1 Band edge



CH 11 Band edge

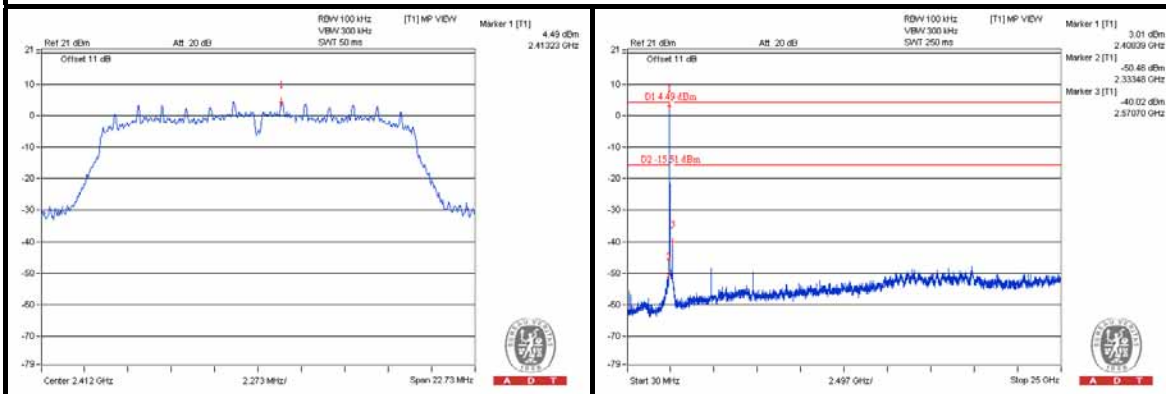




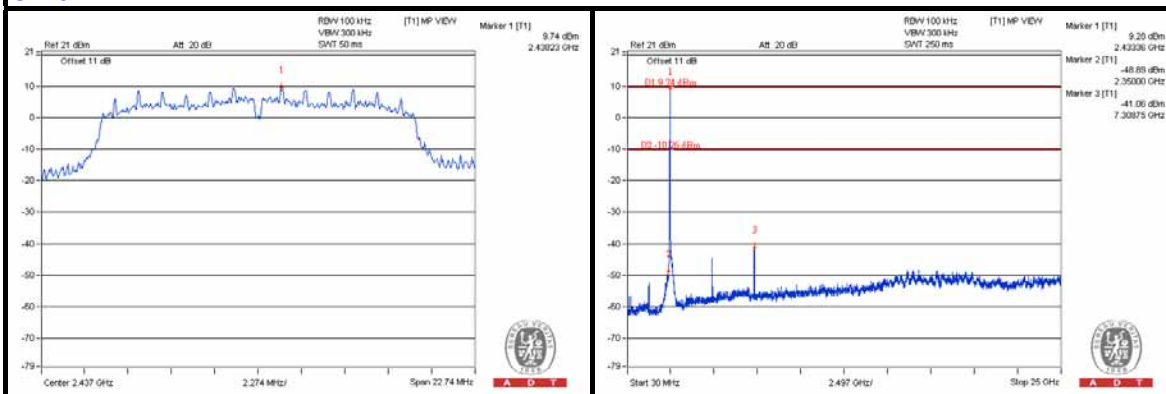
A D T

802.11g:

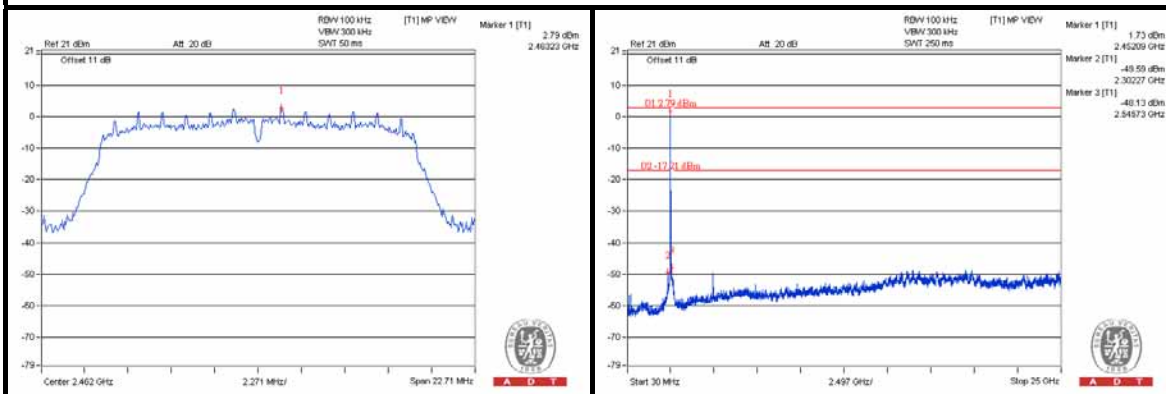
CH 1



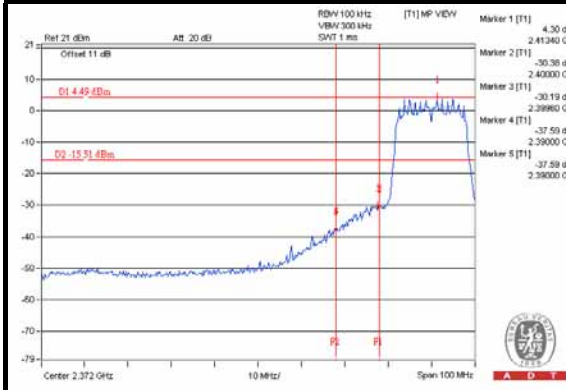
CH 6



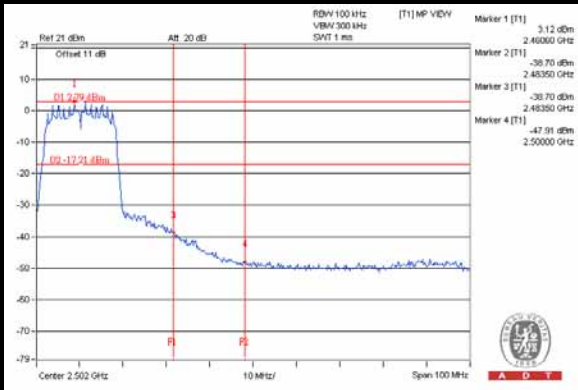
CH 11



CH 1 Band edge

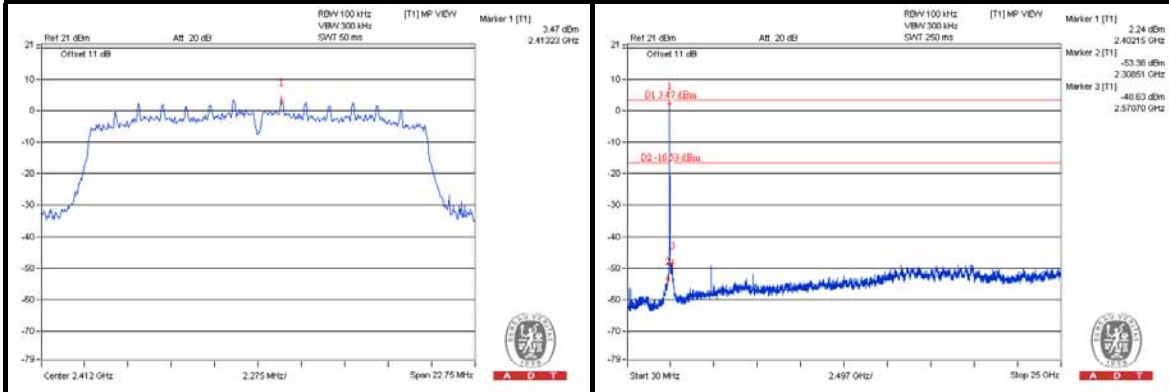


CH 11 Band edge

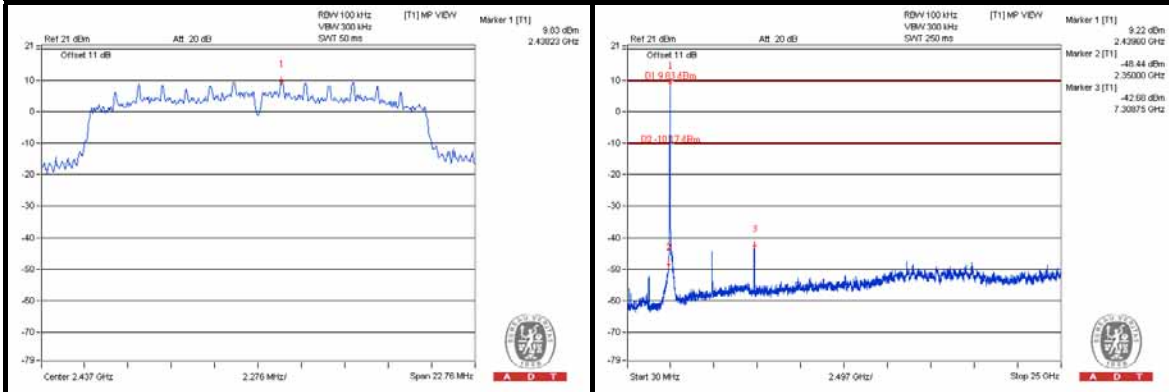


802.11n (HT20):

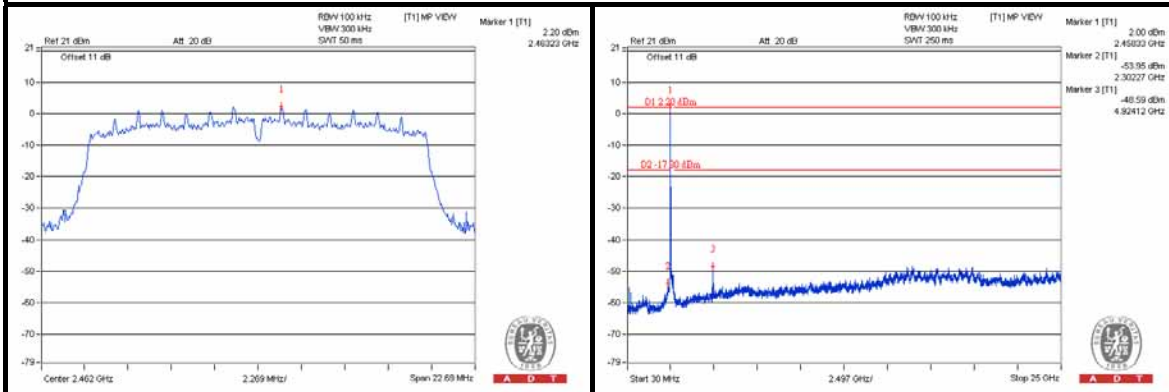
CH 1



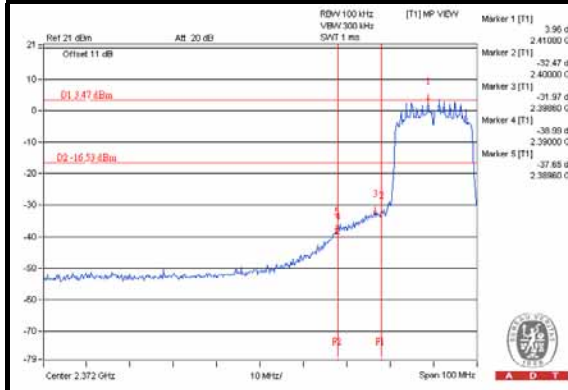
CH 6



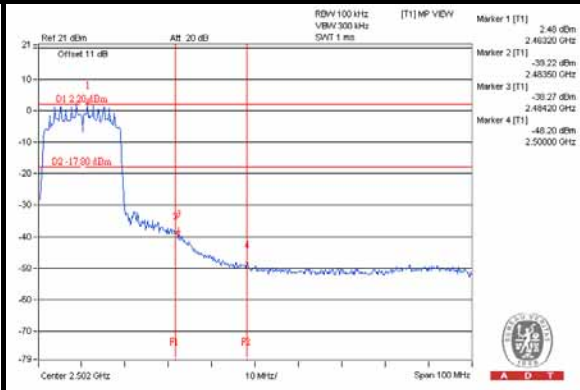
CH 11



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.



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

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

--- END ---