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FCC TEST REPORT

REPORT NO.: RF130806E06B R1

MODEL NO.: F@ST 3284u

FCC ID: VW3FAST3284U

RECEIVED: July 14, 2014

TESTED: July 16 to Sep. 23, 2014

ISSUED: Nov. 18, 2014

APPLICANT: SAGEMCOM SAS

ADDRESS: 250 Route de l ' Empereur - 92848 RUEIL
MALMAISON CEDEX- FRANCE

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

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R.O.C.

TEST LOCATION (1): No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,
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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130806E06B	Original release	Oct. 13, 2014
RF130806E06B R1	Modified the applicant information	Nov. 18, 2014



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1. CERTIFICATION

PRODUCT: Cable modem
BRAND NAME: Sagemcom
MODEL NO.: F@ST 3284u
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: SAGEMCOM SAS
TESTED: July 16 to Sep. 23, 2014
STANDARDS: **FCC Part 15, Subpart C (Section 15.247)**
ANSI C63.10-2009

The above equipment (Model: F@ST 3284u) 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. 18, 2014
(Claire Kuan, Specialist)

Approved by :  , **DATE:** Nov. 18, 2014
(May Chen, Manager)



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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 -13.82dB at 0.15000MHz
15.205 15.209 15.247(d)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -0.1dB at 2483.5MHz
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.



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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)	5.43 dB
Radiated emissions (1GHz -6GHz)	3.72 dB
Radiated emissions (6GHz -18GHz)	4.00 dB
Radiated emissions (18GHz -40GHz)	4.11 dB



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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Cable modem
MODEL NO.	F@ST 3284u
POWER SUPPLY	DC 12V from power adapter
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n : up to 300Mbps
OPERATING FREQUENCY	2.412 ~ 2.462GHz
NUMBER OF CHANNEL	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
MAXIMUM OUTPUT POWER	802.11b: 83.368mW 802.11g: 411.493mW 802.11n (HT20): 387.743mW 802.11n (HT40): 257.437mW
ANTENNA TYPE	Please see NOTE
DATA CABLE	RJ-45 cable (unshielded, 1.5m) RJ-11 cable (unshielded, 1.5m)
I/O PORTS	Refer to user's manual
ASSOCIATED DEVICES	Adapter x1

Note:

1. The EUT uses following adapter.

Brand	Sagemcom
Model	NBSE24120200HU
Input Power	100-240V, 50-60Hz, 0.6A
Output Power	12V, 2.0A
Power Line	DC output cable: 2.0m(unshielded)



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

Transmitter Circuit	Brand	Model	Gain(dBi) Include cable loss	Antenna Type	Frequency range (MHz to MHz)	Connector Type
Chain (0)	MASTER WAVE	902P00089S0	2.89	PIFA	2400~2500	NA
Chain (1)	NA	NA	2.84	Print	2400~2500	NA

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

MODULATION MODE	DATA RATE (MCS)	Tx/Rx FUNCTION
802.11b	1 ~ 11Mbps	1Tx / 2Rx
802.11g	6 ~ 54Mbps	2Tx / 2Rx
802.11n (HT20)	MCS 0~7	2Tx / 2Rx
	MCS 8~15	2Tx / 2Rx
802.11n (HT40)	MCS 0~7	2Tx / 2Rx
	MCS 8~15	2Tx / 2Rx

Note : For 802.11b mode will fix transmission on Chain (0)

- When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 15.
- The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



3.2 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

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

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

7 channels are provided for 802.11n (HT40):

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



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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

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

POWER LINE CONDUCTED EMISSION TEST:

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

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



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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	25deg. C, 65%RH	120Vac, 60Hz	Tim Ho
RE≥1G	21deg. C, 66%RH	120Vac, 60Hz	Andy Ho
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.



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3.4 DUTY CYCLE OF TEST SIGNAL

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

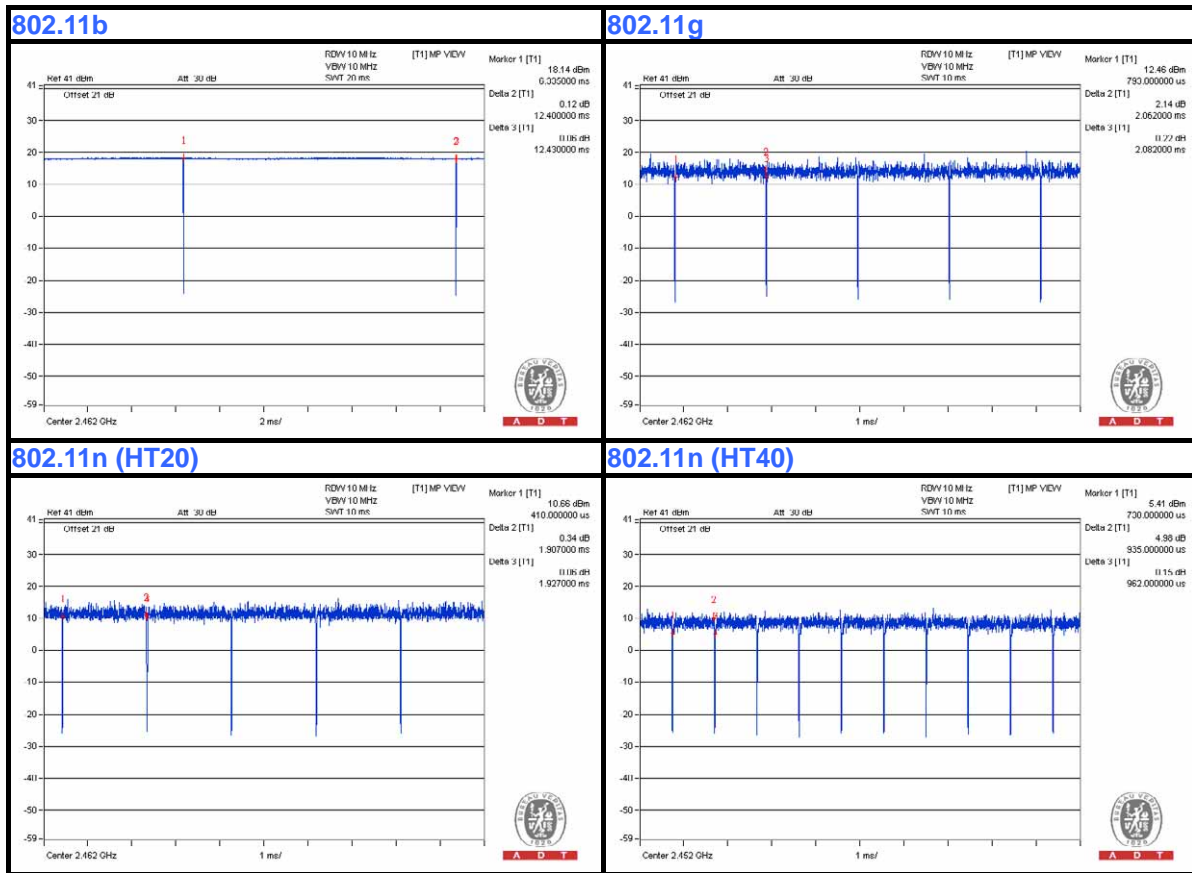
Duty cycle of test signal is $< 98\%$, duty factor shall be considered.

802.11b: Duty cycle = 12.4 ms/12.43 ms = 0.998

802.11g: Duty cycle = 2.062 ms/2.082 ms = 0.99

802.11n (HT20): Duty cycle = 1.907 ms/1.927 ms = 0.99

802.11n (HT40): Duty cycle = 0.935 ms/0.962 ms = 0.972, Duty factor = $10 * \log(1/0.972) = 0.1$





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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.

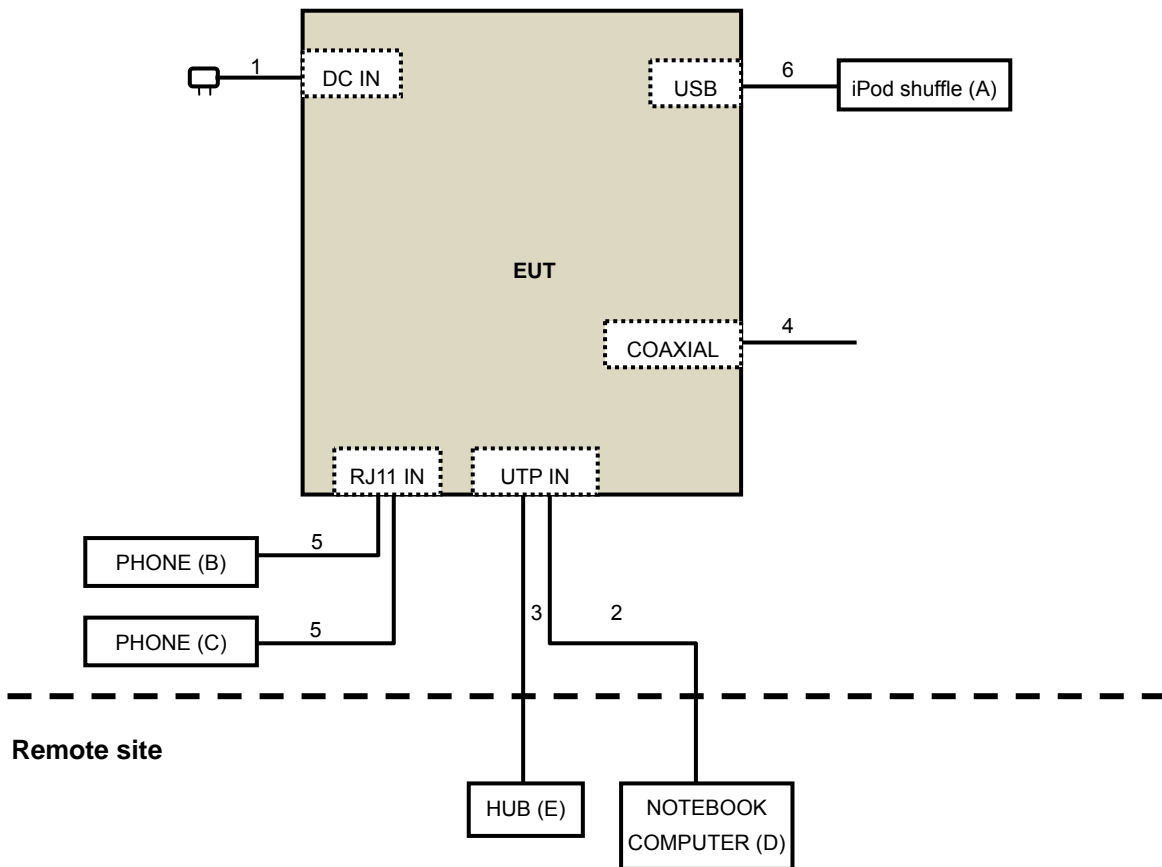
No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	i-Pod	Apple	MC749TA/A	CC4DN29UDFDM	NA	Provided by Lab
B	Phone	Linksys	SD208	NA	NA	Provided by Lab
C	Phone	DELL	E5430	HYV4VY1	NA	Provided by Lab
D	NOTEBOOK COMPUTER	DELL	PP32LA	HSLB32S	FCC DoC	Provided by Lab
E	HUB	HP	J9801A	NA	NA	Supplied by client

NOTE:

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

No.	Cable	Qty.	Length (m)	Shielded (Yes/ No)	Cores (Number)	Remark
1.	DC	1	2.0	No	0	Supplied by client
2.	RJ45	1	10	No	0	Provided by Lab
3.	RJ45	3	10	No	0	Provided by Lab
4.	COAXIAL	1	10	No	0	Provided by Lab
5.	RJ11	1	1.5	No	0	Provided by Lab
6.	USB	1	0.1	No	0	Provided by Lab

3.6 CONFIGURATION OF SYSTEM UNDER TEST





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4. TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS 30	100375	Apr. 29, 2014	Apr. 28, 2015
Line-Impedance Stabilization Network (for EUT) SCHWARZBECK	NSLK8127	8127-522	Sep. 12, 2013	Sep. 11, 2014
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: July 28, 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.

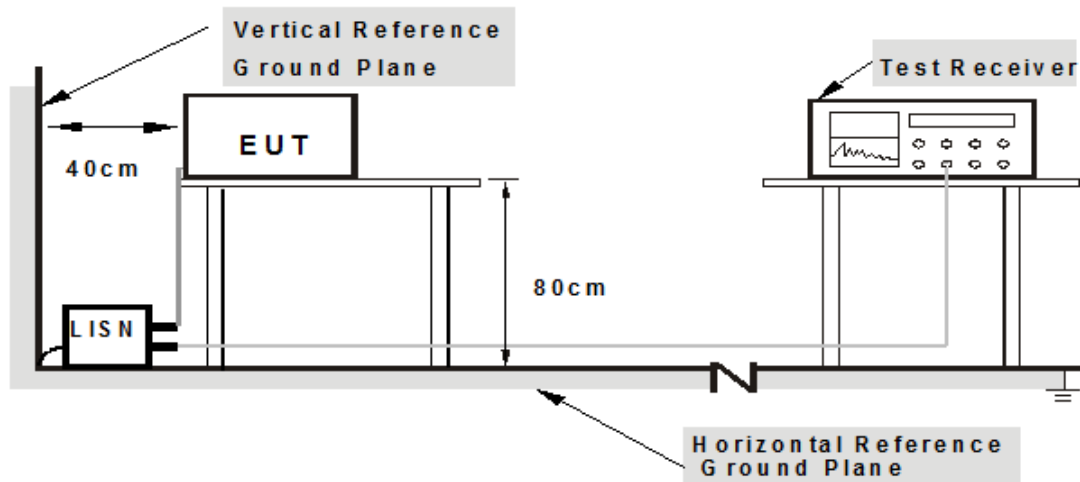
NOTE:

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.



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4.1.6 EUT OPERATING CONDITIONS

1. Placed the EUT on testing table.
2. Prepared computer system (support unit D) 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.

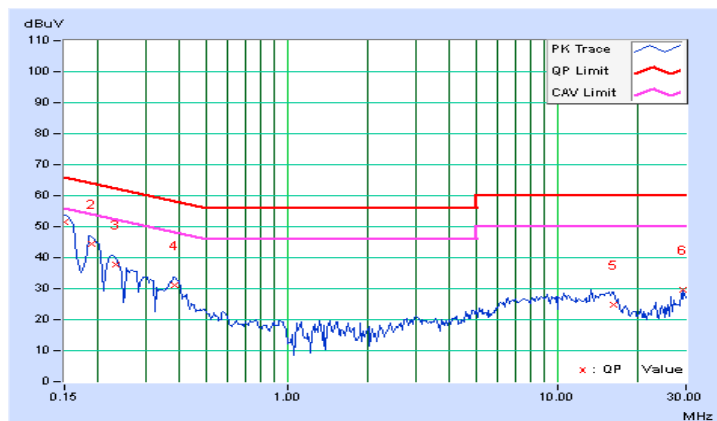
4.1.7 TEST RESULTS

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

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.07	51.37	40.00	51.44	40.07	66.00	56.00	-14.56	-15.93
2	0.18906	0.07	44.44	33.47	44.51	33.54	64.08	54.08	-19.57	-20.54
3	0.23203	0.07	37.67	26.94	37.74	27.01	62.38	52.38	-24.63	-25.36
4	0.38438	0.09	31.08	20.94	31.17	21.03	58.18	48.18	-27.02	-27.16
5	16.22266	0.62	24.02	19.41	24.64	20.03	60.00	50.00	-35.36	-29.97
6	29.23438	0.98	28.67	27.54	29.65	28.52	60.00	50.00	-30.35	-21.48

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





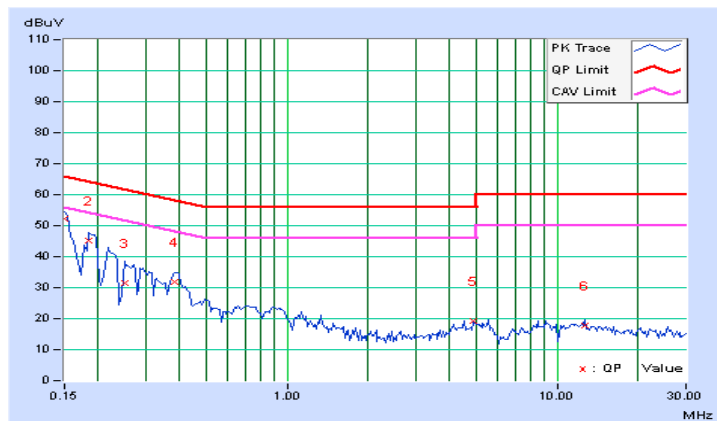
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PHASE	Neutral (N)	DETECTOR FUNCTION	Quasi-Peak (QP) / Average (AV)
--------------	-------------	--------------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.08	52.10	40.14	52.18	40.22	66.00	56.00	-13.82	-15.78
2	0.18516	0.07	45.23	32.03	45.30	32.10	64.25	54.25	-18.95	-22.15
3	0.25156	0.08	31.23	20.28	31.31	20.36	61.71	51.71	-30.40	-31.35
4	0.38438	0.09	31.67	21.32	31.76	21.41	58.18	48.18	-26.43	-26.78
5	4.90234	0.29	18.88	16.39	19.17	16.68	56.00	46.00	-36.83	-29.32
6	12.74219	0.52	17.35	15.90	17.87	16.42	60.00	50.00	-42.13	-33.58

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





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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.



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4.2.2 TEST INSTRUMENTS

Below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
MXE EMI Receiver Agilent	N9038A	MY50010156	Jan. 15, 2014	Jan. 14, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 13, 2013	Nov. 12, 2014
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 27, 2014	Feb. 26, 2015
RF Cable	NA	CHHCAB_001	Oct. 06, 2013	Oct. 05, 2014
Spectrum Analyzer R&S	FSV40	100964	July 05, 2014	July 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Dec. 06, 2013	Dec. 05, 2014
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 29, 2013	Oct. 28, 2014
RF Cable	NA	RF104-205 RF104-207 RF104-202	Dec. 12, 2013	Dec. 11, 2014
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The 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: Aug. 11, 2014



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Above 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. 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
Spectrum Analyzer Agilent	E4446A	MY48250253	Aug. 28, 2013	Aug. 27, 2014
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Nov. 13, 2013	Nov. 12, 2014
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Oct. 08, 2013	Oct. 07, 2014
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The 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: Aug. 14, 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:

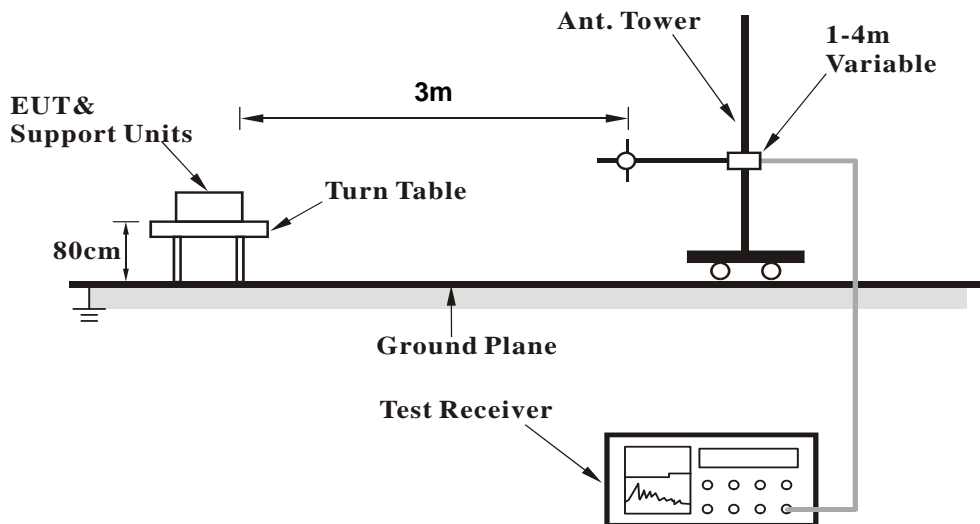
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

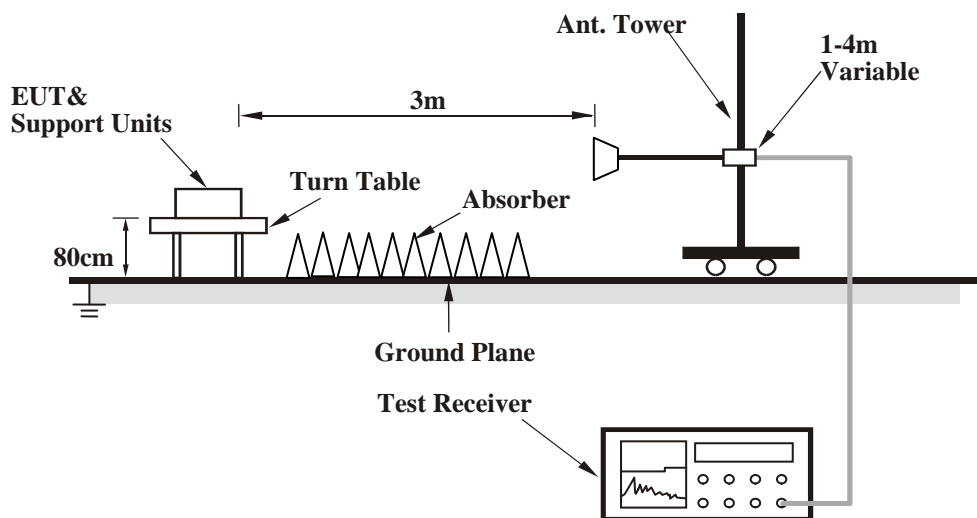
No deviation

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	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	199.99	39.6 QP	43.5	-3.9	1.50 H	66	55.35	-15.73
2	314.65	34.4 QP	46.0	-11.6	1.00 H	292	45.42	-11.06
3	374.98	34.3 QP	46.0	-11.7	1.00 H	332	44.21	-9.91
4	625.00	38.4 QP	46.0	-7.6	1.00 H	315	42.47	-4.08
5	749.98	37.5 QP	46.0	-8.5	1.00 H	332	39.10	-1.64
6	875.02	37.8 QP	46.0	-8.2	1.50 H	348	37.79	0.02
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	87.67	32.7 QP	40.0	-7.3	1.00 V	95	51.16	-18.43
2	142.04	35.6 QP	43.5	-7.9	1.00 V	360	48.50	-12.87
3	250.00	34.4 QP	46.0	-11.6	1.00 V	347	48.02	-13.66
4	625.00	37.2 QP	46.0	-8.8	1.50 V	0	41.24	-4.08
5	833.21	38.5 QP	46.0	-7.5	1.50 V	133	38.90	-0.44
6	875.02	38.4 QP	46.0	-7.6	1.00 V	339	38.40	0.02

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	55.6 PK	74.0	-18.4	1.35 H	304	61.20	-5.60
2	2390.00	43.9 AV	54.0	-10.1	1.35 H	304	49.50	-5.60
3	*2412.00	109.2 PK			1.35 H	304	114.73	-5.53
4	*2412.00	106.5 AV			1.35 H	304	112.03	-5.53
5	4824.00	48.2 PK	74.0	-25.8	1.50 H	255	44.34	3.86
6	4824.00	37.5 AV	54.0	-16.5	1.50 H	255	33.64	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	48.1 PK	74.0	-25.9	1.13 V	44	53.70	-5.60
2	2390.00	37.7 AV	54.0	-16.3	1.13 V	44	43.30	-5.60
3	*2412.00	101.7 PK			1.13 V	44	107.23	-5.53
4	*2412.00	98.4 AV			1.13 V	44	103.93	-5.53
5	4824.00	46.7 PK	74.0	-27.3	1.92 V	147	42.84	3.86
6	4824.00	38.9 AV	54.0	-15.1	1.92 V	147	35.04	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	53.3 PK	74.0	-20.7	1.34 H	307	58.90	-5.60
2	2390.00	41.1 AV	54.0	-12.9	1.34 H	307	46.70	-5.60
3	*2437.00	110.0 PK			1.34 H	307	115.42	-5.42
4	*2437.00	107.3 AV			1.34 H	307	112.72	-5.42
5	2483.50	57.0 PK	74.0	-17.0	1.34 H	307	62.20	-5.20
6	2483.50	43.4 AV	54.0	-10.6	1.34 H	307	48.60	-5.20
7	4874.00	48.2 PK	74.0	-25.8	1.50 H	268	44.39	3.81
8	4874.00	37.7 AV	54.0	-16.3	1.50 H	268	33.89	3.81
9	7311.00	54.2 PK	74.0	-19.8	1.03 H	137	45.97	8.23
10	7311.00	42.6 AV	54.0	-11.4	1.03 H	137	34.37	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	48.0 PK	74.0	-26.0	1.11 V	52	53.60	-5.60
2	2390.00	37.2 AV	54.0	-16.8	1.11 V	52	42.80	-5.60
3	*2437.00	102.5 PK			1.11 V	52	107.92	-5.42
4	*2437.00	99.0 AV			1.11 V	52	104.42	-5.42
5	2483.50	52.1 PK	74.0	-21.9	1.11 V	52	57.30	-5.20
6	2483.50	41.6 AV	54.0	-12.4	1.11 V	52	46.80	-5.20
7	4874.00	46.9 PK	74.0	-27.1	1.94 V	154	43.09	3.81
8	4874.00	39.4 AV	54.0	-14.6	1.94 V	154	35.59	3.81
9	7311.00	55.3 PK	74.0	-18.7	1.02 V	265	47.07	8.23
10	7311.00	43.5 AV	54.0	-10.5	1.02 V	265	35.27	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	110.4 PK			1.34 H	307	115.71	-5.31
2	*2462.00	107.8 AV			1.34 H	307	113.11	-5.31
3	2483.50	59.7 PK	74.0	-14.3	1.34 H	307	64.90	-5.20
4	2483.50	49.0 AV	54.0	-5.0	1.34 H	307	54.20	-5.20
5	4924.00	47.8 PK	74.0	-26.2	1.53 H	259	44.00	3.80
6	4924.00	37.4 AV	54.0	-16.6	1.53 H	259	33.60	3.80
7	7386.00	54.4 PK	74.0	-19.6	1.00 H	129	45.85	8.55
8	7386.00	43.1 AV	54.0	-10.9	1.00 H	129	34.55	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	102.9 PK			1.10 V	38	108.21	-5.31
2	*2462.00	99.5 AV			1.10 V	38	104.81	-5.31
3	4924.00	47.0 PK	74.0	-27.0	1.94 V	163	43.20	3.80
4	4924.00	39.5 AV	54.0	-14.5	1.94 V	163	35.70	3.80
5	7386.00	54.9 PK	74.0	-19.1	1.00 V	275	46.35	8.55
6	7386.00	43.2 AV	54.0	-10.8	1.00 V	275	34.65	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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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	72.1 PK	74.0	-1.9	1.35 H	305	77.70	-5.60
2	2390.00	53.8 AV	54.0	-0.2	1.35 H	305	59.40	-5.60
3	*2412.00	111.5 PK			1.35 H	305	117.03	-5.53
4	*2412.00	102.0 AV			1.35 H	305	107.53	-5.53
5	4824.00	48.3 PK	74.0	-25.7	1.48 H	245	44.44	3.86
6	4824.00	37.8 AV	54.0	-16.2	1.48 H	245	33.94	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	48.0 PK	74.0	-26.0	1.06 V	109	53.60	-5.60
2	2390.00	38.5 AV	54.0	-15.5	1.06 V	109	44.10	-5.60
3	*2412.00	104.1 PK			1.06 V	109	109.63	-5.53
4	*2412.00	94.2 AV			1.06 V	109	99.73	-5.53
5	4824.00	47.3 PK	74.0	-26.7	1.99 V	156	43.44	3.86
6	4824.00	39.7 AV	54.0	-14.3	1.99 V	156	35.84	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	2310.00	54.6 PK	74.0	-19.4	1.32 H	307	60.33	-5.73
2	2310.00	42.5 AV	54.0	-11.5	1.32 H	307	48.23	-5.73
3	*2437.00	112.9 PK			1.32 H	307	118.32	-5.42
4	*2437.00	103.5 AV			1.32 H	307	108.92	-5.42
5	2483.50	64.2 PK	74.0	-9.8	1.32 H	307	69.40	-5.20
6	2483.50	45.4 AV	54.0	-8.6	1.32 H	307	50.60	-5.20
7	4874.00	47.7 PK	74.0	-26.3	1.51 H	272	43.89	3.81
8	4874.00	37.4 AV	54.0	-16.6	1.51 H	272	33.59	3.81
9	7311.00	54.4 PK	74.0	-19.6	1.05 H	142	46.17	8.23
10	7311.00	43.2 AV	54.0	-10.8	1.05 H	142	34.97	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	2310.00	47.8 PK	74.0	-26.2	1.05 V	107	53.53	-5.73
2	2310.00	38.1 AV	54.0	-15.9	1.05 V	107	43.83	-5.73
3	*2437.00	105.6 PK			1.05 V	107	111.02	-5.42
4	*2437.00	95.5 AV			1.05 V	107	100.92	-5.42
5	2483.50	52.0 PK	74.0	-22.0	1.05 V	107	57.20	-5.20
6	2483.50	41.2 AV	54.0	-12.8	1.05 V	107	46.40	-5.20
7	4874.00	47.4 PK	74.0	-26.6	1.99 V	175	43.59	3.81
8	4874.00	39.8 AV	54.0	-14.2	1.99 V	175	35.99	3.81
9	7311.00	55.2 PK	74.0	-18.8	1.00 V	283	46.97	8.23
10	7311.00	43.5 AV	54.0	-10.5	1.00 V	283	35.27	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	110.9 PK			1.31 H	303	116.21	-5.31
2	*2462.00	101.6 AV			1.31 H	303	106.91	-5.31
3	2483.50	70.0 PK	74.0	-4.0	1.31 H	303	75.20	-5.20
4	2483.50	53.5 AV	54.0	-0.5	1.31 H	303	58.70	-5.20
5	4924.00	48.2 PK	74.0	-25.8	1.47 H	275	44.40	3.80
6	4924.00	37.7 AV	54.0	-16.3	1.47 H	275	33.90	3.80
7	7386.00	54.8 PK	74.0	-19.2	1.07 H	150	46.25	8.55
8	7386.00	43.6 AV	54.0	-10.4	1.07 H	150	35.05	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	103.6 PK			1.10 V	92	108.91	-5.31
2	*2462.00	93.6 AV			1.10 V	92	98.91	-5.31
3	2483.50	62.4 PK	74.0	-11.6	1.10 V	92	67.60	-5.20
4	2483.50	46.1 AV	54.0	-7.9	1.10 V	92	51.30	-5.20
5	4924.00	48.0 PK	74.0	-26.0	2.01 V	170	44.20	3.80
6	4924.00	40.3 AV	54.0	-13.7	2.01 V	170	36.50	3.80
7	7386.00	55.2 PK	74.0	-18.8	1.05 V	274	46.65	8.55
8	7386.00	43.5 AV	54.0	-10.5	1.05 V	274	34.95	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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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	72.4 PK	74.0	-1.6	1.32 H	299	78.00	-5.60
2	2390.00	53.8 AV	54.0	-0.2	1.32 H	299	59.40	-5.60
3	*2412.00	111.0 PK			1.32 H	299	116.53	-5.53
4	*2412.00	100.9 AV			1.32 H	299	106.43	-5.53
5	4824.00	48.2 PK	74.0	-25.8	1.44 H	269	44.34	3.86
6	4824.00	37.7 AV	54.0	-16.3	1.44 H	269	33.84	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	48.3 PK	74.0	-25.7	1.06 V	102	53.90	-5.60
2	2390.00	38.9 AV	54.0	-15.1	1.06 V	102	44.50	-5.60
3	*2412.00	103.7 PK			1.06 V	102	109.23	-5.53
4	*2412.00	93.1 AV			1.06 V	102	98.63	-5.53
5	4824.00	48.2 PK	74.0	-25.8	2.00 V	156	44.34	3.86
6	4824.00	40.3 AV	54.0	-13.7	2.00 V	156	36.44	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	53.8 PK	74.0	-20.2	1.29 H	297	59.40	-5.60
2	2390.00	41.2 AV	54.0	-12.8	1.29 H	297	46.80	-5.60
3	*2437.00	112.2 PK			1.29 H	297	117.62	-5.42
4	*2437.00	102.4 AV			1.29 H	297	107.82	-5.42
5	2483.50	63.8 PK	74.0	-10.2	1.29 H	297	69.00	-5.20
6	2483.50	44.2 AV	54.0	-9.8	1.29 H	297	49.40	-5.20
7	4874.00	48.6 PK	74.0	-25.4	1.45 H	267	44.79	3.81
8	4874.00	37.8 AV	54.0	-16.2	1.45 H	267	33.99	3.81
9	7311.00	55.3 PK	74.0	-18.7	1.12 H	136	47.07	8.23
10	7311.00	44.0 AV	54.0	-10.0	1.12 H	136	35.77	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	48.3 PK	74.0	-25.7	1.05 V	94	53.90	-5.60
2	2390.00	38.5 AV	54.0	-15.5	1.05 V	94	44.10	-5.60
3	*2437.00	104.9 PK			1.05 V	94	110.32	-5.42
4	*2437.00	94.6 AV			1.05 V	94	100.02	-5.42
5	2483.50	52.1 PK	74.0	-21.9	1.05 V	94	57.30	-5.20
6	2483.50	41.6 AV	54.0	-12.4	1.05 V	94	46.80	-5.20
7	4874.00	47.9 PK	74.0	-26.1	2.01 V	164	44.09	3.81
8	4874.00	40.4 AV	54.0	-13.6	2.01 V	164	36.59	3.81
9	7311.00	55.4 PK	74.0	-18.6	1.06 V	262	47.17	8.23
10	7311.00	43.9 AV	54.0	-10.1	1.06 V	262	35.67	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	109.2 PK			1.28 H	300	114.51	-5.31
2	*2462.00	99.9 AV			1.28 H	300	105.21	-5.31
3	2483.50	72.8 PK	74.0	-1.2	1.28 H	300	78.00	-5.20
4	2483.50	53.6 AV	54.0	-0.4	1.28 H	300	58.80	-5.20
5	4924.00	48.1 PK	74.0	-25.9	1.50 H	264	44.30	3.80
6	4924.00	37.4 AV	54.0	-16.6	1.50 H	264	33.60	3.80
7	7386.00	55.2 PK	74.0	-18.8	1.17 H	135	46.65	8.55
8	7386.00	43.7 AV	54.0	-10.3	1.17 H	135	35.15	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	101.9 PK			1.10 V	86	107.21	-5.31
2	*2462.00	92.1 AV			1.10 V	86	97.41	-5.31
3	2483.50	63.1 PK	74.0	-10.9	1.10 V	86	68.30	-5.20
4	2483.50	46.5 AV	54.0	-7.5	1.10 V	86	51.70	-5.20
5	4924.00	47.9 PK	74.0	-26.1	2.00 V	153	44.10	3.80
6	4924.00	40.7 AV	54.0	-13.3	2.00 V	153	36.90	3.80
7	7386.00	55.6 PK	74.0	-18.4	1.07 V	250	47.05	8.55
8	7386.00	44.1 AV	54.0	-9.9	1.07 V	250	35.55	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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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	2389.00	70.4 PK	74.0	-3.6	1.33 H	299	76.01	-5.61
2	2389.00	53.8 AV	54.0	-0.2	1.33 H	299	59.41	-5.61
3	*2422.00	104.4 PK			1.33 H	299	109.89	-5.49
4	*2422.00	94.9 AV			1.33 H	299	100.39	-5.49
5	4844.00	47.6 PK	74.0	-26.4	1.55 H	253	43.76	3.84
6	4844.00	37.1 AV	54.0	-16.9	1.55 H	253	33.26	3.84
7	7266.00	54.9 PK	74.0	-19.1	1.12 H	131	46.84	8.06
8	7266.00	43.6 AV	54.0	-10.4	1.12 H	131	35.54	8.06

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	2389.00	48.4 PK	74.0	-25.6	1.07 V	73	54.01	-5.61
2	2389.00	38.8 AV	54.0	-15.2	1.07 V	73	44.41	-5.61
3	*2422.00	97.1 PK			1.07 V	73	102.59	-5.49
4	*2422.00	87.1 AV			1.07 V	73	92.59	-5.49
5	4844.00	48.0 PK	74.0	-26.0	2.03 V	158	44.16	3.84
6	4844.00	41.1 AV	54.0	-12.9	2.03 V	158	37.26	3.84
7	7266.00	55.0 PK	74.0	-19.0	1.03 V	255	46.94	8.06
8	7266.00	43.7 AV	54.0	-10.3	1.03 V	255	35.64	8.06

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	71.8 PK	74.0	-2.2	1.30 H	302	77.40	-5.60
2	2390.00	53.2 AV	54.0	-0.8	1.30 H	302	58.80	-5.60
3	*2437.00	108.3 PK			1.30 H	302	113.72	-5.42
4	*2437.00	98.6 AV			1.30 H	302	104.02	-5.42
5	2483.50	71.8 PK	74.0	-2.2	1.30 H	302	77.00	-5.20
6	2483.50	53.9 AV	54.0	-0.1	1.30 H	302	59.10	-5.20
7	4874.00	47.2 PK	74.0	-26.8	1.50 H	268	43.39	3.81
8	4874.00	36.8 AV	54.0	-17.2	1.50 H	268	32.99	3.81
9	7311.00	55.5 PK	74.0	-18.5	1.16 H	130	47.27	8.23
10	7311.00	43.9 AV	54.0	-10.1	1.16 H	130	35.67	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	48.2 PK	74.0	-25.8	1.12 V	69	53.80	-5.60
2	2390.00	38.5 AV	54.0	-15.5	1.12 V	69	44.10	-5.60
3	*2437.00	101.0 PK			1.12 V	69	106.42	-5.42
4	*2437.00	90.8 AV			1.12 V	69	96.22	-5.42
5	2483.50	63.4 PK	74.0	-10.6	1.12 V	69	68.60	-5.20
6	2483.50	46.9 AV	54.0	-7.1	1.12 V	69	52.10	-5.20
7	4874.00	47.3 PK	74.0	-26.7	2.00 V	167	43.49	3.81
8	4874.00	40.6 AV	54.0	-13.4	2.00 V	167	36.79	3.81
9	7311.00	55.7 PK	74.0	-18.3	1.03 V	263	47.47	8.23
10	7311.00	44.2 AV	54.0	-9.8	1.03 V	263	35.97	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 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	104.7 PK			1.31 H	301	110.06	-5.36
2	*2452.00	95.3 AV			1.31 H	301	100.66	-5.36
3	2483.50	70.3 PK	74.0	-3.7	1.31 H	301	75.50	-5.20
4	2483.50	53.6 AV	54.0	-0.4	1.31 H	301	58.80	-5.20
5	4904.00	47.1 PK	74.0	-26.9	1.54 H	265	43.31	3.79
6	4904.00	36.6 AV	54.0	-17.4	1.54 H	265	32.81	3.79
7	7356.00	55.3 PK	74.0	-18.7	1.15 H	140	46.87	8.43
8	7356.00	43.9 AV	54.0	-10.1	1.15 H	140	35.47	8.43

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	97.4 PK			1.12 V	73	102.76	-5.36
2	*2452.00	87.5 AV			1.12 V	73	92.86	-5.36
3	2483.50	62.9 PK	74.0	-11.1	1.12 V	73	68.10	-5.20
4	2483.50	46.6 AV	54.0	-7.4	1.12 V	73	51.80	-5.20
5	4904.00	47.4 PK	74.0	-26.6	2.05 V	152	43.61	3.79
6	4904.00	40.5 AV	54.0	-13.5	2.05 V	152	36.71	3.79
7	7356.00	55.5 PK	74.0	-18.5	1.09 V	250	47.07	8.43
8	7356.00	43.8 AV	54.0	-10.2	1.09 V	250	35.37	8.43

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. 23, 2014

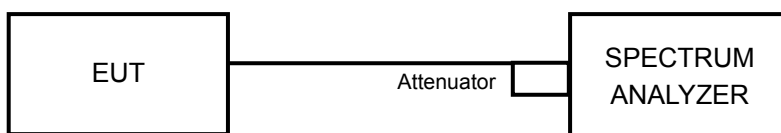
4.3.3 TEST PROCEDURE

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	8.12	0.5	PASS
6	2437	8.13	0.5	PASS
11	2462	8.13	0.5	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	15.15	15.12	0.5	PASS
6	2437	15.14	15.15	0.5	PASS
11	2462	15.15	15.15	0.5	PASS

802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	15.13	15.15	0.5	PASS
6	2437	15.13	15.73	0.5	PASS
11	2462	15.07	15.16	0.5	PASS

802.11n (HT40)

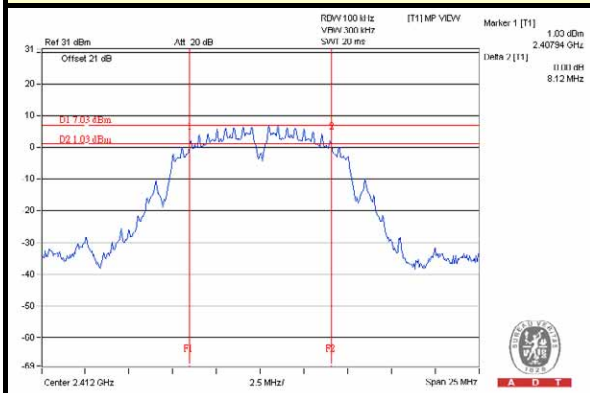
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
3	2422	35.28	35.25	0.5	PASS
6	2437	35.22	35.87	0.5	PASS
9	2452	35.23	35.34	0.5	PASS



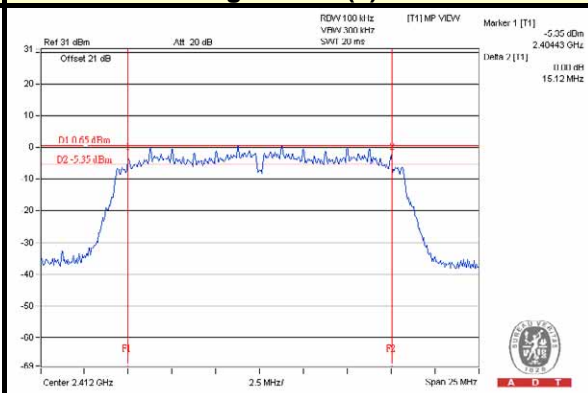
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SPECTRUM PLOT OF WORST VALUE

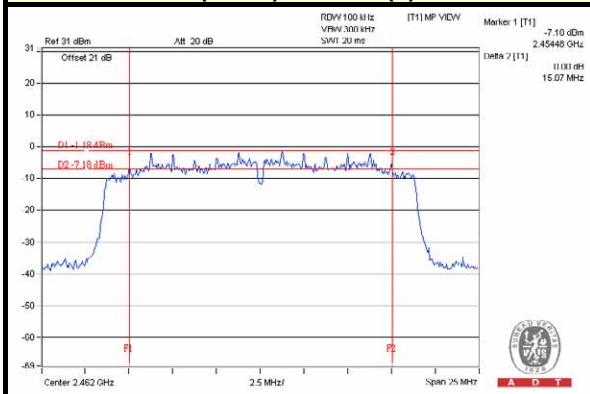
802.11b : CH1



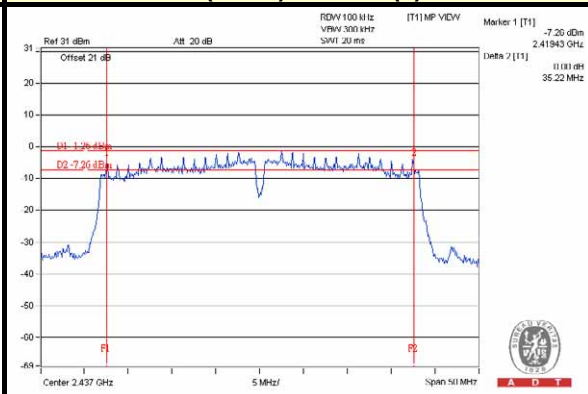
802.11g / Chain (1) : CH1



802.11n (HT20) / Chain (0) : CH11



802.11n (HT40) / Chain (0) : CH6





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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 \leq 4;

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

Array Gain = $5 \log(\text{NANT}/\text{NSS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with NANT \geq 5.

For power measurements on all other devices: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ 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. 23, 2014

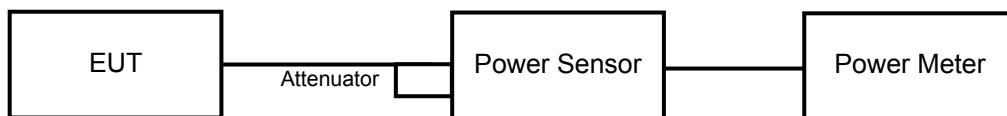
4.4.3 TEST PROCEDURES

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



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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	82.035	19.14	30	PASS
6	2437	83.368	19.21	30	PASS
11	2462	77.446	18.89	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	22.16	20.32	272.084	24.35	30	PASS
6	2437	22.96	23.30	411.493	26.14	30	PASS
11	2462	22.22	20.75	285.575	24.56	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	22.14	19.84	260.065	24.15	30	PASS
6	2437	22.91	22.84	387.743	25.89	30	PASS
11	2462	18.72	18.92	152.456	21.83	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	17.70	18.06	122.857	20.89	30	PASS
6	2437	20.77	21.40	257.437	24.11	30	PASS
9	2452	18.24	18.88	143.949	21.58	30	PASS



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FOR AVERAGE POWER

802.11b

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	35.318	15.48	30	PASS
6	2437	34.674	15.40	30	PASS
11	2462	33.113	15.20	30	PASS

802.11g

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	12.66	11.40	32.254	15.09	30	PASS
6	2437	13.46	13.39	44.009	16.44	30	PASS
11	2462	11.08	10.44	23.889	13.78	30	PASS

802.11n (HT20)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	11.67	10.31	25.429	14.05	30	PASS
6	2437	13.14	12.83	39.793	16.00	30	PASS
11	2462	9.27	9.26	16.886	12.28	30	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
3	2422	7.72	8.39	12.818	11.08	30	PASS
6	2437	11.55	11.67	28.978	14.62	30	PASS
9	2452	8.19	8.34	13.415	11.28	30	PASS

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

4.5.2 TEST INSTRUMENTS

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

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Tested date : Sep. 23, 2014

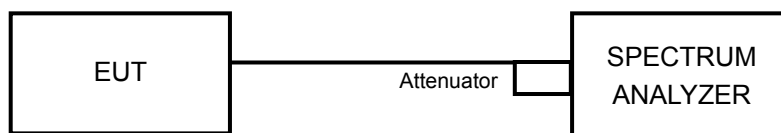
4.5.3 TEST PROCEDURE

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

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



4.5.7 TEST RESULTS

802.11b

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	LIMIT (dBm)	PASS /FAIL
1	2412	-7.19	8	PASS
6	2437	-8.57	8	PASS
11	2462	-8.38	8	PASS

802.11g

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-13.09	3.01	-10.08	8	PASS
	6	2437	-11.58	3.01	-8.57	8	PASS
	11	2462	-13.95	3.01	-10.94	8	PASS
1	1	2412	-12.92	3.01	-9.91	8	PASS
	6	2437	-11.92	3.01	-8.91	8	PASS
	11	2462	-15.00	3.01	-11.99	8	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$ = 5.88dBi < 6dBi, so the power density limit shall not be reduced.

802.11n (HT20)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-13.67	3.01	-10.66	8	PASS
	6	2437	-11.90	3.01	-8.89	8	PASS
	11	2462	-16.66	3.01	-13.65	8	PASS
1	1	2412	-15.85	3.01	-12.84	8	PASS
	6	2437	-13.30	3.01	-10.29	8	PASS
	11	2462	-16.53	3.01	-13.52	8	PASS

NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$ = 5.88dBi < 6dBi, so the power density limit shall not be reduced.



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802.11n (HT40)

TX CHAIN	CHANNEL	FREQUENCY (MHz)	PSD (dBm)	10 log (N=2) dB	Total PSD (dBm)	Limit (dBm)	PASS /FAIL
0	3	2422	-20.97	3.01	-17.96	8	PASS
	6	2437	-15.64	3.01	-12.63	8	PASS
	9	2452	-19.77	3.01	-16.76	8	PASS
1	3	2422	-20.10	3.01	-17.09	8	PASS
	6	2437	-16.95	3.01	-13.94	8	PASS
	9	2452	-19.52	3.01	-16.51	8	PASS

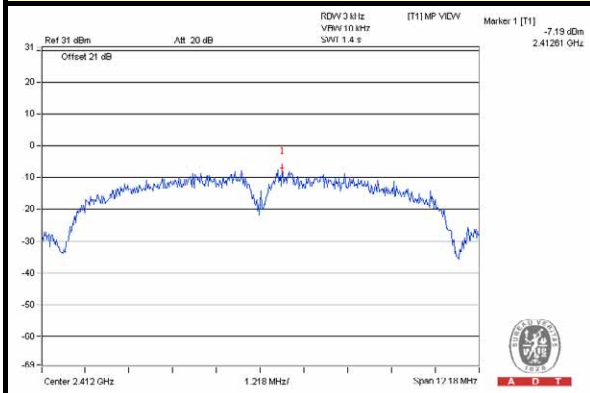
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / 2]$ = 5.88dBi < 6dBi, so the power density limit shall not be reduced.



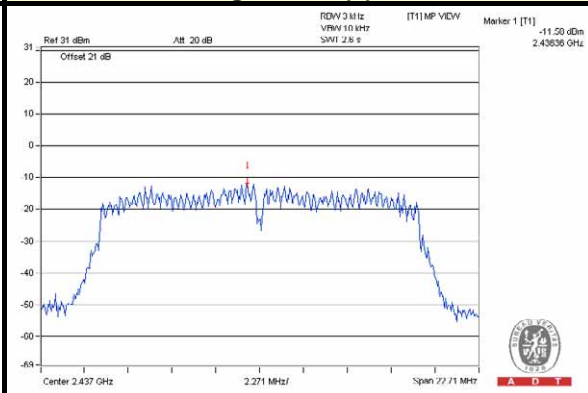
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SPECTRUM PLOT OF WORST VALUE

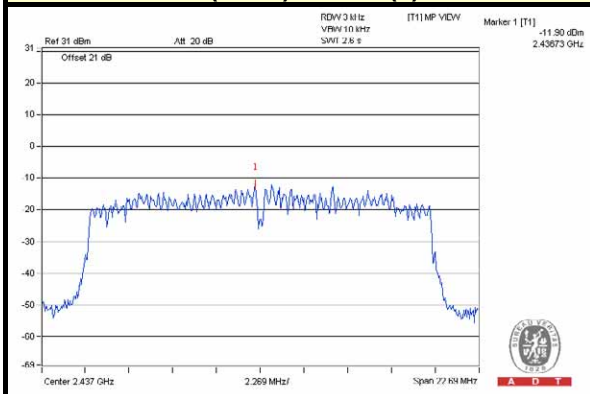
802.11b : CH1



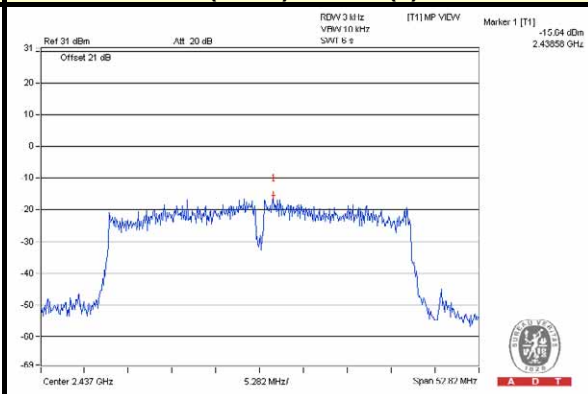
802.11g / Chain(0) : CH6



802.11n (HT20) / Chain(0) : CH6



802.11n (HT40) / Chain(0) : CH6





4.6 CONDUCTED OUT-BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF CONDUCTED OUT-BAND EMISSION MEASUREMENT

Below 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 : Sep. 23, 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.

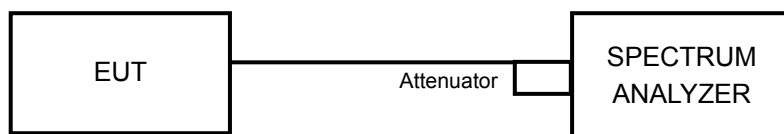
Measurement Procedure –Unwanted Emission Level

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

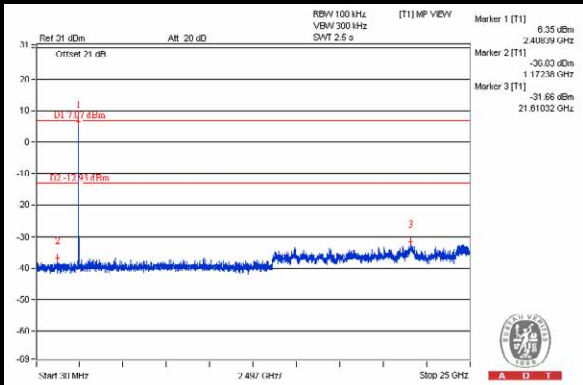
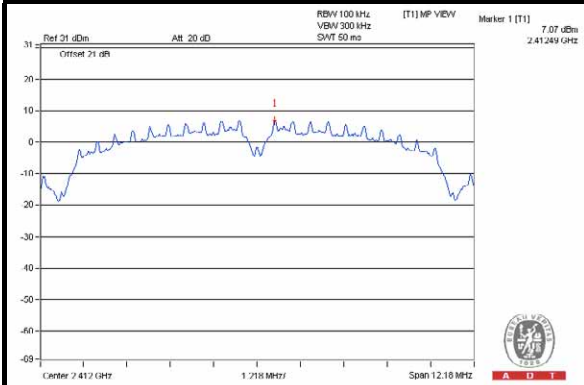
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.



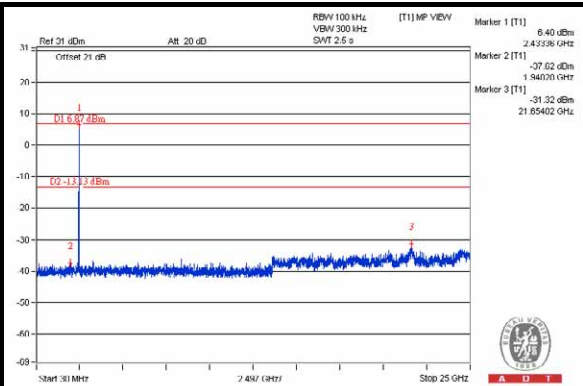
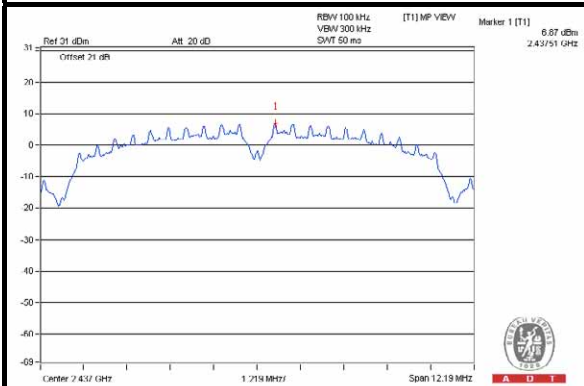
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802.11b

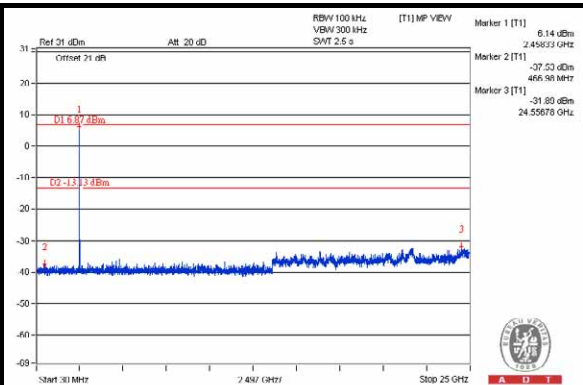
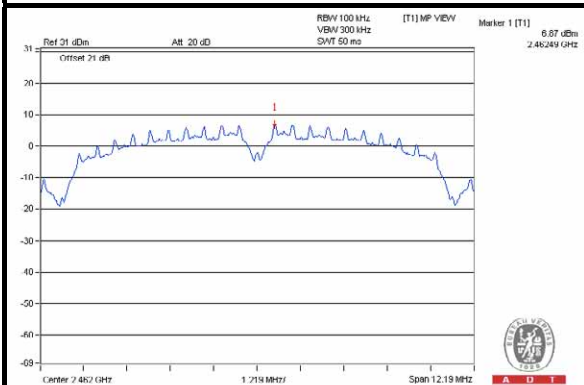
CH 1



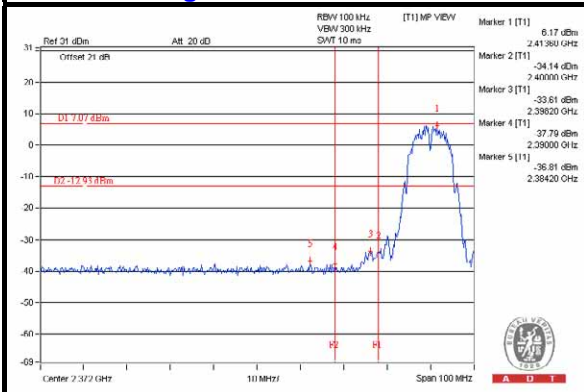
CH 6



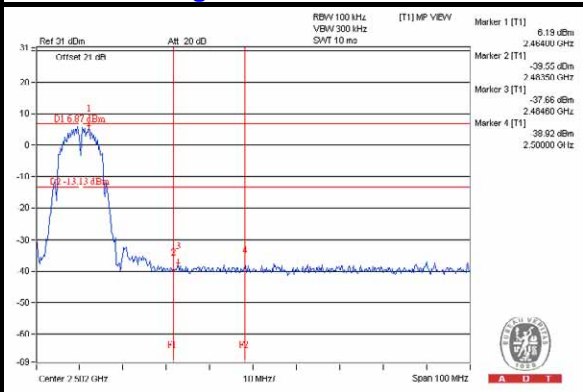
CH 11



CH 1 Band edge



CH 11 Band edge



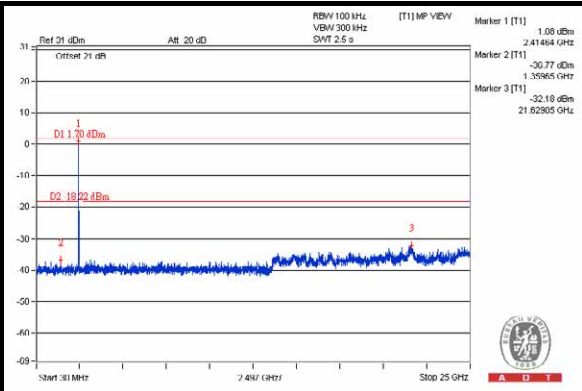
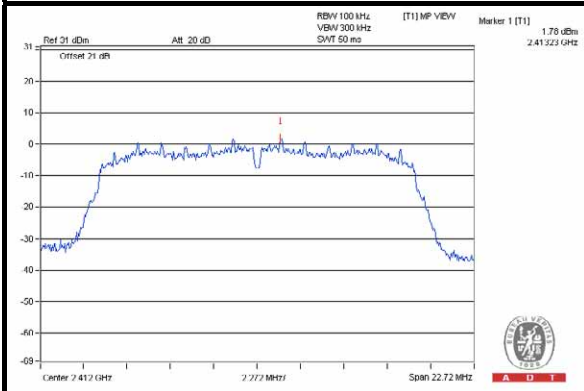


A D T

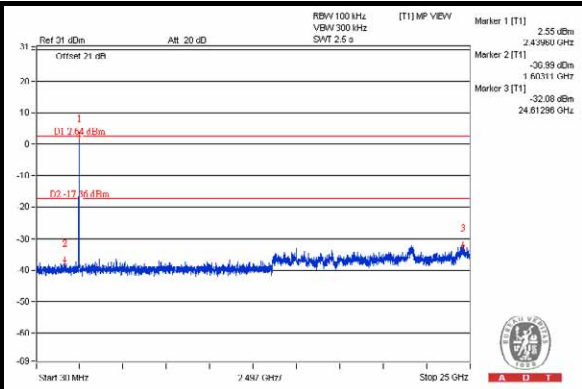
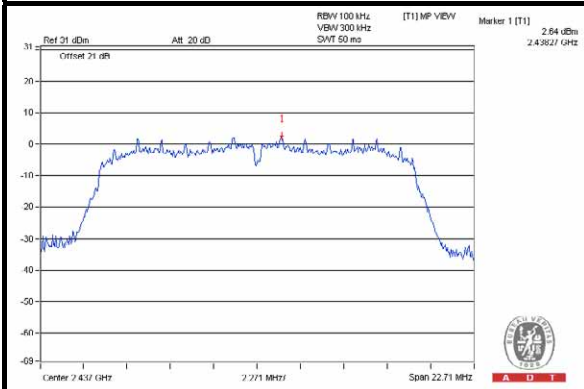
802.11g

Chain (0)

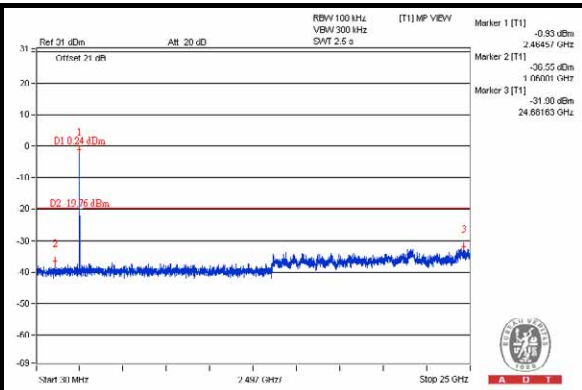
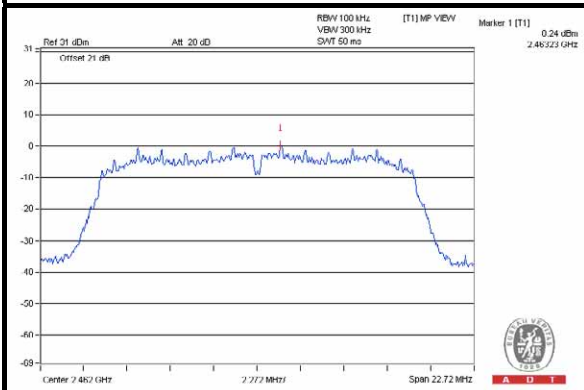
CH 1



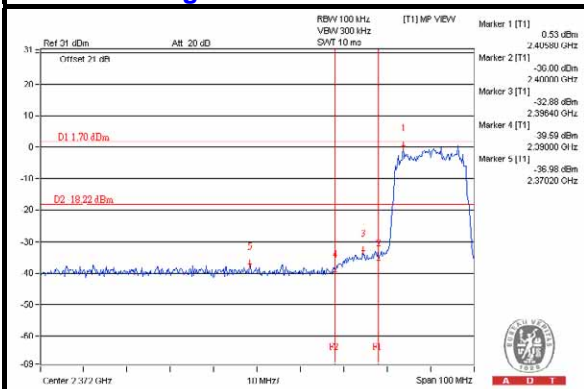
CH 6



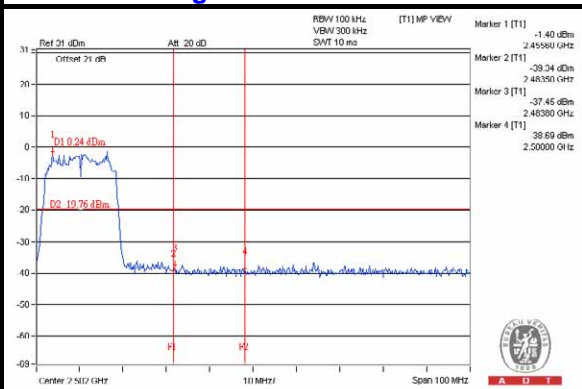
CH 11



CH 1 Band edge



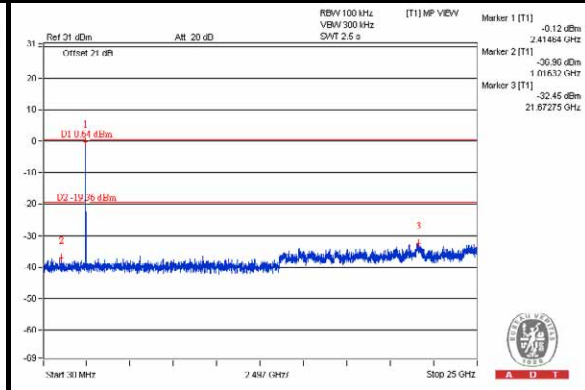
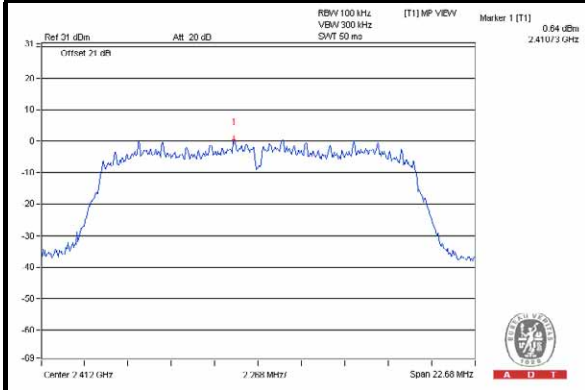
CH 11 Band edge



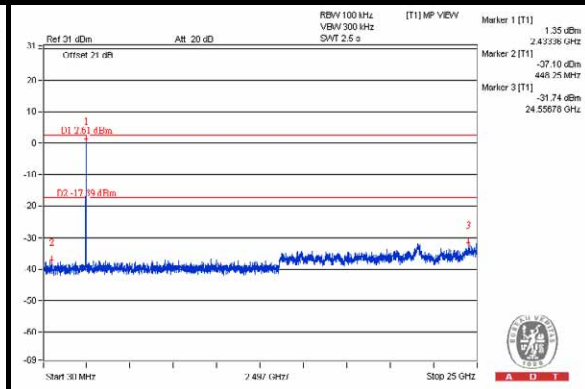
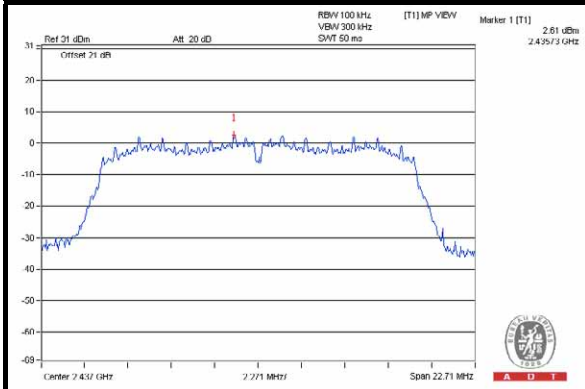


A D T

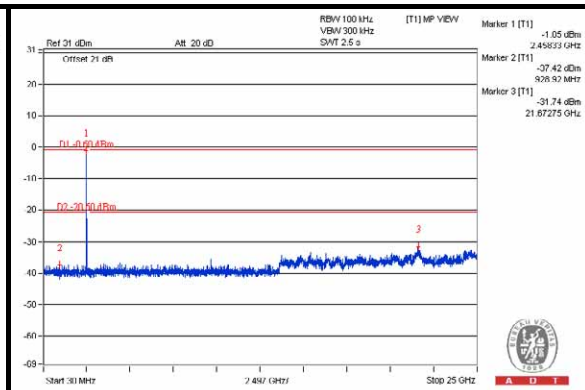
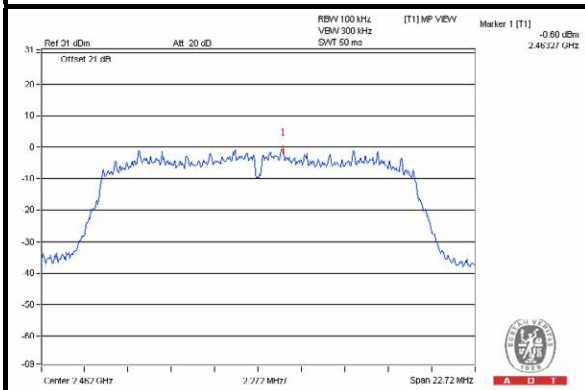
Chain (1) CH 1



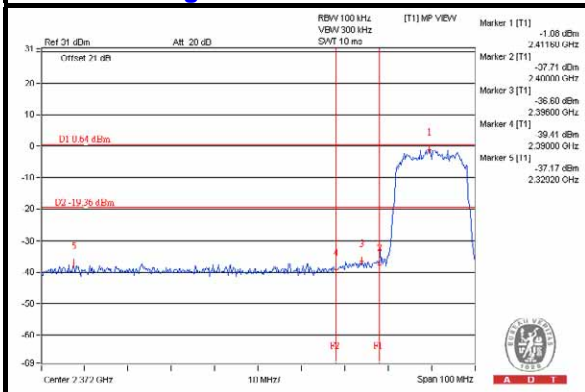
CH 6



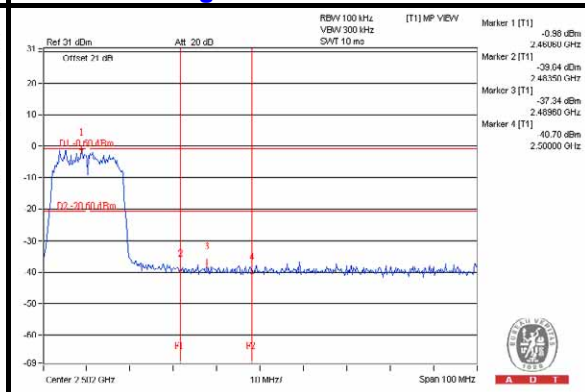
CH 11



CH 1 Band edge



CH 11 Band edge



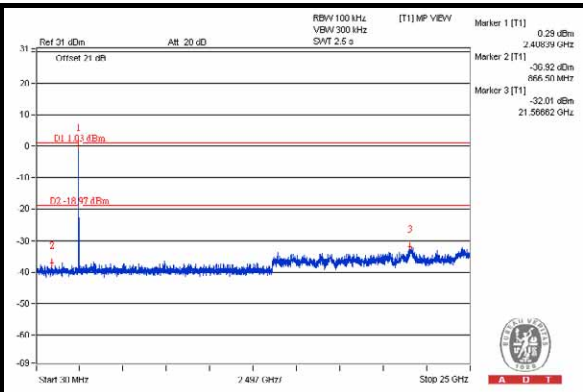
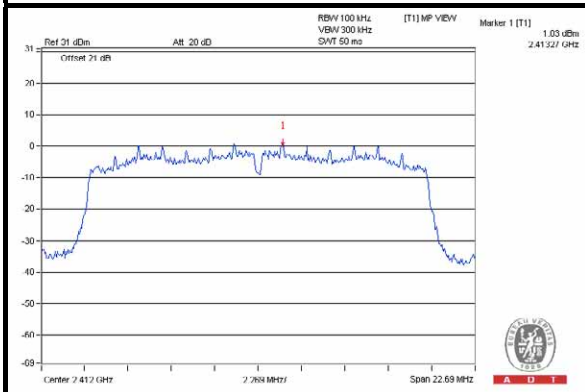


A D T

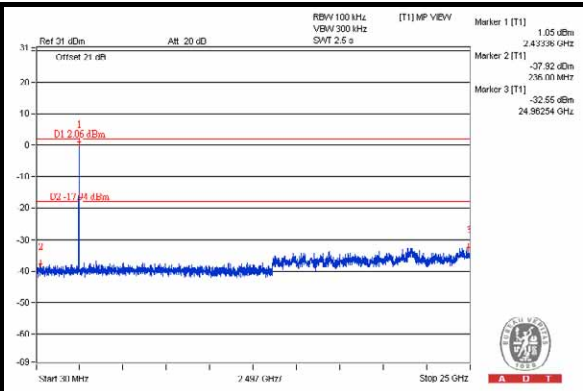
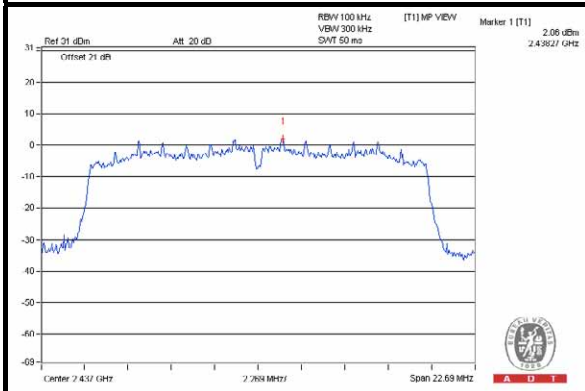
802.11n (HT20)

Chain (0)

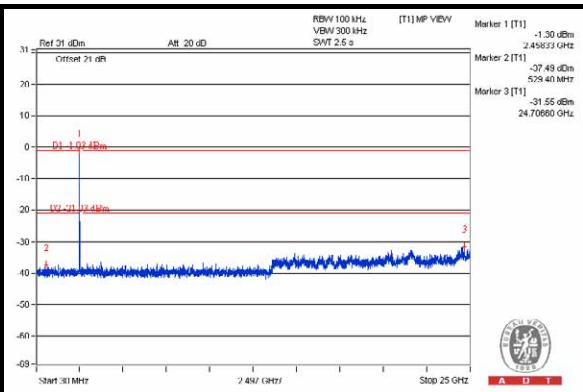
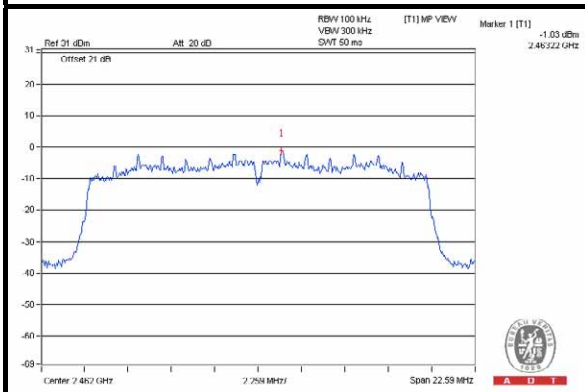
CH 1



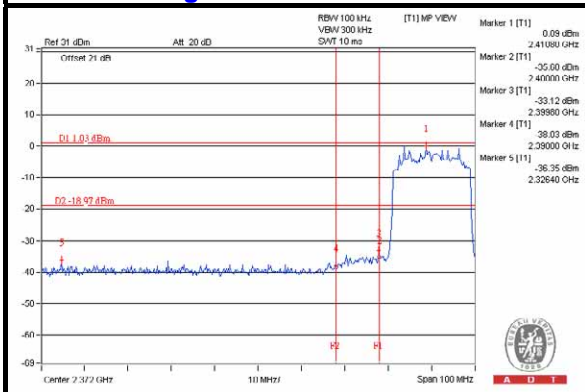
CH 6



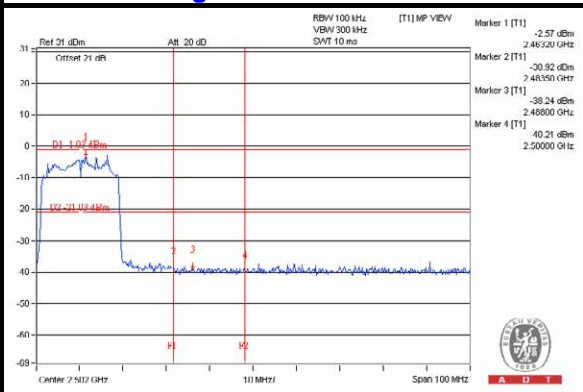
CH 11



CH 1 Band edge



CH 11 Band edge

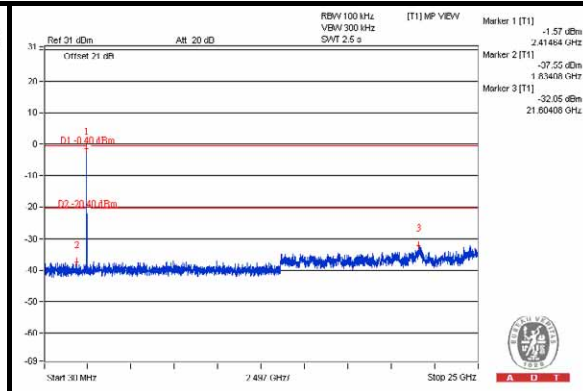
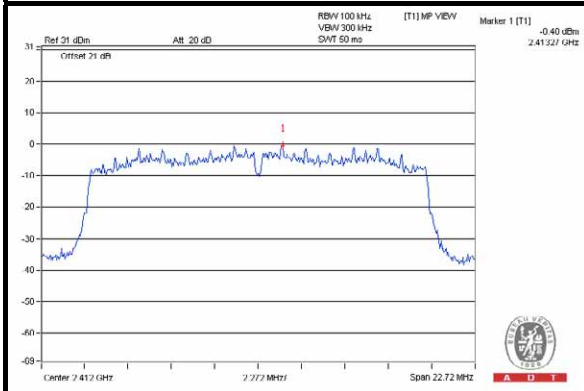




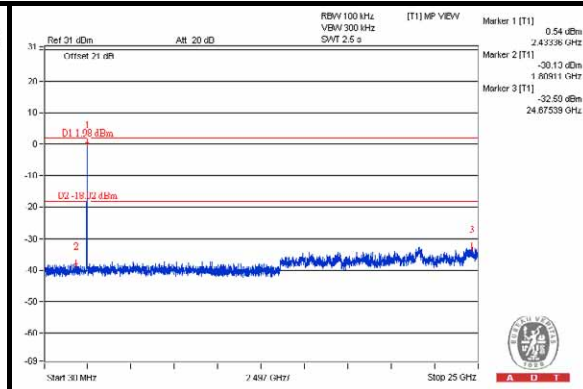
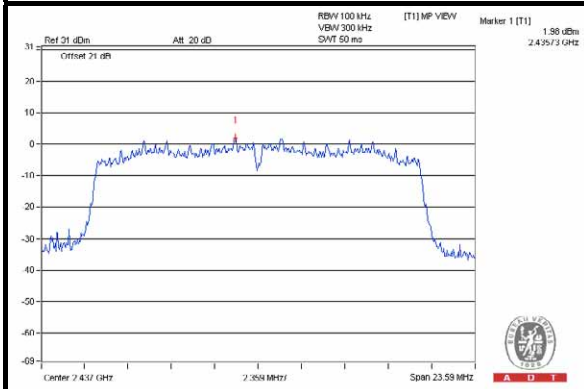
A D T

Chain (1)

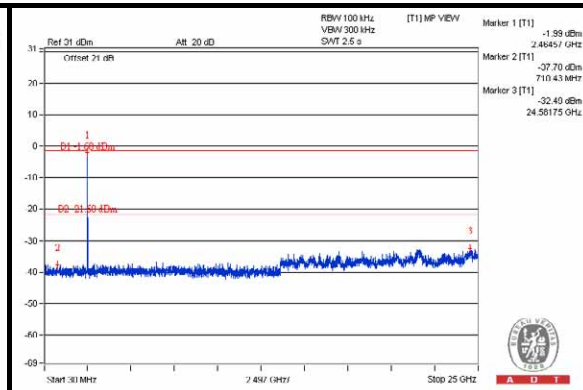
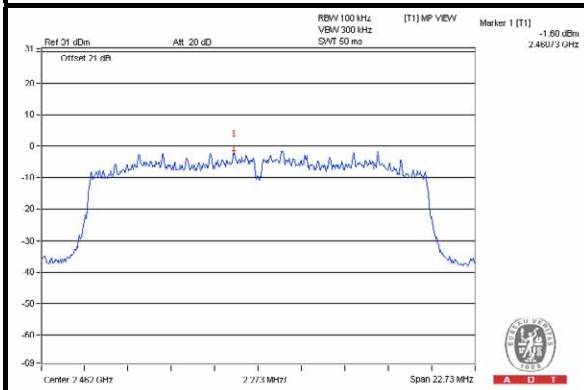
CH 1



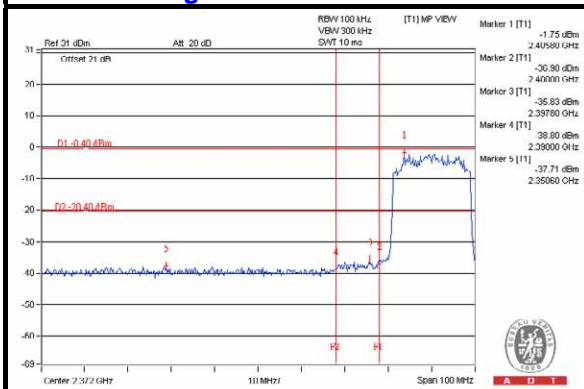
CH 6



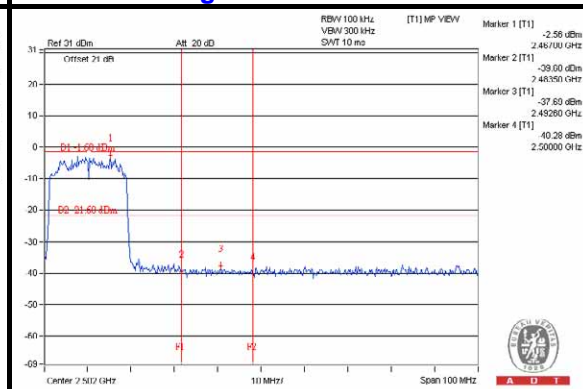
CH 11



CH 1 Band edge



CH 11 Band edge



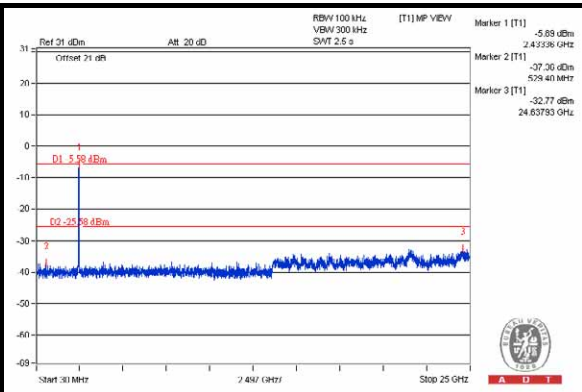
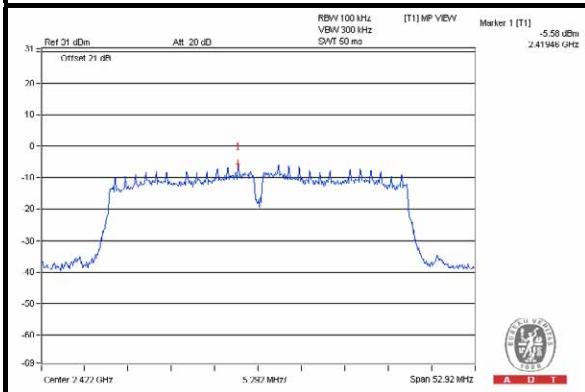


A D T

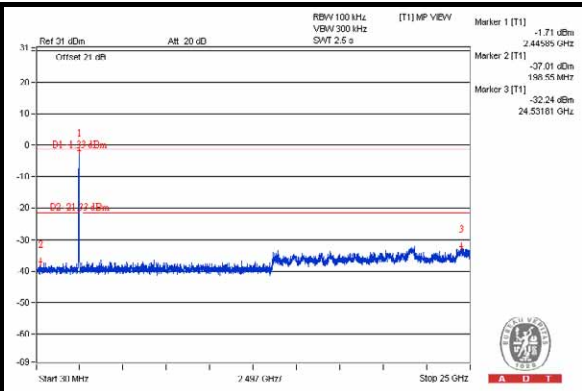
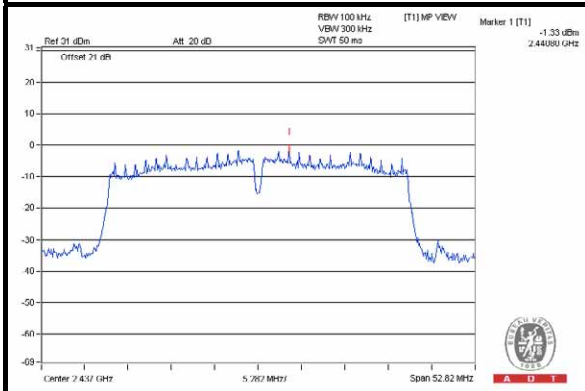
802.11n (HT40)

Chain (0)

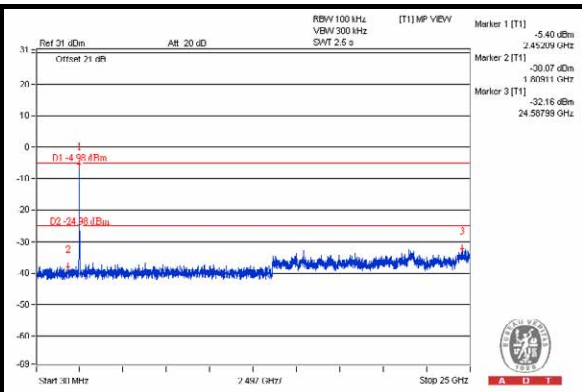
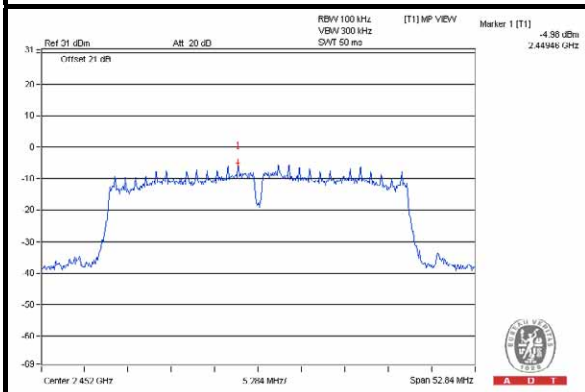
CH 3



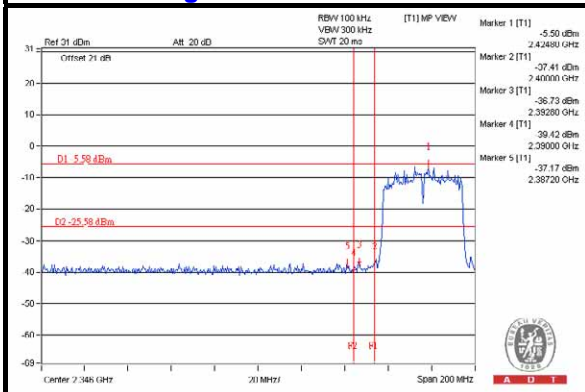
CH 6



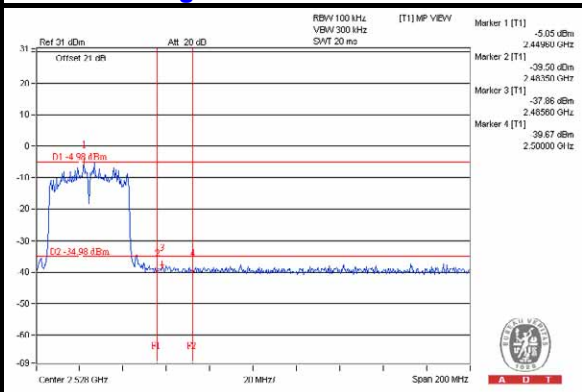
CH 9



CH 3 Band edge



CH 9 Band edge

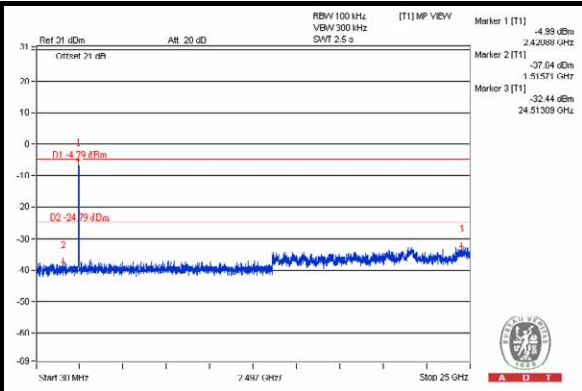
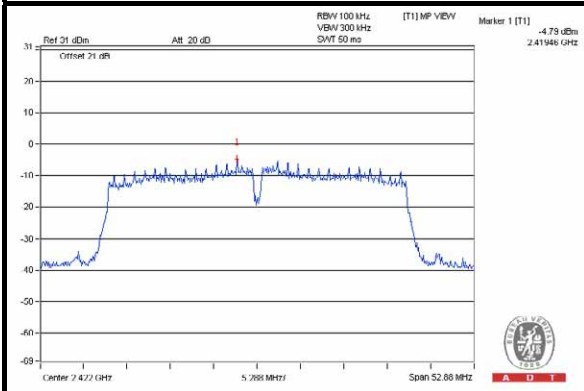




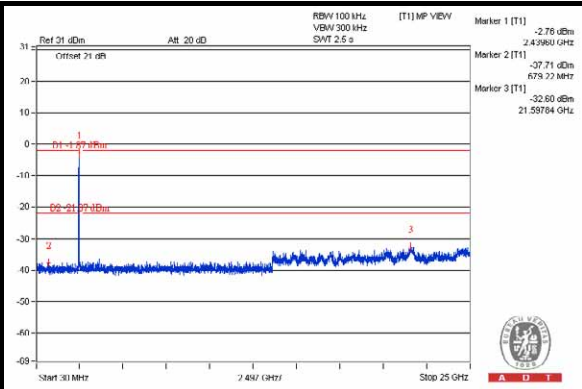
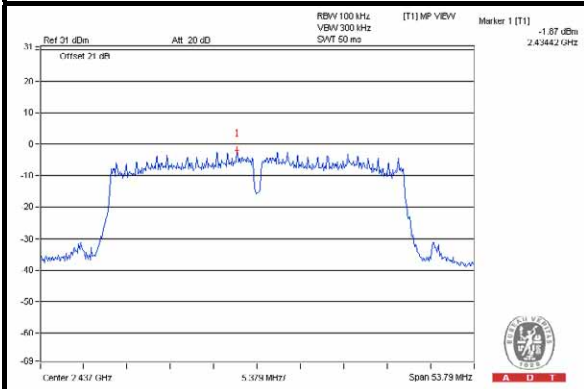
A D T

Chain (1)

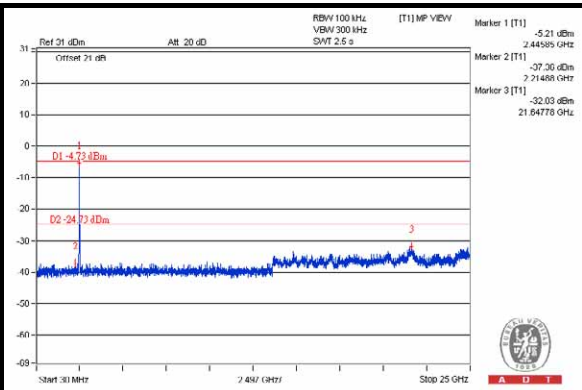
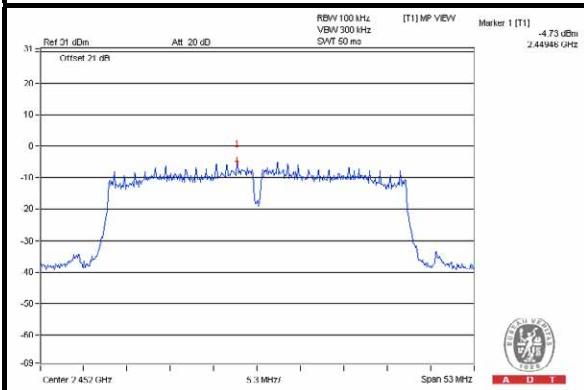
CH 3



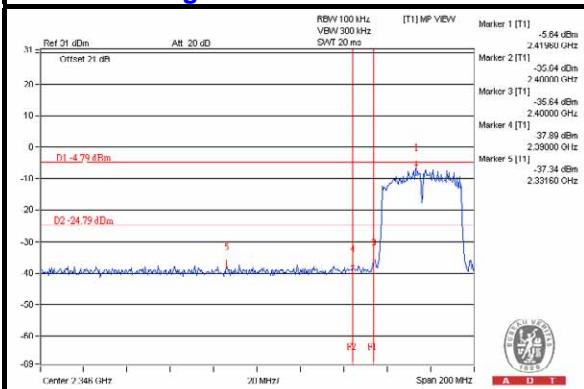
CH 6



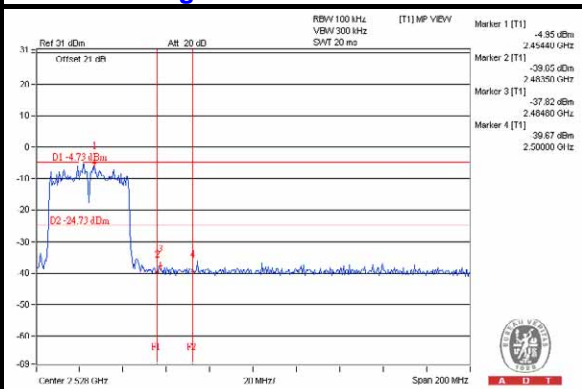
CH 9



CH 3 Band edge



CH 9 Band edge





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5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



A D T

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:

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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.

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