FCC TEST REPORT

(CO-LOCATED)

REPORT NO.:	RF130104C26-2
MODEL NO.:	XR500
FCC ID:	SK6-XR520
IC:	5428A-XR520
RECEIVED:	Jan. 04, 2013
TESTED:	Jan. 28, 2013
ISSUED:	Jan. 30, 2013

APPLICANT:	Xirrus, INC
ADDRESS:	2101 Corporate Center Drive Thousand Oaks, California 91320

ISSUED BY:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
LAB ADDRESS:	No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
TEST LOCATION:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF130104C26-2	Original release	Jan. 30, 2013

1. CERTIFICATION

PRODUCT:	Xirrus Wireless Array
MODEL:	XR500
BRAND:	Xirrus
APPLICANT:	Xirrus, INC
TESTED:	Jan. 28, 2013
TEST SAMPLE:	ENGINEERING SAMPLE
STANDARDS:	**FCC Part 15, Subpart C (Section 15.247)**
	FCC Part 15, Subpart E (Section 15.407)
	Canada RSS-210 Issue 8 (2010-12)
	Canada RSS-Gen Issue 3 (2010-12)
	ANSI C63.10-2009

The above equipment (Model: XR500) 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 : Jemma Yang / Specialist , **DATE :** Jan. 30, 2013

APPROVED BY : Ken Liu / Manager , **DATE :** Jan. 30, 2013

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) FCC PART 15, SUBPART E (SECTION 15.407) RSS-210; RSS-Gen			
Standard Section		Test Type and Limit	Result	Remark
FCC Part 15	CANADA STANDARD			
15.207 15.407(b)(5)	RSS-Gen 7.2.4	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -3.34dB at 17.69531MHz.
15.247(d) 15.407(b/1/2/3) (b)(5)	RSS-Gen A8.5, A9.2	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.2dB at 5150.00MHz.

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:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	Xirrus Wireless Array
MODEL NO.	XR500
POWER SUPPLY	55Vdc (from POE)
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
TRANSFER RATE	802.11b:11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
OPERATING FREQUENCY	**2.4GHz:** 2412 ~ 2462MHz **5.0GHz:** 5180 ~ 5240MHz, 5745 ~ 5825MHz
NUMBER OF CHANNEL	**2.4GHz:** 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) **5.0GHz:** **5180 ~ 5240MHz:** 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) **5745 ~ 5825MHz:** 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
OUTPUT POWER	729.260mW for 2412 ~ 2462MHz 43.975mW for 5180 ~ 5240MHz 501.946mW for 5745 ~ 5825MHz
ANTENNA TYPE	PCB antenna with 4dBi gain
ANTENNA CONNECTOR	I - PEX
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	NA

NOTE:

1. Simultaneous transmission test result is required and submitted since 2.4 and 5GHz can transmit simultaneously and share a common antenna.

2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

MODULATION MODE	TX FUNCTION
802.11b	2TX
802.11g	2TX
802.11a	2TX
802.11n (20MHz)	2TX
802.11n (40MHz)	2TX

3. The EUT has two modules and transmitters would not simultaneously operate in each 5G band.

NO	TYPE
A	2.4G+5G combo
B	5G only

4. The EUT consumes power from the following POE.

POE	
BRAND:	PowerDsine
MODEL:	PD-9001G
INPUT:	100-250Vac, 50/60Hz, 0.8A
OUTPUT:	55Vdc, 0.6A

* POE was supplied for optional accessory.

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 DESCRIPTION OF TEST MODES

FOR 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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 (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

Operated in 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190MHz	46	5230MHz

Operated in 5745 ~ 5825MHz

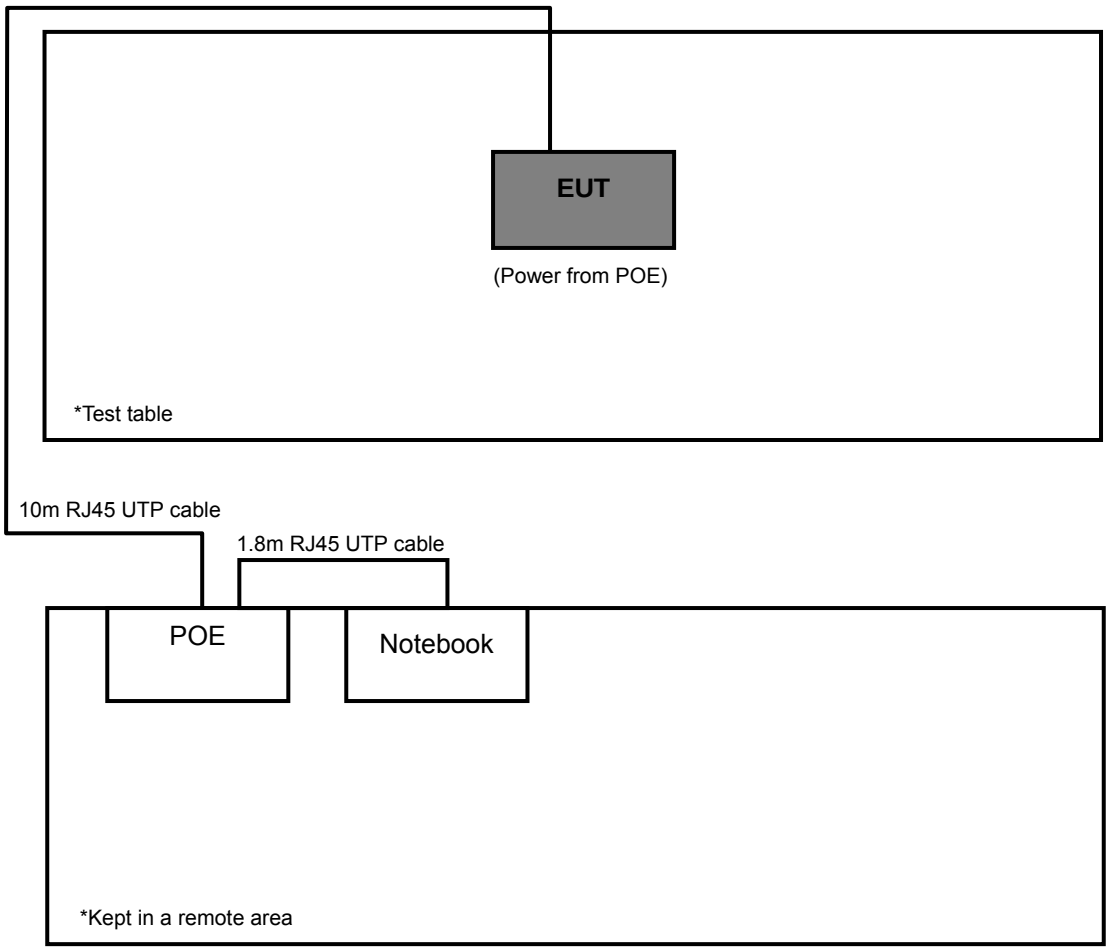
5 channels are provided for 802.11a, 802.11n (20MHz):

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

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz

3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE≥1G	RE<1G	CE	
-	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
CE: Conducted Emission Measurement

NOTE: Test modes as below are composed of the max output power channel of each band.

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ 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	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	2412 ~ 2462	1 to 11	1 + 38	OFDM	BPSK	1.0
802.11n (40MHz)	5180 ~ 5240	38 to 46				13.5
802.11b	2412 ~ 2462	1 to 11	1 + 157	OFDM	BPSK	1.0
802.11n (20MHz)	5745 ~ 5825	149 to 165				6.5

RADIATED EMISSION TEST (BELOW 1GHz):

☒ 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	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	2412 ~ 2462	1 to 11	1 + 38	OFDM	BPSK	1.0
802.11n (40MHz)	5180 ~ 5240	38 to 46				13.5
802.11b	2412 ~ 2462	1 to 11	1 + 157	OFDM	BPSK	1.0
802.11n (20MHz)	5745 ~ 5825	149 to 165				6.5

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	FREQ. RANGE (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	2412 ~ 2462	1 to 11	1 + 38	OFDM	BPSK	1.0
802.11n (40MHz)	5180 ~ 5240	38 to 46				13.5
802.11b	2412 ~ 2462	1 to 11	1 + 157	OFDM	BPSK	1.0
802.11n (20MHz)	5745 ~ 5825	149 to 165				6.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 69%RH	55Vdc	Chris Lin
RE<1G	23deg. C, 69%RH	55Vdc	Chris Lin
PLC	22deg. C, 65%RH	55Vdc	Sun Lin

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 (Section 15.247)
FCC Part 15, Subpart E (Section 15.407)
Canada RSS-210 Issue 8 (2010-12)
Canada RSS-Gen Issue 3 (2010-12)
ANSI C63.4-2009
ANSI C63.10-2009

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	POE	POWERDSINE	PD-9001G	NA	NA
2	Notebook	DELL	E5420	33MKMQ1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m non-shielded RJ45 Cable, without core
2	1.8m non-shielded RJ45 Cable, without core.

NOTE:

1. All power cords of the above support units are non shielded (1.8m).
2. Item 2 acted as communication partner to transfer data.

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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. As shown in 15.35(b), 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.

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

FREQUENCIES (MHz)	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m) *NOTE 3
	PK	PK
5150 ~ 5250	-27	68.3

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 06, 2012	Aug. 05, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Feb. 03, 2012	Feb. 02, 2013
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 06, 2012	Apr. 05, 2013
HORN Antenna SCHWARZBECK	9120D	209	Sep. 03, 2012	Sep. 02, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 11, 2012	Jul. 10, 2013
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8449B	3008A01964	Oct. 25, 2012	Oct. 24, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/4	Aug. 28, 2012	Aug. 27, 2013
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table ADT.	TT100	TT93021703	NA	NA
Turn Table Controller ADT.	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 25, 2012	Oct. 24, 2013
High Speed Peak Power Meter	ML2495A	0842014	Apr. 28, 2012	Apr. 27, 2013
Power Sensor	MA2411B	0738404	Apr. 28, 2012	Apr. 27, 2013

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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 3.
4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 988962.
6. The IC Site Registration No. is 7450F-3.

4.1.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. 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 antenna is a broadband antenna, and its height 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

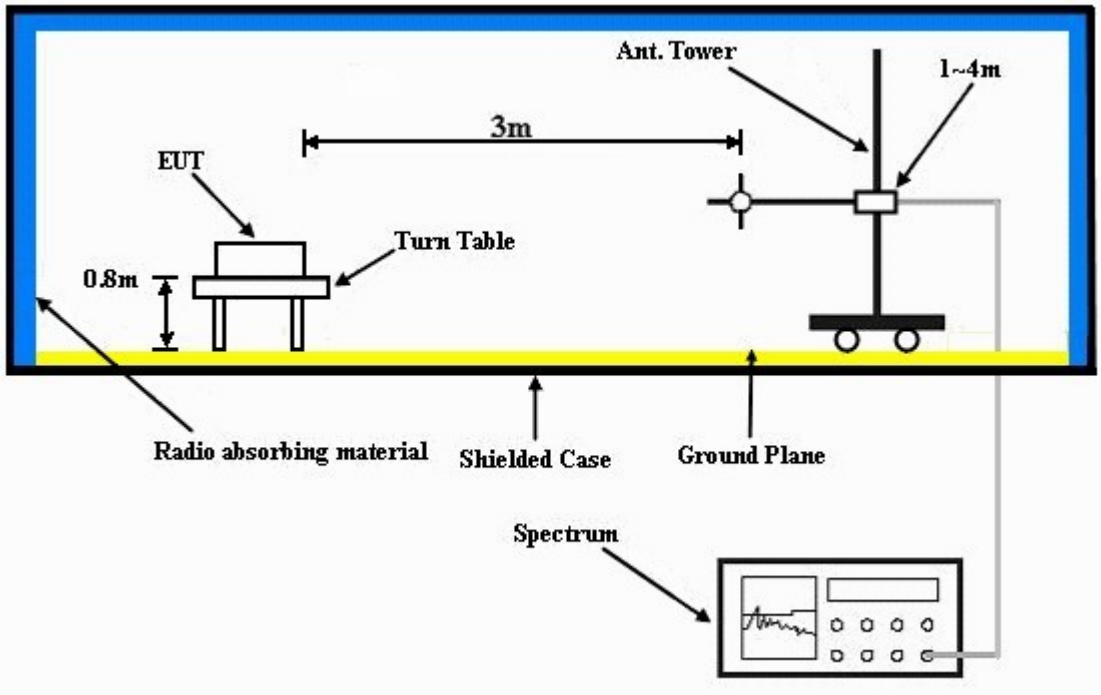
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

No deviation

4.1.6 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.7 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. Prepared notebook to act as communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".

4.1.8 TEST RESULTS

802.11b + 802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 1 + CH 38	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	55Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.8 PK	74.0	-19.2	1.33 H	152	22.70	32.10
2	2390.00	46.1 AV	54.0	-7.9	1.33 H	152	14.00	32.10
3	*2412.00	105.3 PK			1.05 H	210	73.10	32.20
4	*2412.00	101.9 AV			1.05 H	210	69.70	32.20
5	4824.00	45.8 PK	74.0	-28.2	1.16 H	74	7.00	38.80
6	4824.00	38.6 AV	54.0	-15.4	1.16 H	74	-0.20	38.80
7	5150.00	55.8 PK	74.0	-18.2	1.20 H	70	16.20	39.60
8	5150.00	43.9 AV	54.0	-10.1	1.20 H	70	4.30	39.60
9	*5190.00	101.0 PK			1.10 H	350	61.40	39.60
10	*5190.00	91.8 AV			1.10 H	350	52.20	39.60
11	#10380.00	52.8 PK	74.0	-21.2	1.15 H	55	6.00	46.80
12	#10380.00	43.9 AV	54.0	-10.1	1.15 H	55	-2.90	46.80

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 1 + CH 38	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	55Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.00	58.2 PK	74.0	-15.8	1.05 V	330	26.10	32.10
2	2386.00	52.2 AV	54.0	-1.8	1.05 V	330	20.10	32.10
3	2390.00	57.3 PK	74.0	-16.7	1.10 V	330	25.20	32.10
4	2390.00	47.2 AV	54.0	-6.8	1.10 V	330	15.10	32.10
5	*2412.00	109.1 PK			1.15 V	320	76.90	32.20
6	*2412.00	105.2 AV			1.15 V	320	73.00	32.20
7	4824.00	48.2 PK	74.0	-25.8	1.08 V	123	9.40	38.80
8	4824.00	43.5 AV	54.0	-10.5	1.08 V	123	4.70	38.80
9	5150.00	70.5 PK	74.0	-3.5	1.05 V	340	30.90	39.60
10	**5150.00**	**52.8 AV**	**54.0**	**-1.2**	**1.05 V**	**340**	**13.20**	**39.60**
11	*5190.00	107.6 PK			1.15 V	32	68.00	39.60
12	*5190.00	96.4 AV			1.15 V	32	56.80	39.60
13	#10380.00	56.2 PK	74.0	-17.8	1.23 V	84	9.40	46.80
14	#10380.00	43.1 AV	54.0	-10.9	1.23 V	84	-3.70	46.80

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

802.11b + 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 1 + CH 157	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	55Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.6 PK	74.0	-19.4	1.30 H	130	22.50	32.10
2	2390.00	46.7 AV	54.0	-7.3	1.30 H	130	14.60	32.10
3	*2412.00	103.9 PK			1.10 H	310	71.70	32.20
4	*2412.00	99.6 AV			1.10 H	310	67.40	32.20
5	4824.00	45.9 PK	74.0	-28.1	1.09 H	320	7.10	38.80
6	4824.00	38.6 AV	54.0	-15.4	1.09 H	320	-0.20	38.80
7	*5785.00	103.6 PK			1.10 H	56	63.20	40.40
8	*5785.00	93.8 AV			1.10 H	56	53.40	40.40
9	11570.00	56.8 PK	74.0	-17.2	1.50 H	110	8.50	48.30
10	11570.00	46.2 AV	54.0	-7.8	1.50 H	110	-2.10	48.30
11	#17355.00	62.9 PK	74.0	-11.1	1.20 H	23	7.90	55.00
12	#17355.00	48.9 AV	54.0	-5.1	1.20 H	23	-6.10	55.00

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 1 + CH 157	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER	55Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2386.00	58.7 PK	74.0	-15.3	1.10 V	340	26.60	32.10
2	2386.00	52.4 AV	54.0	-1.6	1.10 V	340	20.30	32.10
3	2390.00	57.2 PK	74.0	-16.8	1.06 V	330	25.10	32.10
4	2390.00	47.1 AV	54.0	-6.9	1.06 V	330	15.00	32.10
5	*2412.00	109.8 PK			1.30 V	350	77.60	32.20
6	*2412.00	105.7 AV			1.30 V	350	73.50	32.20
7	4824.00	48.5 PK	74.0	-25.5	1.10 V	74	9.70	38.80
8	4824.00	43.9 AV	54.0	-10.1	1.10 V	74	5.10	38.80
9	*5785.00	110.5 PK			1.10 V	340	70.10	40.40
10	*5785.00	100.7 AV			1.10 V	340	60.30	40.40
11	11570.00	60.4 PK	74.0	-13.6	1.10 V	65	12.10	48.30
12	11570.00	48.8 AV	54.0	-5.2	1.10 V	65	0.50	48.30
13	#17355.00	62.5 PK	74.0	-11.5	1.40 V	74	7.50	55.00
14	#17355.00	50.7 AV	54.0	-3.3	1.40 V	74	-4.30	55.00

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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

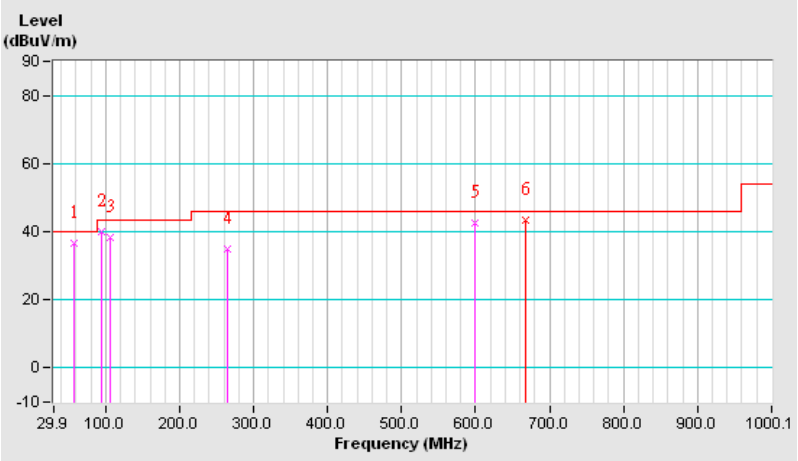
BELOW 1GHz WORST-CASE DATA：

802. 11b + 802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 1 + CH 38	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	55Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 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	57.12	36.60 QP	40.00	-3.40	1.99 H	0	9.90	26.70
2	94.06	39.80 QP	43.50	-3.70	1.99 H	92	13.10	26.70
3	105.73	38.40 QP	43.50	-5.10	1.24 H	257	11.70	26.70
4	265.16	35.10 QP	46.00	-10.90	1.00 H	238	8.40	26.70
5	599.58	42.60 QP	46.00	-3.40	1.50 H	5	15.90	26.70
6	667.48	43.20 QP	46.00	-2.80	1.38 H	24	16.50	26.70

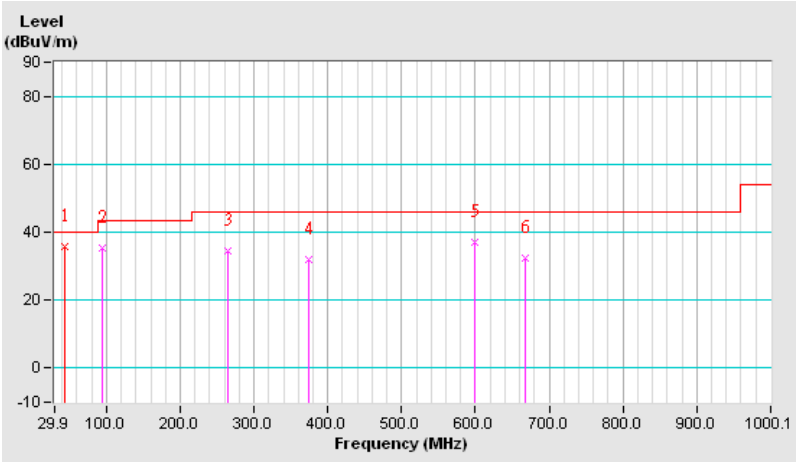
REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 1 + CH 38	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	55Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 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	43.15	35.80 QP	40.00	-4.20	1.38 V	17	9.10	26.70
2	94.06	35.30 QP	43.50	-8.20	1.25 V	161	8.60	26.70
3	265.16	34.30 QP	46.00	-11.70	1.00 V	55	7.60	26.70
4	374.04	31.80 QP	46.00	-14.20	1.50 V	124	5.10	26.70
5	599.58	37.20 QP	46.00	-8.80	1.00 V	86	10.50	26.70
6	667.63	32.40 QP	46.00	-13.60	1.00 V	242	5.70	26.70

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

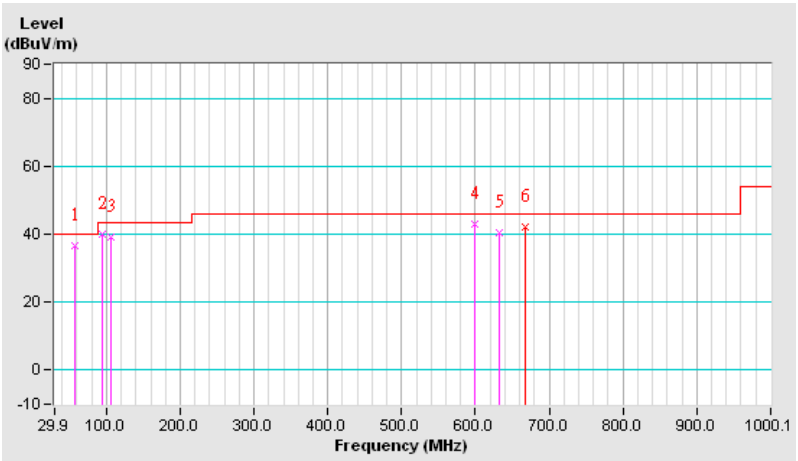


802. 11b + 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 1 + CH 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	55Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 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	57.12	36.70 QP	40.00	-3.30	2.00 H	310	10.00	26.70
2	94.06	39.80 QP	43.50	-3.70	2.00 H	85	13.10	26.70
3	105.73	39.20 QP	43.50	-4.30	2.00 H	265	12.50	26.70
4	599.58	42.80 QP	46.00	-3.20	1.25 H	5	16.10	26.70
5	632.63	40.30 QP	46.00	-5.70	1.50 H	0	13.60	26.70
6	667.58	42.20 QP	46.00	-3.80	1.07 H	52	15.50	26.70

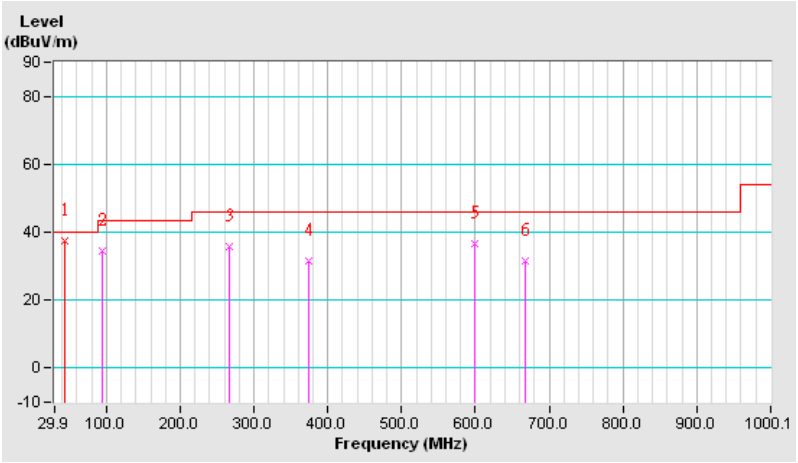
REMARKS: 1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	CH 1 + CH 157	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	55Vdc	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 69%RH	TESTED BY	Chris Lin

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 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	43.62	37.50 QP	40.00	-2.50	1.05 V	47	10.80	26.70
2	94.06	34.60 QP	43.50	-8.90	1.49 V	185	7.90	26.70
3	267.10	35.80 QP	46.00	-10.20	1.00 V	104	9.10	26.70
4	374.04	31.40 QP	46.00	-14.60	1.24 V	137	4.70	26.70
5	599.58	36.50 QP	46.00	-9.50	1.00 V	89	9.80	26.70
6	667.63	31.40 QP	46.00	-14.60	1.24 V	211	4.70	26.70

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)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 16, 2012	Nov. 15, 2013
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Jul. 02, 2012	Jul. 01, 2013
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 07, 2012	Feb. 06, 2013
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 HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

4.2.3 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. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

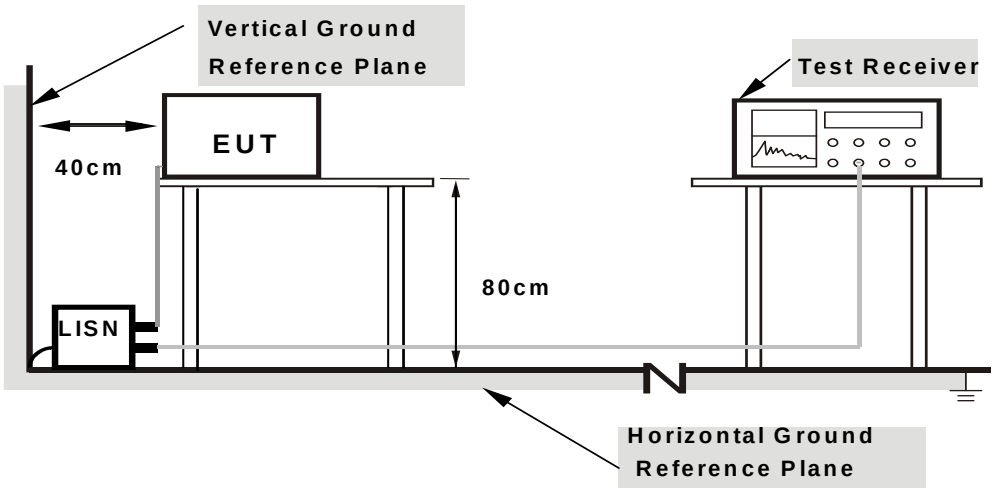
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: 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



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

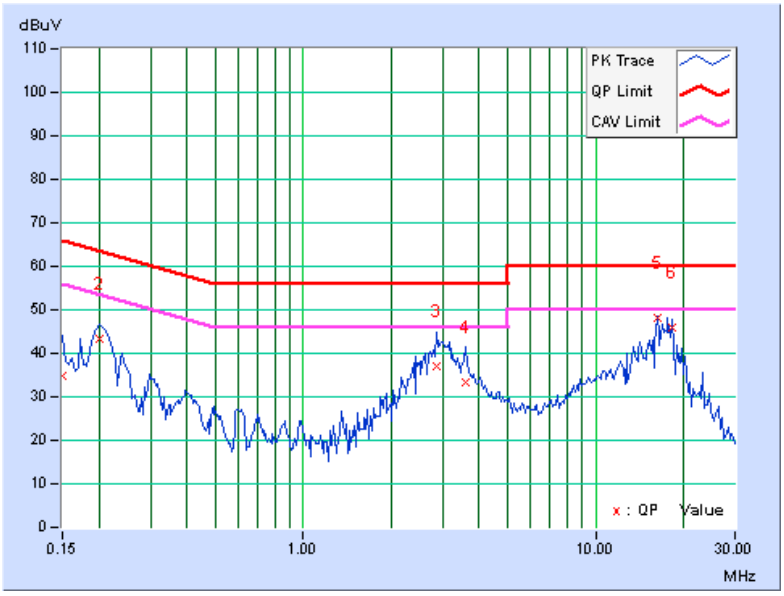
802.11b + 802.11n (40MHz)

CHANNEL	CH 1 + CH 38	6dB BANDWIDTH	9kHz
PHASE	Line 1		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.18	34.50	18.64	34.68	18.82	66.00	56.00	-31.32	-37.18
2	0.20078	0.17	43.16	31.26	43.33	31.43	63.58	53.58	-20.25	-22.15
3	2.85938	0.32	36.65	27.97	36.97	28.29	56.00	46.00	-19.03	-17.71
4	3.57422	0.35	32.86	26.36	33.21	26.71	56.00	46.00	-22.79	-19.29
5	16.22656	0.56	47.42	44.62	47.98	45.18	60.00	50.00	-12.02	-4.82
6	18.24219	0.60	45.13	44.73	45.73	45.33	60.00	50.00	-14.27	-4.67

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.

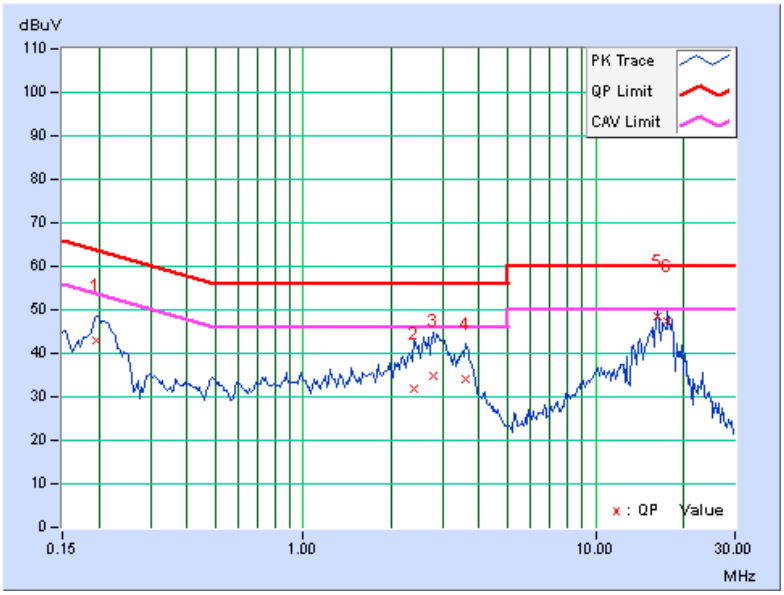


CHANNEL	CH 1 + CH 38	6dB BANDWIDTH	9kHz
PHASE	Line 2		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19687	0.18	42.90	29.31	43.08	29.49	63.74	53.74	-20.66	-24.25
2	2.40234	0.30	31.61	25.46	31.91	25.76	56.00	46.00	-24.09	-20.24
3	2.77344	0.32	34.31	26.24	34.63	26.56	56.00	46.00	-21.37	-19.44
4	3.60547	0.37	33.52	24.26	33.89	24.63	56.00	46.00	-22.11	-21.37
5	16.22656	0.64	47.84	45.01	48.48	45.65	60.00	50.00	-11.52	-4.35
6	17.69531	0.67	46.91	45.69	47.58	46.36	60.00	50.00	-12.42	-3.64

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.



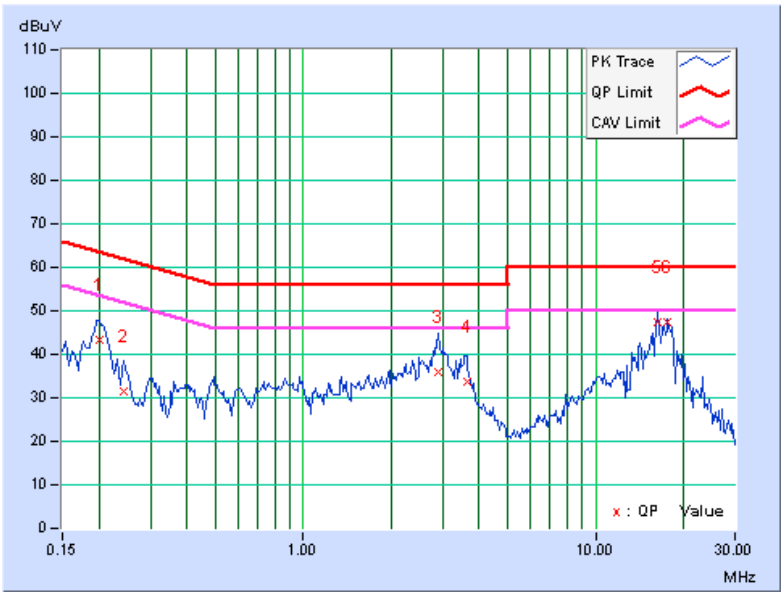
802.11b + 802.11n (20MHz)

CHANNEL	CH 1 + CH 157	**6dB BANDWIDTH**	9kHz
PHASE	Line 1		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.20078	0.17	43.28	31.40	43.45	31.57	63.58	53.58	-20.13	-22.01
2	0.24375	0.18	31.23	19.39	31.41	19.57	61.97	51.97	-30.56	-32.40
3	2.88281	0.32	35.70	27.30	36.02	27.62	56.00	46.00	-19.98	-18.38
4	3.61719	0.35	33.47	24.46	33.82	24.81	56.00	46.00	-22.18	-21.19
5	16.23047	0.56	47.01	44.34	47.57	44.90	60.00	50.00	-12.43	-5.10
6	17.69531	0.59	46.81	45.67	47.40	46.26	60.00	50.00	-12.60	-3.74

REMARKS:

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

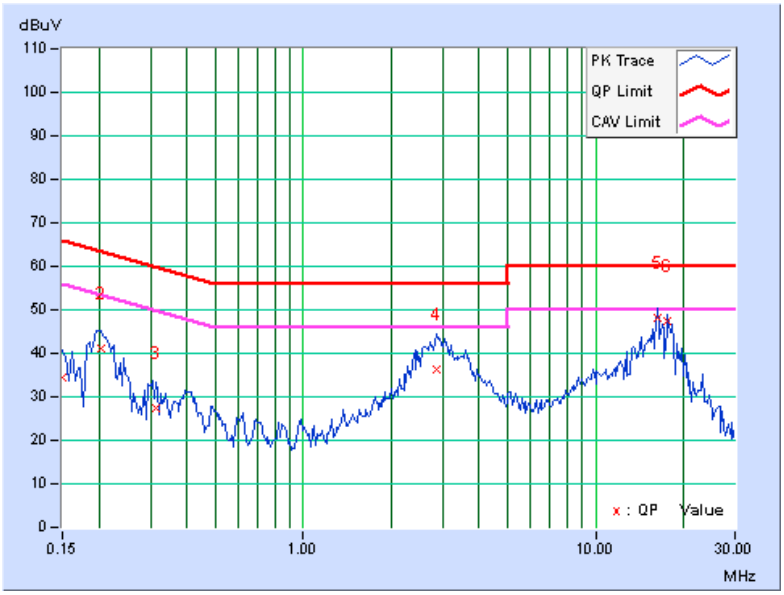


CHANNEL	CH 1 + CH 157	6dB BANDWIDTH	9kHz
PHASE	Line 2		

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.19	34.38	19.76	34.57	19.95	66.00	56.00	-31.43	-36.05
2	0.20469	0.18	40.75	29.97	40.93	30.15	63.42	53.42	-22.49	-23.27
3	0.31406	0.22	27.04	16.01	27.26	16.23	59.86	49.86	-32.60	-33.63
4	2.84766	0.33	35.82	27.90	36.15	28.23	56.00	46.00	-19.85	-17.77
5	16.22656	0.64	47.44	44.70	48.08	45.34	60.00	50.00	-11.92	-4.66
6	17.69531	0.67	46.61	45.41	47.28	46.08	60.00	50.00	-12.72	-3.92

REMARKS:

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



5. 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: 886-2-26051924

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

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

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

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

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

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

---END---