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# FCC TEST REPORT (WLAN)

**REPORT NO.:** RF120723C24-4

**MODEL NO.:** Quattro 4.5 HD

**FCC ID:** YHLBLUQT45D

**RECEIVED:** Jul. 23, 2012

**TESTED:** Aug. 30, 2012

**ISSUED:** Aug. 31, 2012

**APPLICANT:** CT Asia

**ADDRESS:** Unit 01, 15/F, Seaview Centre, 139-141 Hoi bun road, Kwun Tong, Kowloon, Hongkong

**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.

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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120723C24-4	Original release	Aug. 31, 2012



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## 1. CERTIFICATION

**PRODUCT:** GSM/WCDMA mobile  
**MODEL NO.:** Quattro 4.5 HD  
**BRAND:** BLU  
**APPLICANT:** CT Asia  
**TESTED:** Aug. 30, 2012  
**TEST SAMPLE:** Identical Prototype  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: Quattro 4.5 HD) 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** : Aug. 31, 2012  
Pettie Chen / Senior Specialist

**APPROVED BY** :  , **DATE** : Aug. 31, 2012  
Gary Chang / Technical Manager

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -2.91dB at 0.18253MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -4.39dB at 2390.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted 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.

### 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	150kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	2.93 dB
	200MHz ~1000MHz	2.95 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

<b>EUT</b>	GSM/WCDMA mobile
<b>MODEL NO.</b>	Quattro 4.5 HD
<b>POWER SUPPLY</b>	5.0Vdc (adapter or host equipment) 3.7Vdc (battery)
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	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 802.11n: up to 72.2Mbps
<b>OPERATING FREQUENCY</b>	2412 ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11 for 802.11b, 802.11g, 802.11n (20MHz)
<b>OUTPUT POWER</b>	0.183W
<b>ANTENNA TYPE</b>	Chip antenna with -5.8dBi gain
<b>ANTENNA CONNECTOR</b>	N/A
<b>I/O PORTS</b>	Refer to user's manual
<b>DATA CABLE</b>	Refer to Note as below
<b>ACCESSORY DEVICES</b>	Refer to Note as below

#### NOTE:

- The EUT provides one completed transmitter and one receiver.

<b>MODULATION MODE</b>	<b>TX FUNCTION</b>
<b>802.11b</b>	1TX
<b>802.11g</b>	1TX
<b>802.11n (20MHz)</b>	1TX

- The EUT contains the following accessories.

<b>ITEM</b>	<b>BRAND</b>	<b>MODEL</b>	<b>SPECIFICATION</b>
Adapter	BLU	US-02-001	Input: 100-240Vac, 150mA Output: 5Vdc, 800mA
Battery	BLU	NA	Rating: 3.7Vdc, 1820mAh Type: Li-ion
Earphone	BLU	NA	1.1m non-shielded cable without ferrite core
USB Cable	BLU	NA	0.9m shielded cable without ferrite core

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

### 3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g 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		



### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.

#### **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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2

#### **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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	11	OFDM	BPSK	6.0

#### **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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	11	OFDM	BPSK	6.0

#### **BANDEDGE 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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2

#### **ANTENNA PORT CONDUCTED MEASUREMENT:**

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2

#### **TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Kay Wu
PLC	25deg. C, 63%RH	120Vac, 60Hz	Jones Chang
APCM	25deg. C, 65%RH	120Vac, 60Hz	Howard Kao



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### 3.3 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.

#### For Power Line Conducted Emission Test

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	24" LCD Monitor	DELL	U2410	CN082WXD-72872-0CR-06FL	FCC DoC Approved
2	PC	DELL	Precision 490	99G7N1S	NA
3	Keyboard	DELL	SK-8115	MY-OJ4635-71619-548-0467	FCC DoC Approved
4	Mouse	DELL	MOA8BO	H0G00889	NA
5	Printer	EPSON	LQ-300+	DCGY054009	FCC DoC Approved
6	Modem	ACEEX	1414V/3	0401008252	IFAXDM1414
7	Universal Radio Communication Tester	R&S	CMU200	123121	NA
8	Wireless N Router	D-Link	DIR-615	F3O8188007995	NA
9	Bluetooth earphone	ELECOM	LBT-MPHS400	NA	NA

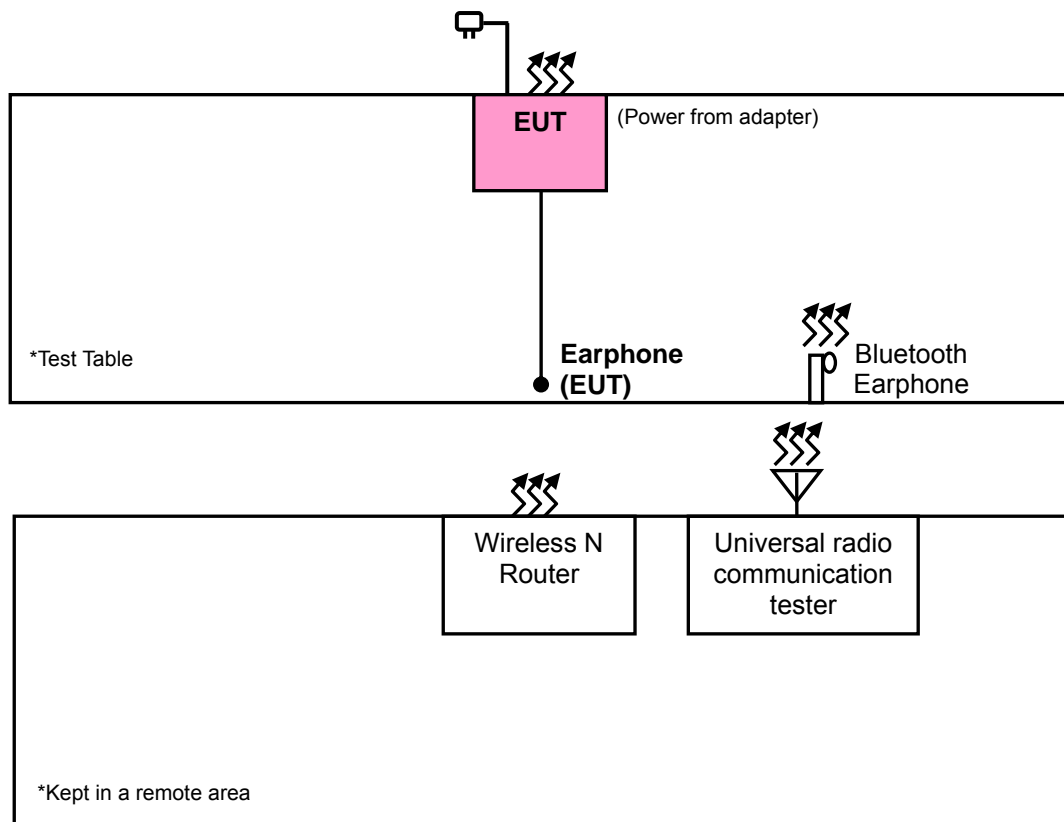
NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	2 m shielded D-Sub cable
2	NA
3	2m foil shielded wire, USB Connector, with core.
4	NA
5	1.8m braid shielded wire, DB25 connector, w/o core.
6	1.2m braid shielded wire, DB25 & DB9 connector, w/o core.
7	NA
8	NA
9	NA

#### NOTE:

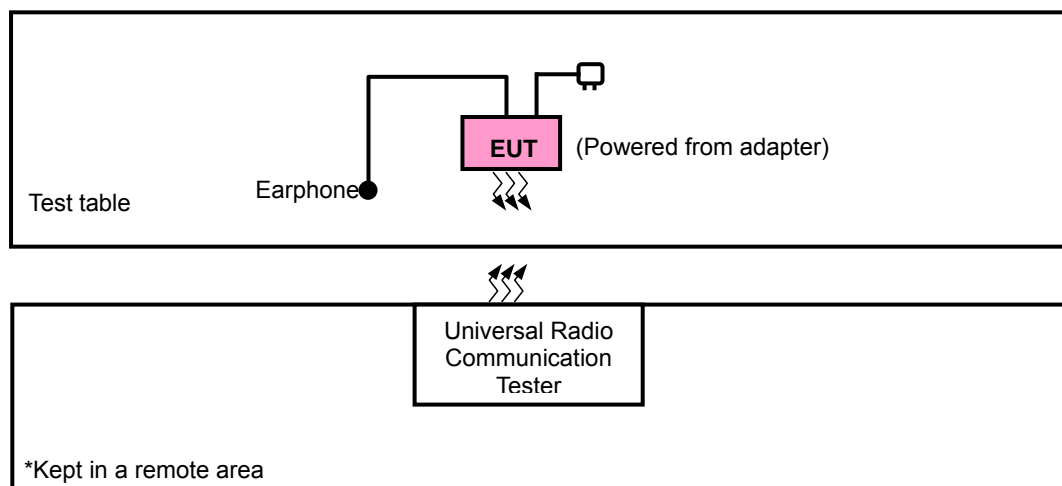
1. All power cords of the above support units are non shielded (1.8m).
2. Items 7-8 acted as communication partners.

### 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST

#### For Power Line Conducted Emission Test



#### For all tests except Power Line Conducted Emission Test





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### 3.4 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)**

ANSI C63.10-2009

558074 D01 DTS Meas Guidance v01

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

## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

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

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver Agilent	N9038A	MY51210203	Dec. 22, 2011	Dec. 21, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 21, 2011	Dec. 20, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 20, 2011	Dec. 19, 2012
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 20, 2011	Dec. 19, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 20, 2011	Dec. 19, 2012
Loop Antenna	HFH2-Z2	100070	Jan. 31, 2012	Jan. 30, 2014
Preamplifier EMCI	EMC 012645	980115	Dec. 30, 2011	Dec. 29, 2012
Preamplifier EMCI	EMC 330H	980112	Dec. 30, 2011	Dec. 29, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4	Oct. 21, 2011	Oct. 20, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Jan. 02, 2012	Jan. 01, 2013
RF signal cable Worken	RG-213	NA	Jan. 02, 2012	Jan. 01, 2013
Software	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
Radio Communication Analyzer	MT8820C	6201127458	May 25, 2012	May 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 except loop antenna is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The calibration interval of loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 9.
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 460141.
6. The IC Site Registration No. is IC 7450F-4.

#### 4.1.3 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. Height of receiving 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 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:**

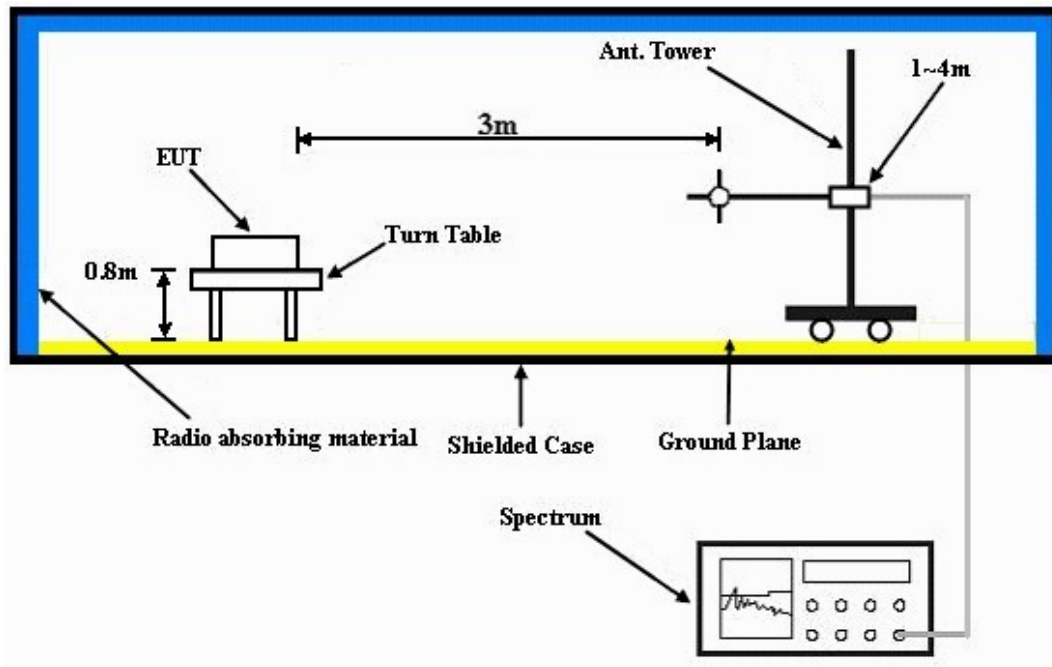
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.1.5 TEST SETUP



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

#### 4.1.6 EUT OPERATING CONDITIONS

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.



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## 4.1.7 TEST RESULTS

ABOVE 1GHz WORST-CASE DATA :

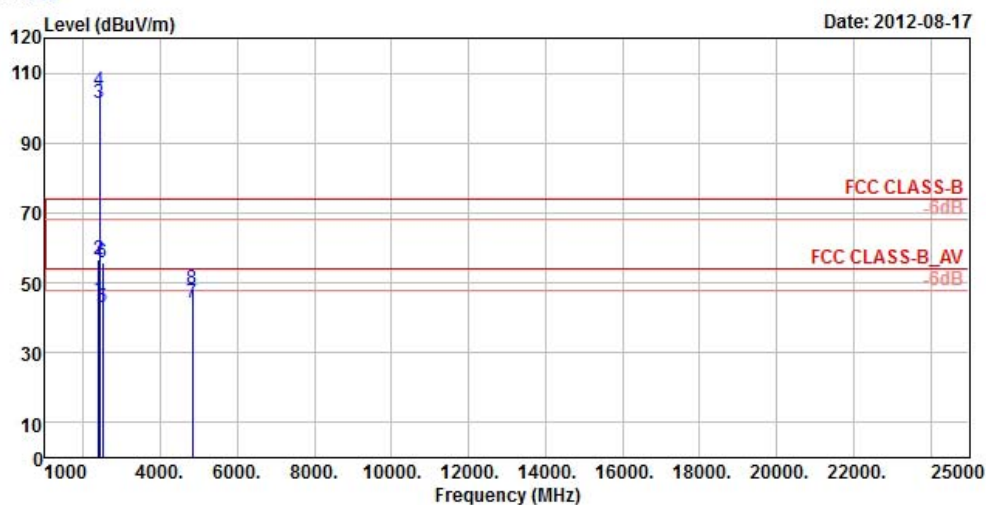
802.11b



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Data: 19



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11B TX CH01  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 1M  
Power : 12

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2390.00	45.22	50.61	54.00	-8.78	27.26	4.87	37.52	120	198	Average
2	2390.00	56.72	62.11	74.00	-17.28	27.26	4.87	37.52	120	198	Peak
3 pp	2412.00	101.20	106.54			27.31	4.87	37.52	120	198	Average
4 pk	2412.00	104.74	110.08			27.31	4.87	37.52	120	198	Peak
5	2492.00	43.00	47.76	54.00	-11.00	27.55	4.94	37.25	120	198	Average
6	2492.00	56.00	60.76	74.00	-18.00	27.55	4.94	37.25	120	198	Peak
7	4824.00	44.40	58.36	54.00	-9.60	31.42	7.70	53.08	100	169	Average
8	4824.00	48.36	62.32	74.00	-25.64	31.42	7.70	53.08	100	169	Peak



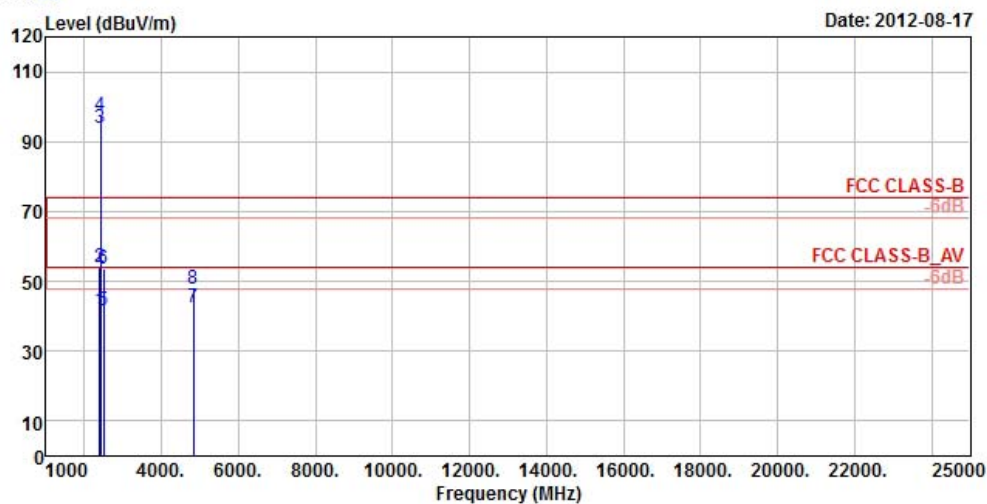
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Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11B TX CH01  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 1M  
Power : 12

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2386.00	41.43	46.82	54.00	-12.57	27.26	4.85	37.50	100	92	Average
2	2386.00	54.21	59.60	74.00	-19.79	27.26	4.85	37.50	100	92	Peak
3 pp	2412.00	93.88	99.22			27.31	4.87	37.52	100	92	Average
4 pk	2412.00	97.27	102.61			27.31	4.87	37.52	100	92	Peak
5	2492.00	41.74	46.50	54.00	-12.26	27.55	4.94	37.25	100	92	Average
6	2492.00	53.79	58.55	74.00	-20.21	27.55	4.94	37.25	100	92	Peak
7	4824.00	42.43	56.39	54.00	-11.57	31.42	7.70	53.08	100	183	Average
8	4824.00	47.62	61.58	74.00	-26.38	31.42	7.70	53.08	100	183	Peak



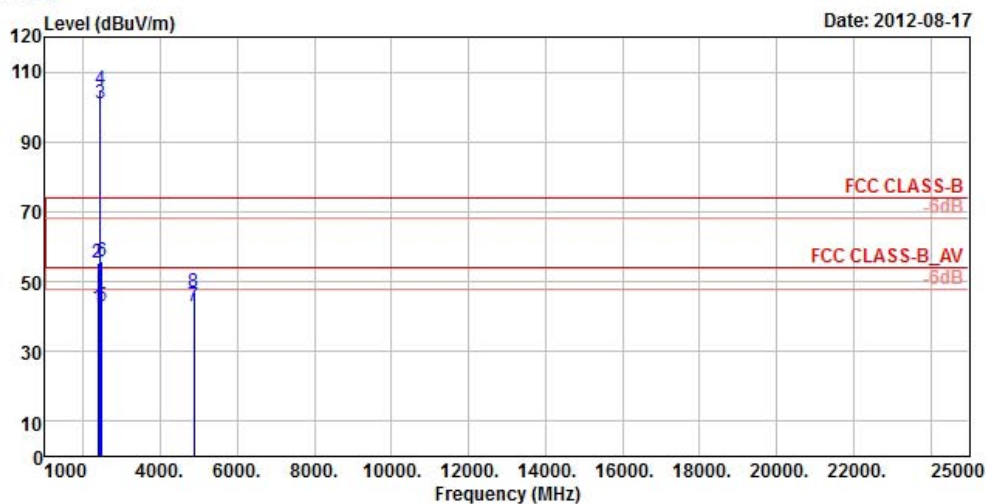
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11B TX CH06  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 1M  
Power : 12

	Freq	Level	Read Level	Limit Line	OverLimit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2380.00	42.53	47.97	54.00	-11.47	27.21	4.85	37.50	119	198	Average
2	2380.00	55.57	61.01	74.00	-18.43	27.21	4.85	37.50	119	198	Peak
3 pp	2437.00	101.15	106.32			27.40	4.89	37.46	119	198	Average
4 pk	2437.00	104.77	109.94			27.40	4.89	37.46	119	198	Peak
5	2484.00	43.12	48.02	54.00	-10.88	27.50	4.92	37.32	119	198	Average
6	2484.00	55.77	60.67	74.00	-18.23	27.50	4.92	37.32	119	198	Peak
7	4874.00	43.05	56.85	54.00	-10.95	31.53	7.72	53.05	110	157	Average
8	4874.00	46.81	60.61	74.00	-27.19	31.53	7.72	53.05	110	157	Peak



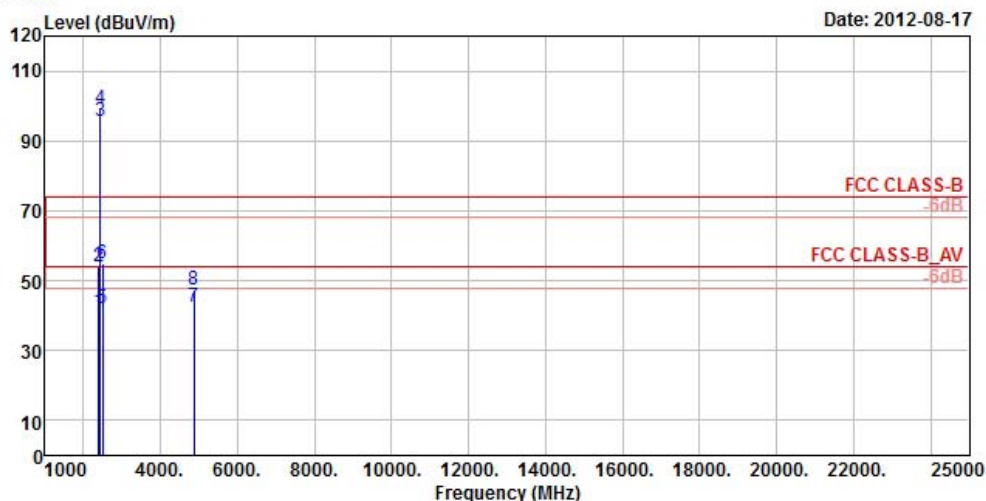
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11B TX CH06  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 1M  
Power : 12

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Cable Factor	Preamp Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg
1	2390.00	41.19	46.58	54.00	-12.81	27.26	4.87	37.52	100	92 Average
2	2390.00	53.88	59.27	74.00	-20.12	27.26	4.87	37.52	100	92 Peak
3 pp	2437.00	95.46	100.63			27.40	4.89	37.46	100	92 Average
4 pk	2437.00	99.02	104.19			27.40	4.89	37.46	100	92 Peak
5	2486.00	41.93	46.83	54.00	-12.07	27.50	4.92	37.32	100	92 Average
6	2486.00	55.13	60.03	74.00	-18.87	27.50	4.92	37.32	100	92 Peak
7	4874.00	42.45	56.25	54.00	-11.55	31.53	7.72	53.05	100	214 Average
8	4874.00	47.32	61.12	74.00	-26.68	31.53	7.72	53.05	100	214 Peak





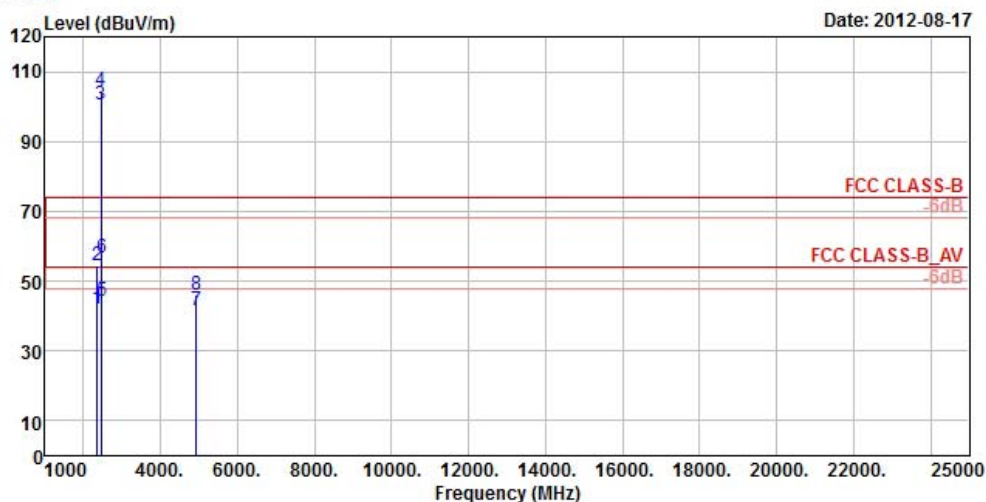
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11B TX CH11  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 1M  
Power : 12

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamplifier	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2362.00	41.89	47.40	54.00	-12.11	27.16	4.82	37.49	100	191	Average
2	2362.00	54.48	59.99	74.00	-19.52	27.16	4.82	37.49	100	191	Peak
3 pp	2462.00	100.55	105.58			27.45	4.91	37.39	100	191	Average
4 pk	2462.00	104.39	109.42			27.45	4.91	37.39	100	191	Peak
5	2484.00	44.17	49.07	54.00	-9.83	27.50	4.92	37.32	100	191	Average
6	2484.00	56.57	61.47	74.00	-17.43	27.50	4.92	37.32	100	191	Peak
7	4923.00	41.76	55.42	54.00	-12.24	31.64	7.73	53.03	100	185	Average
8	4923.00	46.17	59.83	74.00	-27.83	31.64	7.73	53.03	100	185	Peak



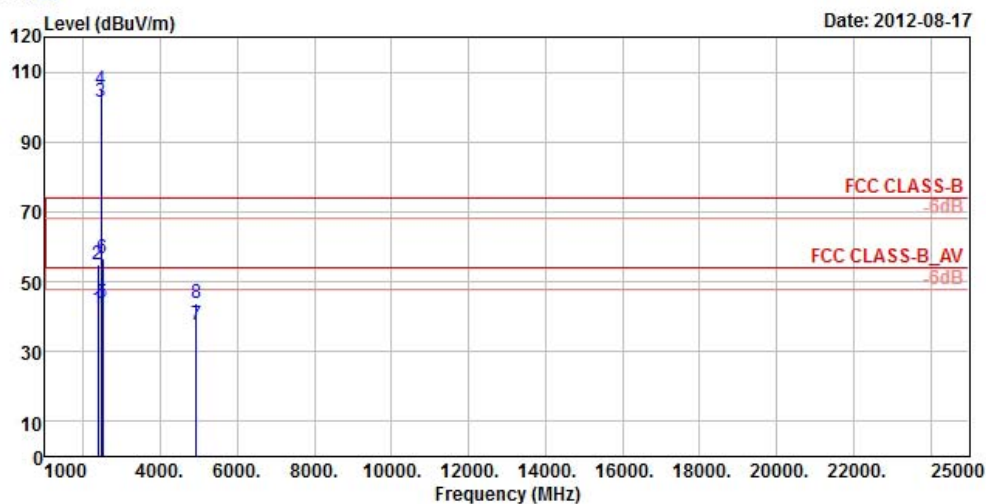
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11B TX CH11  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 1M  
Power : 12

	Freq	Level	Read Level	Limit Line	OverLimit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2370.00	42.11	47.55	54.00	-11.89	27.21	4.85	37.50	100	270	Average
2	2370.00	55.04	60.48	74.00	-18.96	27.21	4.85	37.50	100	270	Peak
3 pp	2462.00	101.30	106.33			27.45	4.91	37.39	100	270	Average
4 pk	2462.00	105.04	110.07			27.45	4.91	37.39	100	270	Peak
5	2490.00	43.99	48.84	54.00	-10.01	27.55	4.92	37.32	100	270	Average
6	2490.00	56.84	61.69	74.00	-17.16	27.55	4.92	37.32	100	270	Peak
7	4923.00	37.59	51.25	54.00	-16.41	31.64	7.73	53.03	100	136	Average
8	4923.00	43.74	57.40	74.00	-30.26	31.64	7.73	53.03	100	136	Peak



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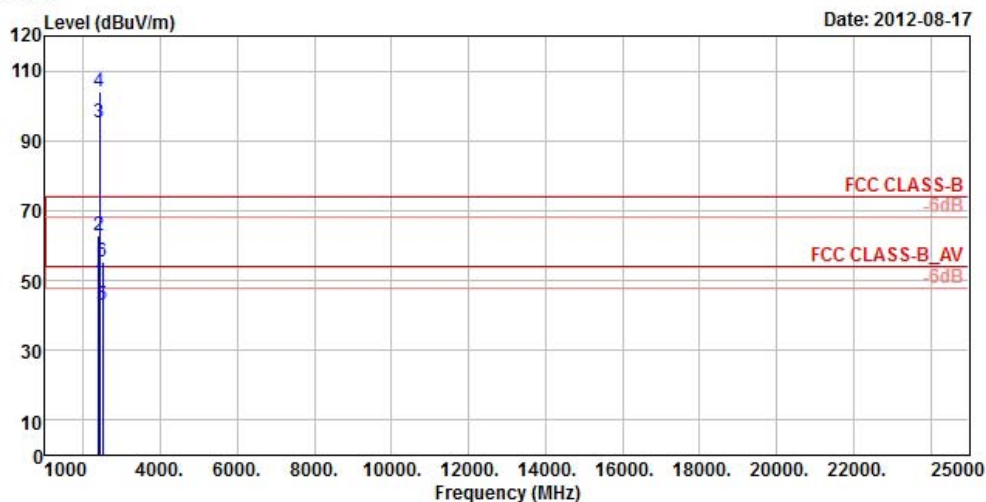
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11G TX CH01  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 6M  
Power : 10

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1 !	2390.00	49.61	55.00	54.00	-4.39	27.26	4.87	37.52	124	201	Average
2	2390.00	62.85	68.24	74.00	-11.15	27.26	4.87	37.52	124	201	Peak
3 pp	2412.00	95.24	100.58			27.31	4.87	37.52	124	201	Average
4 pk	2412.00	104.19	109.53			27.31	4.87	37.52	124	201	Peak
5	2496.00	43.01	47.77	54.00	-10.99	27.55	4.94	37.25	124	201	Average
6	2496.00	55.21	59.97	74.00	-18.79	27.55	4.94	37.25	124	201	Peak





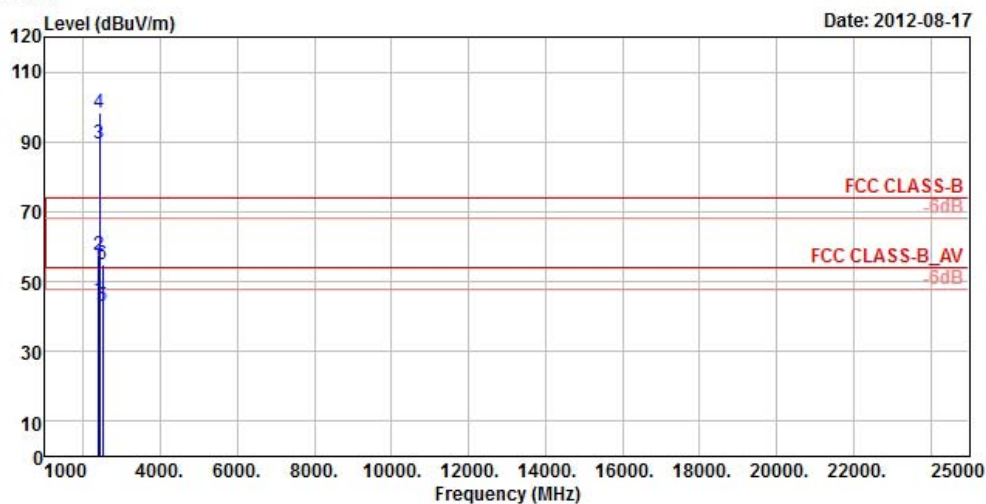
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11G TX CH01  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 6M  
Power : 10

	Freq	Level	Read Level	Limit Line	OverLimit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2390.00	44.76	50.15	54.00	-9.24	27.26	4.87	37.52	100	270	Average
2	2390.00	57.65	63.04	74.00	-16.35	27.26	4.87	37.52	100	270	Peak
3 pp	2412.00	89.29	94.63			27.31	4.87	37.52	100	270	Average
4 pk	2412.00	98.32	103.66			27.31	4.87	37.52	100	270	Peak
5	2494.00	42.77	47.53	54.00	-11.23	27.55	4.94	37.25	100	270	Average
6	2494.00	54.85	59.61	74.00	-19.15	27.55	4.94	37.25	100	270	Peak



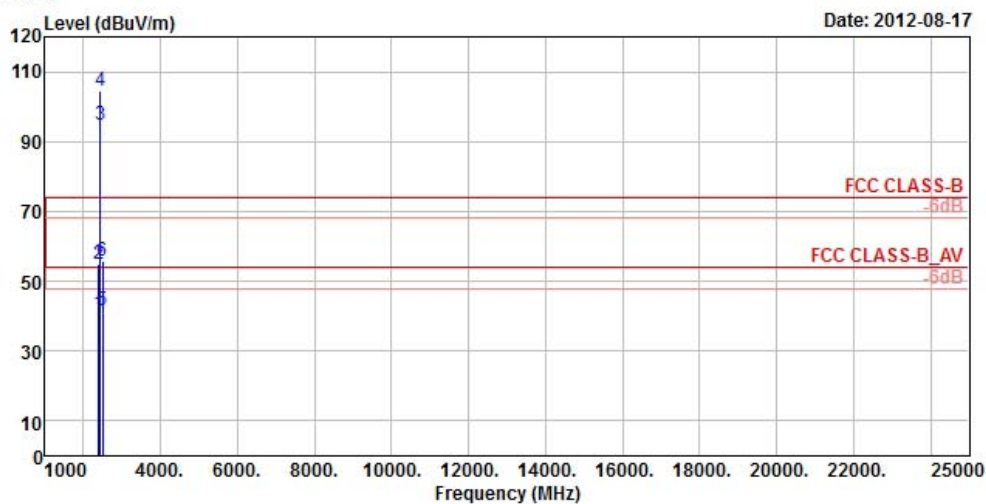
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11G TX CH06  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 6M  
Power : 10

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2388.00	40.74	46.13	54.00	-13.26	27.26	4.85	37.50	120	191	Average
2	2388.00	55.02	60.41	74.00	-18.98	27.26	4.85	37.50	120	191	Peak
3 pp	2437.00	94.77	99.94			27.40	4.89	37.46	120	191	Average
4 pk	2437.00	104.56	109.73			27.40	4.89	37.46	120	191	Peak
5	2486.00	41.69	46.59	54.00	-12.31	27.50	4.92	37.32	120	191	Average
6	2486.00	55.85	60.75	74.00	-18.15	27.50	4.92	37.32	120	191	Peak



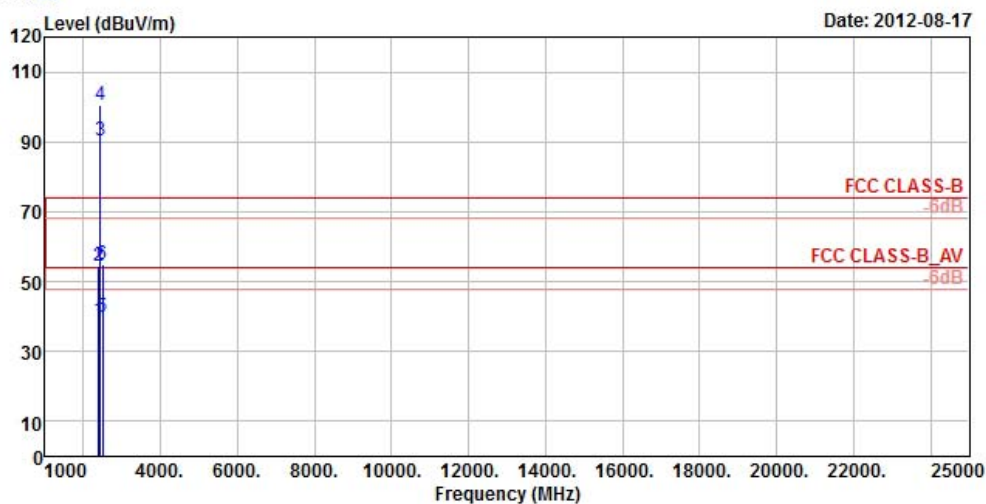
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11G TX CH06  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 6M  
Power : 10

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2390.00	38.76	44.15	54.00	-15.24	27.26	4.87	37.52	103	272	Average
2	2390.00	54.63	60.02	74.00	-19.37	27.26	4.87	37.52	103	272	Peak
3 pp	2437.00	90.52	95.69			27.40	4.89	37.46	103	272	Average
4 pk	2437.00	100.69	105.86			27.40	4.89	37.46	103	272	Peak
5	2492.00	39.73	44.49	54.00	-14.27	27.55	4.94	37.25	103	272	Average
6	2492.00	54.78	59.54	74.00	-19.22	27.55	4.94	37.25	103	272	Peak



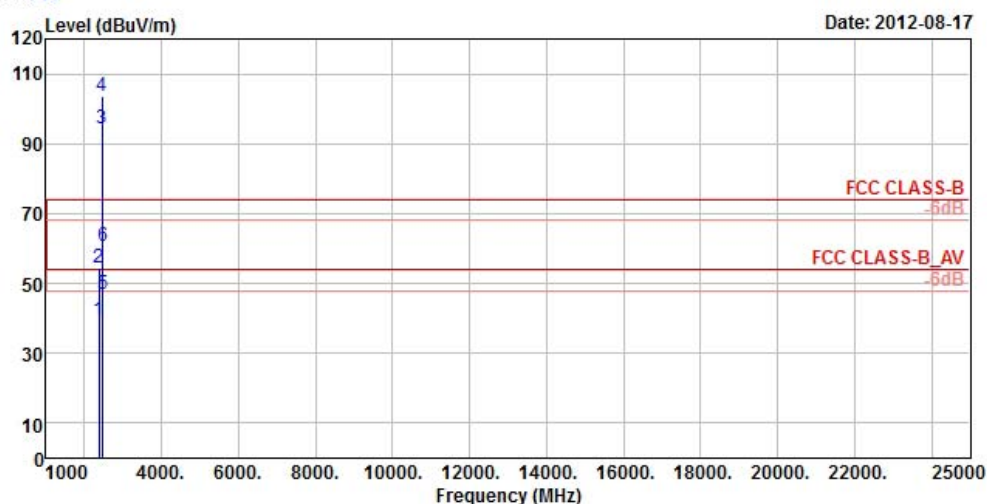
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5  
 Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
 Brand/Model: Quarrro 4.5HD  
 Remark : 11G TX CH11  
 Tested by : Kay Wu  
 Temperature : 25°C  
 Humidity : 65%  
 Plane : Z  
 Rate : 6M  
 Power : 10

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2368.00	39.47	44.96	54.00	-14.53	27.16	4.85	37.50	100	345	Average
2	2368.00	54.55	60.04	74.00	-19.45	27.16	4.85	37.50	100	345	Peak
3 pp	2462.00	94.24	99.27			27.45	4.91	37.39	100	345	Average
4 pk	2462.00	103.43	108.46			27.45	4.91	37.39	100	345	Peak
5	2484.00	47.06	51.96	54.00	-6.94	27.50	4.92	37.32	100	345	Average
6	2484.00	60.74	65.64	74.00	-13.26	27.50	4.92	37.32	100	345	Peak



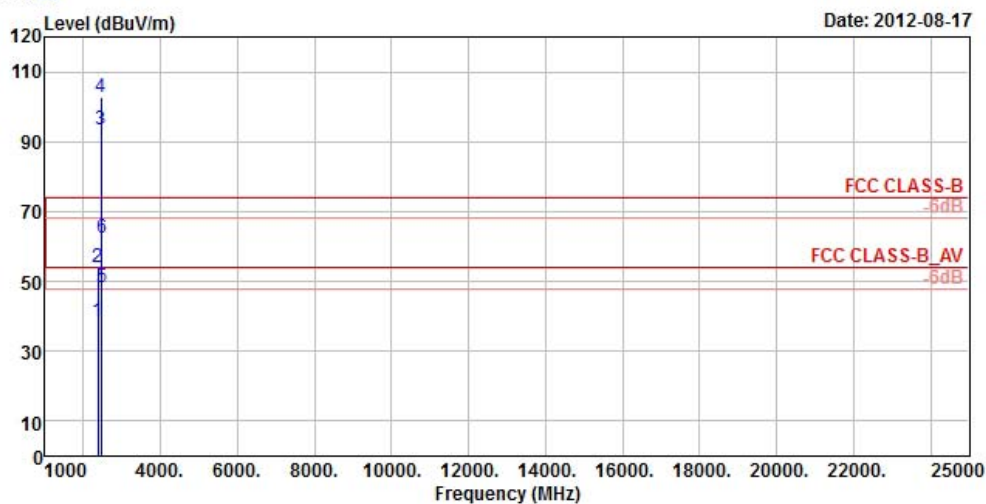
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11G TX CH11  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : 6M  
Power : 10

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2380.00	38.60	44.04	54.00	-15.40	27.21	4.85	37.50	100	271	Average
2	2380.00	54.07	59.51	74.00	-19.93	27.21	4.85	37.50	100	271	Peak
3 pp	2462.00	93.22	98.25			27.45	4.91	37.39	100	271	Average
4 pk	2462.00	102.53	107.56			27.45	4.91	37.39	100	271	Peak
5 !	2484.00	48.22	53.12	54.00	-5.78	27.50	4.92	37.32	100	271	Average
6	2484.00	62.60	67.50	74.00	-11.40	27.50	4.92	37.32	100	271	Peak





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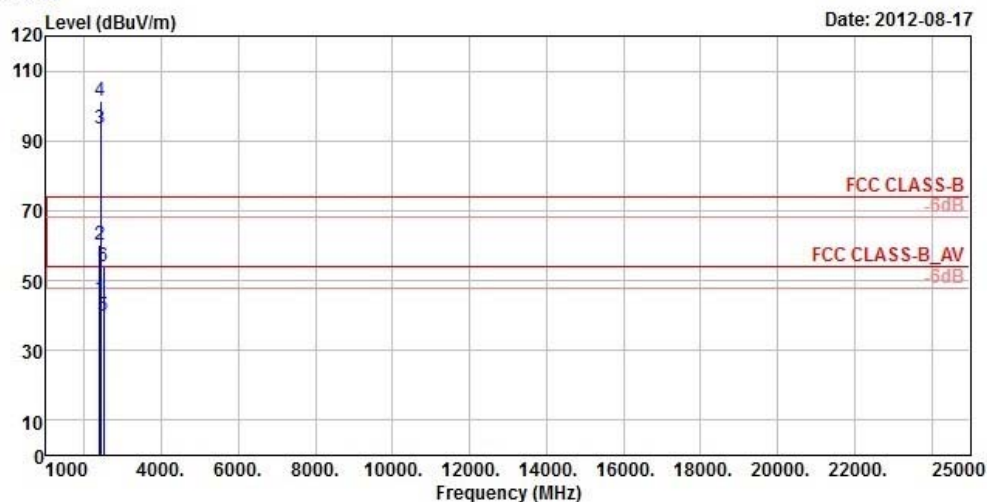
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11N\_HT 20 CH 01  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : M0  
Power : 7

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2390.00	44.71	50.10	54.00	-9.29	27.26	4.87	37.52	123	199	Average
2	2390.00	60.40	65.79	74.00	-13.60	27.26	4.87	37.52	123	199	Peak
3 pp	2412.00	93.25	98.59			27.31	4.87	37.52	123	199	Average
4 pk	2414.00	101.51	106.85			27.31	4.87	37.52	123	199	Peak
5	2496.00	39.76	44.52	54.00	-14.24	27.55	4.94	37.25	123	199	Average
6	2496.00	54.23	58.99	74.00	-19.77	27.55	4.94	37.25	123	199	Peak



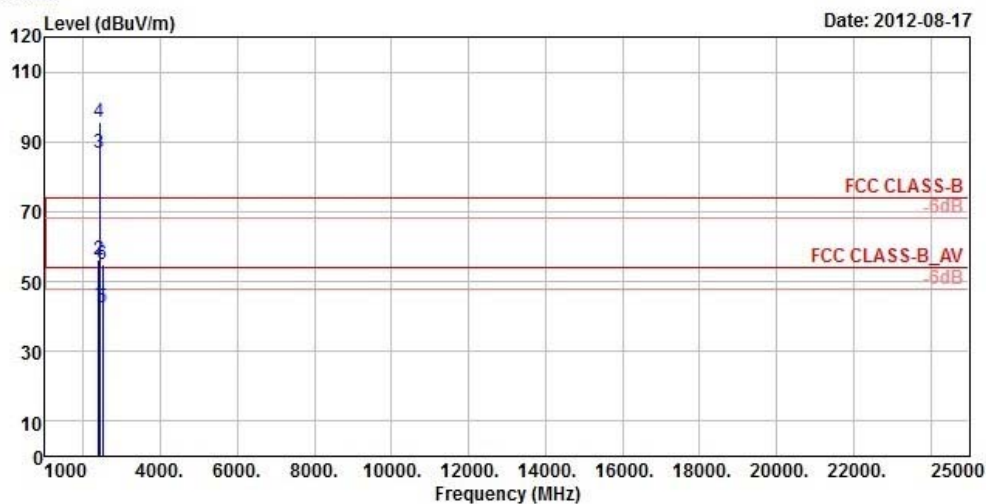
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11N\_HT 20 CH 01  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : M0  
Power : 7

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2390.00	43.31	48.70	54.00	-10.69	27.26	4.87	37.52	100	90	Average
2	2390.00	56.36	61.75	74.00	-17.64	27.26	4.87	37.52	100	90	Peak
3 pp	2412.00	86.69	92.03			27.31	4.87	37.52	100	90	Average
4 pk	2412.00	95.61	100.95			27.31	4.87	37.52	100	90	Peak
5	2494.00	42.35	47.11	54.00	-11.65	27.55	4.94	37.25	100	90	Average
6	2494.00	54.95	59.71	74.00	-19.05	27.55	4.94	37.25	100	90	Peak



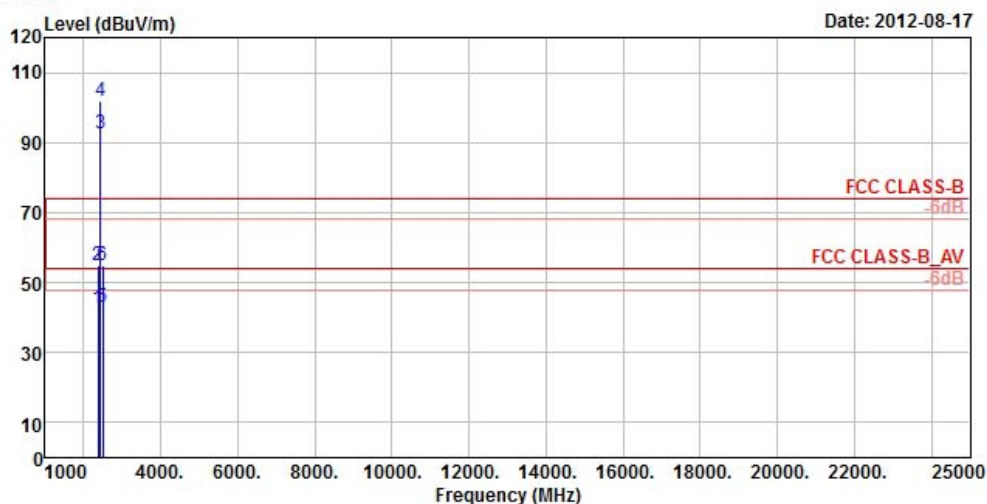
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5  
 Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
 Brand/Model: Quarrro 4.5HD  
 Remark : 11N\_HT 20 CH 06  
 Tested by : Kay Wu  
 Temperature : 25°C  
 Humidity : 65%  
 Plane : Z  
 Rate : M0  
 Power : 7

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2366.00	42.45	47.94	54.00	-11.55	27.16	4.85	37.50	119	199	Average
2	2366.00	55.04	60.53	74.00	-18.96	27.16	4.85	37.50	119	199	Peak
3 pp	2437.00	92.71	97.88			27.40	4.89	37.46	119	199	Average
4 pk	2437.00	101.66	106.83			27.40	4.89	37.46	119	199	Peak
5	2498.00	43.12	47.88	54.00	-10.88	27.55	4.94	37.25	119	199	Average
6	2498.00	54.86	59.62	74.00	-19.14	27.55	4.94	37.25	119	199	Peak





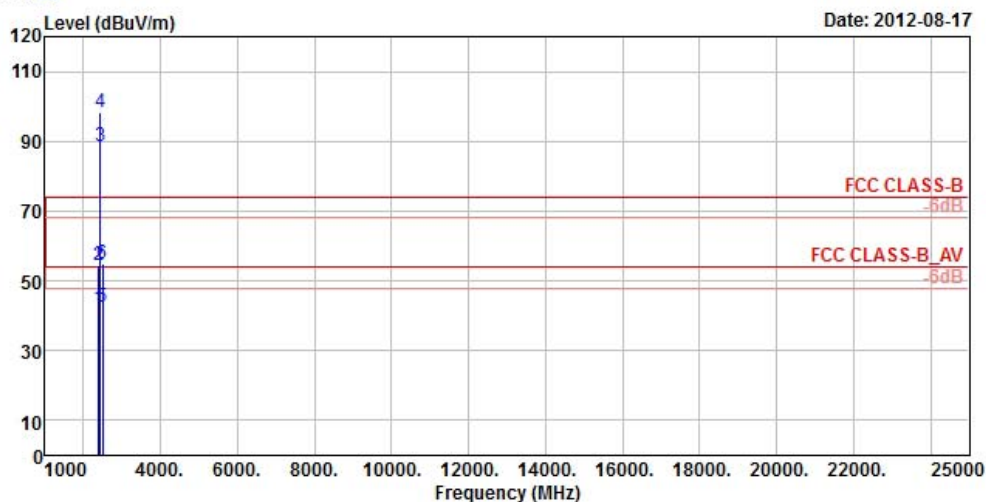
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11N\_HT 20 CH 06  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : M0  
Power : 7

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2390.00	42.23	47.62	54.00	-11.77	27.26	4.87	37.52	105	270	Average
2	2390.00	54.57	59.96	74.00	-19.43	27.26	4.87	37.52	105	270	Peak
3 pp	2437.00	88.59	93.76			27.40	4.89	37.46	105	270	Average
4 pk	2437.00	98.51	103.68			27.40	4.89	37.46	105	270	Peak
5	2500.00	42.67	47.43	54.00	-11.33	27.55	4.94	37.25	105	270	Average
6	2500.00	54.87	59.63	74.00	-19.13	27.55	4.94	37.25	105	270	Peak



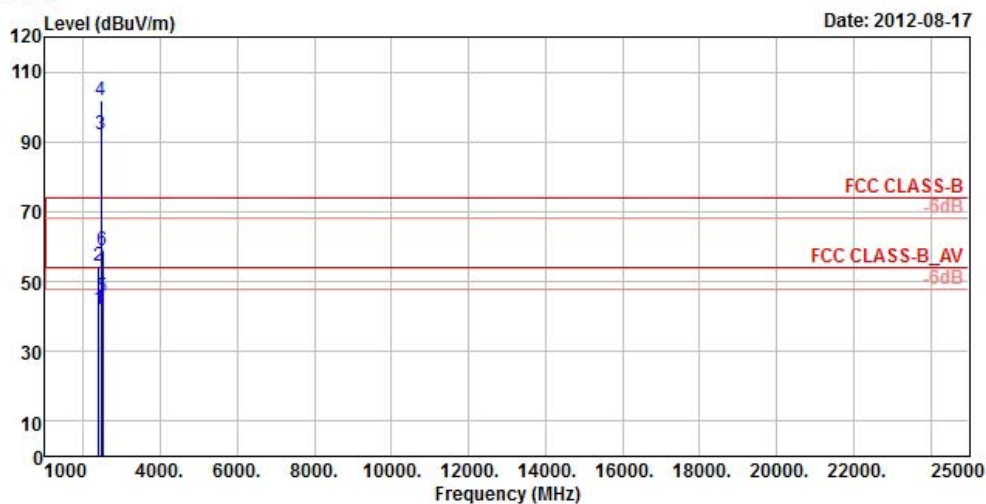
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 19



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF HORIZONTAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11N\_HT 20 CH 11  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : M0  
Power : 7

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2386.00	42.22	47.61	54.00	-11.78	27.26	4.85	37.50	100	199	Average
2	2386.00	54.28	59.67	74.00	-19.72	27.26	4.85	37.50	100	199	Peak
3 pp	2462.00	92.07	97.10			27.45	4.91	37.39	100	199	Average
4 pk	2462.00	101.70	106.73			27.45	4.91	37.39	100	199	Peak
5	2486.00	45.70	50.60	54.00	-8.30	27.50	4.92	37.32	100	199	Average
6	2486.00	58.69	63.59	74.00	-15.31	27.50	4.92	37.32	100	199	Peak



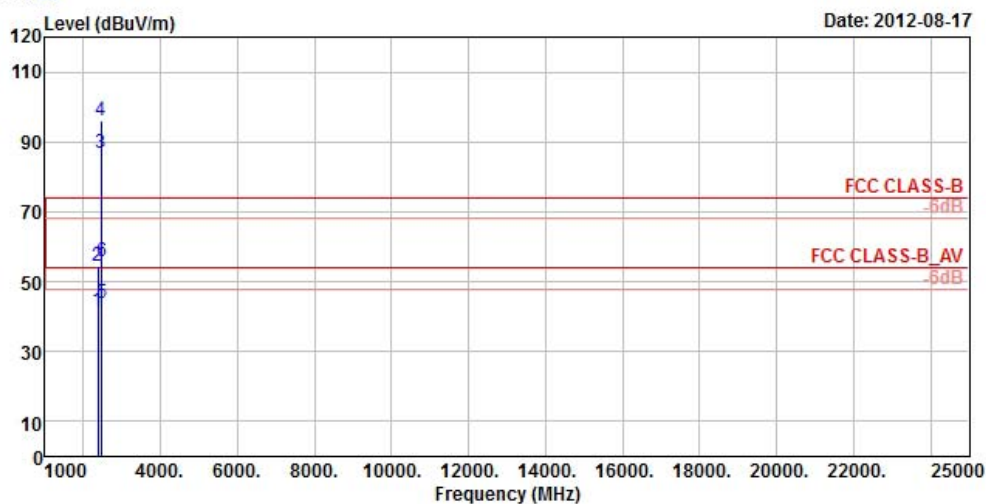
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Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 20



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_18G~40G\_HF VERTICAL  
Brand/Model: Quarrro 4.5HD  
Remark : 11N\_HT 20 CH 11  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Z  
Rate : M0  
Power : 7

	Freq	Level	Read Level	Limit Line	OverAntenna Limit	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m	dB	dB	cm	deg	
1	2366.00	41.82	47.31	54.00	-12.18	27.16	4.85	37.50	100	93	Average
2	2366.00	54.43	59.92	74.00	-19.57	27.16	4.85	37.50	100	93	Peak
3 pp	2462.00	86.59	91.62			27.45	4.91	37.39	100	93	Average
4 pk	2462.00	96.06	101.09			27.45	4.91	37.39	100	93	Peak
5	2484.00	43.78	48.68	54.00	-10.22	27.50	4.92	37.32	100	93	Average
6	2484.00	55.70	60.60	74.00	-18.30	27.50	4.92	37.32	100	93	Peak



A D T

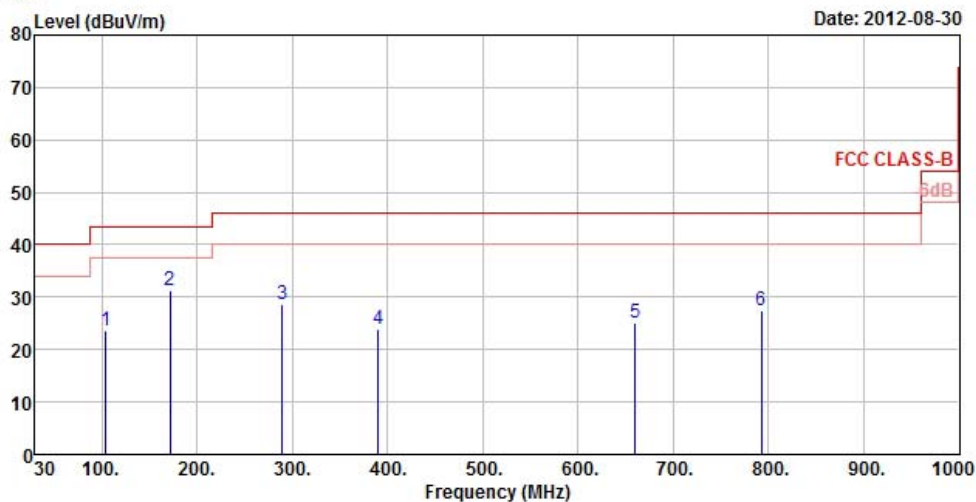
## BELOW 1GHz WORST-CASE DATA : 802.11g



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 5



Site : 966 Chamber 5  
 Condition : FCC CLASS-B 3m ANT\_30M~1G\_LF HORIZONTAL  
 Brand/Model: Quarrro 4.5HD  
 Remark : WIFI TX LF  
 Tested by : Kay Wu  
 Temperature : 25°C  
 Humidity : 65%  
 Plane : Z

	Freq	Level	Read	Limit	OverAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Level	Line	Limit	Factor	Loss	Factor	cm	deg
1	104.52	23.70	44.98	43.50	-19.80	9.53	1.09	31.90	100	295 Peak
2 pp	171.48	31.19	49.92	43.50	-12.31	11.57	1.45	31.75	100	218 Peak
3	289.47	28.67	45.72	46.00	-17.33	12.63	2.00	31.68	100	354 Peak
4	390.30	24.00	38.56	46.00	-22.00	15.10	2.38	32.04	100	237 Peak
5	659.80	25.19	33.53	46.00	-20.81	20.33	3.28	31.95	100	157 Peak
6	792.80	27.36	32.97	46.00	-18.64	22.12	3.68	31.41	100	142 Peak



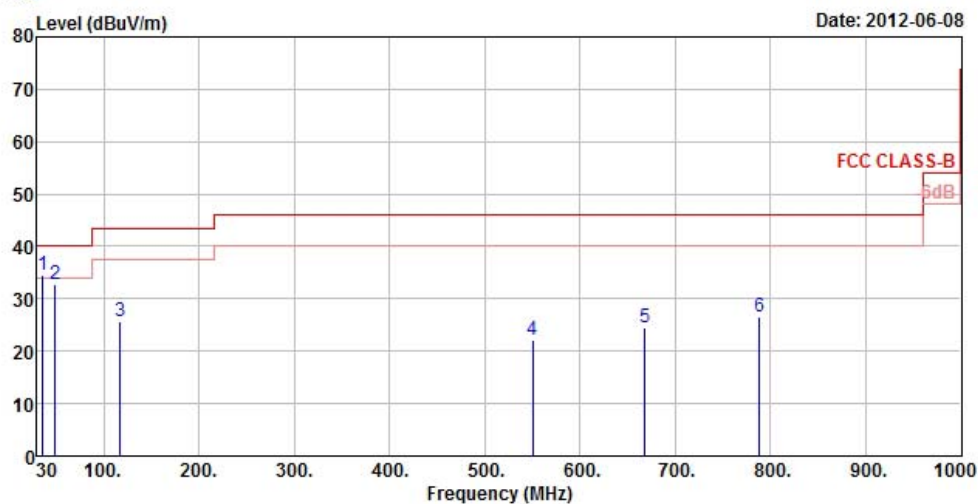
A D T



Bureau Veritas Consumer Products Services Ltd., Taoyuan Branch

A D T

Data: 6



Site : 966 Chamber 5  
Condition : FCC CLASS-B 3m ANT\_30M~1G\_LF VERTICAL  
Brand/Model: PL01200  
Remark : WIFI TX LF  
Tested by : Kay Wu  
Temperature : 25°C  
Humidity : 65%  
Plane : Y

	Freq	Level	Read	Limit	OverAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Level	Line	Limit	Factor	Loss	Factor	cm	deg
1 pp	35.67	34.50	52.00	40.00	-5.50	12.94	0.61	31.05	133	242 QP
2	48.63	32.91	50.22	40.00	-7.09	13.18	0.76	31.25	100	300 QP
3 pk	117.48	25.60	45.57	43.50	-17.90	10.74	1.17	31.88	231	123 Peak
4	550.60	21.99	32.52	46.00	-24.01	18.48	2.95	31.96	221	274 Peak
5	668.20	24.49	32.59	46.00	-21.51	20.43	3.31	31.84	199	66 Peak
6	788.60	26.53	32.20	46.00	-19.47	22.07	3.67	31.41	133	274 Peak



## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ 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 0.50MHz.
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	100291	Nov. 23, 2011	Nov. 22, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 29, 2011	Dec. 28, 2012
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-2047.

#### 4.2.3 TEST PROCEDURES

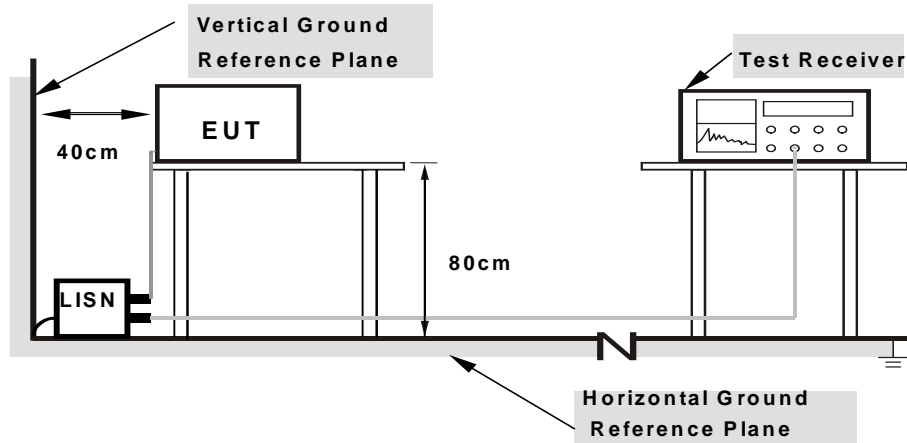
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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 cm 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

- Placed the EUT and Bluetooth earphone on a testing table.
- The EUT link with Bluetooth earphone in idle mode.
- The EUT sent audio signal to the earphone.
- The EUT ran MPEG4.
- The EUT communicated data with the wireless AP and Universal Radio Communication Tester, which acted as communication partners.
- The communication partner connected with EUT via PCS1900 and WLAN function and run a test program (provided by manufacturer) to enable EUT under receiving condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.



## 4.2.7 TEST RESULTS

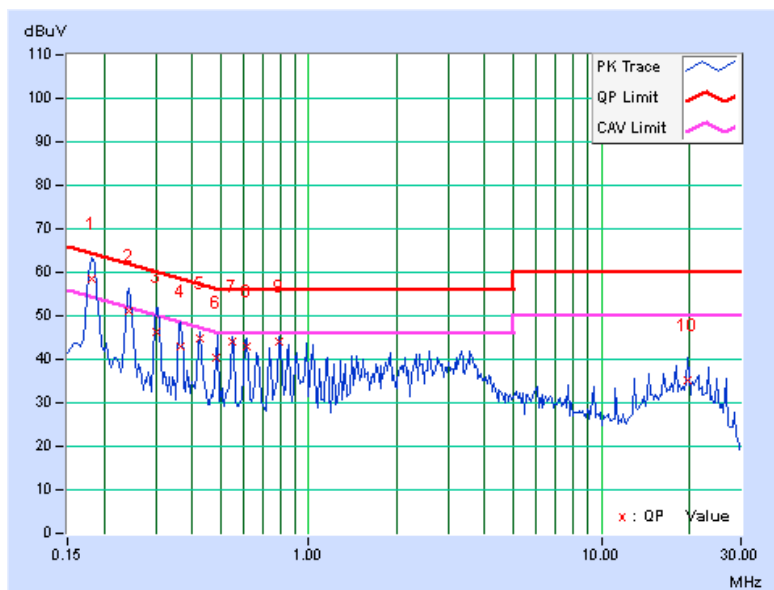
### CONDUCTED WORST-CASE DATA : 802.11g

PHASE	Line 1	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

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	0.18253	0.20	58.50	51.26	58.70	51.46	64.37	54.37	-5.67	-2.91
2	0.24375	0.21	50.84	43.71	51.05	43.92	61.97	51.97	-10.91	-8.04
3	0.30354	0.19	46.23	41.41	46.42	41.60	60.15	50.15	-13.72	-8.54
4	0.36484	0.17	42.76	35.32	42.93	35.49	58.62	48.62	-15.69	-13.13
5	0.42492	0.16	44.67	38.34	44.83	38.50	57.35	47.35	-12.52	-8.85
6	0.48562	0.17	40.30	32.93	40.47	33.10	56.24	46.24	-15.78	-13.15
7	0.54844	0.17	43.80	34.62	43.97	34.79	56.00	46.00	-12.03	-11.21
8	0.61094	0.18	42.96	33.41	43.14	33.59	56.00	46.00	-12.86	-12.41
9	0.79334	0.19	43.75	33.39	43.94	33.58	56.00	46.00	-12.06	-12.42
10	19.76681	0.87	34.46	26.88	35.33	27.75	60.00	50.00	-24.67	-22.25

#### REMARKS:

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

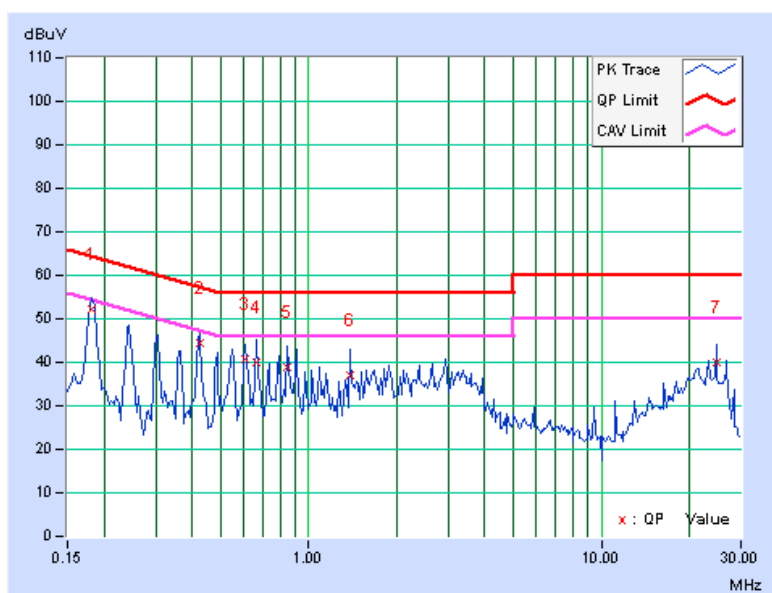


PHASE	Line 1	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

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	0.18125	0.28	51.93	44.53	52.21	44.81	64.43	54.43	-12.22	-9.62
2	0.42344	0.25	44.02	37.06	44.27	37.31	57.38	47.38	-13.11	-10.07
3	0.60506	0.27	40.33	34.02	40.60	34.29	56.00	46.00	-15.40	-11.71
4	0.66563	0.27	39.77	33.09	40.04	33.36	56.00	46.00	-15.96	-12.64
5	0.84531	0.29	38.72	32.20	39.01	32.49	56.00	46.00	-16.99	-13.51
6	1.38672	0.32	36.81	26.47	37.13	26.79	56.00	46.00	-18.87	-19.21
7	24.92044	1.15	38.87	28.76	40.02	29.91	60.00	50.00	-19.98	-20.09

#### REMARKS:

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

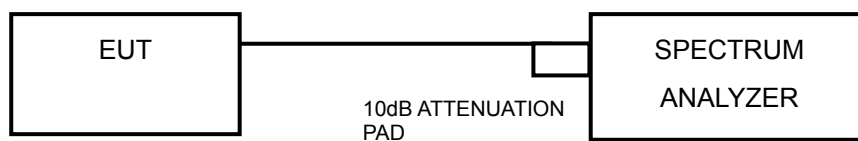


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST SETUP



#### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 TEST PROCEDURE

- Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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

#### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 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	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	7.26	0.5	PASS
6	2437	7.12	0.5	PASS
11	2462	7.08	0.5	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.89	0.5	PASS
6	2437	15.81	0.5	PASS
11	2462	16.08	0.5	PASS

##### 802.11n (20MHz)

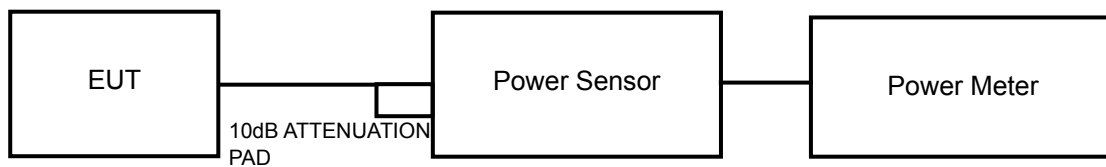
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.38	0.5	PASS
6	2437	17.33	0.5	PASS
11	2462	17.11	0.5	PASS

## 4.4 CONDUCTED OUTPUT POWER

### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 TEST PROCEDURES

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

### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

#### 4.4.7 TEST RESULTS

##### 802.11b

CHANNEL	FREQUENCY (MHz)	PEAK POWER (W)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	0.061	17.83	30	PASS
6	2437	0.067	18.25	30	PASS
11	2462	0.070	18.44	30	PASS

##### 802.11g

CHANNEL	FREQUENCY (MHz)	PEAK POWER (W)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	0.175	22.42	30	PASS
6	2437	0.181	22.57	30	PASS
11	2462	0.183	22.63	30	PASS

##### 802.11n (20MHz)

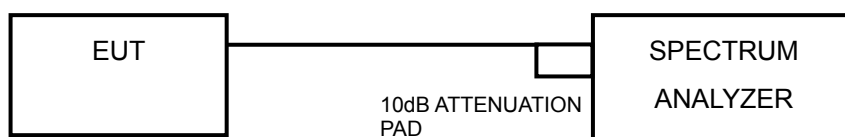
CHANNEL	FREQUENCY (MHz)	PEAK POWER (W)	PEAK POWER (dBm)	LIMIT (dBm)	PASS/FAIL
1	2412	0.122	20.85	30	PASS
6	2437	0.123	20.91	30	PASS
11	2462	0.139	21.44	30	PASS

## 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 SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURE

- Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3 \text{ kHz}/100\text{kHz})$

### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

#### 4.5.7 TEST RESULTS

##### 802.11b

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	7.63	-7.60	8	PASS
6	2437	8.09	-7.14	8	PASS
11	2462	7.92	-7.31	8	PASS

##### 802.11g

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	2.43	-12.80	8	PASS
6	2437	2.83	-12.40	8	PASS
11	2462	2.81	-12.42	8	PASS

##### 802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-0.46	-15.69	8	PASS
6	2437	0.22	-15.01	8	PASS
11	2462	0.42	-14.81	8	PASS

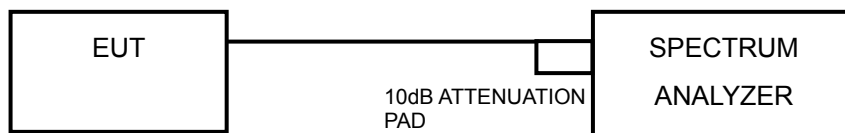


## 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST SETUP



### 4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 TEST PROCEDURE

#### MEASUREMENT PROCEDURE REF

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 OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.6.6 EUT OPERATING CONDITION

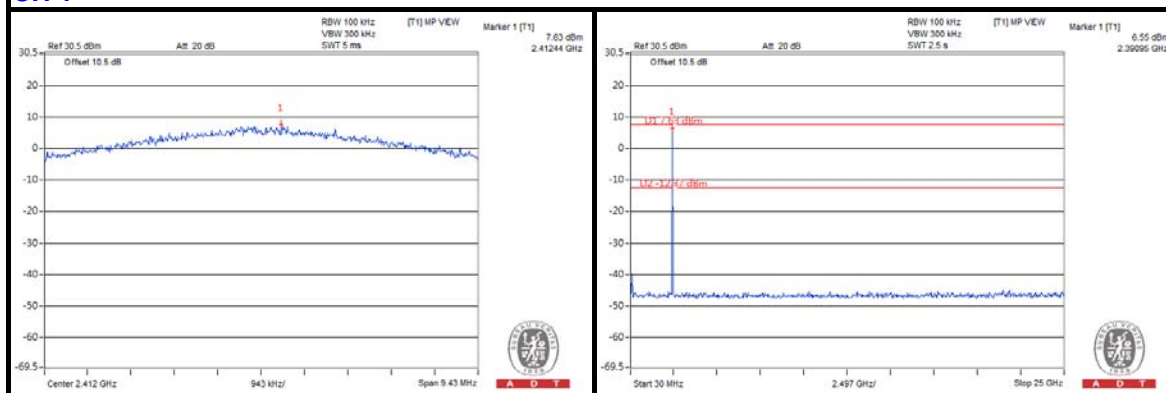
Same as Item 4.3.6

### 4.6.7 TEST RESULTS

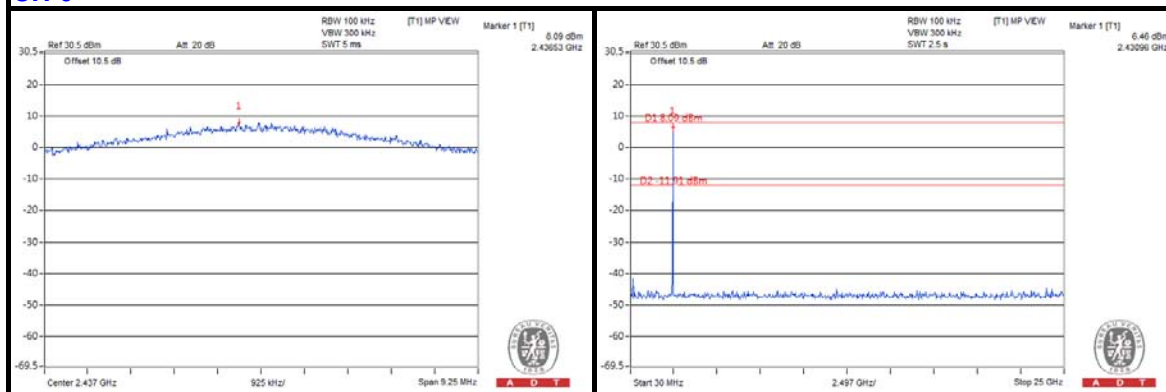
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11b

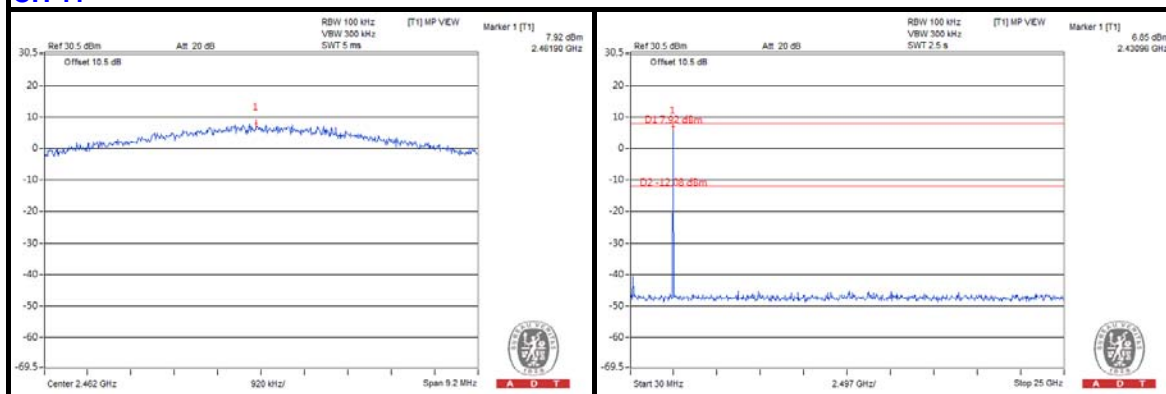
CH 1



CH 6



CH 11

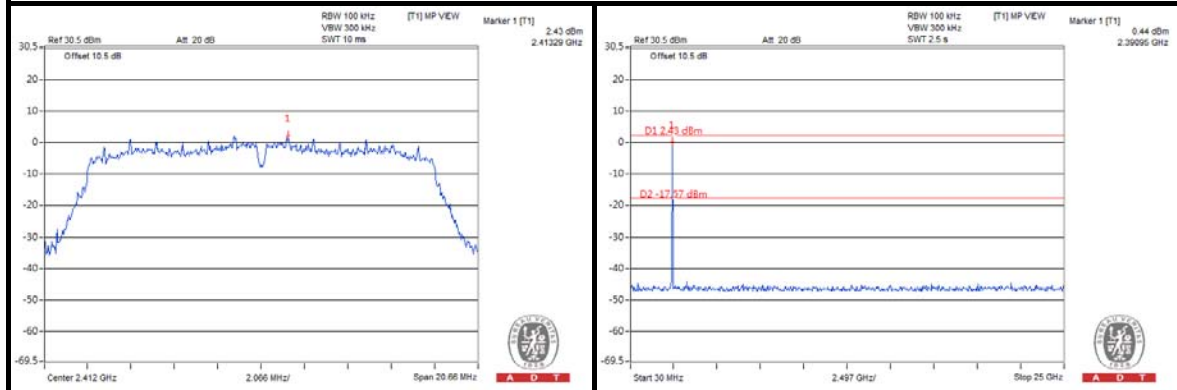




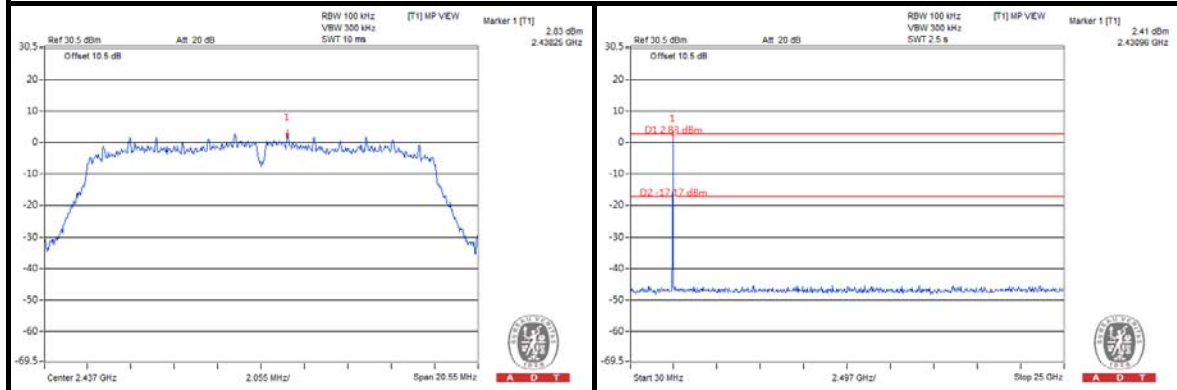
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802.11g

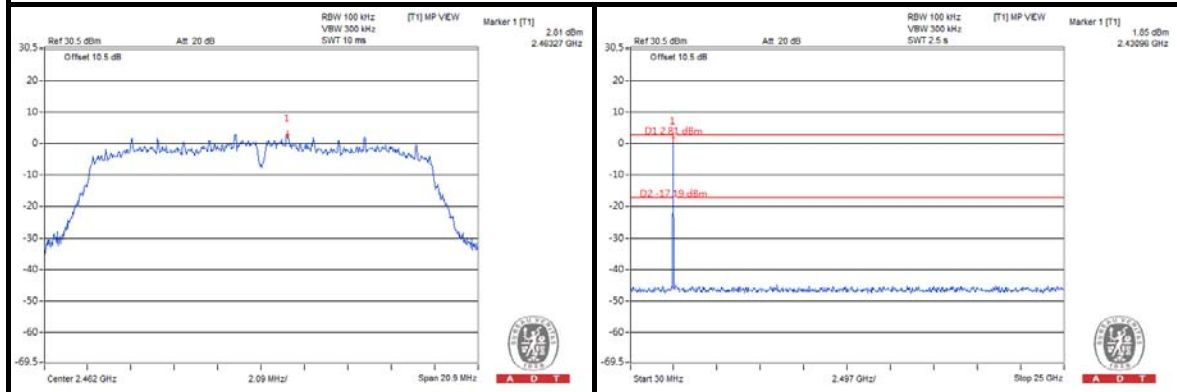
CH 1



CH 6

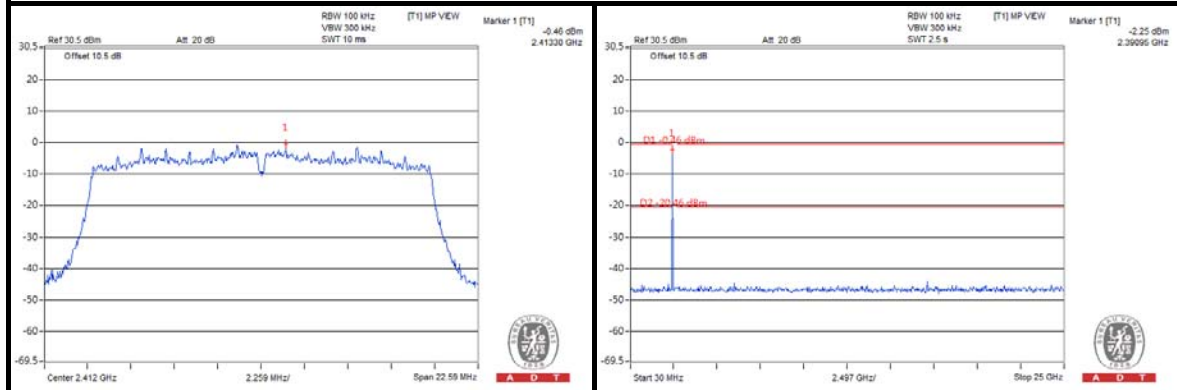


CH 11

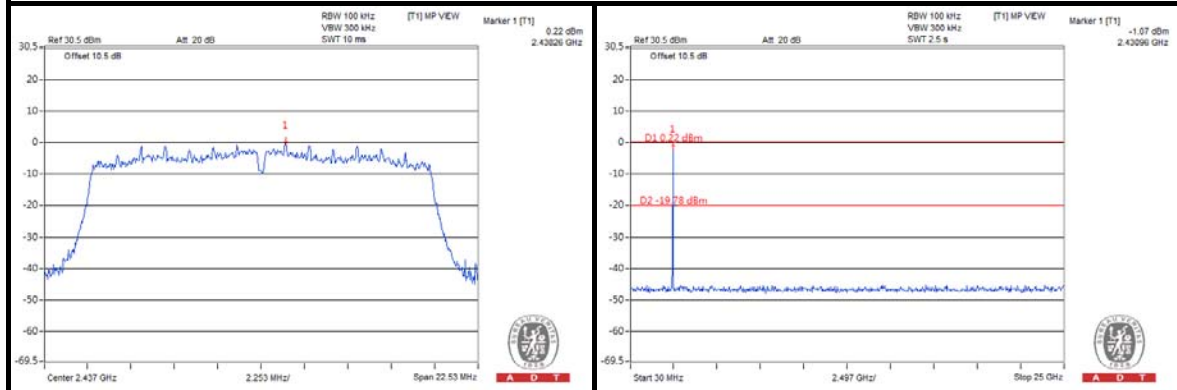


## 802.11n (20MHz)

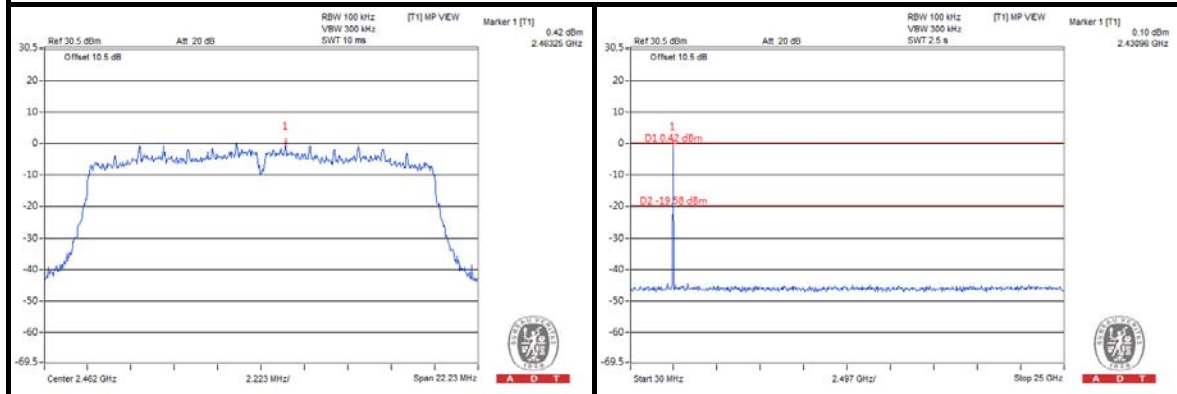
### CH 1



### CH 6



### CH 11





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## 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](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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 any modifications are made to the EUT by the lab during the test.

**---END---**