Test Report of FCC Part 15 C for FCC Certificate

On Behalf of

KENXI INDUSTRIAL CO.,LTD

Product description:	**UNIVERSAL WIRELESS GUITAR CONTROLLER**
Model No.:	**KX01141**
FCC ID:	**XF2-KX01141**
Prepared for:	**KENXI INDUSTRIAL CO.,LTD** 3RD BUILDING, SHAPU INDUSTRIAL ROAD, SHAPU INDUSTRIAL CITY, SONGGANG, BAO'AN, SHENZHEN
Prepared by:	**Bontek Compliance Testing Laboratory Ltd** 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China Tel: 86-755-86337020 Fax: 86-755-86337028
Report No.:	BCT09ER-431E
Issue Date:	June 5, 2009
Test Date:	May 24~June 3, 2009

Test by:	**Reviewed By:**
Kendy Wang	Tony Wu

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	**KENXI INDUSTRIAL CO.,LTD**
Address of applicant:	3RD BUILDING, SHAPU INDUSTRIAL ROAD, SHAPU INDUSTRIAL CITY, SONGGANG, BAO'AN, SHENZHEN
Manufacturer:	**KENXI INDUSTRIAL CO.,LTD**
Address of manufacturer:	3RD BUILDING, SHAPU INDUSTRIAL ROAD, SHAPU INDUSTRIAL CITY, SONGGANG, BAO'AN, SHENZHEN
EUT Description:	UNIVERSAL WIRELESS GUITAR CONTROLLER
Trade Name:	N/A
Model No.:	KX01141
Rated Voltage	DC 6V (4 x1.5VAA alkaline battery) for Transmitter
Frequency range	2464.1MHz
Number of channels	1
Channel Separation	None
Product Class:	Low Power Communication Device Transmitter
Measurement Procedure	ANSI C63.4-2003

Remark: * *The test data gathered are from the production sample provided by the manufacturer.*

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with Section 15.107 and 15.109 under the FCC Rules Part 15 Subpart B and Section 15.207, 15.209,15.249 under the FCC Rules Part 15 Subpart C.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China.

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 338263

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

IC Registration No.: 126111

The 3m alternate test site of Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 126111 on March, 2008.

2. SYSTEM TEST CONFIGURATION

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and FCC CFR 47 Part 15 Subpart C.

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

2.4 List of Measuring Equipments Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	R&S	ESCI	100687	2008/11/17	1 Year
2	EMI Test Receiver	R&S	ESPI7	100097	2008/11/17	1 Year
3	Spectrum Analyzer	Agilent	E7405A	US41160416	2008/11/17	1 Year
4	Amplifier	HP	8447D	1937A02492	2008/11/17	1 Year
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2008/11/17	1 Year
6	3 phase Artificial Mains（L.I.S.N）	SCHWARZBECK	NSLK 8128	8128247	2008/11/17	1 Year
7	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2008/11/17	1 Year
8	Horn Antenna	SCHWARZBECK	BBHA9120A	D69250	2008/11/17	1 Year
9	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2008/11/17	1 Year
10	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2008/11/17	1 Year
11	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2008/11/17	1 Year
12	Power Clamp	SCHWARZBECK	MDS-21	3812	2008/11/17	1 Year
13	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2008/11/17	1 Year
14	Teo Line Single Phase Module	FCC	FCC-LISN-50-25-2-01	06061	2008/11/17	1 Year

3. SUMMARY OF TEST RESULTS

EUT Fundamental Frequency	FCC Rules	Description of Test	Result
2464.1MHz	15.207	Disturbance Voltage at The Mains Terminals	N/A, without AC power supply
	15.249	Band Edges Measurement	Pass
	15.249	Fundamental&Spurious Emission	Pass
	15.203	Antenna Requirement	Pass

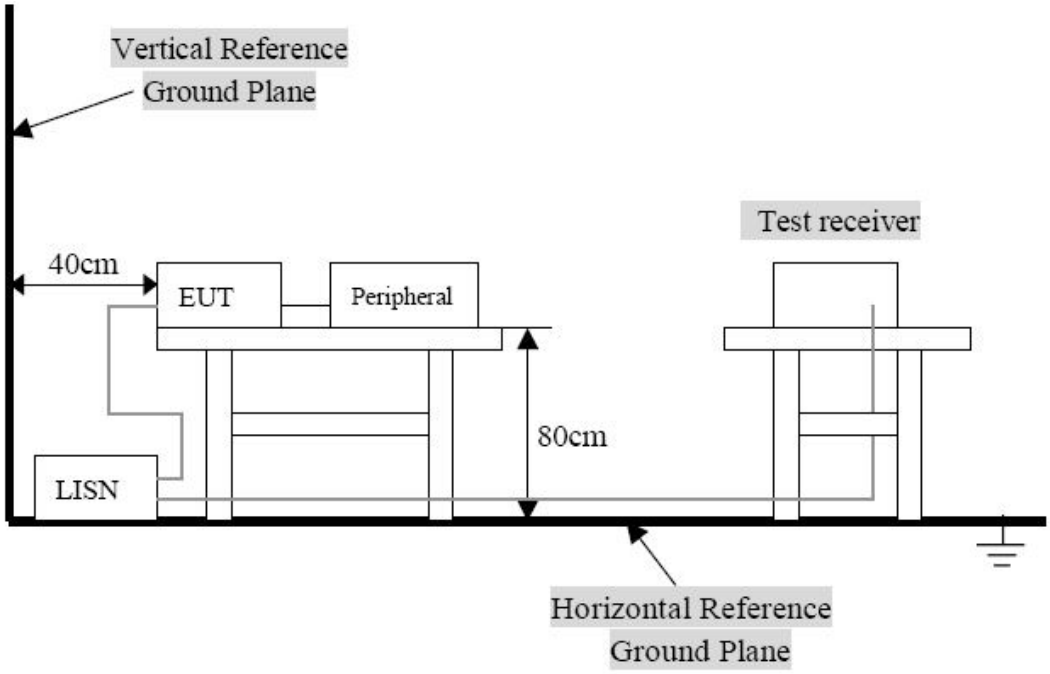
4. TEST OF CONDUCTED EMISSION

4.1 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150～0.500	66～56	56～46
0.500～5.000	56	46
5.000～30.00	60	50

4.2 Test Setup Diagram



Remark: 1. The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC 15.207 limits.

2. The EUT is exclused from investigation of Disturbance Voltage at The Mains Terminals, for it is powered by DC 6V (4 x1.5VAA alkaline) bettary. According to the Section 15.207(d),measurement to demonstrate compliance with the limits of Disturbance Voltage at The Mains Terminals are not required to the devices which only employed bettary power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

5- BAND EDGES MEASUREMENT

5.1 Limit of Band Edges Measurement

1. In the above emission table, the tighter limit applies at the band edges.

2. As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

5.2 EUT Setup

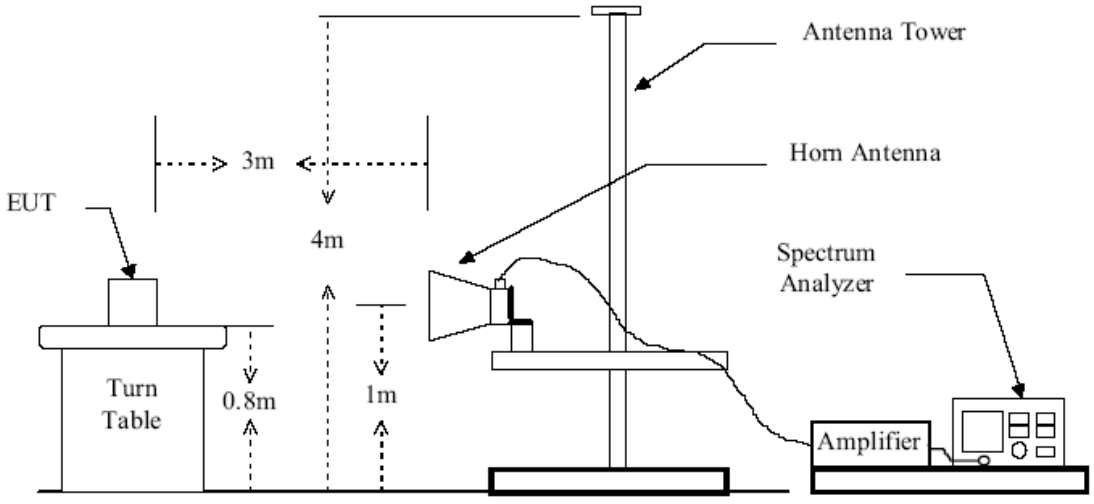


Figure 2 : Frequencies measured above 1 GHz configuration

5.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

1). Configure the EUT according to ANSI C63.4:2003.

2). The EUT was placed on the top of the turntable 0.8 meter above ground.

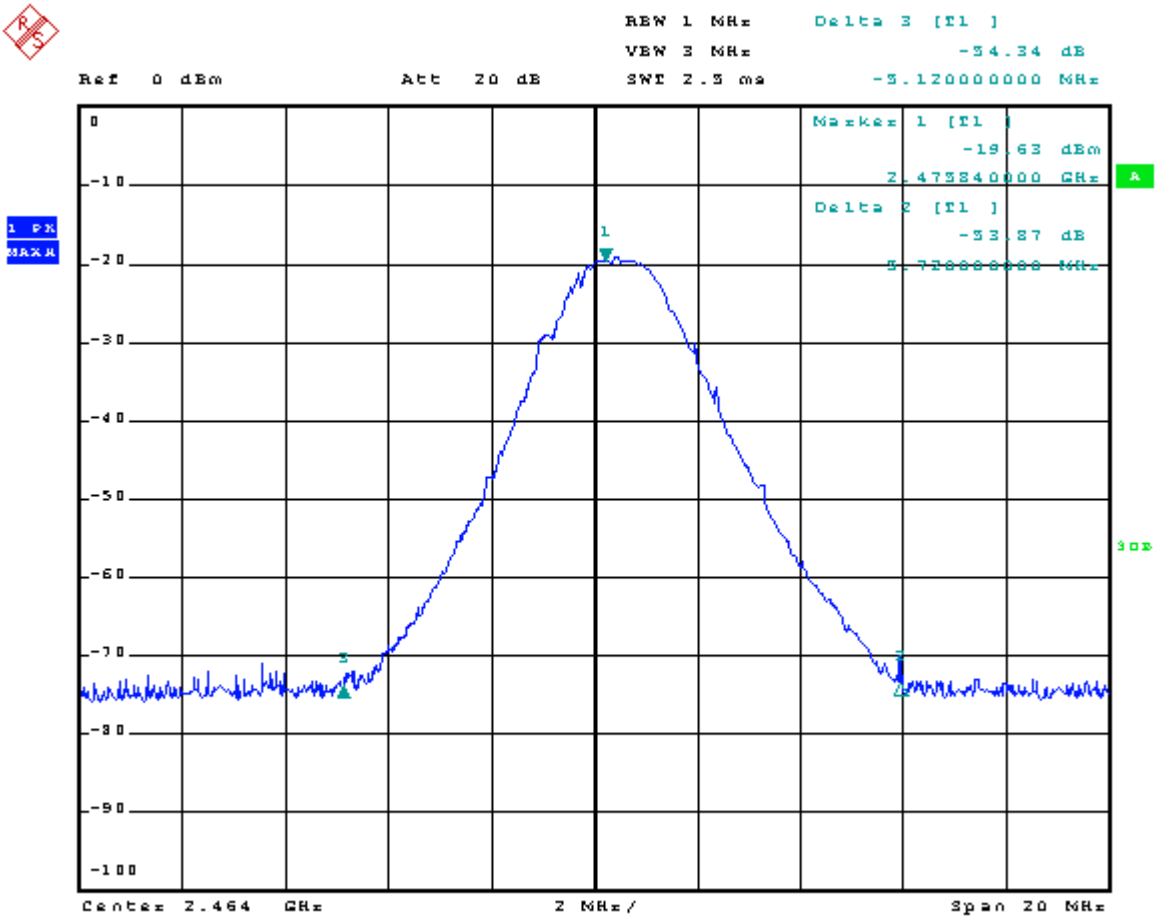
3). The receiving antenna was placed 3 meters far away from the turntable.

4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.

5). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

5.4 Test Result

Temperature (℃) : 22~23	EUT: UNIVERSAL WIRELESS GUITAR CONTROLLER
Humidity (%RH): 50~54	M/N: KX01141
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous Transmitting


RBW 1 MHz
VBW 3 MHz
SWT 2.5 ms
Delta 3 [T1]
-54.34 dB
-5.120000000 MHz
Ref 0 dBm
Att 20 dB
Marker 1 [T1]
-19.63 dBm
2.475840000 GHz
Delta 2 [T1]
-53.87 dB
5.720000000 MHz
1 PK
MAXH
A
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Center 2.464 GHz
2 MHz/
Span 20 MHz

6- SPURIOUS EMISSIONS

6.1 Limit of Spurious Emissions

1. In the section 15.249(a): Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

2. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Fundamental Frequency (MHz)	Field Strength of Fundamental Field Strength (mV/m)	Field Strength of Harmonics (mV/m)
902-928 MHz	50	500
2400 - 2483.5 MHz	50	500
5725 - 5875 MHz	50	500
24.0 - 24.25 GHz	250	2500

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

3. In the above emission table, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

6.2 EUT Setup

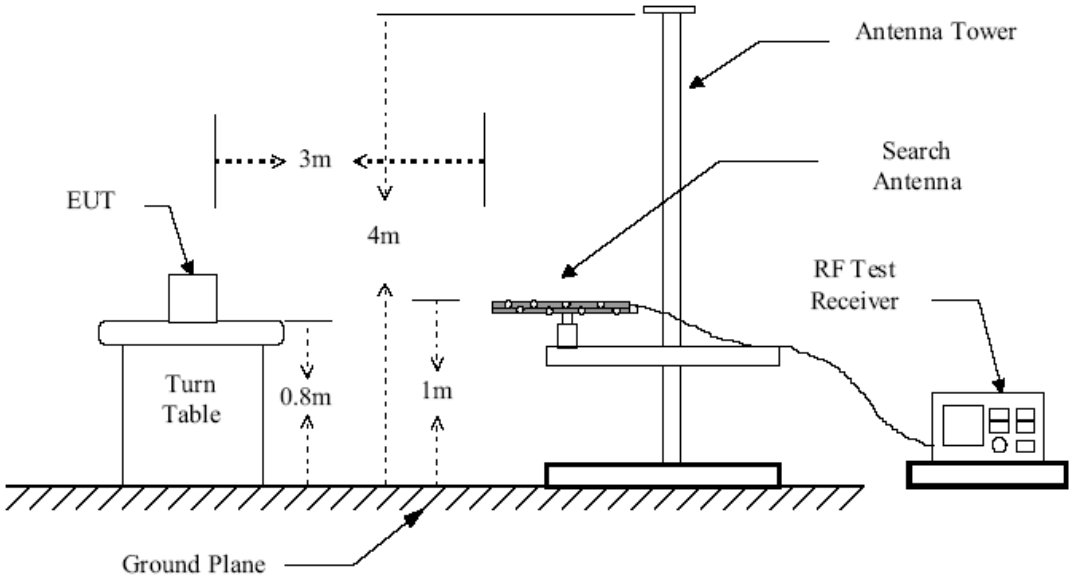


Figure 1 : Frequencies measured below 1 GHz configuration

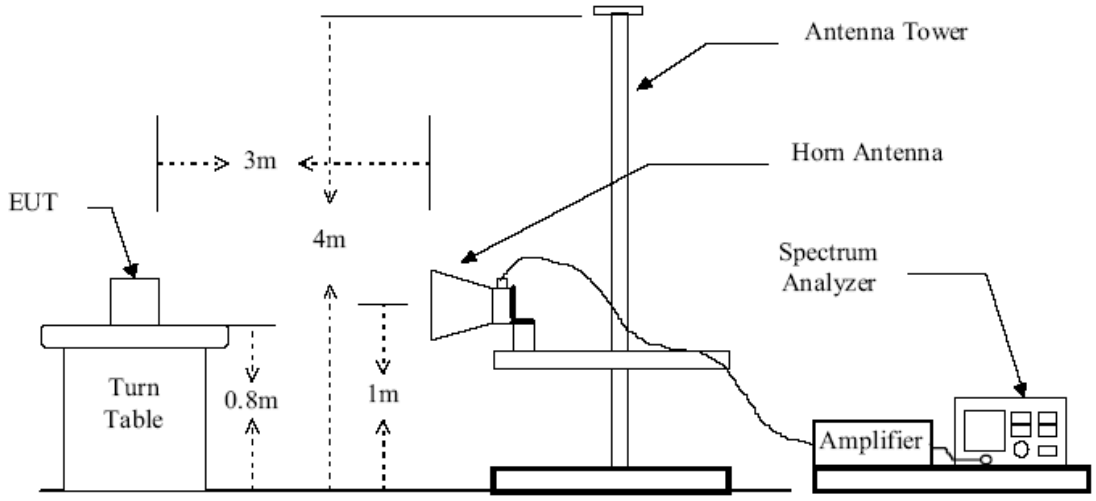


Figure 2 : Frequencies measured above 1 GHz configuration

6.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

1). Configure the EUT according to ANSI C63.4:2003.

2). The EUT was placed on the top of the turntable 0.8 meter above ground.

3). The receiving antenna was placed 3 meters far away from the turntable.

4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.

5). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

6.4 Spurious Emissions Test Result

Temperature (℃) : 22~23	EUT: UNIVERSAL WIRELESS GUITAR CONTROLLER
Humidity (%RH): 50~54	M/N: KX01141
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous Transmitting

Spurious Emissions Below 1 GHz							
Frequency (MHz)	**Ant.Pol. (H/V)**	**Reading (dBuV)**	**Correction Factor (dB/m)**	**Result (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Remark**
181.28	V	12.57	11.54	24.11	43.50	-19.39	QP
221.13	V	6.32	13.19	19.51	46.00	-26.49	QP
250.23	V	15.89	14.27	30.16	46.00	-15.84	QP
264.00	V	8.32	14.52	22.84	46.00	-23.16	QP
333.65	V	16.42	16.32	32.73	46.00	-13.27	QP
499.78	V	11.99	19.57	31.57	46.00	-14.43	QP
178.88	H	10.40	11.42	21.83	43.50	-21.67	QP
233.48	H	12.91	13.64	26.55	46.00	-19.45	QP
248.10	H	20.51	14.20	34.71	46.00	-11.29	QP
333.68	H	19.67	16.32	35.98	46.00	-10.02	QP
417.18	H	9.38	17.97	27.35	46.00	-18.65	QP
498.63	H	6.09	19.55	25.64	46.00	-20.36	QP

Remark:

1). Measuring frequencies from 30 MHz to the 1GHz.

2). Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.

3). Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.

4). Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " --- " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

5). Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

Spurious Emissions above 1GHz										
Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Result		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Peak Margin (dB)	AV Margin (dB)
					Peak (dBuV/m)	AV (dBuV/m)				
2464.10	V	82.22	79.96	-4.37	77.85	75.59	---	93.97	---	-17.98
1232.05	V	48.16	45.92	-10.3	37.86	35.62	74.00	54.00	-36.14	-18.38
4928.20	V	46.98	40.03	-9.81	37.17	30.22	74.00	54.00	-36.83	-23.78
7392.30	V	46.96	43.55	-8.43	38.53	35.12	74.00	54.00	-35.47	-18.88
9856.40	V	47.11	38.18	-7.96	39.15	30.22	74.00	54.00	-34.85	-23.78
12320.50	V	42.16	40.12	-6.67	35.49	33.45	74.00	54.00	-38.51	-20.55
14784.60	V	41.18	37.5	-4.29	36.89	33.21	74.00	54.00	-37.11	-20.79
17248.70	V	51.3	37.13	2.28	53.58	39.41	74.00	54.00	-20.42	-14.59
19712.80	V	41.57	41.57	3.85	45.42-	38.55	74.00	54.00	-28.58	-15.45
22176.90	---	---	---	---	---	---	---	---	---	---
24641.00	---	---	---	---	---	---	---	---	---	---
2464.10	H	75.63	72.28	-4.37	71.26	67.91	---	93.97	---	-26.06
1232.05	H	45.86	40.55	-10.33	32.53	30.22	74.00	54.00	-41.47	-23.78
4928.20	H	41.01	41.01	-6.79	34.22	29.53	74.00	54.00	-39.78	-24.47
7392.30	H	41.35	36.2	-4.05	37.30	32.15	74.00	54.00	-36.7	-21.85
9856.40	H	45.04	42.04	-3.59	41.45	38.45	74.00	54.00	-32.55	-15.55
12320.50	H	43.77	41.11	-1.25	42.52	39.86	74.00	54.00	-31.48	-14.14
14784.60	---	---	---	---	---	---	---	---	---	---
17248.70	---	---	---	---	---	---	---	---	---	---
19712.80	---	---	---	---	---	---	---	---	---	---
22176.90	---	---	---	---	---	---	---	---	---	---
24641.00	---	---	---	---	---	---	---	---	---	---

Remark:

1). Measuring frequencies from 1GHz to the 10 harmonics of operating frequency.

2). Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/AV detector mode.

3). Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " --- " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

5). Margin (dB) = Remark result (dBuV/m) – limit (dBuV/m).

7. ANTENNA REQUIREMENT

7.1 Standard Applicable

Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Section 15.247(b)/(c):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

7.2 Antenna Connected Construction

The antenna connector is designed with permanent attachment and no consideration of replacement.