



**FCC 47 CFR PART 15 SUBPART C AND ANSI C63.10:2009
CO-LOCATION TEST REPORT
(Class II Permissive Change Report)**

For

4G/LTE VoIP Wireless-N VPN Broadband Router

Model : BiPAC 6300VNOZ

**Data Applies To : BiPAC 6300VNPZ ; BEC 6300VNL ; BiPAC 6300NZ ;
BiPAC 6300NZL ; BEC 6300NL**

Trade Name : Billion

Issued for

Billion Electric Co., Ltd.

**8F, No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City 231,
Taiwan (R.O.C.)**

Issued by

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	07/04/2014	Initial Issue	All Page 15	Gloria Chang



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1. TEST REPORT CERTIFICATION

Applicant : Billion Electric Co., Ltd.
Address : 8F., No.192, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei
City 231, Taiwan (R.O.C.)
Equipment Under Test : 4G/LTE VoIP Wireless-N VPN Broadband Router
Model : BiPAC 6300VNOZ
Data Applies To : BiPAC 6300VNPZ ; BEC 6300VNL ; BiPAC 6300NZ ;
BiPAC 6300NZL ; BEC 6300NL
Trade Name : Billion
Tested Date : May 06 ~ June 24, 2014

APPLICABLE STANDARD	
Standard	Test Result
FCC Part 15 Subpart C AND ANSI C63.10:2009	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Sb. Lu
Sr. Engineer

Reviewed by:

Gundam Lin
Sr. Engineer



2. EUT DESCRIPTION

2.1 DESCRIPTION OF EUT & POWER

Product Name	4G/LTE VoIP Wireless-N VPN Broadband Router
Model Number	BiPAC 6300VNOZ
Data Applies To	BiPAC 6300VNPZ ; BEC 6300VNL ; BiPAC 6300NZ ; BiPAC 6300NZL ; BEC 6300NL
Identify Number	T140506S04
Received Date	May 06, 2014
Frequency Range	IEEE 802.11b/g, 802.11n HT20 : 2412MHz ~ 2462MHz IEEE 802.11n HT40 : 2422MHz ~ 2452MHz
Transmit Power	IEEE 802.11b : 20.45dBm (0.1109W) IEEE 802.11g : 25.61dBm (0.3639W) IEEE 802.11n HT20 : 23.76dBm (0.2374W) IEEE 802.11n HT40 : 25.46dBm (0.3516W)
Channel Spacing	IEEE 802.11b/g, 802.11n HT20/HT40 : 5MHz
Channel Number	IEEE 802.11b/g, 802.11n HT20: 11 Channels IEEE 802.11n HT40 : 7 Channels
Transmit Data Rate	IEEE 802.11b : 11, 5.5, 2, 1 Mbps IEEE 802.11g : 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20 : 144.4, 130, 117, 115.6, 104, 86.7, 78, 72.2, 65, 58.5, 57.8, 52, 43.3, 39, 28.9, 26, 21.7, 19.5, 14.4, 13, 7.2, 6.5 Mbps IEEE 802.11n HT40 : 300, 270, 243, 240, 216, 180, 162, 150, 135, 121.5, 120, 108, 90, 81, 60, 54, 45, 40.5, 30, 27, 15, 13.5 Mbps
Type of Modulation	IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK)
Frequency Selection	by software / firmware
Antenna Type	PCB Antenna x 2 : Antenna 0 (Chain 0), Antenna Gain 2.36 dBi Antenna 1 (Chain 1), Antenna Gain 2.36 dBi
Power Rating	12Vdc, 15Vdc
Test Voltage	120Vac, 60Hz
DC Power Cable Type	Non-shielded cable 1.5m (Non-detachable)
I/O Port	RJ-45 Port x 4, RJ-11 Port x 2, USB Port x 1, UPS Port x 1, SIM Card Port x 1, Power Port x 1
Signal Cable	Non-shielded RJ-45 cable 1.8m x 1 (Detachable)



Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	EGB	PAW024A15US	100-240Vac, 0.7A, 50/60Hz	15Vdc, 1.6 A
2	EGB	PAW018A12UL	100-240Vac, 0.5A, 50/60Hz	12Vdc, 1.5 A

The difference of the model :

Difference Item	Model					
	BiPAC 6300VNOZ	BiPAC 6300VNPZ	BEC 6300VNL	BiPAC 6300NZ	BiPAC 6300NZZ	BEC 6300NL
LAN	3	3	3	4	4	4
EWAN	1	1	1	1	1	1
UPS	1	1	1	0	0	0
USB	1	1	1	1	1	1
FXS	2	2	2	0	0	0
SIM	1	1	1	1	1	1
Note	For the marketing purpose.					
Power Adapter	15V / 1.6A			15V / 1.6A		
	12V / 1.5A			12V / 1.5A		

Remark :

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. For more details, please refer to the User's manual of the EUT.
3. The models BiPAC 6300VNOZ was considered the main model for testing.
4. This submittal(s) (test report) is intended for FCC ID: QI3BIL- 6300VNOZ filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.

2.2 DESCRIPTION OF CLASS II CHANGE

The major change filed under this application is :

1. The intension of this application is to enable the system certified FCC ID: QI3BIL-6300VNOZ, Dated 12/11/2013 to be co-located with 4G LTE Embedded Mini-Card Module with FCC ID: QI3BIL-AWDL060, in the system; to certify the additional of certified FCC ID: QI3BIL-6300VNOZ as a Class II Permissive Change in system.
2. Change product description (VoIP Wireless-N VPN Broadband Router change to 4G/LTE VoIP Wireless-N VPN Broadband Router)

After pre-scan, the testing data please refer to section 6.1.

Other testing items data was showed as original application document reports (FCC ID: QI3BIL- 6300VNOZ).



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2009 and FCC CFR 47, 15.207, 15.209 and 15.247.

4. FACILITIES AND ACCREDITATION

4.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

NO. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.10:2009 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

4.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

Taiwan	TAF
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The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	INDUSTRY CANADA
Japan	VCCI
Taiwan	BSMI
USA	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>

Remark: FCC Designation Number TW1027.



4.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81

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

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.



5. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.
1	PC	IBM (Lenovo)	ThinkCentre AG5	L3C8189
2	Notebook PC	IBM (Lenovo)	ThinkPad T61 7663-AS6	L3F3864
3	Notebook PC	HP	ProBook 4421s	CNF03242PM

No.	Signal cable description
1	Non-shielded RJ-45 cable, 10m x 2
2	Non-shielded UPS fixture cable, 5cm x 1



6. RADIATED EMISSION FOR CO-LOCATION

LIMITS

(1) According to § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	(²)
13.36 - 13.41			

Remark:

1. ¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2. ² Above 38.6

(2) According to § 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



(3) According to § 15.209 (a) 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 :

Frequency (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

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.

(4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST EQUIPMENT

Radiated Emission / 966Chamber_B

Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/15/2015
EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/16/2014
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	09/12/2014
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-778	09/12/2014
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/05/2014
Horn Antenna	COM-POWER	AH-840	03077	12/18/2014
Pre-Amplifier	Agilent	8447D	2944A10052	07/16/2014
Pre-Amplifier	Agilent	8449B	3008A01916	07/16/2014
LOOP Antenna	EMCO	6502	8905-2356	08/20/2014
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R

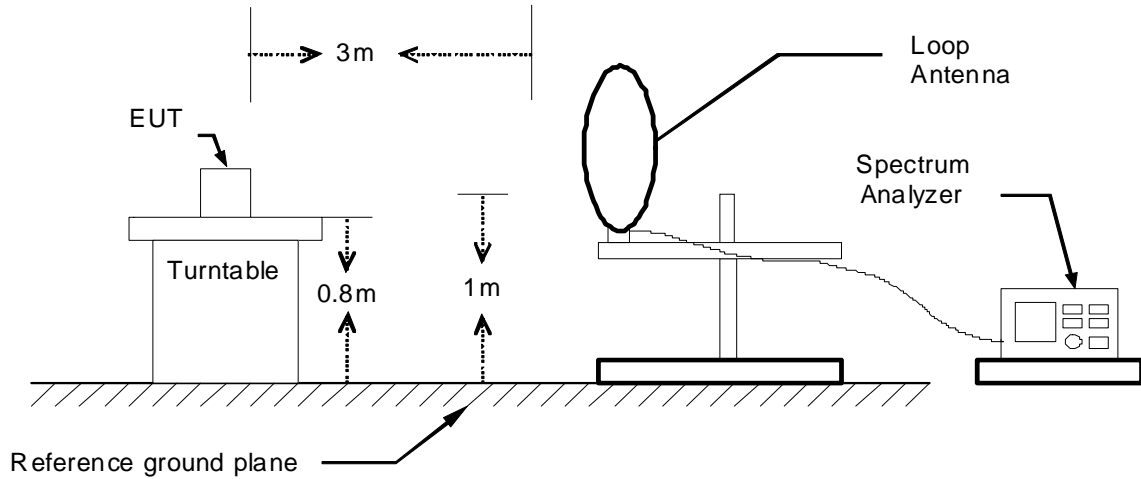
Remark: 1. Each piece of equipment is scheduled for calibration once a year.
2. N.C.R = No Calibration Request.



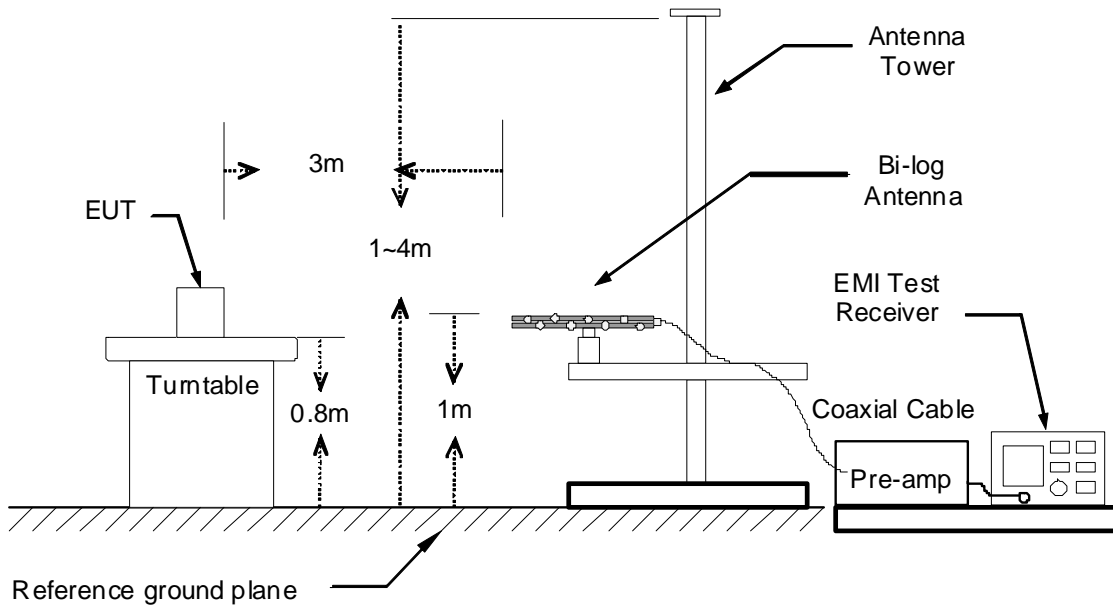
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission below 1GHz.

9kHz ~ 30MHz

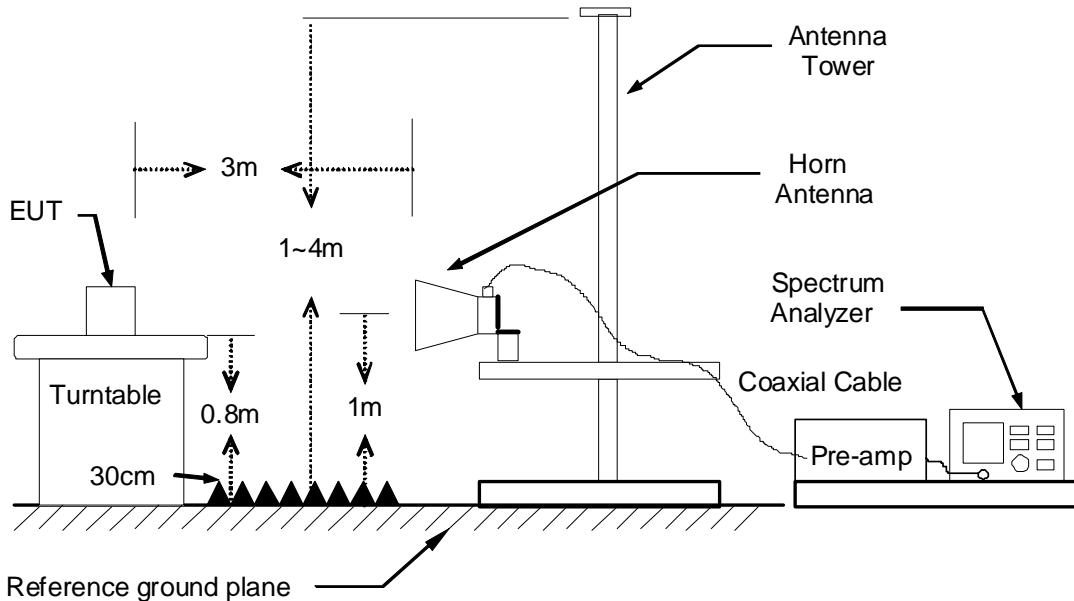


30MHz ~ 1GHz





The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. 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 polarization of the antenna are set to make the measurement.
4. 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 table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Remark :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.



TEST RESULTS

Product Name	4G/LTE VoIP Wireless-N VPN Broadband Router	Test By	Audi Chang
Test Model	BiPAC 6300VNOZ	Test Date	2014/05/15
Test Mode	WLAN + LTE (LTE Dipole Ant SX-7)	Temp. & Humidity	27°C, 56%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1010.00	50.97	---	-2.88	48.09	---	74.00	54.00	-5.91	Peak
2312.00	50.40	---	2.44	52.84	---	74.00	54.00	-1.16	Peak
2374.00	55.75	35.48	2.56	58.31	38.04	74.00	54.00	-15.96	AVG
2380.00	53.69	36.64	2.57	56.26	39.21	74.00	54.00	-14.79	AVG
2502.00	56.25	37.33	2.82	59.07	40.15	74.00	54.00	-13.85	AVG
3630.00	40.91	---	4.85	45.76	---	74.00	54.00	-8.24	Peak
4485.00	39.24	---	7.36	46.60	---	74.00	54.00	-7.40	Peak
4875.00	42.99	---	8.18	51.17	---	74.00	54.00	-2.83	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1050.00	53.87	---	-2.88	50.99	---	74.00	54.00	-3.01	Peak
2358.00	47.13	---	2.53	49.66	---	74.00	54.00	-4.34	Peak
2384.00	48.70	---	2.58	51.28	---	74.00	54.00	-2.72	Peak
2492.00	44.89	---	2.79	47.69	---	74.00	54.00	-6.31	Peak
4140.00	38.55	---	6.29	44.84	---	74.00	54.00	-9.16	Peak
4590.00	38.51	---	7.60	46.10	---	74.00	54.00	-7.90	Peak
4875.00	47.62	39.22	8.18	55.80	47.40	74.00	54.00	-6.60	AVG

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " 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. Result = Reading + Correction Factor
Margin = Result - Limit
Remark Peak = Result(PK) - Limit(AV)
Remark AVG = Result(AV) - Limit(AV)