FCC PART 15 B

TEST REPORT

For

Hideki Electronics Limited

UNITS 2304-06, 23/F., RILEY HOUSE, 88 LEI MUK ROAD, KWAI CHUNG, HONG KONG.

FCC ID: Q9PPCR325W1

Report Type:	**Product Type:**
Original Report	Atomic Projection Clock

Test Engineer: Dean Liu

Report Number: RDG150106003-00

Report Date: 2015-01-15

Reviewed By: Sula Huang, RF Engineer

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Hideki Electronics Limited*'s product, model number: *PCR325W (FCC ID: Q9PPCR325W1) (*or the "EUT") in this report was a *Atomic Projection Clock*, which was measured approximately: 16 cm (L) x11.6 cm (W) x4.9 cm (H), rated input voltage: DC3.0V from 2*AA batteries or DC 5V from adapter. The highest operating frequency is 434MHz.

Adapter information:
Model: MA132-050010
Input: AC 120V, 60Hz,
Output: DC 5V, 100mA

**All measurement and test data in this report was gathered from production sample serial number: 150106003 (Assigned by Applicant). The EUT was received on 2015-01-06.*

Objective

This test report is prepared on behalf of *Hideki Electronics Limited* in accordance with Part 2, Subpart J, and Part 15-Subparts A and B of the Federal Communications Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15 B Class B.

Related Submittal(s)/Grant(s)

No related submittal.

Test Methodology

All measurements contained in this report were conducted with 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Dongguan).

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 02, 2012. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

No software was used during test.

Equipment Modifications

No modification was made to the EUT tested.

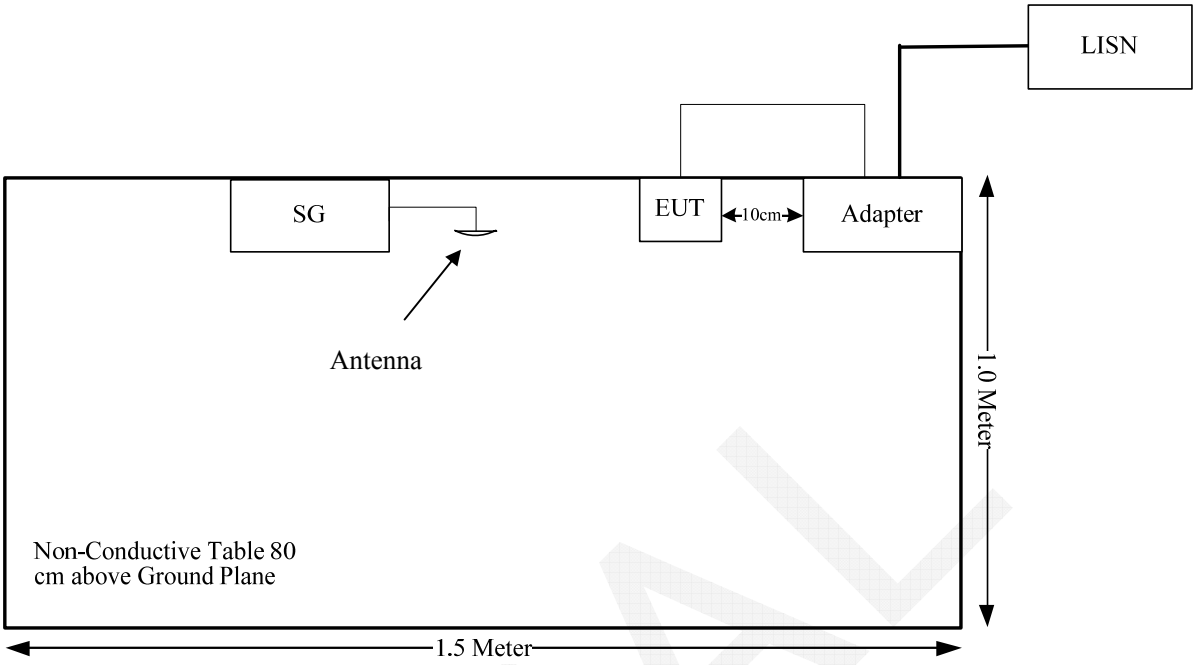
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
HP	Signal Generator	8648A	3426A00831

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
DC Cable	No	No	0.8	Adapter	EUT

Configuration of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

FCC§15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are Receiver, cable loss, and LISN.

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

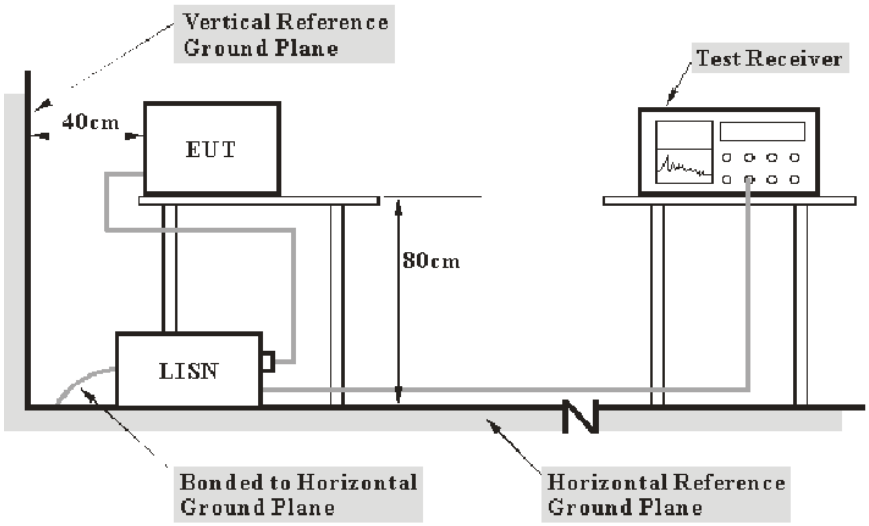
If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of conducted disturbance at mains port using AMN at Bay Area Compliance Laboratories Corp. (Dongguan) is 3.46 dB (150 kHz to 30 MHz).

Table 1 – Values of U_{cispr}

Measurement	U_{cispr}
Conducted disturbance at mains port using AMN (150 kHz to 30 MHz)	3.4 dB

EUT Setup



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

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to a 120V/60Hz AC power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS 30	830245/006	2014-11-20	2015-11-20
R&S	L.I.S.N	ESH3-Z5	843331/015	N/A	N/A
R&S	Two-line V-network	ENV 216	3560.6550.12	2014-01-22	2015-01-22
R&S	Test Software	EMC32	Version8.53.0	N/A	N/A

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Procedure

During the conducted emission test, the adapter of laptop was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Corrected Amplitude & Margin Calculation

The basic equation is as follows:

$V_C = V_R + A_C + VDF$

Herein,
V_C: corrected voltage amplitude

V_R: reading voltage amplitude

A_c: attenuation caused by cable loss

VDF: voltage division factor of AMN or ISN

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

26.9 dB at **1.624765 MHz** in the **Neutral** conducted mode

Test Data

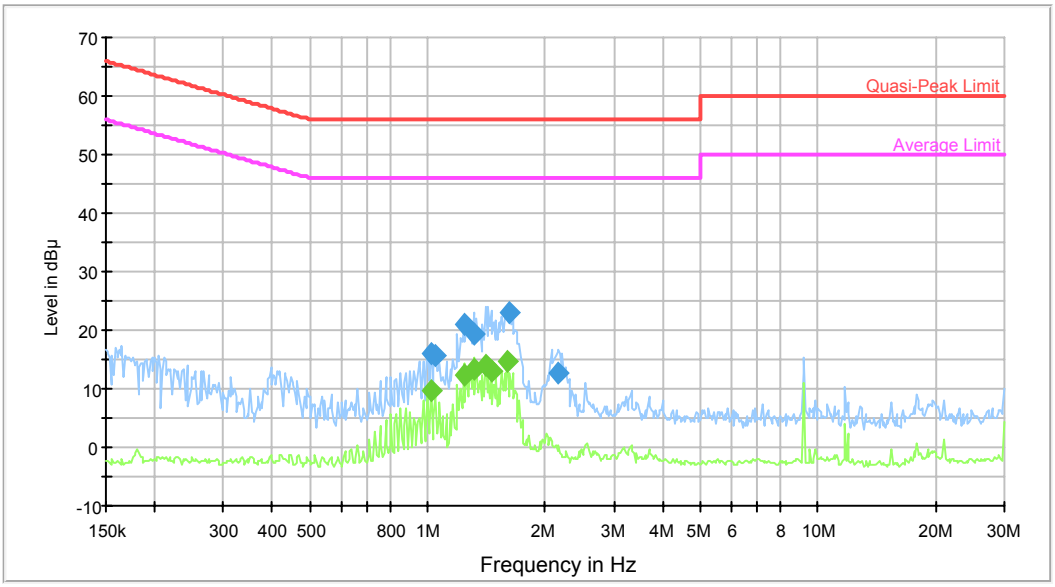
Environmental Conditions

Temperature:	22.3 °C
Relative Humidity:	42 %
ATM Pressure:	101.6kPa

The testing was performed by Dean Liu on 2015-01-21.

Test Mode: Receiving

AC120V, 60Hz, Line:

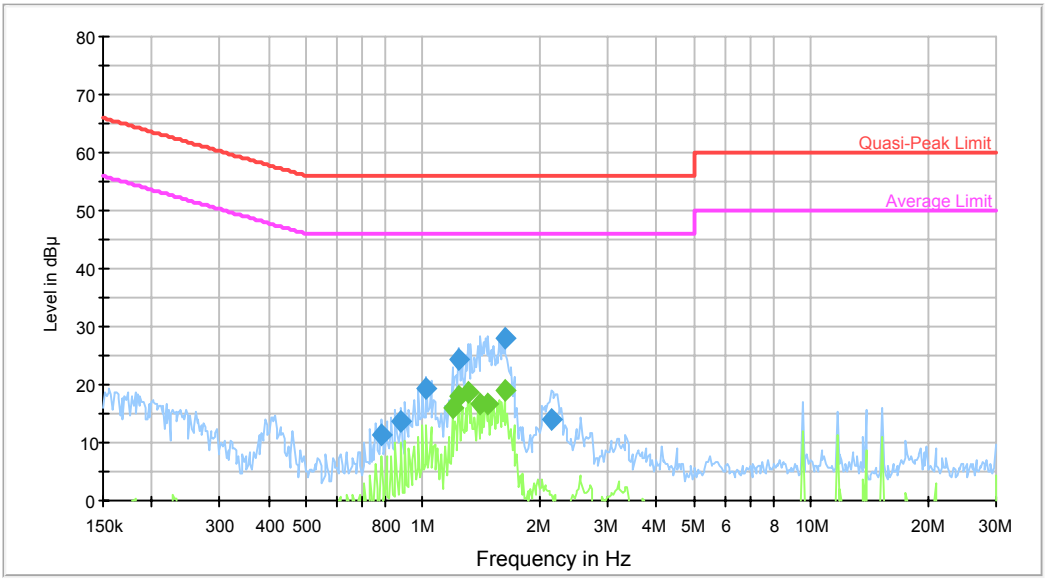


Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
1.023481	15.9	9.000	L1	10.4	40.1	56.0	Compliance
1.048242	15.5	9.000	L1	10.4	40.5	56.0	Compliance
1.239175	21.0	9.000	L1	10.4	35.0	56.0	Compliance
1.310256	19.3	9.000	L1	10.4	36.7	56.0	Compliance
1.624765	23.0	9.000	L1	10.4	33.0	56.0	Compliance
2.164561	12.6	9.000	L1	10.5	43.4	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
1.023481	9.7	9.000	L1	10.4	36.3	46.0	Compliance
1.239175	12.5	9.000	L1	10.4	33.5	46.0	Compliance
1.310256	13.2	9.000	L1	10.4	32.8	46.0	Compliance
1.407671	14.2	9.000	L1	10.4	31.8	46.0	Compliance
1.453260	13.1	9.000	L1	10.4	32.9	46.0	Compliance
1.599078	14.7	9.000	L1	10.4	31.3	46.0	Compliance

**Within measurement uncertainty!*

AC120V, 60Hz, Neutral:



Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.780588	11.3	9.000	N	10.5	44.7	56.0	Compliance
0.879690	13.8	9.000	N	10.5	42.2	56.0	Compliance
1.023481	19.2	9.000	N	10.5	36.8	56.0	Compliance
1.239175	24.2	9.000	N	10.5	31.8	56.0	Compliance
1.624765	27.9	9.000	N	10.5	28.1	56.0	Compliance
2.147382	14.0	9.000	N	10.5	42.0	56.0	Compliance

Frequency (MHz)	Average (dBµV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
1.190776	16.1	9.000	N	10.5	29.9	46.0	Compliance
1.239175	17.9	9.000	N	10.5	28.1	46.0	Compliance
1.310256	18.5	9.000	N	10.5	27.5	46.0	Compliance
1.407671	16.7	9.000	N	10.5	29.3	46.0	Compliance
1.476605	16.7	9.000	N	10.5	29.3	46.0	Compliance
1.624765	19.1	9.000	N	10.5	26.9	46.0	Compliance

FCC §15.109 - RADIATED SPURIOUS EMISSIONS

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner：

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
–compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
–non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

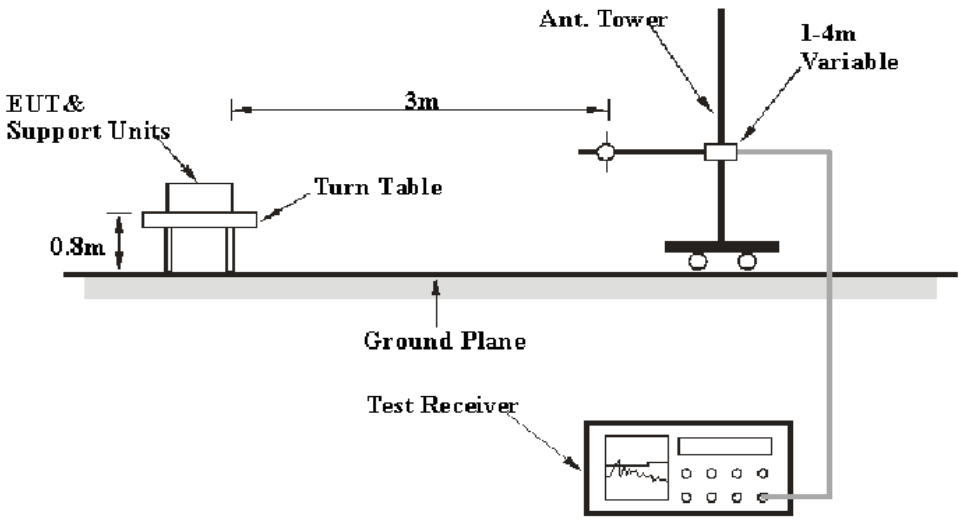
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 5.0 dB; 200M~1GHz: 6.2 dB; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 – Values of U_{cispr}

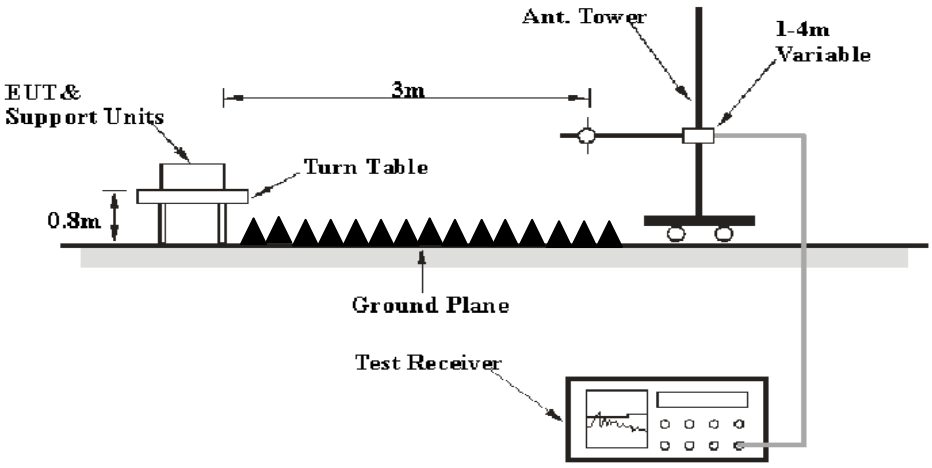
Measurement		U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)	(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)	(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)	(6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	10 Hz	/	Ave.

Test Procedure

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

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS-Lindgren	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Loss + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15 B Class B, with the worst margin reading of:

15.3 dB at **30.0000 MHz** in the **Vertical** polarization

Test Data

Environmental Conditions

Temperature:	20 °C
Relative Humidity:	59 %
ATM Pressure:	101.6 kPa

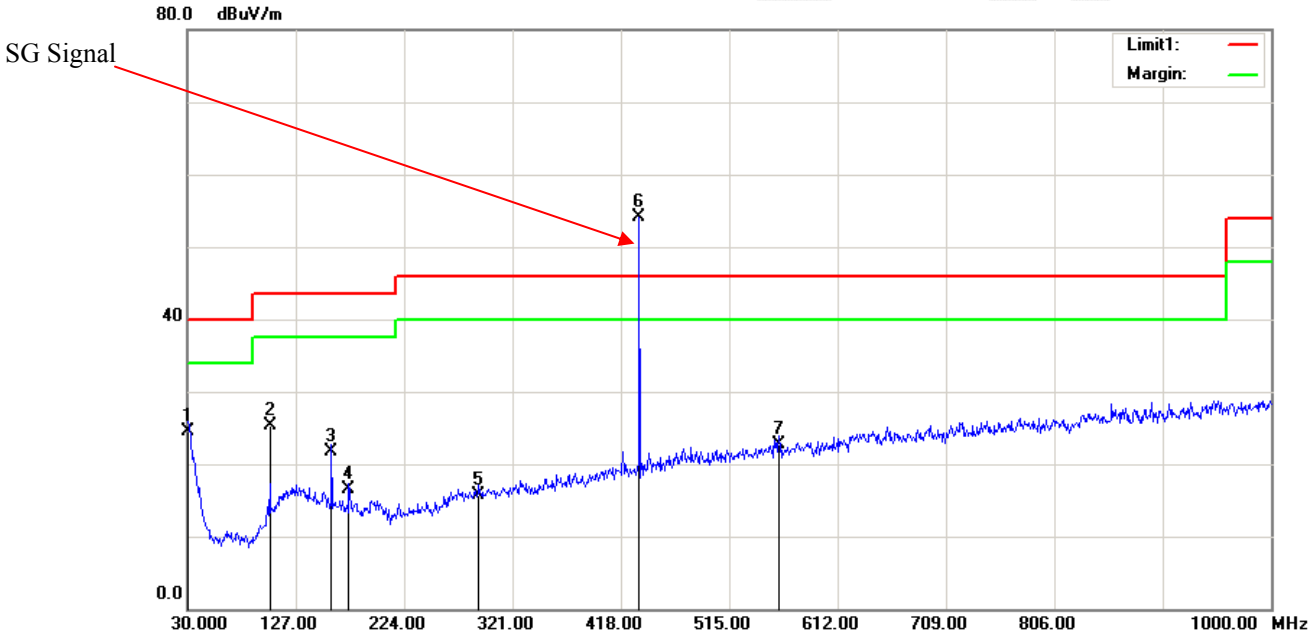
The testing was performed by Dean Liu on 2015-01-21

Test Result: Compliance

Test Mode: Receiving

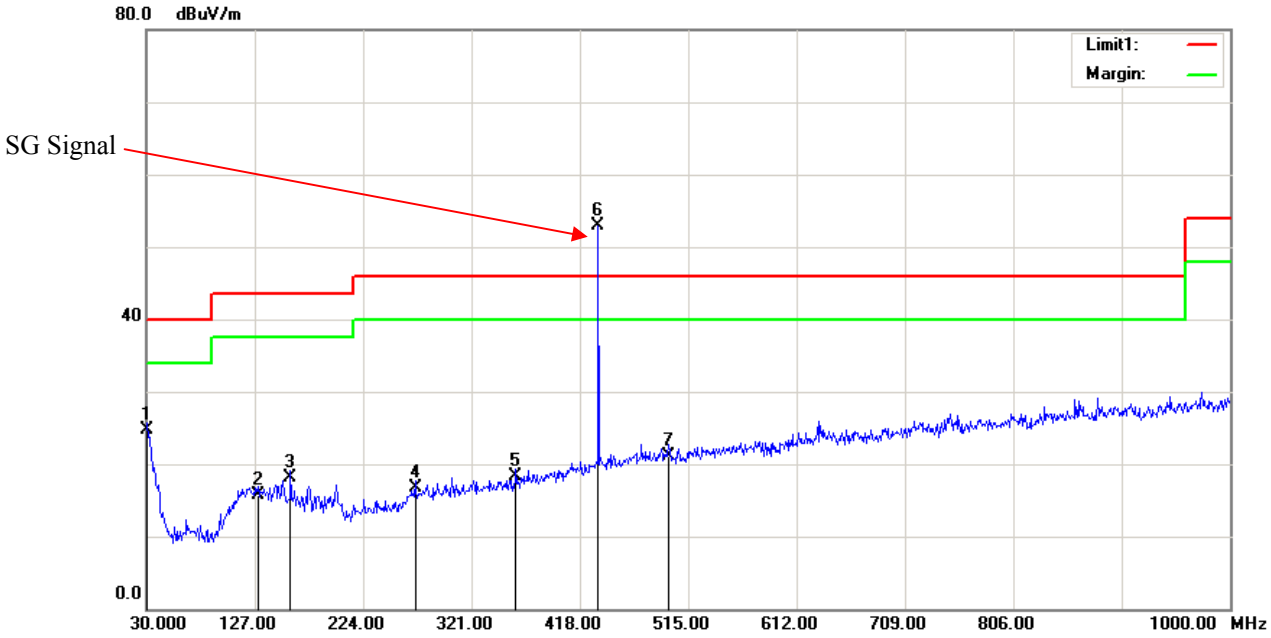
1) Below 1G:

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.9700	22.28	QP	2.22	24.50	40.00	15.50
103.7200	34.10	QP	-8.70	25.40	43.50	18.10
159.0100	29.12	QP	-7.42	21.70	43.50	21.80
174.5300	24.84	QP	-8.34	16.50	43.50	27.00
290.9300	21.89	QP	-6.09	15.80	46.00	30.20
559.6200	23.71	QP	-0.91	22.80	46.00	23.20

Vertical

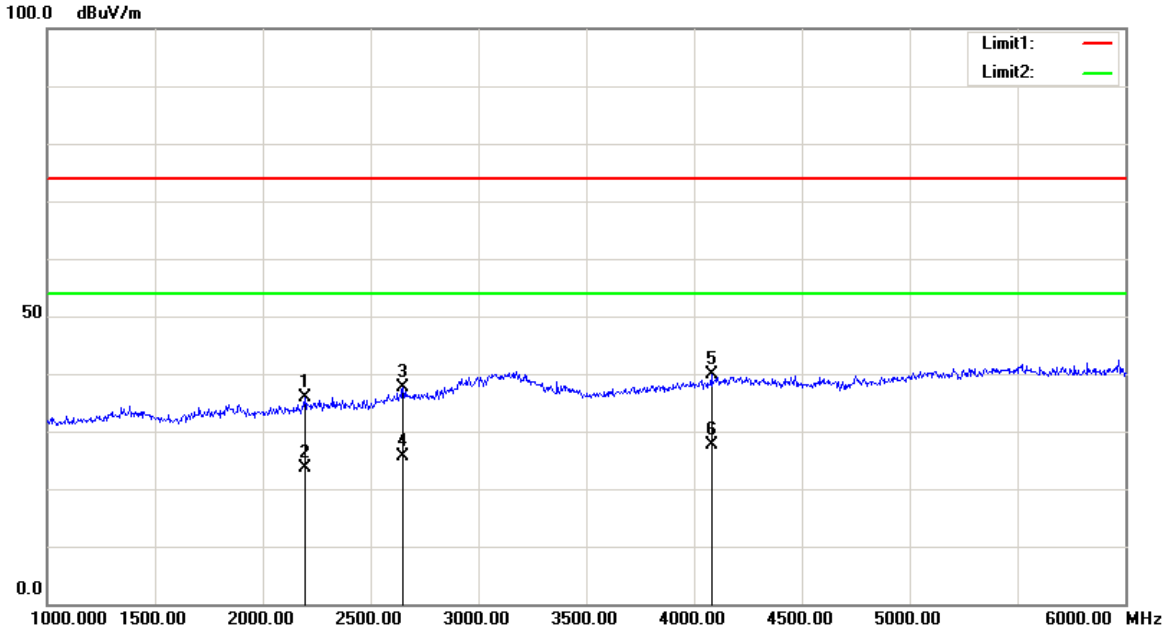


**Within measurement uncertainty!*

Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
30.0000	21.32	QP	3.38	24.70	40.00	15.30
129.9100	21.33	QP	-5.53	15.80	43.50	27.70
159.0100	25.52	QP	-7.42	18.10	43.50	25.40
270.5600	22.93	QP	-6.23	16.70	46.00	29.30
360.7700	22.79	QP	-4.49	18.30	46.00	27.70
497.5400	22.64	QP	-1.54	21.10	46.00	24.90

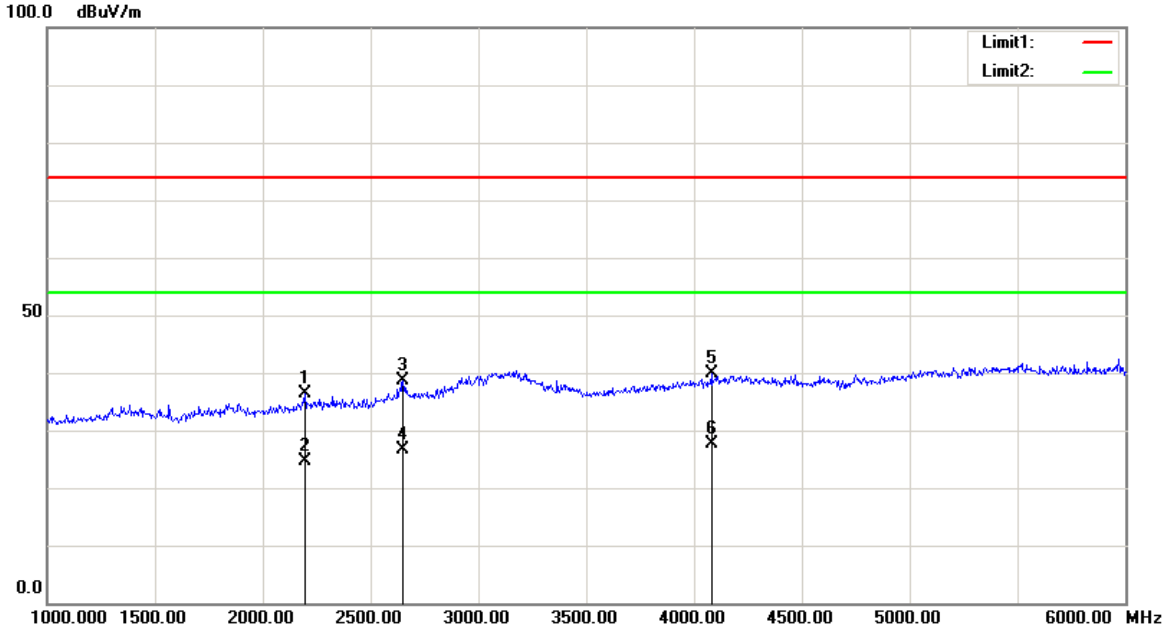
2) Above 1G:

Horizontal



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2197.500	34.65	peak	1.13	35.78	74.00	38.22
2197.500	22.41	AVG	1.13	23.54	54.00	30.46
2650.000	34.10	peak	3.58	37.68	74.00	36.32
2650.000	22.09	AVG	3.58	25.67	54.00	28.33
4080.000	32.30	peak	7.52	39.82	74.00	34.18
4080.000	20.02	AVG	7.52	27.54	54.00	26.46

Vertical



Frequency (MHz)	Receiver Reading (dBµV)	Detector (PK/QP/Ave)	Correction Factor (dB/m)	Cord. Amp. (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2197.500	35.15	peak	1.13	36.28	74.00	37.72
2197.500	23.43	AVG	1.13	24.56	54.00	29.44
2650.000	35.10	peak	3.58	38.68	74.00	35.32
2650.000	22.96	AVG	3.58	26.54	54.00	27.46
4080.000	32.30	peak	7.52	39.82	74.00	34.18
4080.000	20.02	AVG	7.52	27.54	54.00	26.46

*******END OF REPORT*******