



FCC PART 15.247
TEST REPORT

For

Chengdu Vantron Technology, Ltd.

No. 5 GaoPeng Road, Hi-Tech Zone, Chengdu, Sichuan 610045, China

FCC ID: 2AAGEVTM2M-TC

Report Type: Original Report	Product Type: M2M Gateway
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Report Number: R2SC130723050-00A	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Chengdu Vantron Technology, Ltd.*'s product, model number: *VT-M2M-TC (FCC ID: 2AAGEVTM2M-TC)* (the "EUT") in this report was a *M2M Gateway*, which was measured approximately: 16.0 cm (L) x 10.2 cm (W) x 5.2 cm (H), rated input voltage: DC 12V from adapter.

Adapter Information: GPE
MODEL: GPE652-120500D
INPUT: 100-240Vac, 50/60Hz, 1.5A
OUTPUT: DC 12V, 5000mA

** All measurement and test data in this report was gathered from production sample serial number: 130723050 (Assigned by BAACL.Dongguan). The EUT was received on 2013-07-26.*

Objective

This report is prepared on behalf of *Chengdu Vantron Technology, Ltd.* accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communications Commission rules.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: *2AAGEVTM2M-TC* for Zigbee.
FCC Part 27 PCB submissions with FCC ID: *2AAGEVTM2M-TC*.
FCC Part 22H&24E PCB submissions with FCC ID: *2AAGEVTM2M-TC*.

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 emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan).

EUT Exercise Software

The software “DRTU.exe” was used for testing, which was provided by manufacturer. The worst condition (maximum power) was setting by the software as following table:

Test Mode	Test Software Version	DRTU.exe		
		Test Frequency	Power Level Setting	Power Level Setting
802.11b	Test Frequency	2412MHz	2437MHz	2462MHz
	Power Level Setting	14	14	15
802.11g	Test Frequency	2412MHz	2437MHz	2462MHz
	Power Level Setting	15	15	15
2.4G band-802.11n ht20	Test Frequency	2412MHz	2437MHz	2462MHz
	Power Level Setting	12	12	12
2.4G band-802.11n ht40	Test Frequency	2422MHz	2437MHz	2452MHz
	Power Level Setting	12	12	12

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 Communication 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.

Additionally, Bay Area Compliance Laboratories Corp. (Dongguan) is an ISO/IEC 17025 accredited laboratory, and is accredited by National Voluntary Laboratory Accredited Program (Lab Code 500069-0).



The current scope of accreditations can be found at <http://ts.nist.gov/standards/scopes/5000690.htm>

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in testing mode, which was provided by manufacturer.
For 2.4G band, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For 802.11b, 802.11g, and 802.11n20 modes were tested with Channel 1, 6 and 11. For 802.11n40 mode were tested with Channel 3, 6 and 9.

The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates bandwidths, and modulations.

EUT Exercise Software

The test was performed under “*DRTU.exe*” which was provided by the manufacturer.

Equipment Modifications

No modification was made to the EUT tested.

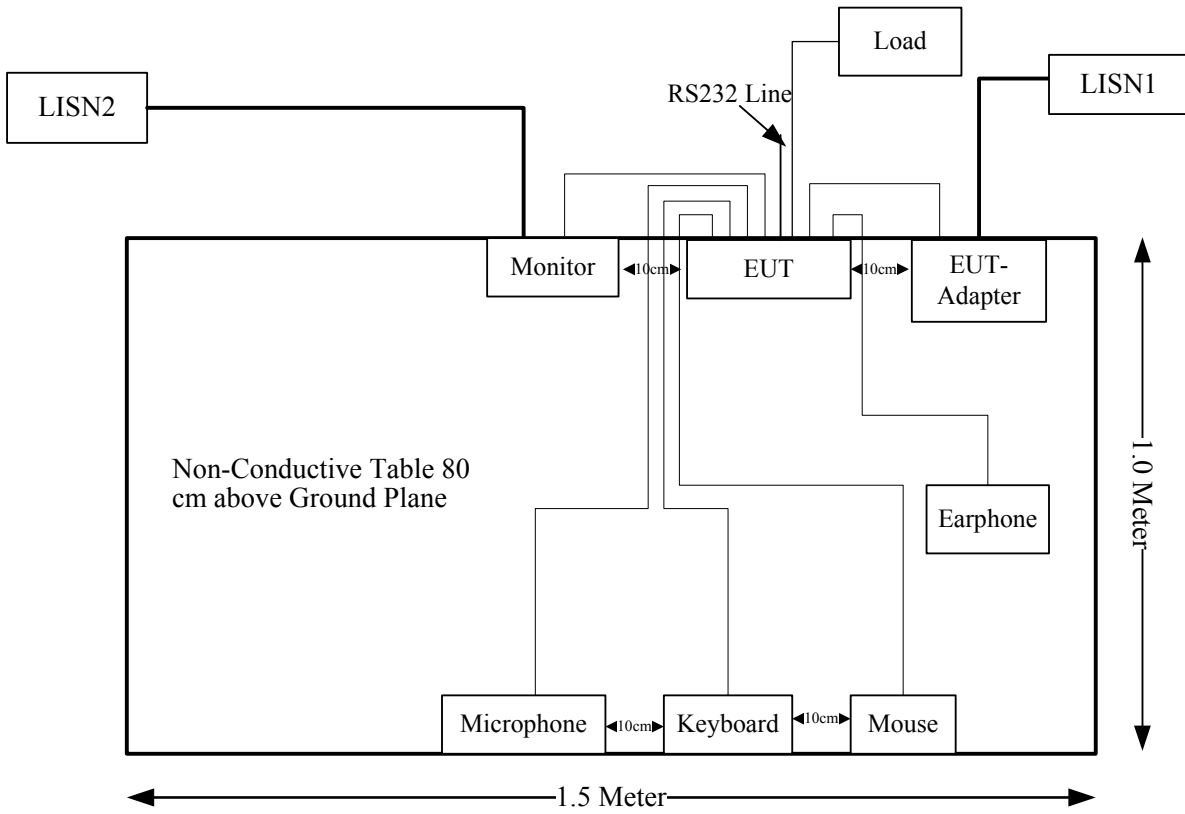
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
DELL	Monitor	1708FPt	CN-OF534H-71618-B6C-BJWQ-AOO
DELL	Keyboard	SK-8115	CN-0J4628-71616-52H-0RT6
DELL	Mouse	MO56UOA	F0Y02P7Y
Keenion	Microphone	KM-206	/
/	Earphone	/	/

External Cable

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
Keyboard Line	Yes	No	2.0	EUT	Keyboard
Mouse Line	Yes	No	1.8	EUT	Mouse
VGA Line	Yes	Yes	1.8	EUT	Monitor
Ethernet Line	Yes	No	10	EUT	Load
RS232 Line	No	No	2	EUT	/
Earphone Line	No	No	1.0	EUT	Earphone
Microphone Line	No	No	2.2	EUT	Microphone
EUT-Adapter DC Line	No	No	2.0	EUT	EUT-Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
FCC §15.247 (i) & §1.1310 & §2.1091	Maximum Permissible Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Not applicable*
§15.247(b)(3)	Maximum conducted output power	Not applicable*
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Not applicable*
§15.247(e)	Power Spectral Density	Not applicable*

Note: * Please refer to certified Wi-Fi module with FCC ID: PD962205ANH.

FCC §15.247 (i) & §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission’s guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Per 447498 D01 General RF Exposure Guidance v05r01, simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

RF module	Frequency band	Antenna Gain		Conducted Power		Duty cycle (%)	Evaluation distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)	MPE Ratios (%)
	(MHz)	(dBi)	(numeric)	(dBm)	(mW)					
WIFI	2412-2462	2.5	1.78	20.68	117	100	20	0.041	1	4.14
Zigbee	2405-2480	2.5	1.78	7.99	6.3	100	20	0.002	1	0.22
3G	1850.2-1909.8	2.4	1.74	29.20	832	50	20	0.144	1.00	14.38
Total sum of MPE ratios (%)										18.74

Note:

* For 3G module, the worst case for MPE was chosen.

Result: 18.74 % < 1, the device meet FCC MPE at 20 cm distance.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 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 user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT has three external antennas for transceiver, which are used unique type of connectors to attach to the EUT, and complied with 15.203, please refer to the internal photos and following table:

RF Module	Ant manufacturer	Ant Model Name	Ant Connector Type	Max. Antenna Gain
WIFI	Norminson	NW001	SMA(Male)	2400-2500 MHz:2.5 dBi
Zigbee	Norminson	NW001	SMA(Male)	2400-2500 MHz: 2.5 dBi
3G	Norminson	NG026	SMA(Male)	GSM850/WCDMA BAND V : -3.3 dBi
				GSM1900/WCDMA BAND II : 2.4 dBi
				AWS1700: 2.4 dBi

Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC§15.207

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:

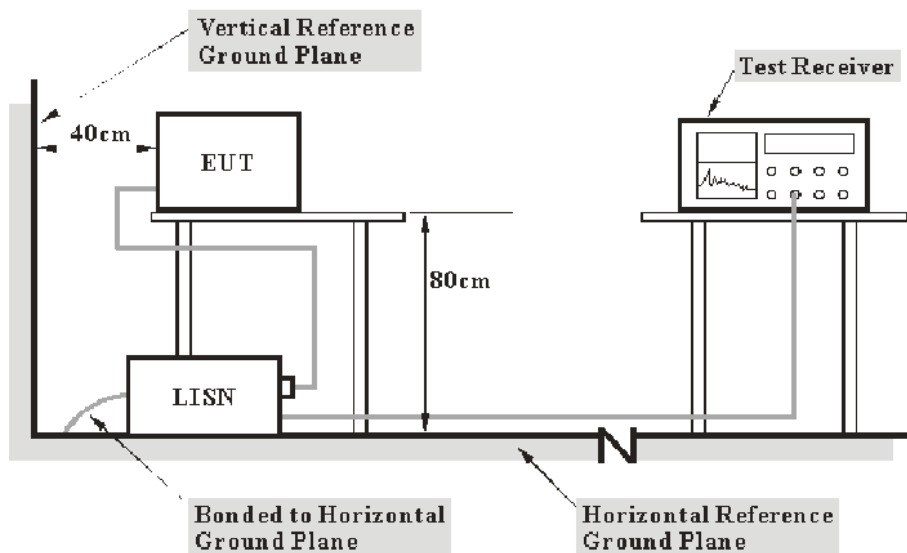
- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2-2011, measurement uncertainty of 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 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter for EUT was connected to a 120 VAC/60 Hz 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 Procedure

During the conducted emission test, the adapter for EUT was connected to 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:

$$V_C = V_R + A_C + VDF$$

$$C_f = A_C + VDF$$

Herein,

V_C (cord. Reading): corrected voltage amplitude

V_R : reading voltage amplitude

A_C : attenuation caused by cable loss

VDF: voltage division factor of AMN

C_f : Correction Factor

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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCS 30	830245/006	2012-11-29	2013-11-28
R&S	Two-line V-network	ENV216	3560.6550.12	2013-2-18	2014-2-17
R&S	L.I.S.N	ESH3-Z5	100113	2012-11-29	2013-11-28
BACL	Test Software	BACL-EMC	V1.0-2010	N/A	N/A

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207, with the worst margin reading of:

2.70 dB at 0.740 MHz in the **Neutral** conducted mode

Test Data

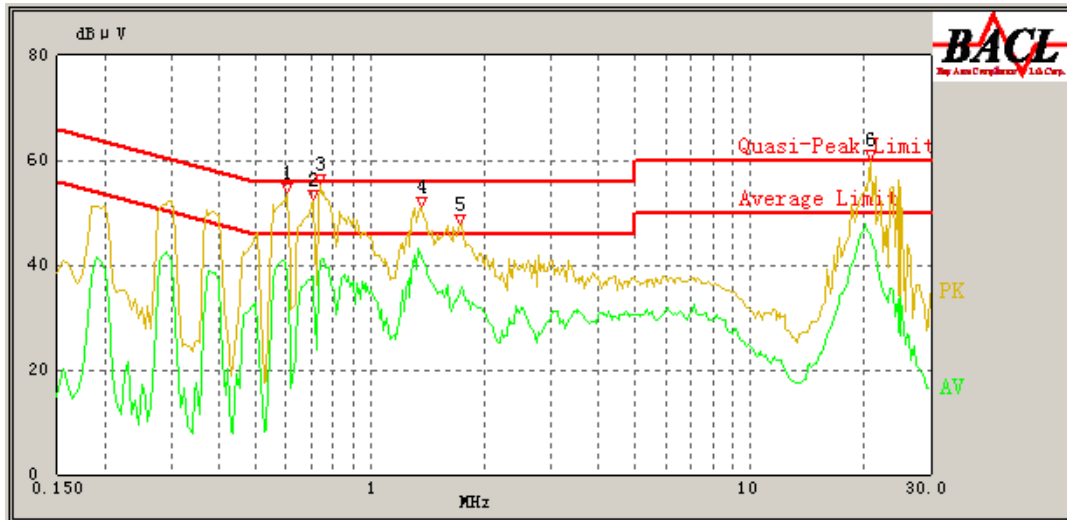
Environmental Conditions

Temperature:	28.4 °C
Relative Humidity:	43 %
ATM Pressure:	101.1 kPa

The testing was performed by Leon Chen on 2013-10-22.

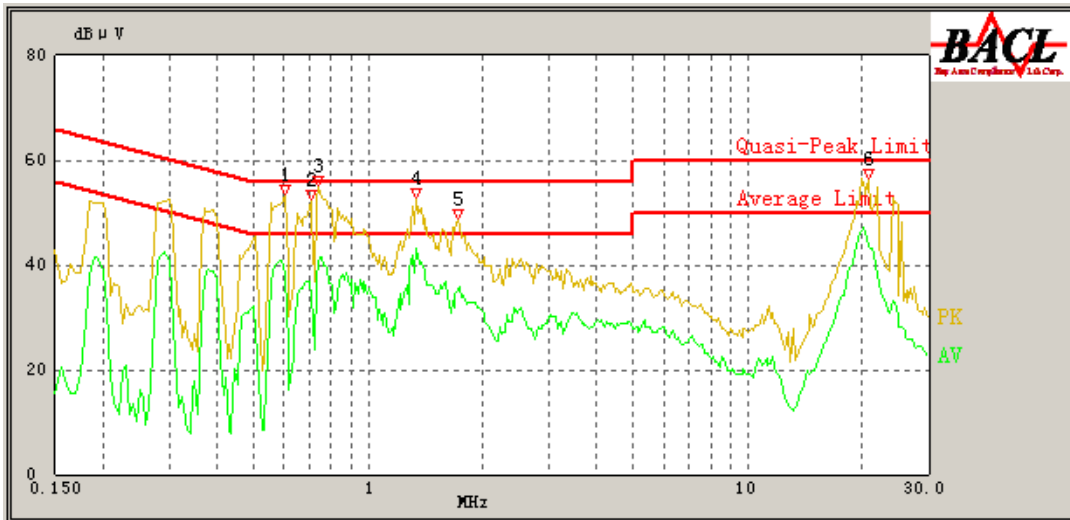
Test Mode: Transmitting

120 V, 60 Hz, Line:



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.605	51.69	9.67	56.00	4.31	QP
0.605	38.55	9.67	46.00	7.45	AV
0.705	50.61	9.67	56.00	5.39	QP
0.705	37.74	9.67	46.00	8.26	AV
0.740	53.17	9.67	56.00	2.83*	QP
0.740	40.56	9.67	46.00	5.44	AV
1.360	47.53	9.68	56.00	8.47	QP
1.360	41.53	9.68	46.00	4.47	AV
1.720	44.04	9.68	56.00	11.96	QP
1.720	34.59	9.68	46.00	11.41	AV
20.715	48.91	9.83	60.00	11.09	QP
20.715	45.78	9.83	50.00	4.22	AV

120 V, 60 Hz, Neutral:



Frequency (MHz)	Cord. Reading (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.605	51.45	9.67	56.00	4.55	QP
0.605	38.30	9.67	46.00	7.70	AV
0.705	50.17	9.67	56.00	5.83	QP
0.700	36.98	9.67	46.00	9.02	AV
0.740	53.30	9.67	56.00	2.70*	QP
0.740	40.56	9.67	46.00	5.44	AV
1.335	47.69	9.68	56.00	8.31	QP
1.335	43.01	9.68	46.00	2.99*	AV
1.720	43.98	9.68	56.00	12.02	QP
1.720	35.33	9.68	46.00	10.67	AV
20.715	48.71	9.83	60.00	11.29	QP
20.715	43.88	9.83	50.00	6.12	AV

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

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 2, 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 2, 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:

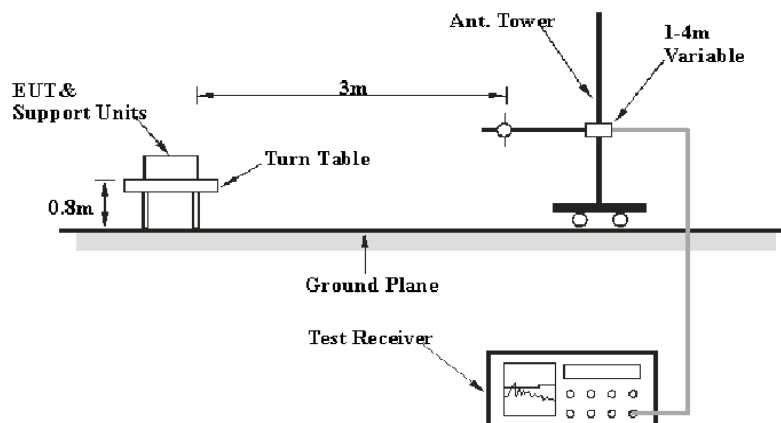
- 30M~200MHz: 5.0 dB
- 200M~1GHz: 6.2 dB
- 1G~6GHz: 4.45 dB
- 6G~18GHz: 5.23 dB

Table 2 – Values of U_{cispr}

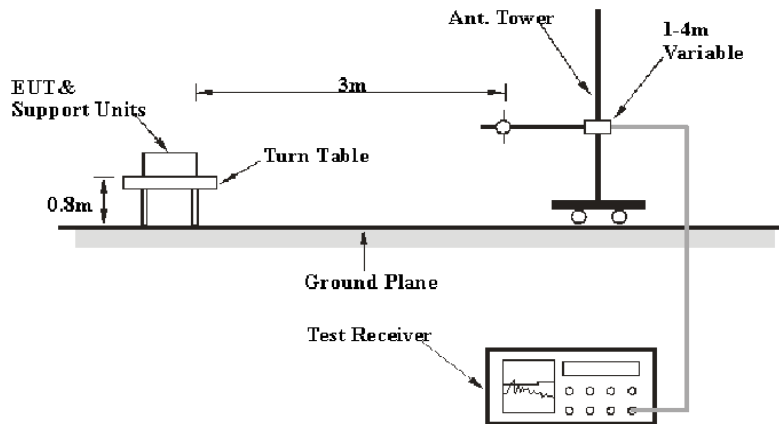
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

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 15.209, and FCC 15.247 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 spacing between the peripherals was 10 cm.

The adapter for EUT was connected to a 120 VAC/60 Hz power source

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 40 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

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

Test Procedure

During the radiated emission test, the adapter for EUT was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

According to C63.4, the above 1G test result shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade from 3m to 1.5m
 Distance extrapolation factor = $20 \log(3\text{m}/1.5\text{m})$ dB
 Extrapolation result = Corrected Amplitude (dB μ V/m) -6dB

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:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

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

$$\text{Margin} = \text{Limit} - \text{Extrapolation result}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI TEST RECEIVER	ESCI	100224	2013-5-6	2014-5-5
Sunol Sciences	Antenna	JB3	A060611-1	2011-9-6	2014-9-5
HP	AMPLIFIER	8447E	2434A02181	N/A	N/A
R&S	Spectrum analyzer	FSEM	DE31388	2013-5-7	2014-5-6
ETS LINDGREN	horn antenna	3115	000 527 35	2012-9-6	2015-9-5
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	N/A	N/A
R&S	Spectrum Analyzer	FSP 38	100478	2013-6-16	2014-6-15
Ducommun Technologies	horn antenna	ARH-4223-02	1007726-01 1304	2013-6-16	2014-6-15
Ducommun Technologies	horn antenna	ARH-2823-02	1007726-01 1302	2013-6-16	2014-6-15
Quinstar	Amplifier	QLW- 18405536-JO	15964001001	N/A	N/A

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

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Section 15.205, 15.209 and 15.247, with the worst margin reading of:

2.39 dB at 5725 MHz in the Vertical polarization for 802.11n20 Mode

Test Data

Environmental Conditions

Temperature:	24.1°C
Relative Humidity:	54 %
ATM Pressure:	101.4 kPa

The testing was performed by Leon Chen on 2013-11-05

Mode: Transmitting

2.4G band:
802.11b Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	66.53	PK	H	25.67	3.93	0.00	96.13	N/A	N/A
2412	60.48	AV	H	25.67	3.93	0.00	90.08	N/A	N/A
2412	70.9	PK	V	25.67	3.93	0.00	100.50	N/A	N/A
2412	63.58	AV	V	25.67	3.93	0.00	93.18	N/A	N/A
2390	27.85	PK	V	25.61	3.84	0.00	57.30	74.00	16.70
2390	13.64	AV	V	25.61	3.84	0.00	43.09	54.00	10.91
4824	34.26	PK	V	30.64	4.73	27.26	42.37	74.00	31.63
4824	18.68	AV	V	30.64	4.73	27.26	26.79	54.00	27.21
7236	32.57	PK	V	34.17	6.56	26.36	46.94	74.00	27.06
7236	17.86	AV	V	34.17	6.56	26.36	32.23	54.00	21.77
9648	31.62	PK	V	36.06	8.70	26.06	50.32	74.00	23.68
9648	17.68	AV	V	36.06	8.70	26.06	36.38	54.00	17.62
3002.16	41.65	PK	V	27.21	7.42	27.48	48.80	74.00	25.20
3002.16	38.56	AV	V	27.21	7.42	27.48	45.71	54.00	8.29
725.06	36.8	QP	H	21.01	3.27	22.32	38.76	46.00	7.24
Middle Channel: 2437 MHz									
2437	67.32	PK	H	25.74	3.98	0.00	97.04	N/A	N/A
2437	61.25	AV	H	25.74	3.98	0.00	90.97	N/A	N/A
2437	71.41	PK	V	25.74	3.98	0.00	101.13	N/A	N/A
2437	64.37	AV	V	25.74	3.98	0.00	94.09	N/A	N/A
4874	34.62	PK	V	30.77	4.76	27.26	42.89	74.00	31.11
4874	18.75	AV	V	30.77	4.76	27.26	27.02	54.00	26.98
7311	33.46	PK	V	34.35	6.70	26.51	48.00	74.00	26.00
7311	18.12	AV	V	34.35	6.70	26.51	32.66	54.00	21.34
9748	32.12	PK	V	36.30	8.60	25.68	51.34	74.00	22.66
9748	17.96	AV	V	36.30	8.60	25.68	37.18	54.00	16.82
1615.68	33.62	PK	V	23.83	3.18	26.91	33.72	74.00	40.28
1615.68	18.57	AV	V	23.83	3.18	26.91	18.67	54.00	35.33
3002.16	41.85	PK	V	27.21	7.42	27.48	49.00	74.00	25.00
3002.16	38.42	AV	V	27.21	7.42	27.48	45.57	54.00	8.43
725.11	36.5	QP	H	21.01	3.27	22.32	38.46	46.00	7.54

High Channel: 2462 MHz									
2462	68.83	PK	H	25.80	3.93	0.00	98.56	N/A	N/A
2462	62.62	AV	H	25.80	3.93	0.00	92.35	N/A	N/A
2462	72.04	PK	V	25.80	3.93	0.00	101.77	N/A	N/A
2462	66.32	AV	V	25.80	3.93	0.00	96.05	N/A	N/A
2483.5	28.71	PK	V	25.86	3.80	0.00	58.37	74.00	15.63
2483.5	13.42	AV	V	25.86	3.80	0.00	43.08	54.00	10.92
4924	35.62	PK	V	30.90	4.70	27.27	43.95	74.00	30.05
4924	19.62	AV	V	30.90	4.70	27.27	27.95	54.00	26.05
7386	33.42	PK	V	34.53	6.84	26.66	48.13	74.00	25.87
7386	18.62	AV	V	34.53	6.84	26.66	33.33	54.00	20.67
9848	32.51	PK	V	36.54	8.49	25.49	52.05	74.00	21.95
9848	17.85	AV	V	36.54	8.49	25.49	37.39	54.00	16.61
3002.16	41.63	PK	V	27.21	7.42	27.48	48.78	74.00	25.22
3002.16	38.62	AV	V	27.21	7.42	27.48	45.77	54.00	8.23
725.05	36.6	QP	H	21.01	3.27	22.32	38.56	46.00	7.44

802.11g Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	69.54	PK	H	25.67	3.93	0.00	99.14	N/A	N/A
2412	57.48	AV	H	25.67	3.93	0.00	87.08	N/A	N/A
2412	74.12	PK	V	25.67	3.93	0.00	103.72	N/A	N/A
2412	62.37	AV	V	25.67	3.93	0.00	91.97	N/A	N/A
2390	32.88	PK	V	25.61	3.84	0.00	62.33	74.00	11.67
2390	16.37	AV	V	25.61	3.84	0.00	45.82	54.00	8.18
4824	33.68	PK	V	30.64	4.73	27.26	41.79	74.00	32.21
4824	18.52	AV	V	30.64	4.73	27.26	26.63	54.00	27.37
7236	32.42	PK	V	34.17	6.56	26.36	46.79	74.00	27.21
7236	18.14	AV	V	34.17	6.56	26.36	32.51	54.00	21.49
9648	32.41	PK	V	36.06	8.70	26.06	51.11	74.00	22.89
9648	17.62	AV	V	36.06	8.70	26.06	36.32	54.00	17.68
3002.16	41.62	PK	V	27.21	7.42	27.48	48.77	74.00	25.23
3002.16	38.26	AV	V	27.21	7.42	27.48	45.41	54.00	8.59
725.02	36.6	QP	V	21.01	3.27	22.32	38.56	46.00	7.44
Middle Channel: 2437 MHz									
2437	69.84	PK	H	25.74	3.98	0.00	99.56	N/A	N/A
2437	57.65	AV	H	25.74	3.98	0.00	87.37	N/A	N/A
2437	74.74	PK	V	25.74	3.98	0.00	104.46	N/A	N/A
2437	62.53	AV	V	25.74	3.98	0.00	92.25	N/A	N/A
4874	33.74	PK	V	30.77	4.76	27.26	42.01	74.00	31.99
4874	15.62	AV	V	30.77	4.76	27.26	23.89	54.00	30.11
7311	32.52	PK	V	34.35	6.70	26.51	47.06	74.00	26.94
7311	17.36	AV	V	34.35	6.70	26.51	31.90	54.00	22.10
9748	31.68	PK	V	36.30	8.60	25.68	50.90	74.00	23.10
9748	17.62	AV	V	36.30	8.60	25.68	36.84	54.00	17.16
1462.52	35.62	PK	V	23.50	2.92	27.06	34.98	74.00	39.02
1462.52	19.52	AV	V	23.50	2.92	27.06	18.88	54.00	35.12
3002.16	41.69	PK	V	27.21	7.42	27.48	48.84	74.00	25.16
3002.16	38.42	AV	V	27.21	7.42	27.48	45.57	54.00	8.43
725.01	36.8	QP	V	21.01	3.27	22.32	38.76	46.00	7.24
High Channel: 2462 MHz									
2462	71.64	PK	H	25.80	3.93	0.00	101.37	N/A	N/A
2462	60.28	AV	H	25.80	3.93	0.00	90.01	N/A	N/A
2462	75.62	PK	V	25.80	3.93	0.00	105.35	N/A	N/A
2462	64.31	AV	V	25.80	3.93	0.00	94.04	N/A	N/A
2483.5	39.78	PK	V	25.86	3.80	0.00	69.44	74.00	4.56
2483.5	20.38	AV	V	25.86	3.80	0.00	50.04	54.00	3.96*
4924	33.42	PK	V	30.90	4.70	27.27	41.75	74.00	32.25
4924	18.47	AV	V	30.90	4.70	27.27	26.80	54.00	27.20
7386	32.57	PK	V	34.53	6.84	26.66	47.28	74.00	26.72
7386	18.26	AV	V	34.53	6.84	26.66	32.97	54.00	21.03
9848	32.32	PK	V	36.54	8.49	25.49	51.86	74.00	22.14
9848	18.11	AV	V	36.54	8.49	25.49	37.65	54.00	16.35
1462.53	33.75	PK	V	23.50	2.92	27.06	33.11	74.00	40.89
1462.53	18.26	AV	V	23.50	2.92	27.06	17.62	54.00	36.38
725.06	36.7	QP	V	21.01	3.27	22.32	38.66	46.00	7.34

*Within measurement uncertainty!

802.11 n20 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2412 MHz									
2412	64.76	PK	H	25.67	3.93	0.00	94.36	N/A	N/A
2412	53.21	AV	H	25.67	3.93	0.00	82.81	N/A	N/A
2412	70.11	PK	V	25.67	3.93	0.00	99.71	N/A	N/A
2412	58.49	AV	V	25.67	3.93	0.00	88.09	N/A	N/A
2390	28.51	PK	V	25.61	3.84	0.00	57.96	74.00	16.04
2390	14.49	AV	V	25.61	3.84	0.00	43.94	54.00	10.06
4824	33.42	PK	V	30.64	4.73	27.26	41.53	74.00	32.47
4824	18.32	AV	V	30.64	4.73	27.26	26.43	54.00	27.57
7236	32.44	PK	V	34.17	6.56	26.36	46.81	74.00	27.19
7236	18.16	AV	V	34.17	6.56	26.36	32.53	54.00	21.47
9648	32.52	PK	V	36.06	8.70	26.06	51.22	74.00	22.78
9648	17.92	AV	V	36.06	8.70	26.06	36.62	54.00	17.38
3002.16	41.62	PK	V	27.21	7.42	27.48	48.77	74.00	25.23
3002.16	38.57	AV	V	27.21	7.42	27.48	45.72	54.00	8.28
725.01	36.8	QP	V	21.01	3.27	22.32	38.76	46.00	7.24
Middle Channel: 2437 MHz									
2437	65.32	PK	H	25.74	3.98	0.00	95.04	N/A	N/A
2437	54.08	AV	H	25.74	3.98	0.00	83.80	N/A	N/A
2437	71.62	PK	V	25.74	3.98	0.00	101.34	N/A	N/A
2437	59.34	AV	V	25.74	3.98	0.00	89.06	N/A	N/A
4874	33.68	PK	V	30.77	4.76	27.26	41.95	74.00	32.05
4874	18.71	AV	V	30.77	4.76	27.26	26.98	54.00	27.02
7311	32.56	PK	V	34.35	6.70	26.51	47.10	74.00	26.90
7311	18.34	AV	V	34.35	6.70	26.51	32.88	54.00	21.12
9748	32.74	PK	V	36.30	8.60	25.68	51.96	74.00	22.04
9748	18.12	AV	V	36.30	8.60	25.68	37.34	54.00	16.66
1436.85	35.68	PK	V	23.44	2.85	27.09	34.88	74.00	39.12
1436.85	19.42	AV	V	23.44	2.85	27.09	18.62	54.00	35.38
3002.16	42.63	PK	V	27.21	7.42	27.48	49.78	74.00	24.22
3002.16	38.96	AV	V	27.21	7.42	27.48	46.11	54.00	7.89
725.03	36.7	QP	V	21.01	3.27	22.32	38.66	46.00	7.34
High Channel: 2462 MHz									
2462	68.28	PK	H	25.80	3.93	0.00	98.01	N/A	N/A
2462	56.47	AV	H	25.80	3.93	0.00	86.20	N/A	N/A
2462	73.56	PK	V	25.80	3.93	0.00	103.29	N/A	N/A
2462	61.65	AV	V	25.80	3.93	0.00	91.38	N/A	N/A
2483.5	35.99	PK	V	25.86	3.80	0.00	65.65	74.00	8.35
2483.5	16.61	AV	V	25.86	3.80	0.00	46.27	54.00	7.73
4924	33.64	PK	V	30.90	4.70	27.27	41.97	74.00	32.03
4924	18.74	AV	V	30.90	4.70	27.27	27.07	54.00	26.93
7386	32.67	PK	V	34.53	6.84	26.66	47.38	74.00	26.62
7386	18.36	AV	V	34.53	6.84	26.66	33.07	54.00	20.93
9848	32.51	PK	V	36.54	8.49	25.49	52.05	74.00	21.95
9848	18.13	AV	V	36.54	8.49	25.49	37.67	54.00	16.33
3002.16	41.63	PK	V	27.21	7.42	27.48	48.78	74.00	25.22
3002.16	38.62	AV	V	27.21	7.42	27.48	45.77	54.00	8.23
725.05	36.5	QP	V	21.01	3.27	22.32	38.46	46.00	7.54

802.11 n40 Mode

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)					
Low Channel: 2422 MHz									
2422	61.23	PK	H	25.70	3.95	0.00	90.88	N/A	N/A
2422	49.13	AV	H	25.70	3.95	0.00	78.78	N/A	N/A
2422	66.61	PK	V	25.70	3.95	0.00	96.26	N/A	N/A
2422	54.77	AV	V	25.70	3.95	0.00	84.42	N/A	N/A
2390	35.88	PK	V	25.61	3.84	0.00	65.33	74.00	8.67
2390	18.29	AV	V	25.61	3.84	0.00	47.74	54.00	6.26
4844	33.68	PK	V	30.69	4.78	27.26	41.89	74.00	32.11
4844	18.53	AV	V	30.69	4.78	27.26	26.74	54.00	27.26
7266	32.85	PK	V	34.24	6.62	26.42	47.29	74.00	26.71
7266	18.42	AV	V	34.24	6.62	26.42	32.86	54.00	21.14
9688	32.47	PK	V	36.15	8.66	25.91	51.37	74.00	22.63
9688	18.26	AV	V	36.15	8.66	25.91	37.16	54.00	16.84
3002.16	41.46	PK	V	27.21	7.42	27.48	48.61	74.00	25.39
3002.16	38.36	AV	V	27.21	7.42	27.48	45.51	54.00	8.49
725.01	36.8	QP	V	21.01	3.27	22.32	38.76	46.00	7.24
Middle Channel: 2437 MHz									
2437	62.35	PK	H	25.74	3.98	0.00	92.07	N/A	N/A
2437	50.52	AV	H	25.74	3.98	0.00	80.24	N/A	N/A
2437	67.25	PK	V	25.74	3.98	0.00	96.97	N/A	N/A
2437	55.71	AV	V	25.74	3.98	0.00	85.43	N/A	N/A
4874	33.57	PK	V	30.77	4.76	27.26	41.84	74.00	32.16
4874	18.63	AV	V	30.77	4.76	27.26	26.90	54.00	27.10
7311	32.56	PK	V	34.35	6.70	26.51	47.10	74.00	26.90
7311	18.12	AV	V	34.35	6.70	26.51	32.66	54.00	21.34
9748	32.61	PK	V	36.30	8.60	25.68	51.83	74.00	22.17
9748	17.96	AV	V	36.30	8.60	25.68	37.18	54.00	16.82
1469.62	35.62	PK	V	23.52	2.94	27.05	35.03	74.00	38.97
1469.62	18.96	AV	V	23.52	2.94	27.05	18.37	54.00	35.63
3002.16	41.69	PK	V	27.21	7.42	27.48	48.84	74.00	25.16
3002.16	38.52	AV	V	27.21	7.42	27.48	45.67	54.00	8.33
725	36.6	QP	V	21.01	3.27	22.32	38.56	46.00	7.44
High Channel: 2452 MHz									
2452	62.85	PK	H	25.78	4.00	0.00	92.62	N/A	N/A
2452	53.02	AV	H	25.78	4.00	0.00	82.79	N/A	N/A
2452	67.15	PK	V	25.78	4.00	0.00	96.92	N/A	N/A
2452	55.21	AV	V	25.78	4.00	0.00	84.98	N/A	N/A
2483.5	36.57	PK	V	25.86	3.80	0.00	66.23	74.00	7.77
2483.5	19.53	AV	V	25.86	3.80	0.00	49.19	54.00	4.81*
4904	33.67	PK	V	30.85	4.72	27.27	41.97	74.00	32.03
4904	18.54	AV	V	30.85	4.72	27.27	26.84	54.00	27.16
7356	32.54	PK	V	34.45	6.79	26.60	47.18	74.00	26.82
7356	18.12	AV	V	34.45	6.79	26.60	32.76	54.00	21.24
9808	32.62	PK	V	36.44	8.53	25.48	52.11	74.00	21.89
9808	18.06	AV	V	36.44	8.53	25.48	37.55	54.00	16.45
3002.16	42.06	PK	V	27.21	7.42	27.48	49.21	74.00	24.79
3002.16	38.68	AV	V	27.21	7.42	27.48	45.83	54.00	8.17
725.06	36.8	QP	V	21.01	3.27	22.32	38.76	46.00	7.24

*Within measurement uncertainty!

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