



FCC TEST REPORT

According to

FCC CFR Title 47 Part 15 Subpart C

Applicant	: BQT Solutions (Australia) Pty Ltd.
Address	: Unit 29,1 Talavera Road,North Ryde,NSW2113, Australia
Equipment	: 13.56MHz/125KHz Dual Frequency Contactless Smart Card Reader
Model No.	: BT950-DT
FCC ID	: QVL-BT950-2

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Document history



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Model No.	: BT950-DT
Trade Name	: BQT Solutions
FCC ID	: QVL-BT950-2

I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 – 2009** and the energy emitted by this equipment was **passed**
CISPR PUB. 22 and FCC Part 15 in radiated emission class B limits.

Testing was carried out on Apr. 23, 2015 at **Cerpss Technology (Suzhou) Co., Ltd.**

Signature

Miro Chueh
EMC/RF B.U. Manager



1. Report of Measurements and Examinations

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. AC Power Line Conducted Emission	N/A
15.225 (a)	In-band Emission	Pass
15.225 (d) 15.209	Out-of –band Emission	Pass
15.225(e)	Frequency Stability Tolerance	Pass

Note: (1)"N/A" denotes test is not applicable in this test report.



2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Equipment	13.56MHz/125KHz Dual Frequency Contactless Smart Card Reader
Model No.	BT950-DT
Frequency	13.56MHz
Number of Channel	1 channel
Modulation type	ASK
Transmit Power	34.19dBuV/m at 3m (Peak)
Antenna type	N/A
Power Supply	12V DC

2.2. Carrier Frequency of Channels

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	13.56	---	---
---	---	---	---
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2.3. Test Mode & Test Software

- A. Test Mode & Test Software
- B. During testing, the interface cables and equipment positions were varied according to ANSI C63.4
- C. The complete test system included EUT for RF test.
- D. The test mode was performed for radiation test.

2.4. Description of Test System

No	Device	Manufacturer	Model No.	FCC ID	Series No.	Data Cable	Power Cord
1	DC Power Supply	TOPWARD	3303D	N/A	N/A	Unshielded	Unshielded

2.5. General Information of Test

Test Site:	Cerpass Technology (Suzhou) Co., Ltd.
Performand Location :	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China
NVLAP LAB Code :	200814-0
FCC Registration Number :	916572, 331395
IC Registration Number :	7290A-1, 7290A-2
VCCI Registration Number :	T-343 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test below 1GHz G-227 for Radiated emission test above 1GHz



2.6. Measurement Uncertainty

Test results and Measurement uncertainty without any relationship in the test report.

Measurement	Polarity	Frequency	Uncertainty
Radiated emissions (below 1GHz)	H	30MHz ~ 200MHz	+/- 4.0677dB
		200MHz ~1000MHz	+/- 3.9131dB
	V	30MHz ~ 200MHz	+/- 4.0678dB
		200MHz ~1000MHz	+/- 3.9142dB

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: 2008, 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.



3. Antenna Requirements

3.1. Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

3.2. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

3.3. Antenna Construction

N/A



4. Test of Spurious Emission (Radiated)

4.1. Test Limit

Radiated emissions from 13.553 MHz to 13.567 MHz were measured according to the 15.225(a), the field strength of any emissions within the band 13.553 – 13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

The field strength of any emissions which appear outside of the 13.110 – 14.010 MHz band shall not exceed the general radiated emission limits in Section 15.209.

Frequency (MHz)	Distance Meters	Radiated (μ V / M)	Radiated (dB μ V / M)
13.553-13.567	30	15848	84.0
13.410-13.553	30	334	50.5
13.567-13.710	30	106	40.5
13.110-13.410	30		
13.710-14.010	30		

Frequency (MHz)	Distance Meters	Radiated (μ V / M)	Radiated (dB μ V / M)
1.705 to 30	30	30	29.5
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

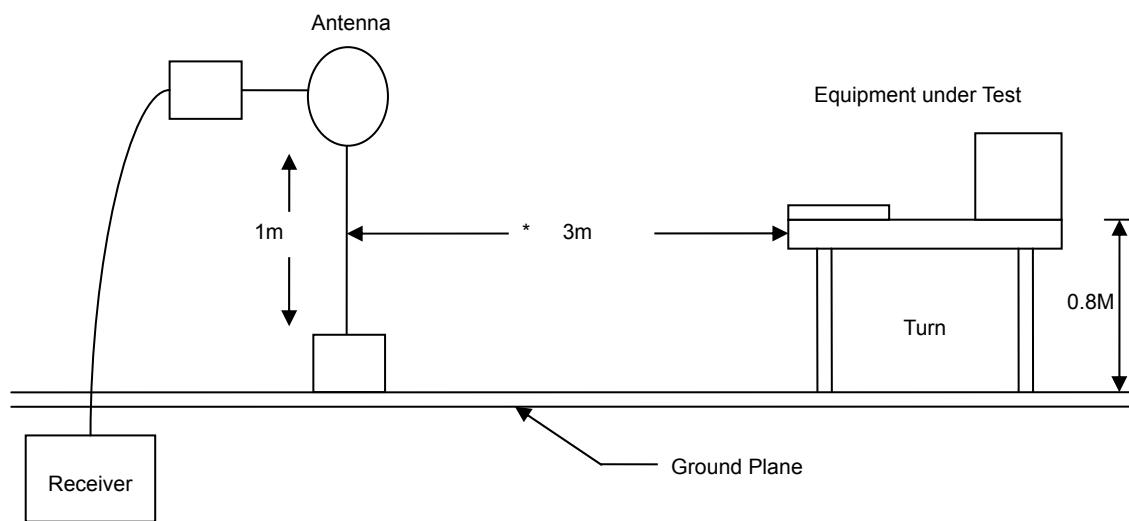
4.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 30 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

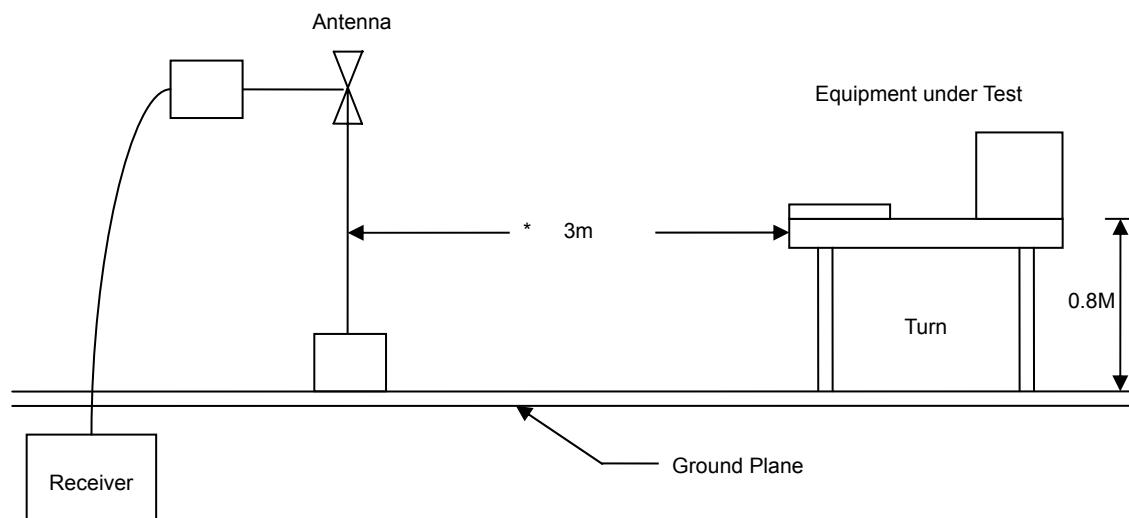


4.3. Typical Test Setup

Below 30MHz test setup



30MHz- 1GHz Test Setup





4.4. Measurement Equipment

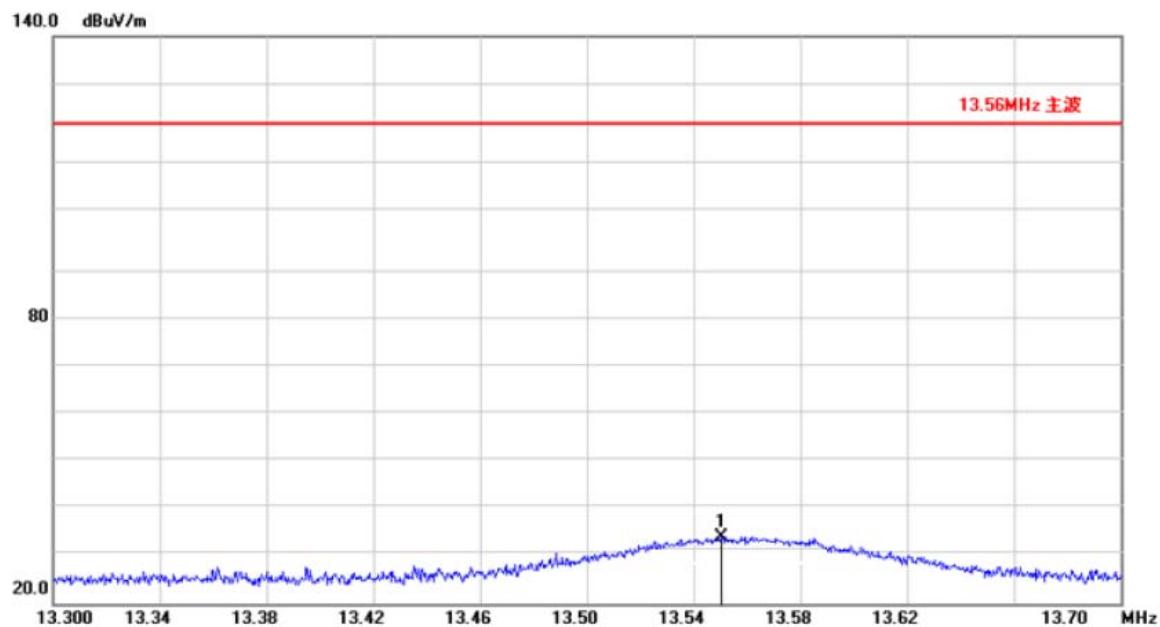
Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date.
EMI Test Receiver	R&S	ESCI	100563	2015.03.29	2016.03.28
Preamplifier	Agilent	87405B	My39500554	2015.03.29	2016.03.28
Preamplifier	Agilent	8449B	3008A02342	2015.03.29	2016.03.28
Bilog Antenna	Sunol Science	JB1	A072414-3	2014.08.05	2015.08.04
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-619	2014.05.24	2015.05.23
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	9170-348	2014.11.04	2015.11.03
Spectrum Analyzer	R&S	FSP40	100324	2015.03.29	2016.03.28
Loop Antenna	R&S	HFH2-Z2	100150	2014.08.30	2015.08.29
Temperature/ Humidity Meter	Zhicheng	ZC1-11	CEP-TH-001	2015.04.02	2016.04.01



4.5. Test Result and Data

4.5.1 Test Result of Fundamental Emission

Power	: DC 12V	Temperature	: 24 °C
Test Mode	: Transmit/ Receive	Humidity	: 54 %
Test Date	: Apr. 23, 2015	Atmospheric Pressure	: 1010 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (deg)
1	13.5503	-23.19	57.38	34.19	124.00	-89.81	peak	105	178

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



4.5.2 Test Result of Spurious emission

Test Mode :	Normal	Frequency Range:	9K-30MHz
Temp :	23°C	Humidity :	52%
Measured Distance	3m	Test Result:	Pass

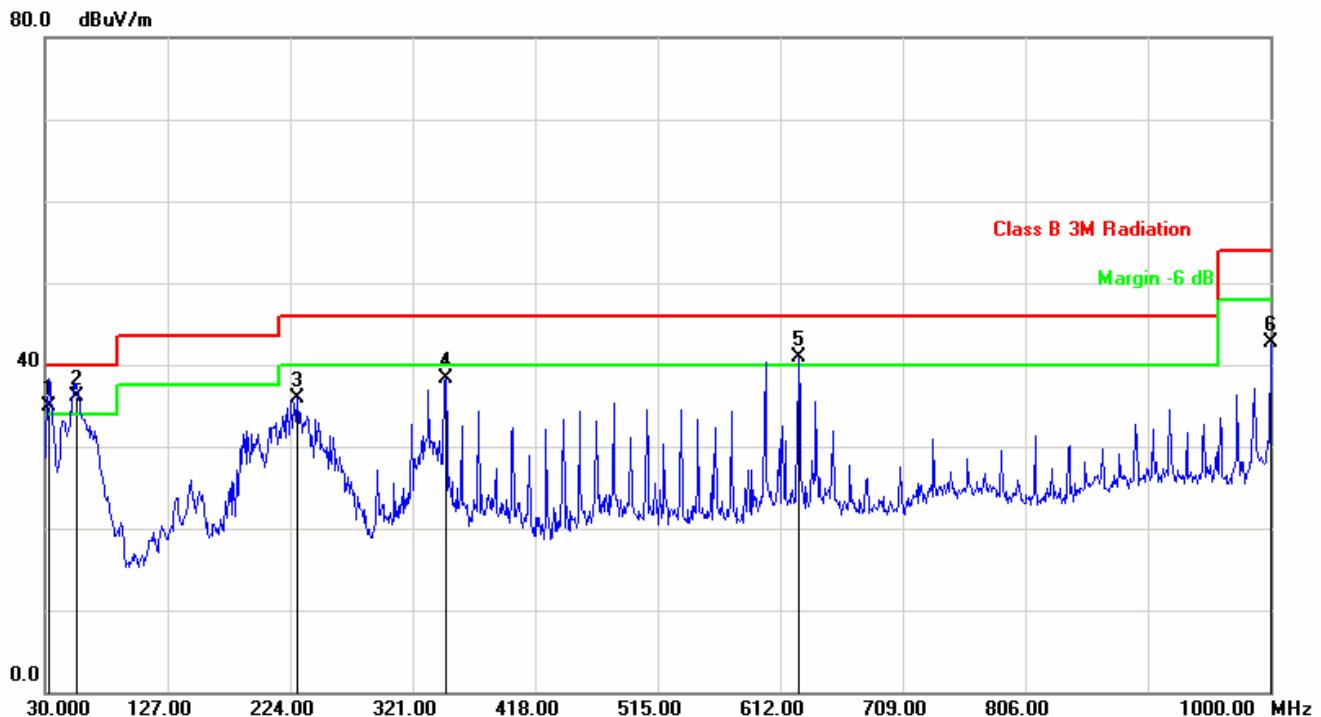
Frequency (MHz)	Ant. Polarization H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
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Note: The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported



30M-1000MHz

Engineer :Amos	
Site : EMC Lab AC 102	Time : Apr. 23, 2015
Limit : FCC_CLASS_B_03M_QP	Margin : 6
EUT : BT950-DT	Probe : HORIZONTAL
Power : DC12V	Note : Normal Link

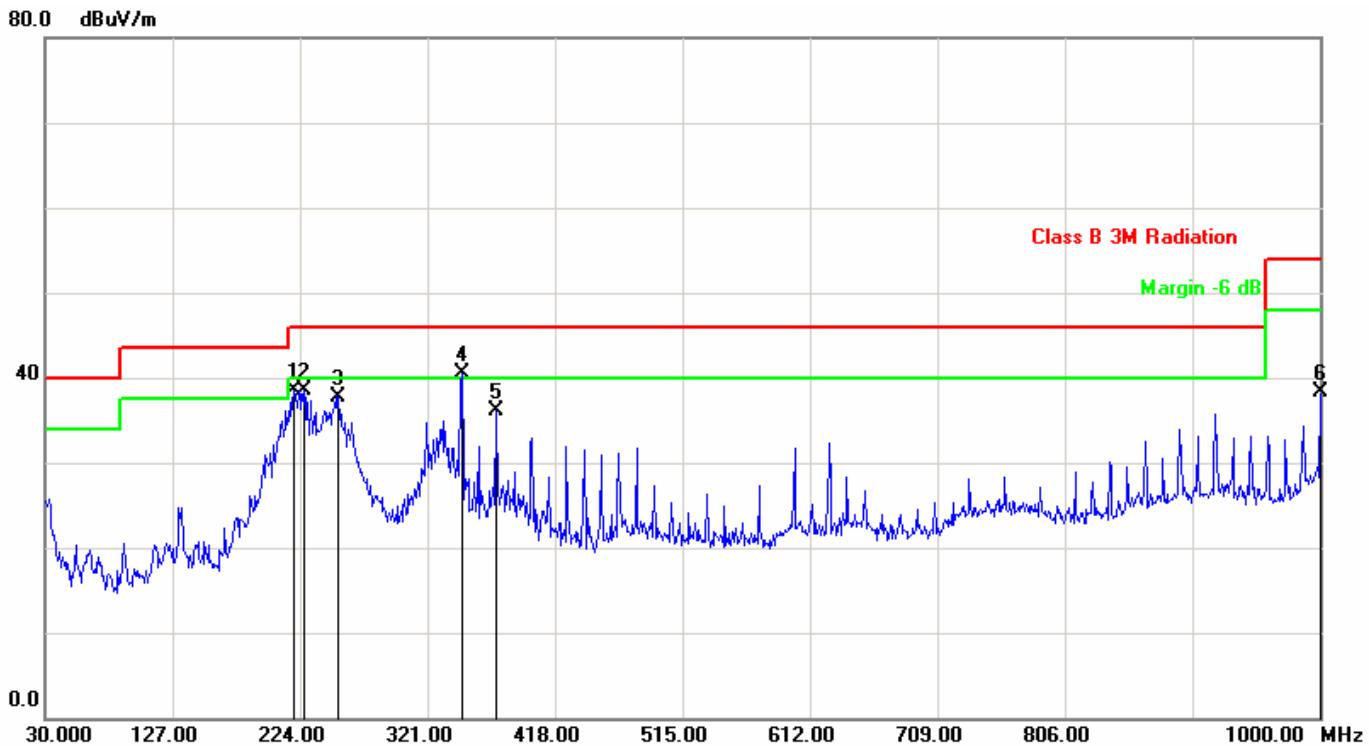


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)
1	32.9100	-4.78	39.67	34.89	40.00	-5.11	QP	100	311
2	55.2200	-15.19	51.37	36.18	40.00	-3.82	QP	100	153
3	229.8200	-9.55	45.49	35.94	46.00	-10.06	QP	100	344
4	347.1900	-4.26	42.55	38.29	46.00	-7.71	QP	100	359
5	626.5500	-1.42	42.42	41.00	46.00	-5.00	QP	100	123
6	1000.0000	5.95	36.81	42.76	54.00	-11.24	QP	100	357

Note: Measurement Level = Reading Level + Correct Factor



Engineer :Amos	
Site : EMC Lab AC 102	Time : Apr. 23, 2015
Limit : FCC_CLASS_B_03M_QP	Margin : 6
EUT : BT950-DT	Probe : VERTICAL
Power : DC12V	Note : Normal Link



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)
1	219.1500	-9.58	48.18	38.60	46.00	-7.40	QP	200	245
2	226.9100	-9.56	48.11	38.55	46.00	-7.45	QP	300	106
3	253.1000	-8.25	45.89	37.64	46.00	-8.36	QP	100	102
4	347.1900	-4.26	44.68	40.42	46.00	-5.58	QP	200	80
5	373.3800	-4.85	40.88	36.03	46.00	-9.97	QP	100	61
6	1000.0000	5.95	32.39	38.34	54.00	-15.66	QP	100	101

Note: Measurement Level = Reading Level + Correct Factor



5. Frequency tolerance (15.225 (e))

5.1. Regulation

15.225 (e) The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.2. Test Result

Operating frequency: 13.56 MHz		Observe Time	Read Frequency (MHz)	Tolerance (%)	Limit
Temperature (°C)	Power supply (V)				
50	120	Start	13.560110	0.001%	$\pm 0.01\%$
		2 minute	13.560110	0.001%	$\pm 0.01\%$
		5 minute	13.560200	0.001%	$\pm 0.01\%$
		10 minute	13.560400	0.003%	$\pm 0.01\%$
40	120	Start	13.560050	0.000%	$\pm 0.01\%$
		2 minute	13.560050	0.000%	$\pm 0.01\%$
		5 minute	13.560100	0.001%	$\pm 0.01\%$
		10 minute	13.560200	0.001%	$\pm 0.01\%$
30	120	Start	13.560030	0.000%	$\pm 0.01\%$
		2 minute	13.560030	0.000%	$\pm 0.01\%$
		5 minute	13.560030	0.000%	$\pm 0.01\%$
		10 minute	13.560100	0.001%	$\pm 0.01\%$
20	120	Start	13.560000	0.000%	$\pm 0.01\%$
		2 minute	13.560000	0.000%	$\pm 0.01\%$
		5 minute	13.560000	0.000%	$\pm 0.01\%$
		10 minute	13.560010	0.000%	$\pm 0.01\%$
20	108	Start	13.560100	0.001%	$\pm 0.01\%$
		2 minute	13.560100	0.001%	$\pm 0.01\%$
		5 minute	13.560120	0.001%	$\pm 0.01\%$
		10 minute	13.560200	0.001%	$\pm 0.01\%$
20	132	Start	13.560050	0.000%	$\pm 0.01\%$
		2 minute	13.560100	0.001%	$\pm 0.01\%$
		5 minute	13.560100	0.001%	$\pm 0.01\%$
		10 minute	13.560100	0.001%	$\pm 0.01\%$
10	120	Start	13.560120	0.001%	$\pm 0.01\%$
		2 minute	13.560120	0.001%	$\pm 0.01\%$
		5 minute	13.560200	0.001%	$\pm 0.01\%$
		10 minute	13.560200	0.001%	$\pm 0.01\%$
0	120	Start	13.560150	0.001%	$\pm 0.01\%$
		2 minute	13.560150	0.001%	$\pm 0.01\%$
		5 minute	13.560200	0.001%	$\pm 0.01\%$
		10 minute	13.560300	0.002%	$\pm 0.01\%$
-10	120	Start	13.560250	0.002%	$\pm 0.01\%$
		2 minute	13.560400	0.003%	$\pm 0.01\%$
		5 minute	13.560400	0.003%	$\pm 0.01\%$
		10 minute	13.560600	0.004%	$\pm 0.01\%$
-20	120	Start	13.560600	0.004%	$\pm 0.01\%$
		2 minute	13.560600	0.004%	$\pm 0.01\%$
		5 minute	13.560800	0.006%	$\pm 0.01\%$
		10 minute	13.561000	0.007%	$\pm 0.01\%$