RADIO TEST REPORT

Applicant	:	ACCO Brands, Inc.
Address	:	1500 Fashion Island Blvd., 3rd Floor, San Mateo, CA 94404, USA
Equipment	:	LD4650P Single-User USB-C Dock with K-Fob Smart Lock
Model No.	:	M01429
Trade Name	:	Kensington
FCC ID	:	GV3M01429

I HEREBY CERTIFY THAT :

The sample was received on Nov. 09, 2018 and the testing was carried out on Nov. 23, 2018 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Assistant Manager

Tested by:

Spree Yei / Engineer

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory

Contents

1. Summary of Test Procedure and Test Results 4
1.1. Applicable Standards 4
2. Test Configuration of Equipment under Test 5
2.1. Feature of Equipment under Test 5
2.2. Carrier Frequency of Channels 5
2.3. Test Mode and Test Software 5
2.4. Description of Test System 5
2.5. General Information of Test 6
2.6. Measurement Uncertainty 6
3. Test Equipment and Ancillaries Used for Tests 7
4. Antenna Requirements 8
4.1. Standard Applicable 8
4.2. Antenna Construction and Directional Gain 8
5. Test of AC Power Line Conducted Emission 9
5.1. Test Limit 9
5.2. Test Procedures 9
5.3. Typical Test Setup 10
5.4. Test Result and Data 11
5.5. Test Photographs 13
6. Test of Radiated Emission 14
6.1. Test Limit 14
6.2. Test Procedures 15
6.3. Typical Test Setup Layout of Radiated Emission 16
6.4. Test Result and Data 17
6.5. 20dB Bandwidth BW 23
6.6. Test Photographs (9KHz ~ 30MHz) 24
6.7. Test Photographs (30MHz ~ 1GHz) 25
7. Frequency Stability 26
7.1. Test Procedure 26
7.2. Test Setup Layout 26
7.3. Test Result and Data 27

History of this test report

Report No.	Issue Date	Description
TEFO1811064	Nov. 29, 2018	Original

1. Summary of Test Procedure and Test Results

1.1. Applicable Standards

ANSI C63.4:2014

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.225

FCC Rule	Description of Test	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.209 15.225	Radiated Emission	PASS
15.225	20dB Bandwidth BW	PASS
15.225(e)	Frequency Stability	PASS

2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Frequency Range	RFID: 13.56MHz;
Modulation Type	ASK

2.2. Carrier Frequency of Channels

Channel	Frequency(MHz)
*1	13.56

Note: Channel remarked **"*"** is selected to perform test.

2.3. Test Mode and Test Software

a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4 and ANSI C63.10.
b. The complete test system included EUT for RF test.
c. The test mode of RF test as follow:
Test Mode 1. Tx

2.4. Description of Test System

The EUT was tested alone. No support devices are needed for testing.

2.5. General Information of Test

Test Site	**Cerpass Technology Corporation Test Laboratory** Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582	
	FCC	TW1079, TW1061, W1439
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-4399, R-4218 for Radiated emission test G-10812, G-10813 for radiated disturbance above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 10,00MHz	
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.	

2.6. Measurement Uncertainty

Measurement Item	Uncertainty
Radiated Spurious Emission(9KHz~30MHz)	±5.007dB
Radiated Spurious Emission(30MHz~1GHz)	±5.157dB
Radiated Spurious Emission(1GHz~18GHz)	±6.383dB
Radiated Spurious Emission(18GHz~40GHz)	±6.648dB
Conducted Spurious Emission	±1.253dB
6dB Bandwidth	±6.89%
Power Spectral Density	±0.630dB
26 dB Occupied Bandwidth	±6.10%
Frequency Stability	±375KHz
Channel Frequencies Separation	±6.10%
20dB Bandwidth	±6.12%
Dwell Time	±1.34%
Peak Output Power(Conducted Power Meter)	±0.86dB
Temperature	±1.2oC
Humidity	±2.7%
Channel Move Time	±4.53%
Channel Closing Transmission Time	±6.61%
Threshold	±0.631dB
Non occupancy period	±1.17%

3. Test Equipment and Ancillaries Used for Tests

Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	100443	2018/03/15	2019/03/14
LISN	Schwarzbeck	NSLK 8127	8127-568	2018/02/26	2019/02/25
Pulse Limiter	R&S	ESH3-Z2	101934	2018/02/22	2019/02/21
Bilog Antenna	Schwarzbeck	VULB9168	275	2018/09/17	2019/09/16
Active Loop Antenna	EMCO	6507	40855	2018/05/22	2019/05/21
Horn Antenna	EMCO	3115	31601	2018/09/26	2019/09/25
Horn Antenna	EMCO	3116	31970	2018/03/23	2019/03/22
Preamplifier	EM	EM330	60660	2018/03/08	2019/03/07
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2018/09/18	2019/09/17
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2018/10/31	2019/10/30
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2018/04/10	2019/04/09
Spectrum Analyzer	R&S	FSP40	100219	2018/07/03	2019/07/02
BLUETOOTH TESTER	R&S	CBT	101133	2018/04/02	2019/04/01
Attenuator	KEYSIGHT	8491B	MY39250705	2018/09/04	2019/09/03
Rotary Attenuator	Agilent	8495B	MY42146680	2018/03/29	2019/03/28
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2018/08/30	2019/08/29
Series Power Meter	Anritsu	ML2495A	1224005	2018/03/23	2019/03/22
Power Sensor	Anritsu	MA2411B	1207295	2018/03/23	2019/03/22
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A
Software	AUDIX	E3	V8.2014-8-6	N/A	N/A
Software	Keysight	N7607B Signal Studio	V3.0.0.0	N/A	N/A
Software	Keysight	Inservice MonitorUtility	N/A	N/A	N/A

4. Antenna Requirements

4.1. 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.

4.2. Antenna Construction and Directional Gain

Antenna Type	Antenna Gain
PCB	0.9 dBi

5. Test of AC Power Line Conducted Emission

5.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014 and ANSI C63.10-2013. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

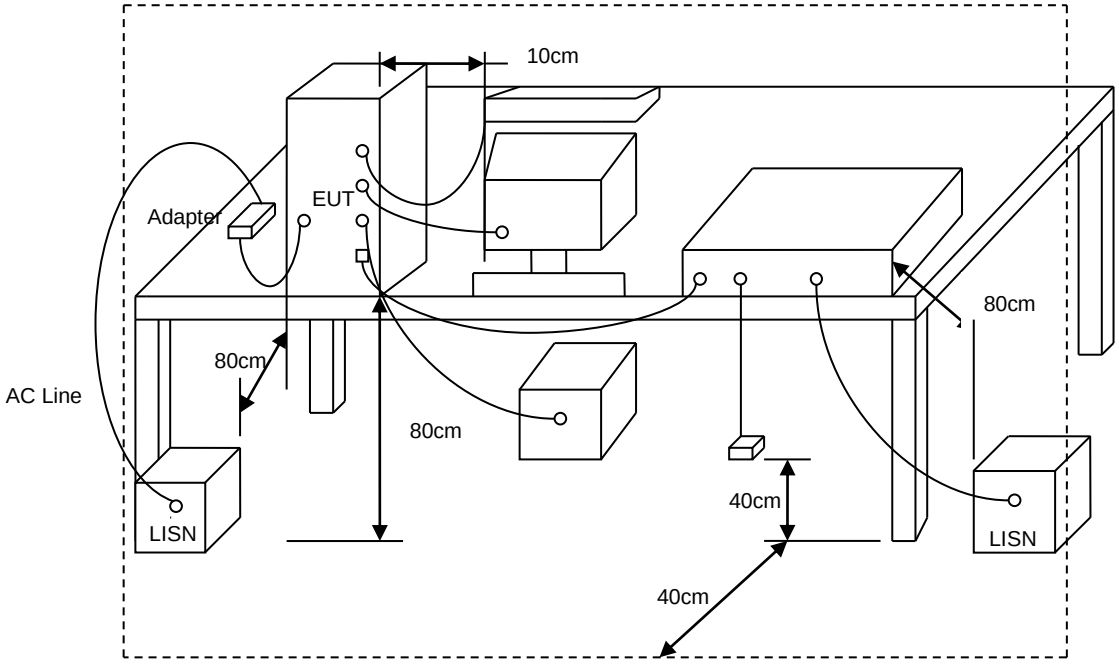
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases with the logarithm of the frequency.

5.2. Test Procedures

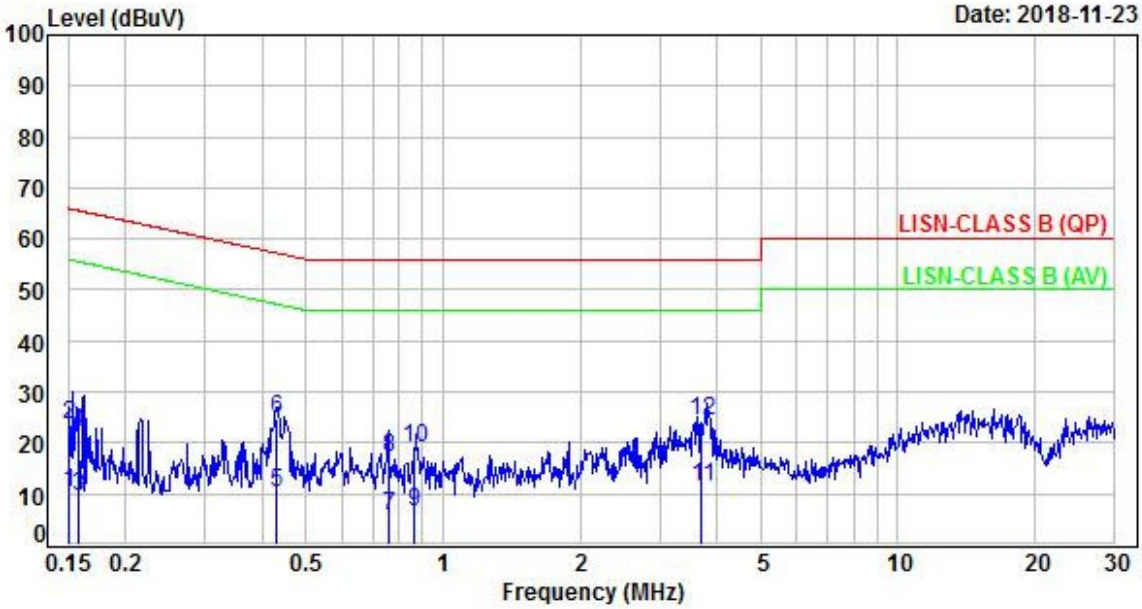
a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connecting to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.3. Typical Test Setup



5.4. Test Result and Data

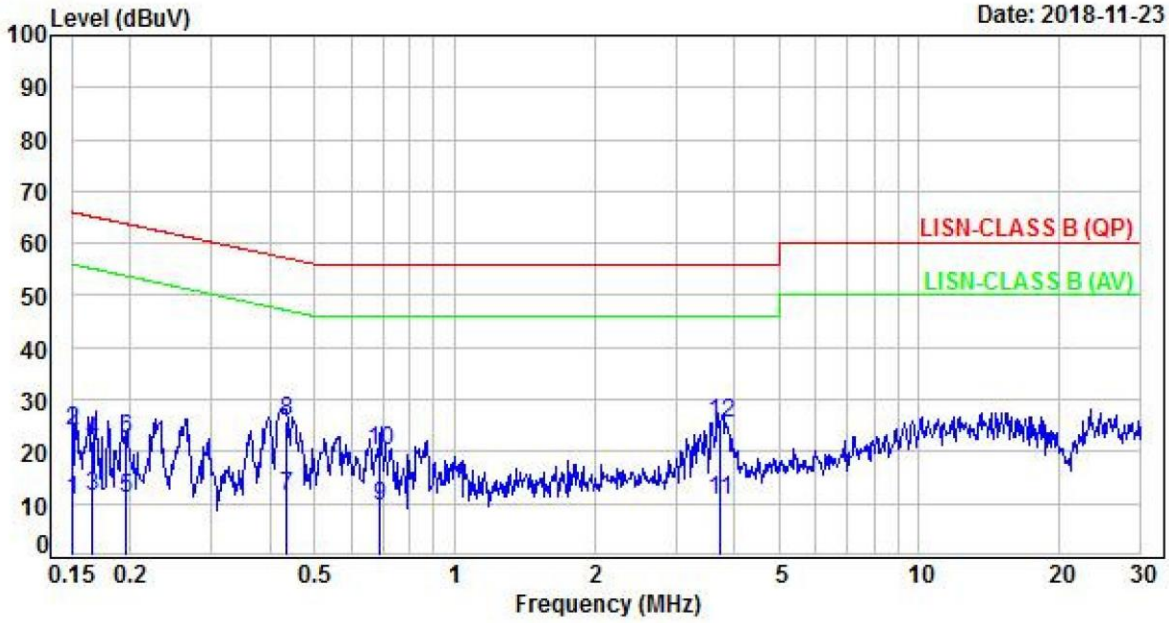
Power :	AC 120V	Pol/Phase :	LINE
Test Mode :	NFC TX	Temperature :	24 °C
Test date :	Nov. 23, 2018	Humidity :	49 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.15	9.94	0.33	10.27	55.99	-45.72	Average	P
2	0.15	9.94	13.70	23.64	65.99	-42.35	QP	P
3	0.16	9.94	-0.34	9.60	55.59	-45.99	Average	P
4	0.16	9.94	12.13	22.07	65.59	-43.52	QP	P
5	0.43	9.95	0.47	10.42	47.23	-36.81	Average	P
6	0.43	9.95	14.85	24.80	57.23	-32.43	QP	P
7	0.76	9.97	-4.26	5.71	46.00	-40.29	Average	P
8	0.76	9.97	7.10	17.07	56.00	-38.93	QP	P
9	0.87	9.98	-3.66	6.32	46.00	-39.68	Average	P
10	0.87	9.98	9.01	18.99	56.00	-37.01	QP	P
11	3.71	10.12	1.24	11.36	46.00	-34.64	Average	P
12	3.71	10.12	14.09	24.21	56.00	-31.79	QP	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator

Power :	AC 120V	Pol/Phase :	NEUTRAL
Test Mode :	NFC TX	Temperature :	24 °C
Test date :	Nov. 23, 2018	Humidity :	49 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.15	9.94	0.76	10.70	55.99	-45.29	Average	P
2	0.15	9.94	13.94	23.88	65.99	-42.11	QP	P
3	0.17	9.94	1.29	11.23	55.14	-43.91	Average	P
4	0.17	9.94	12.04	21.98	65.14	-43.16	QP	P
5	0.20	9.94	1.20	11.14	53.79	-42.65	Average	P
6	0.20	9.94	12.32	22.26	63.79	-41.53	QP	P
7	0.43	9.95	1.61	11.56	47.20	-35.64	Average	P
8	0.43	9.95	15.91	25.86	57.20	-31.34	QP	P
9	0.69	9.97	-0.49	9.48	46.00	-36.52	Average	P
10	0.69	9.97	10.35	20.32	56.00	-35.68	QP	P
11	3.72	10.12	0.67	10.79	46.00	-35.21	Average	P
12	3.72	10.12	15.51	25.63	56.00	-30.37	QP	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator

6. Test of Radiated Emission

6.1. Test Limit

(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.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

Frequency (MHz)	Distance	Limit (μV/ m)
0.09 ~ 0.490	300m	2400/F(kHz)
0.490 ~ 1.705	30m	24000/ F(kHz)
1.705 ~ 30	30m	30
30 ~ 88	3m	100
88 ~ 216	3m	150
216 ~ 960	3m	200
Above 960	3m	500

15.215 Additional provisions to the general radiated emission limitations.:

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

6.2. Test Procedures

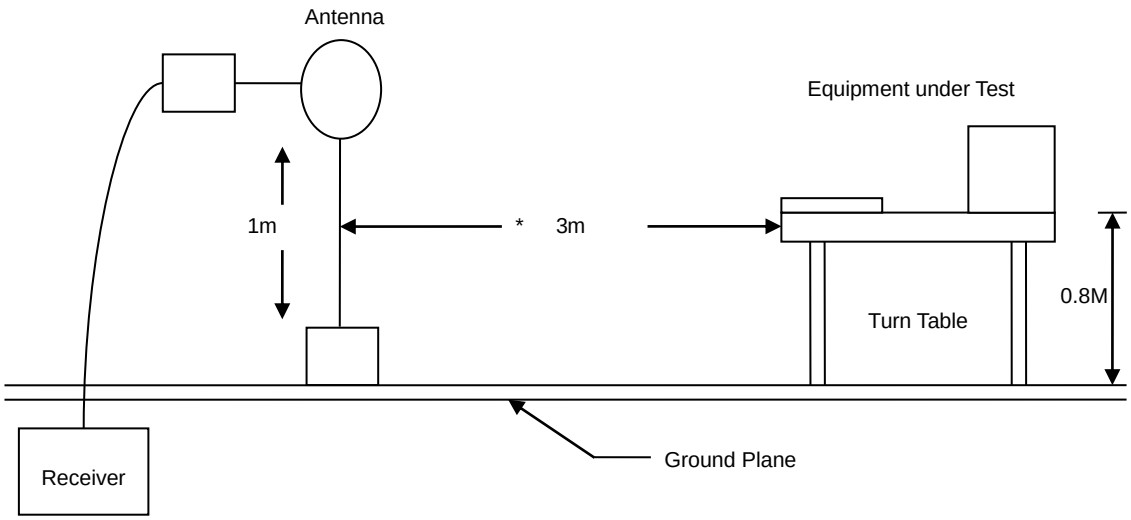
a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna 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. “Cone of radiation” has been considered to be 3dB beamwidth of the measurement antenna.

NOTE:

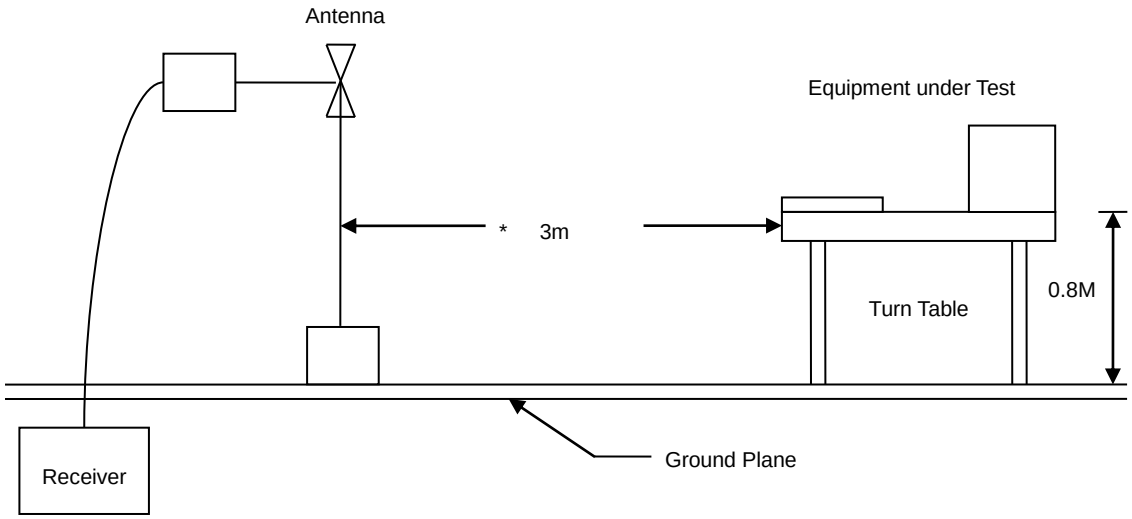
1. The resolution bandwidth of test receiver/spectrum analyzer is 300Hz or CISPR 200Hz(QP detector) at frequency Below 150 kHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 10KHz or CISPR 9KHz(QP detector) at frequency 150 kHz to 30 MHz.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

6.3. Typical Test Setup Layout of Radiated Emission

Below 30MHz test setup



Below 1GHz Test Setup

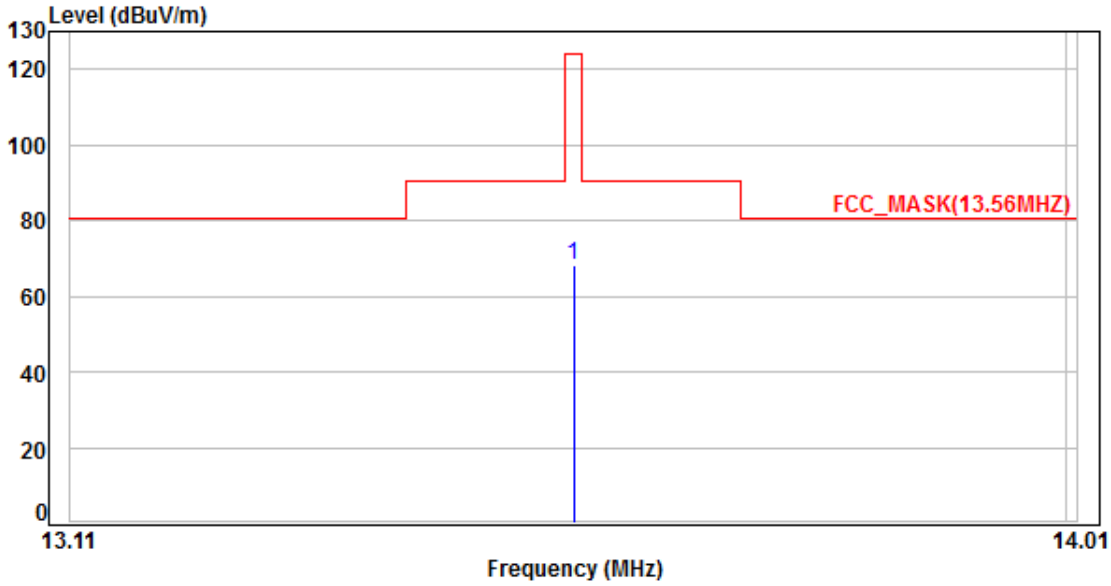


1.5M

6.4. Test Result and Data

6.4.1. Test Result of Fundamental Emission

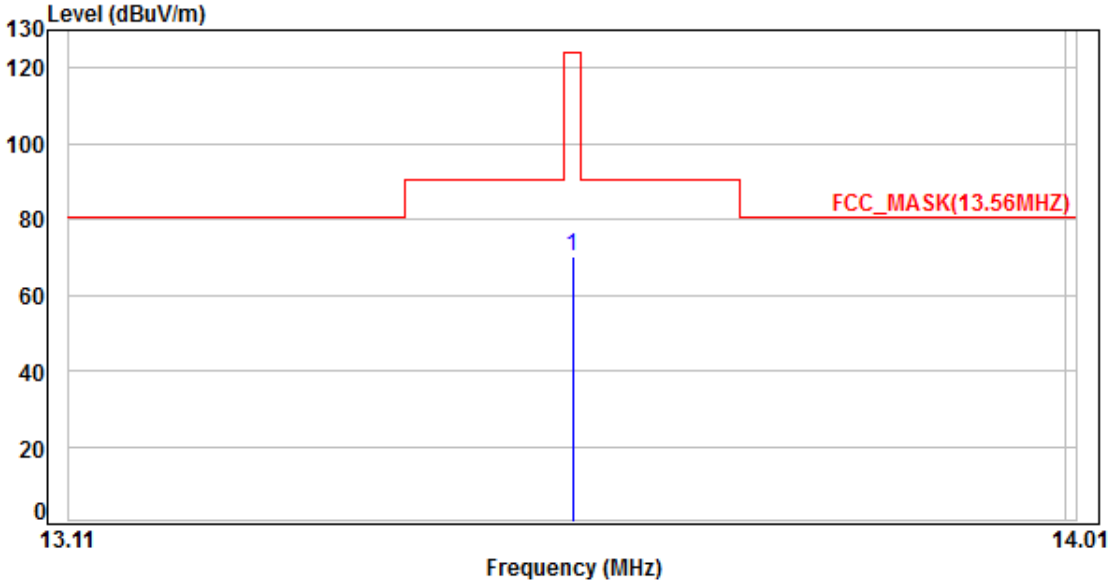
Power	:	AC 120V	Loop	:	Open
Test Mode	:	NFC 13.56MHz	Temperature	:	24°C
Test Date	:	Nov. 22, 2018	Humidity	:	62%



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	13.56	17.12	51.03	68.15	124.00	-55.85	Peak	100	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Power	:	AC 120V	Loop	:	Close
Test Mode	:	NFC 13.56MHz	Temperature	:	24°C
Test Date	:	Nov. 22, 2018	Humidity	:	62%

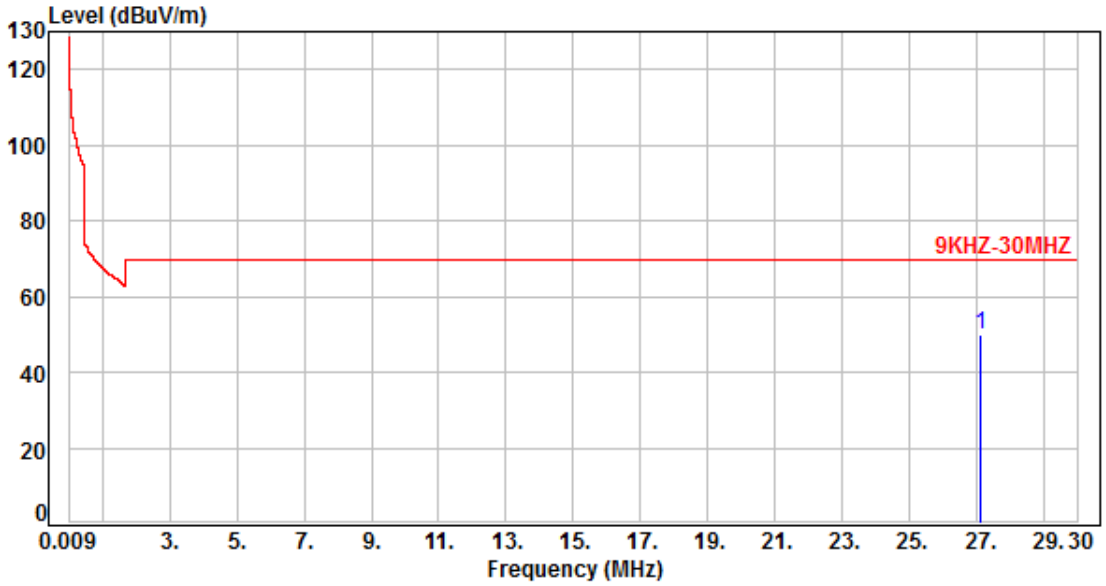


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	13.56	17.12	53.24	70.36	124.00	-53.64	Peak	100	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

6.4.2. Test Result of Unwanted Spurious emission (9KHz ~ 30MHz)

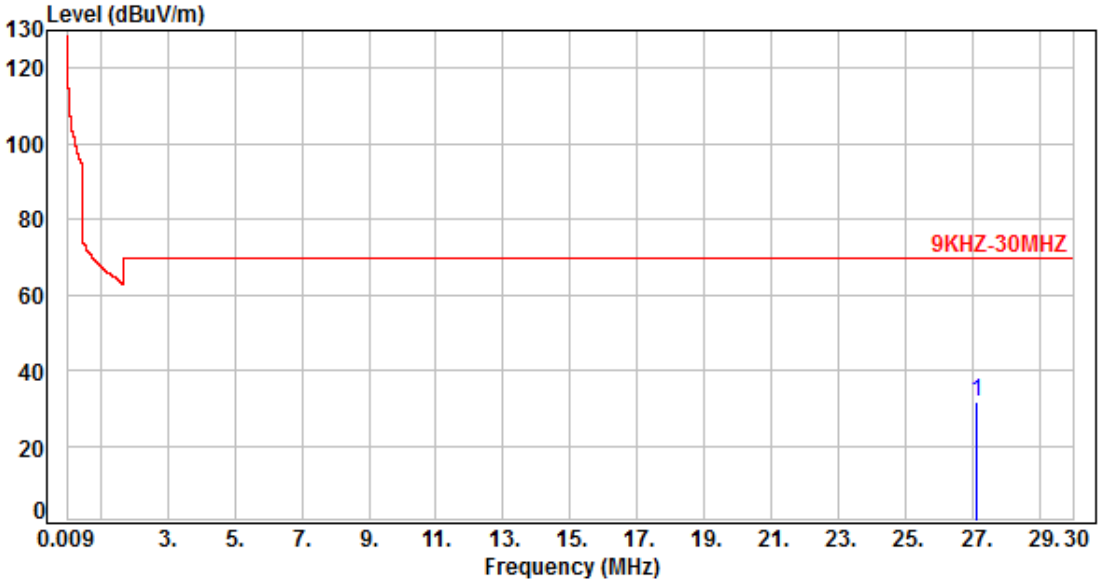
Power	:	AC 120V	Loop	:	Open
Test Mode	:	NFC 13.56MHz	Temperature	:	24°C
Test Date	:	Nov. 22, 2018	Humidity	:	62%



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	27.12	16.44	33.36	49.80	69.54	-19.74	Peak	100	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Power	:	AC 120V	Loop	:	Close
Test Mode	:	NFC 13.56MHz	Temperature	:	24°C
Test Date	:	Nov. 22, 2018	Humidity	:	62%

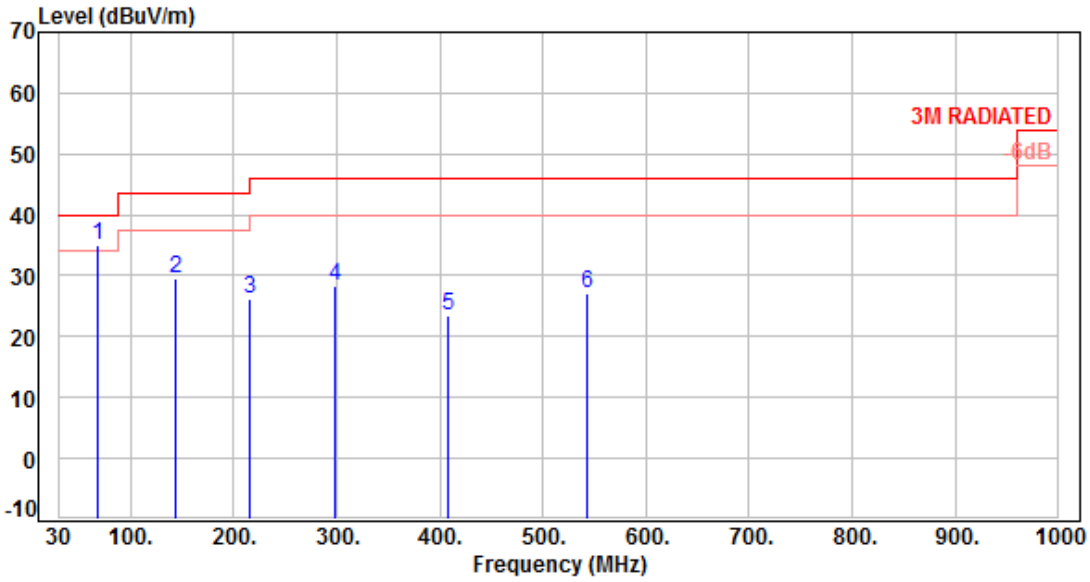


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	27.12	16.44	15.38	31.82	69.54	-37.72	Peak	100	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

6.4.3. Test Result of Unwanted Spurious emission (30GHz ~ 1GHz)

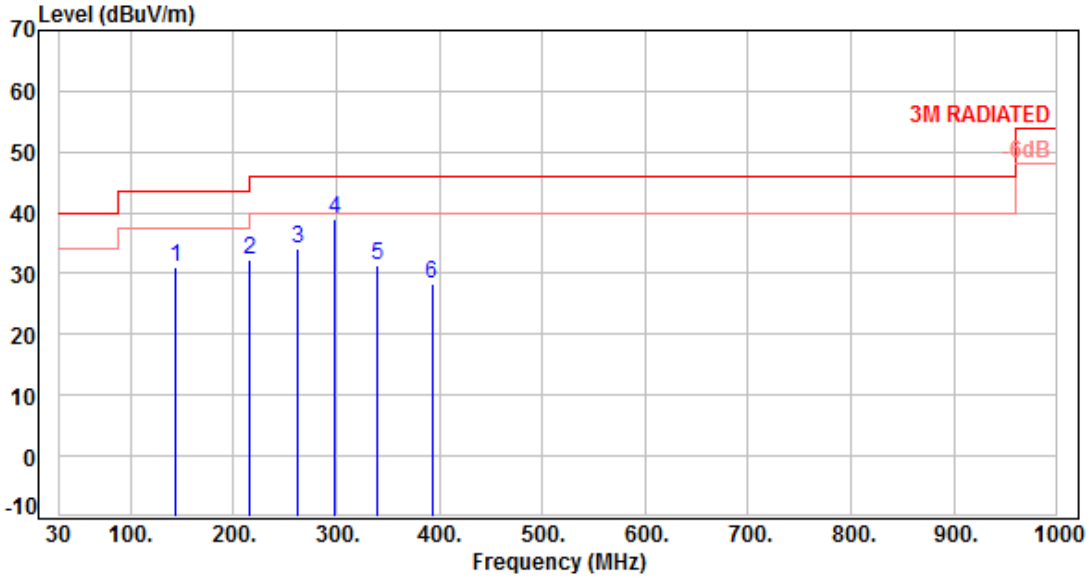
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	NFC TX 13.56MHz	Temperature	:	24°C
Test Date	:	Nov. 22, 2018	Humidity	:	62%



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	67.83	-11.05	45.93	34.88	40.00	-5.12	Peak	400	0	P
2	143.49	-9.60	39.25	29.65	43.50	-13.85	Peak	400	0	P
3	216.24	-11.53	37.67	26.14	46.00	-19.86	Peak	400	0	P
4	298.69	-8.66	36.96	28.30	46.00	-17.70	Peak	400	0	P
5	408.30	-5.67	29.26	23.59	46.00	-22.41	Peak	400	0	P
6	542.16	-2.94	29.99	27.05	46.00	-18.95	Peak	400	0	P

Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	NFC TX 13.56MHz	Temperature	:	24°C
Test Date	:	Nov. 22, 2018	Humidity	:	62%



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	143.49	-9.60	40.77	31.17	43.50	-12.33	Peak	100	0	P
2	216.24	-11.53	43.76	32.23	46.00	-13.77	Peak	100	0	P
3	261.83	-9.85	44.00	34.15	46.00	-11.85	Peak	100	0	P
4	298.69	-8.66	47.65	38.99	46.00	-7.01	Peak	100	0	P
5	340.40	-7.38	38.85	31.47	46.00	-14.53	Peak	100	0	P
6	392.78	-5.93	34.36	28.43	46.00	-17.57	Peak	100	0	P

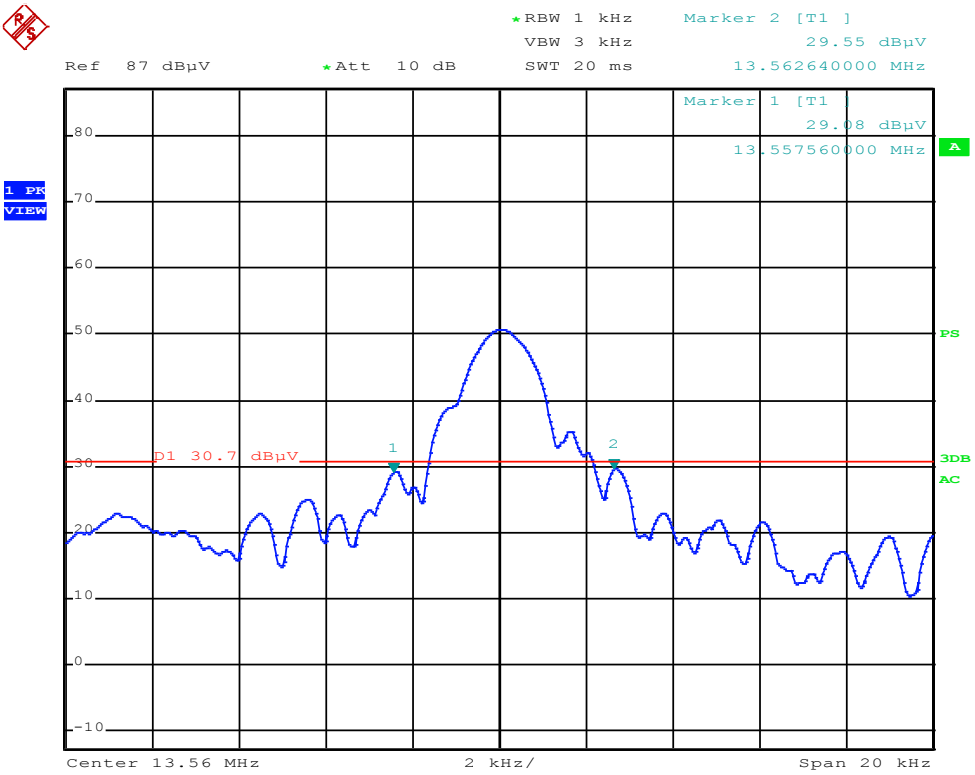
Note: Level=Reading+Factor
Margin=Level-Limit
Factor=Antenna Factor + cable loss - Amplifier Factor

6.5. 20dB Bandwidth BW

Frequency (MHz)	20dB Bandwidth (KHz)	Frequency range MHz (20dB Down) fL ＞ 13.553 MHz	Frequency range MHz (20dB Down) fH ＜ 13.567 MHz
13.56	5.08	13.55756	13.56264

20dB Bandwidth

13.56 MHz

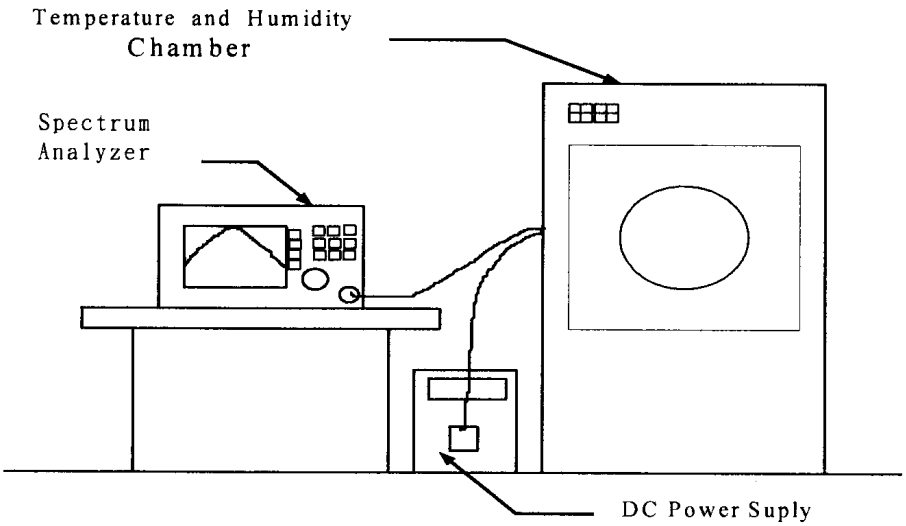


7. Frequency Stability

7.1. Test Procedure

1. The EUT was placed inside the Temperature and Humidity chamber.
2. The transmitter output was connected to spectrum analyzer.
3. Turn the EUT on and couple its output to a spectrum analyzer.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
6. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
7. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

7.2. Test Setup Layout



7.3. Test Result and Data

Temp(°C)	Power supply(V)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	102	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	120	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	138	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
40	102	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	120	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	138	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
30	102	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
	120	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
	138	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
20	102	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
	120	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
	138	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
10	102	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
	120	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
	138	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
0	102	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
	120	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
	138	13.5600	0.000000	13.5600	0.000000	13.5600	0.000000
-10	102	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	120	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	138	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
-20	102	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	120	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	138	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
-30	102	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	120	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737
	138	13.5599	-0.000737	13.5599	-0.000737	13.5599	-0.000737