

**FCC 47 CFR PART 15 SUBPART C**

**CERTIFICATION TEST REPORT**

For

Handheld Computer with Printer

Model No.: Tracksol 002

FCC ID: 2AGUK002

Trademark: **TrackSol**

REPORT NO.: ES151113019E2

ISSUE DATE: November 30, 2015

*Prepared for*

Mobile Money International Sdn Bhd

Lot 23-24, 2nd floor IOI Business Park, Puchong, Selangor 47100, Malaysia

*Prepared by*

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**TEST RESULT CERTIFICATION**

Applicant:	Mobile Money International Sdn Bhd Lot 23-24, 2nd floor IOI Business Park, Puchong, Selangor 47100, Malaysia
Manufacturer:	P-Plus Sdn Bhd No 1807, Jalan Industri 2, Bukit Panchor Industrial Park, 14300 Nibong Tebal, Pulau Pinang, Malaysia.
Product Description:	Handheld Computer with Printer
Model Number:	Tracksol 002
File Number:	ES151113019E2
Date of Test:	November 11, 2015 to November 30, 2015


Measurement Procedure Used:


APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 2, Subpart J:2015 FCC 47 CFR Part 15, Subpart C:2015	PASS

The above equipment was tested by EMTEK (SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 2 and Part 15.225

The test results of this report relate only to the tested sample identified in this report

Date of Test : November 11, 2015 to November 30, 2015

Prepared by :   
 Jack Li/Editor

Reviewer :   
 Joe Xia/Supervisor

Approve & Authorized Signer :   
 Lisa Wang/Manager

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## 1 EUT TECHNICAL DESCRIPTION

Characteristics	Description
Device Type:	Wifi device
IEEE 802.11 WLAN Mode Supported:	<input checked="" type="checkbox"/> 802.11b(20MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11g(20MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11n(20MHz channel bandwidth)
Data Rate:	802.11 b:1,2,5.5,11Mbps; 802.11 g:6,9,12,18,24,36,48,54Mbps; 802.11n(HT20):MCS0-MCS7; 106kbps for NFC
Modulation:	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n; ASK for NFC
Operating Frequency Range:	2412-2462MHz for 802.11b/g; 2412-2462MHz for 802.11n(HT20); 13.56MHz for NFC
Number of Channels:	11 channels for 802.11b/g; 11 channels for 802.11n(HT20); 1 channel for NFC
Transmit Power Max:	10.31dBm for 802.11b; 13.29dBm for 802.11g; 13.19dBm for 802.11n(HT20);
Antenna Type:	PCB Antenna for WIFI Integral Antenna for NFC
Antenna Gain:	5.3dBi for WIFI 1dBi for NFC
Power supply:	<input checked="" type="checkbox"/> DC supply: DC 7.4V internal rechargeable lithium battery or DC 12V from external power
	<input type="checkbox"/> Adapter supply:
Temperature Range:	5°C ~ +40°C
RF power setting in TEST SW:	Software's default

*Note: for more details, please refer to the User's manual of the EUT.*

## 2 SUMMARY OF TEST RESULT

FCC Part Clause	Test Parameter	Verdict	Remark
2.1049	Occupied Bandwidth	PASS	
15.225(e)	Frequency stability	PASS	
15.225(d) 15.209	Radiated Spurious Emissions	PASS	
15.207	Conducted Emission	PASS	
15.203	Antenna Requirement	PASS	
NOTE1: N/A (Not Applicable)			

### RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for FCC ID: 2AGUK002 filing to comply with Section 15.225 of the FCC Part 15, Subpart C Rules.

The system with mutil-fuction is compliance with Subpart B is authorized under a DOC procedure

### 3 TEST METHODOLOGY

#### 3.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:  
 FCC 47 CFR Part 2, Subpart J  
 FCC 47 CFR Part 15, Subpart C  
 FCC KDB 174176 AC POWER-LINE CONDUCTED EMISSIONS

#### 3.2 MEASUREMENT EQUIPMENT USED

##### 3.2.1 Conducted Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/16/2015
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	05/16/2015
50Ω Coaxial Switch	Anritsu	MP59B	M20531	N/A
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	05/16/2015
Voltage Probe	Rohde & Schwarz	TK9416	N/A	05/16/2015
I.S.N	Rohde & Schwarz	ENY22	1109.9508.02	05/16/2015

##### 3.2.2 Radiated Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/16/2015
Pre-Amplifier	HP	8447D	2944A07999	05/16/2015
Bilog Antenna	Schwarzbeck	VULB9163	142	05/16/2015
Loop Antenna	ARA	PLA-1030/B	1029	05/16/2015
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/16/2015
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/16/2015
Cable	Schwarzbeck	AK9513	ACRX1	05/16/2015
Cable	Rosenberger	N/A	FP2RX2	05/16/2015
Cable	Schwarzbeck	AK9513	CRPX1	05/16/2015
Cable	Schwarzbeck	AK9513	CRRX2	05/16/2015

##### 3.2.3 Radio Frequency Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.
Spectrum Analyzer	Agilent	E4407B	88156318	05/16/2015
EMI Test Receiver	Rohde & Schwarz	FSV30	103040	05/16/2015
Signal Analyzer	Agilent	N9010A	My53470879	05/16/2015
Power meter	Anritsu	ML2495A	0824006	05/16/2015
Power sensor	Anritsu	MA2411B	0738172	05/16/2015

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### **3.3 DESCRIPTION OF TEST MODES**

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

## 4 FACILITIES AND ACCREDITATIONS

### 4.1 FACILITIES

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

Bldg 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

### 4.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

- EMC Lab.
- : Accredited by CNAS, 2013.10.28  
The certificate is valid until 2016.10.29  
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)  
The Certificate Registration Number is L2291
  - : Accredited by TUV Rheinland Shenzhen, 2015.08.04  
The Laboratory has been assessed according to the requirements ISO/IEC 17025.
  - : Accredited by FCC, July 24, 2013  
The Certificate Registration Number is 406365.
  - : Accredited by FCC, July 17, 2013  
The Certificate Registration Number is 709623.
  - : Accredited by Industry Canada, November 24, 2015  
The Certificate Registration Number is 4480A-2

## 5 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

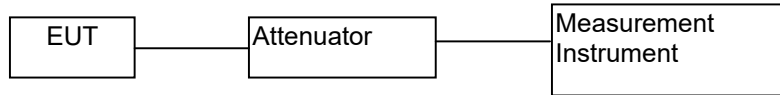
Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Conducted Emissions Test	$\pm 2.0 \text{ dB}$
Radiated Emission Test	$\pm 2.0 \text{ dB}$
Occupied Bandwidth Test	$\pm 1.0 \text{ dB}$
All emission, radiated	$\pm 3 \text{ dB}$
Temperature	$\pm 0.5^\circ \text{C}$
Humidity	$\pm 3\%$

Measurement Uncertainty for a level of Confidence of 95%

## 6 SETUP OF EQUIPMENT UNDER TEST

### 6.1 RADIO FREQUENCY TEST SETUP 1

The component's antenna port(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



### 6.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

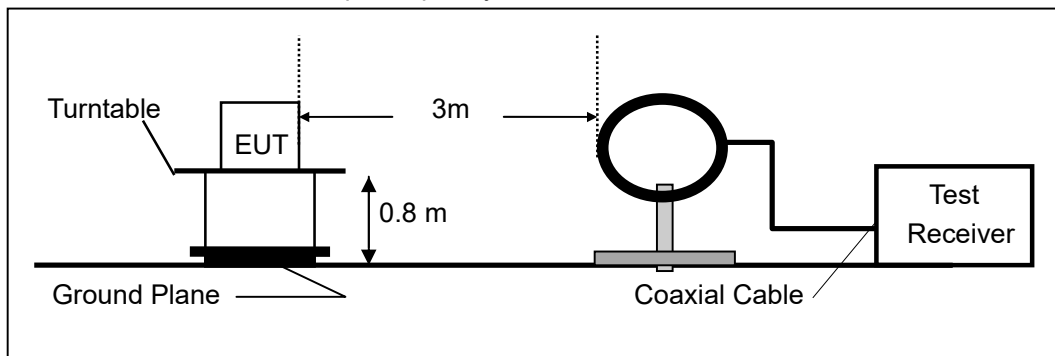
Below 30MHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

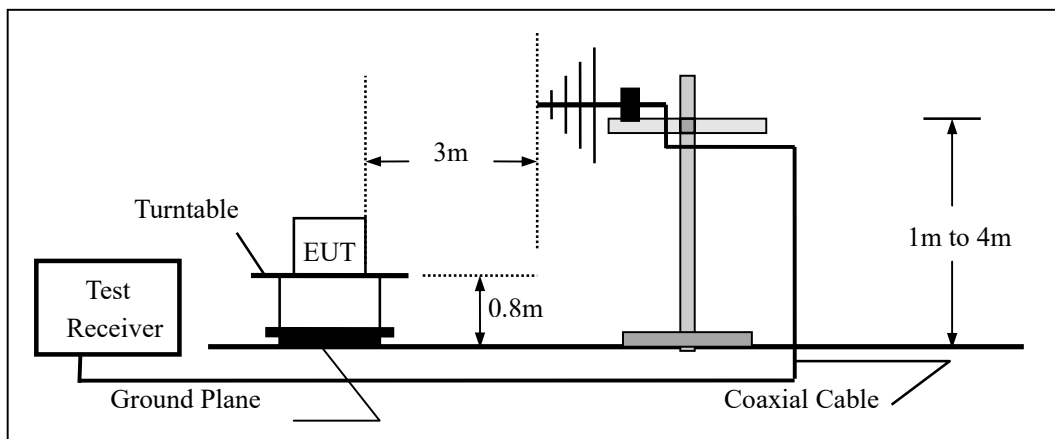
Above 30MHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz

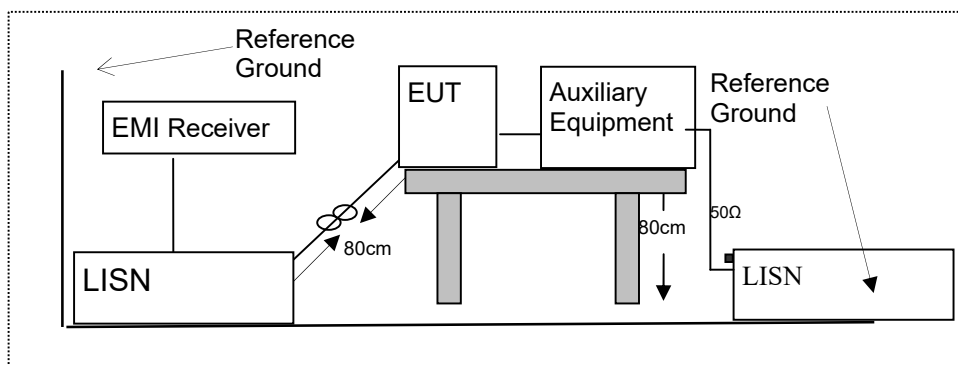


### 6.3 CONDUCTED EMISSION TEST SETUP

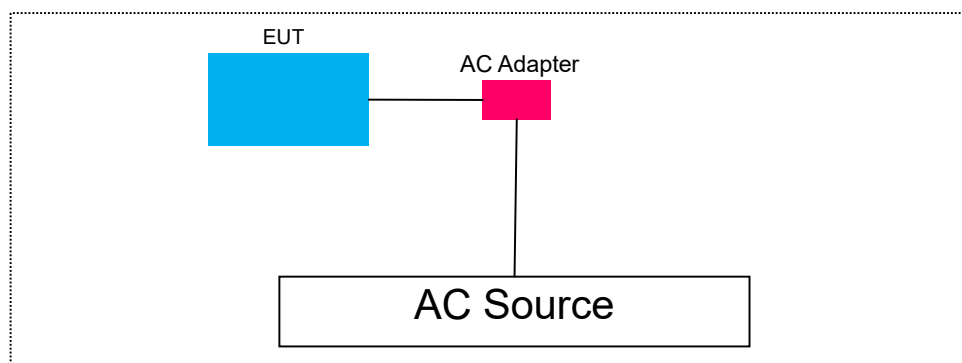
The mains cable of the EUT (Handheld Computer with Printer) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

According to the requirements in ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



#### 6.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



#### 6.5 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Note
1.	Handheld Computer with Printer	<b>TrackSol</b>	Tracksol 002	2AGUK002	EUT
2.	Adapter	N/A	T91-92-1001-1	N/A	Auxiliary Equipment
	STAFF Card	EzeeLink	N/A	N/A	Auxiliary Equipment

**Notes:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 7 TEST REQUIREMENTS

### 7.1 OCCUPIED BANDWIDTH

#### 7.1.1 Applicable Standard

According to FCC Part 2.1049

#### 7.1.2 Conformance Limit

No limit requirement.

#### 7.1.3 Test Configuration

Test according to clause 6.1 radio frequency test setup 1

#### 7.1.4 Test Procedure

The EUT was operating in transmit mode and controlled its channel. Printed out the test result from the spectrum by hard copy function.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously

Set RBW = 1% occupied bandwidth.

Set the video bandwidth (VBW) = 3 times RBW.

Set Span = approximately 2 to 3 times the occupied bandwidth

Set Detector = Peak.

Set Trace mode = max hold.

Set Sweep = auto couple.

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 99% down one side of the emission. Reset the markerdelta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 99% bandwidth of the emission.

If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

Measure and record the results in the test report.

#### 7.1.5 Test Results

Temperature: 28°C  
Humidity: 65 %

Test Date: November 24, 2015  
Test By: Andy

Modulation Mode	Channel Frequency (MHz)	20dB Bandwidth (kHz)	FL at 20dB BW (MHz)	FH at 20dB BW (MHz)	99% Bandwidth (kHz)
ASK	13.56	3.093	13.5602	13.5630	2.818
Limit		N/A	13.553	13.567	N/A
Note: N/A (Not Applicable)					



## **7.2 FREQUENCY STABILITY**

### **7.2.1 Applicable Standard**

According to FCC Part 2.1055

### **7.2.2 Conformance Limit**

According to part 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.

### **7.2.3 Test Configuration**

Test according to clause 6.1 radio frequency test setup

### **7.2.4 Test Procedures**

Connect the EUT to frequency analyzer via the antenna connector.

EUT was placed at temperature chamber and connected to an external power supply.

Temperature and voltage condition shall be tested to confirm frequency stability.

(a) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than  $10^{\circ}$  centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short-term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(b) The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point, which shall be specified by the manufacturer.

### **7.2.5 Test Results**

Operation Mode	Channel Number	Test Condition		Channel Frequency (MHz)	Freq.Dev. (Hz)	Deviation (ppm)	Limit (ppm)
		Voltage (V)	Temp (°C)				
ASK	CH1	Vnom	-20	13.56	1.350	99.55752	100
			-10	13.56	1.349	99.48378	100
			0	13.56	1.348	99.41003	100
			10	13.56	1.345	99.18879	100
			20	13.56	1.346	99.26254	100
			30	13.56	1.349	99.48378	100
			40	13.56	1.348	99.41003	100
			50	13.56	1.351	99.63127	100
		85% Vnom	20	13.56	1.347	99.33628	100
		115% Vnom	20	13.56	1.343	99.0413	100
VERDICT				PASS			

## 7.3 RADIATED SPURIOUS EMISSION

### 7.3.1 Applicable Standard

According to FCC Part 15.225(d) and 15.209

### 7.3.2 Conformance 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.

According to FCC Part 15.225(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	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	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	2690-2900	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	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part 15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	300	See the remark
0.490~1.705	2400/F(KHz)	30	
1.705~30.0	30	30	
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remark :1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. Distance extrapolation factor =40log(Specific distance/ test distance)( dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor.

for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10\*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

Field Strength of Fundamental Emissions and Spectrum Mask					
Emissions	(uV/m)@30m	(dBuV/m)@30m	(dBuV/m)@10m	(dBuV/m)@3m	(dBuV/m)@1m
Fundamental	15848	84.0	103.1	124.0	143.1
Quasi peak measurement of the fundamental.					

Spectrum Mask					
Freq. of Emission (MHz)	(uV/m)@30m	(dBuV/m)@30m	(dBuV/m)@10m	(dBuV/m)@3m	(dBuV/m)@1m
1.705~13.110	30	29.5	48.6	69.5	88.6
13.110~13.410	106	40.5	59.6	80.5	99.6
13.410~13.553	334	50.5	69.6	90.5	109.6
13.553~13.567	15848	84.0	103.1	124.0	143.1
13.567~13.710	334	50.5	69.6	90.5	109.6
13.710~14.010	106	40.5	59.6	80.5	99.6
14.010~30.000	30	29.5	48.6	69.5	88.6

### 7.3.3 Test Configuration

Test according to clause 6.2 radio frequency test setup 2

### 7.3.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 100 kHz for  $f < 1$  GHz(30MHz to 1GHz), 200Hz for  $f < 150$  KHz(9KHz to 150KHz), 9KHz for  $f < 30$  MHz(150KHz to 30MHz)

VBW  $\geq$  RBW Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

### 7.3.5 Test Results

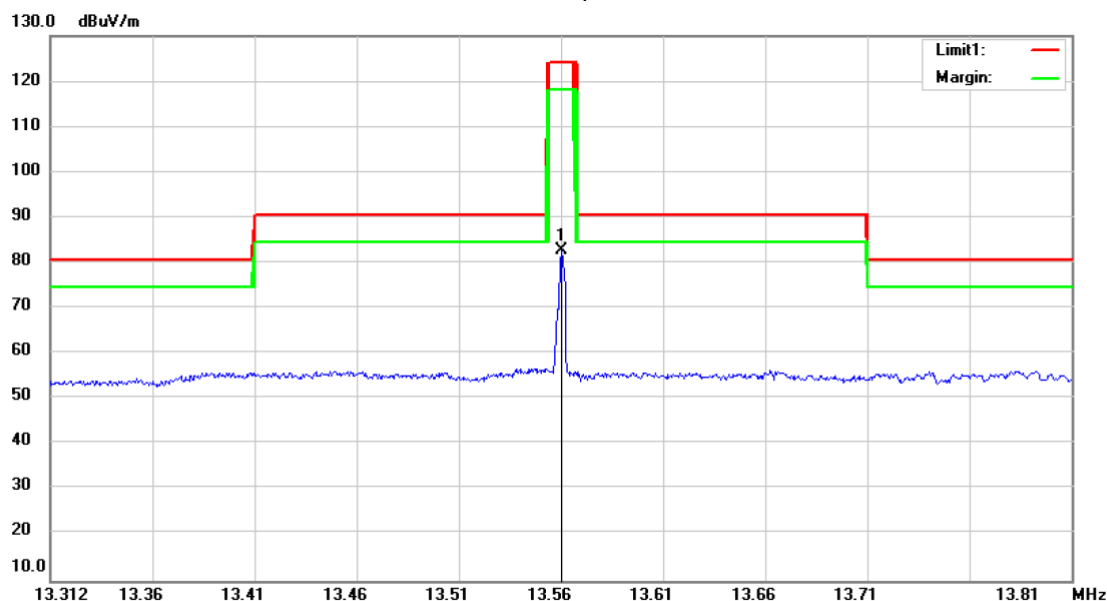
Temperature:	24°C	Test Date:	November 24, 2015
Humidity:	53 %	Test By:	KK
Test mode:	TX Mode		

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor =  $40\log(\text{Specific distance}/ \text{test distance})$  ( dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor

■ Field Strength of Fundamental Emissions and Spectrum Mask  
All mode have been tested, and the worst result was report as below:

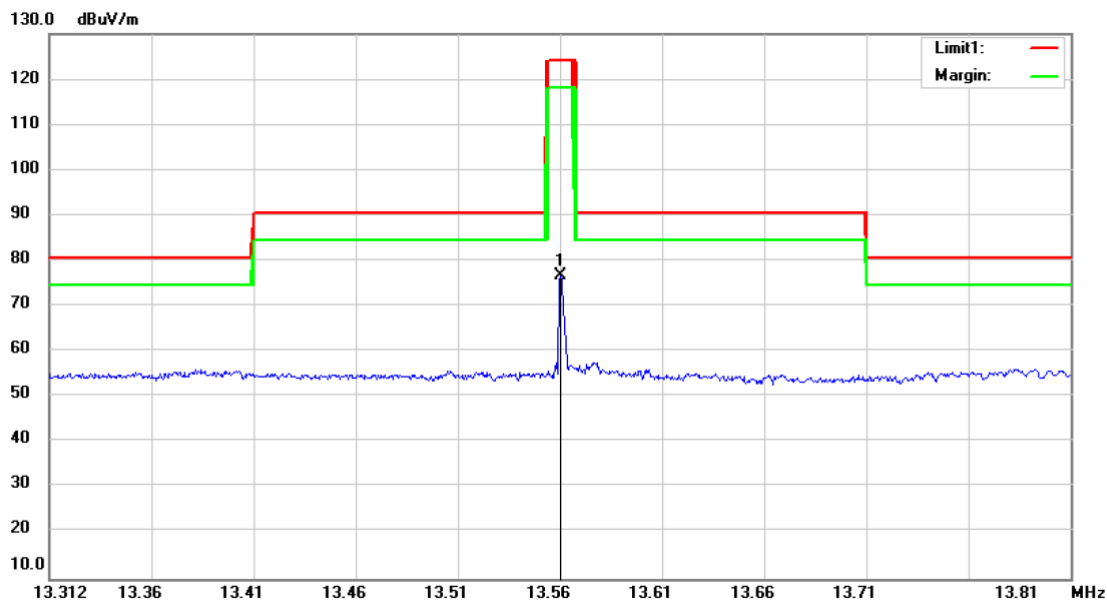


Site 3m Chamber #3 Polarization: **Horizontal** Temperature: 24 C  
Limit: FCC PART 15.225 Spectrum Mask dBuV/m Power: AC 120V/60Hz Humidity: 53 %  
Mode:TX Mode  
Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	13.5594	60.98	21.78	82.76	124.00	-41.24	peak		

\*:Maximum data x:Over limit !:over margin

Operator: KK



Site 3m Chamber #3 Polarization: **Vertical** Temperature: 24 C  
 Limit: FCC PART 15.225 Spectrum Mask dBuV/m Power: AC 120V/60Hz Humidity: 53 %  
 Mode: TX Mode  
 Note:

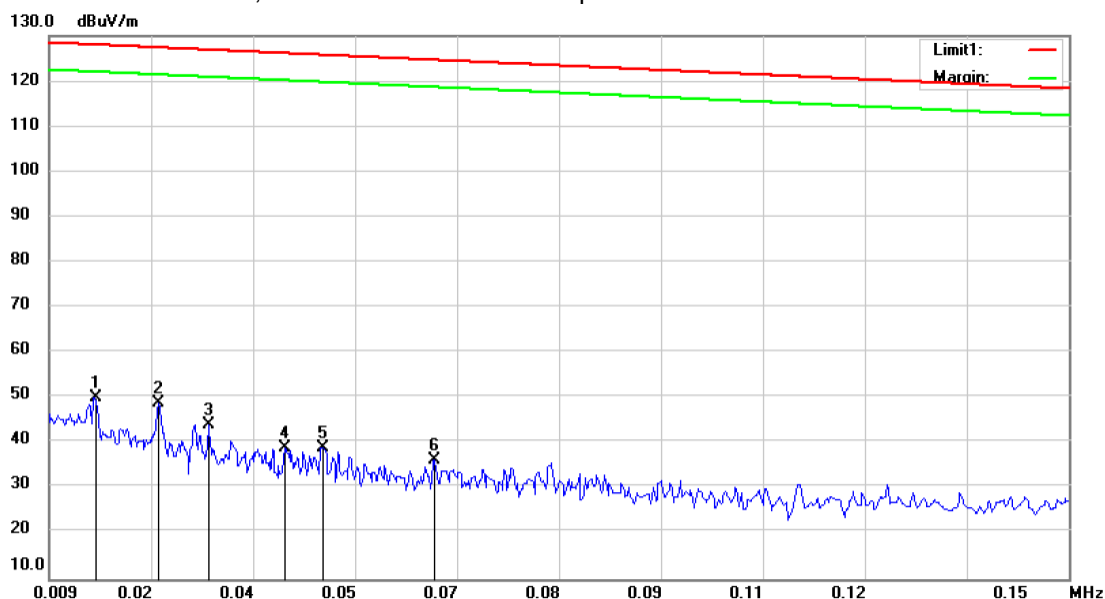
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	13.5600	55.02	21.78	76.80	124.00	-47.20	peak		Comment

\*:Maximum data x:Over limit !:over margin

Operator: KK

■ Spurious Emission below 150kHz (9KHz to 150kHz)

All mode have been tested, and the worst result was report as below:



Site 3m Chamber #3

Polarization: **Horizontal**

Temperature: 24 C

Limit: (RE)FCC PART 15C(9K-30M)

Power: AC 120V/60Hz

Humidity: 53 %

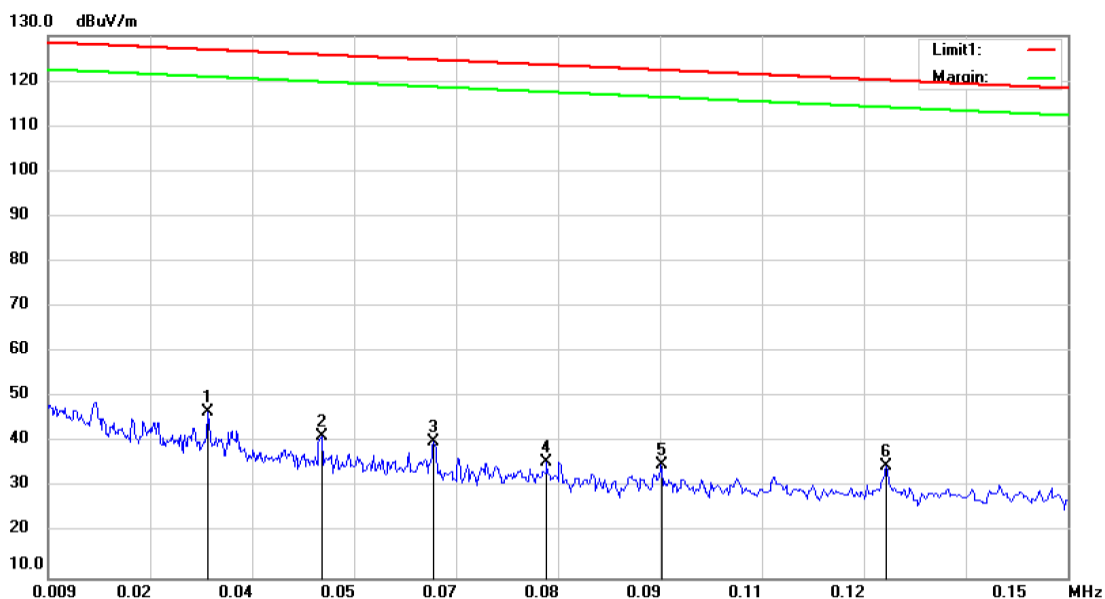
Mode:TX Mode

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	0.0155	29.91	20.11	50.02	128.03	-78.01	QP		
2		0.0241	28.55	20.29	48.84	127.41	-78.57	QP		
3		0.0311	23.50	20.43	43.93	126.91	-82.98	QP		
4		0.0417	18.17	20.66	38.83	126.14	-87.31	QP		
5		0.0468	18.17	20.77	38.94	125.77	-86.83	QP		
6		0.0624	15.48	20.78	36.26	124.65	-88.39	QP		

\*:Maximum data    x:Over limit    !:over margin

Operator: KK



Site 3m Chamber #3

Polarization: **Vertical**

Temperature: 24 C

Limit: (RE)FCC PART 15C(9K-30M)

Power: AC 120V/60Hz

Humidity: 53 %

Mode:TX Mode

Note:

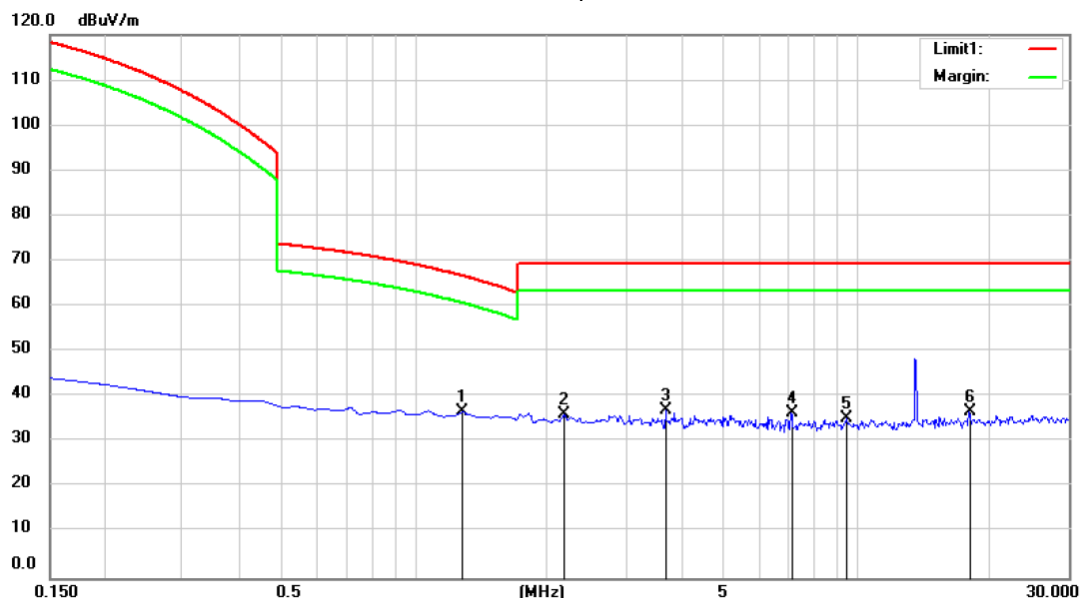
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	0.0311	26.46	20.43	46.89	126.91	-80.02	QP		
2		0.0470	20.65	20.77	41.42	125.76	-84.34	QP		
3		0.0624	19.51	20.78	40.29	124.65	-84.36	QP		
4		0.0781	15.09	20.70	35.79	123.52	-87.73	QP		
5		0.0940	14.57	20.62	35.19	122.37	-87.18	QP		
6		0.1250	14.04	20.70	34.74	120.13	-85.39	QP		

\*:Maximum data x:Over limit !:over margin

Operator: KK

■ Spurious Emission below 30MHz (9KHz to 30MHz)

All mode have been tested, and the worst result was report as below:



Site 3m Chamber #3

Polarization: **Horizontal**

Temperature: 24 C

Limit: (RE)FCC PART 15C(9K-30M)

Power: AC 120V/60Hz

Humidity: 53 %

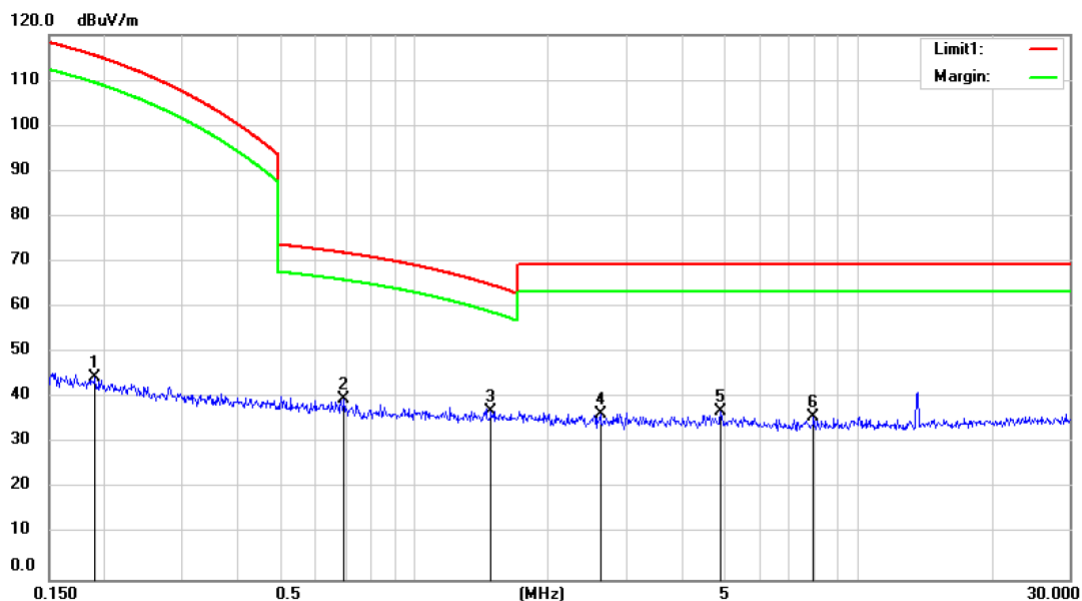
Mode:TX Mode

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	1.2843	14.89	21.85	36.74	66.74	-30.00	QP		
2		2.1798	14.54	21.55	36.09	69.50	-33.41	QP		
3		3.7022	15.22	21.74	36.96	69.50	-32.54	QP		
4		7.1051	14.82	21.55	36.37	69.50	-33.13	QP		
5		9.5230	13.68	21.68	35.36	69.50	-34.14	QP		
6		18.0301	14.54	22.06	36.60	69.50	-32.90	QP		

\*:Maximum data    x:Over limit    !:over margin

Operator: KK



Site 3m Chamber #3

Polarization: **Vertical**

Temperature: 24 C

Limit: ( RE)FCC PART 15C(9K-30M)

Power: AC 120V/60Hz

Humidity: 53 %

Mode: TX Mode

Note:

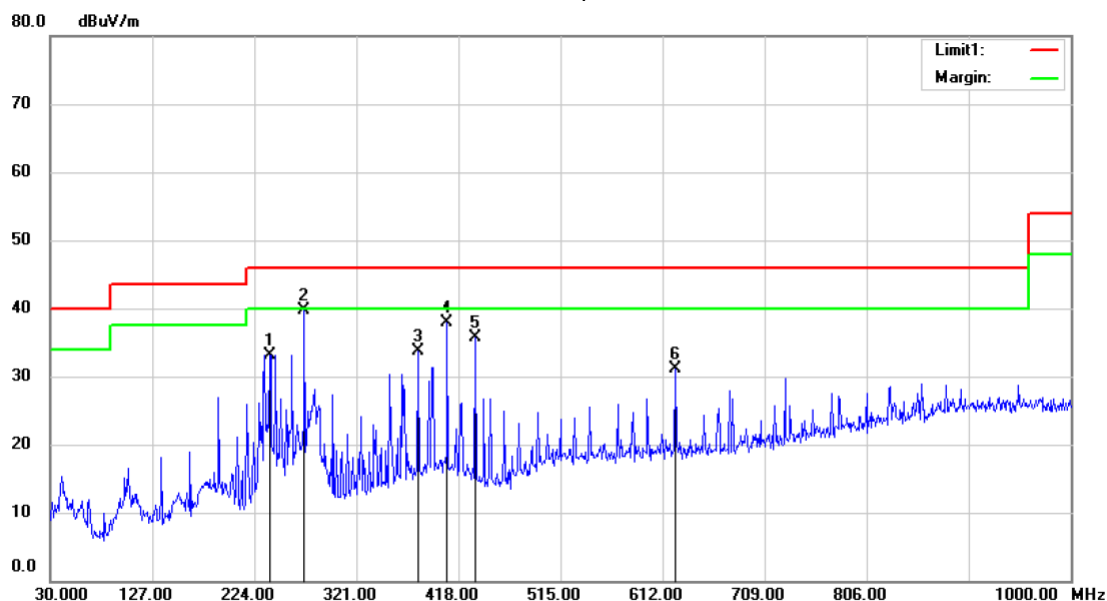
No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	0.1904	23.64	20.96	44.60	115.41	-70.81	QP		
2	0.6936	17.94	21.70	39.64	71.99	-32.35	QP		
3 *	1.4874	15.31	21.76	37.07	64.93	-27.86	QP		
4	2.6221	14.91	21.61	36.52	69.50	-32.98	QP		
5	4.8997	15.14	21.89	37.03	69.50	-32.47	QP		
6	7.9353	14.16	21.60	35.76	69.50	-33.74	QP		

\*:Maximum data    x:Over limit    !:over margin

Operator: KK

## ■ Spurious Emission Above 30MHz (30MHz to 1GHz)

All mode have been tested, and the worst result was report as below:



Site 3m Chamber #3

Polarization: **Horizontal**

Temperature: 24 C

Limit: (RE)FCC PART 15 CLASS B

Power: AC 120V/60Hz

Humidity: 53 %

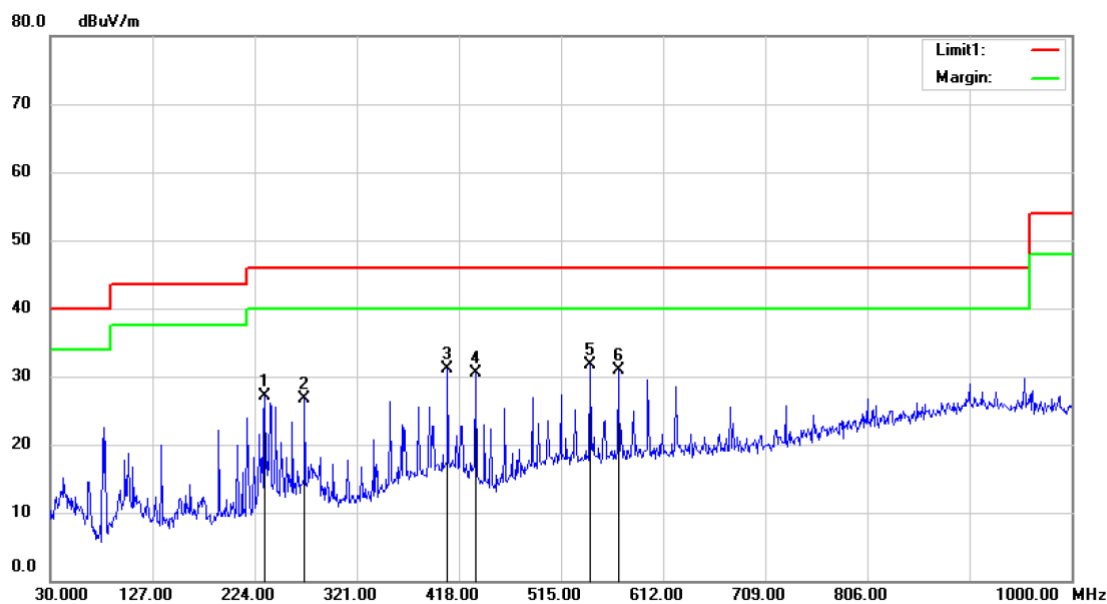
Mode:TX Mode

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		238.5500	47.21	-14.02	33.19	46.00	-12.81	QP		
2	*	271.5300	52.33	-12.67	39.66	46.00	-6.34	QP		
3		379.2000	43.81	-10.03	33.78	46.00	-12.22	QP		
4		407.3300	46.95	-9.07	37.88	46.00	-8.12	QP		
5		433.5200	46.38	-10.63	35.75	46.00	-10.25	QP		
6		623.6400	37.94	-6.75	31.19	46.00	-14.81	QP		

\*:Maximum data x:Over limit !:over margin

Operator: KK



Site 3m Chamber #3 Polarization: **Vertical** Temperature: 24 C  
 Limit: (RE)FCC PART 15 CLASS B Power: AC 120V/60Hz Humidity: 53 %  
 Mode:TX Mode  
 Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		233.7000	41.76	-14.63	27.13	46.00	-18.87	QP		
2		271.5300	39.42	-12.67	26.75	46.00	-19.25	QP		
3		407.3300	40.12	-9.07	31.05	46.00	-14.95	QP		
4		433.5200	41.12	-10.63	30.49	46.00	-15.51	QP		
5	*	543.1300	39.11	-7.45	31.66	46.00	-14.34	QP		
6		569.3200	38.24	-7.24	31.00	46.00	-15.00	QP		

\*:Maximum data x:Over limit !:over margin

Operator: KK

## 7.4 CONDUCTED EMISSION TEST

### 7.4.1 Applicable Standard

According to FCC Part 15.207(a)

### 7.4.2 Conformance Limit

Conducted Emission Limit		
Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. The lower limit shall apply at the transition frequencies 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

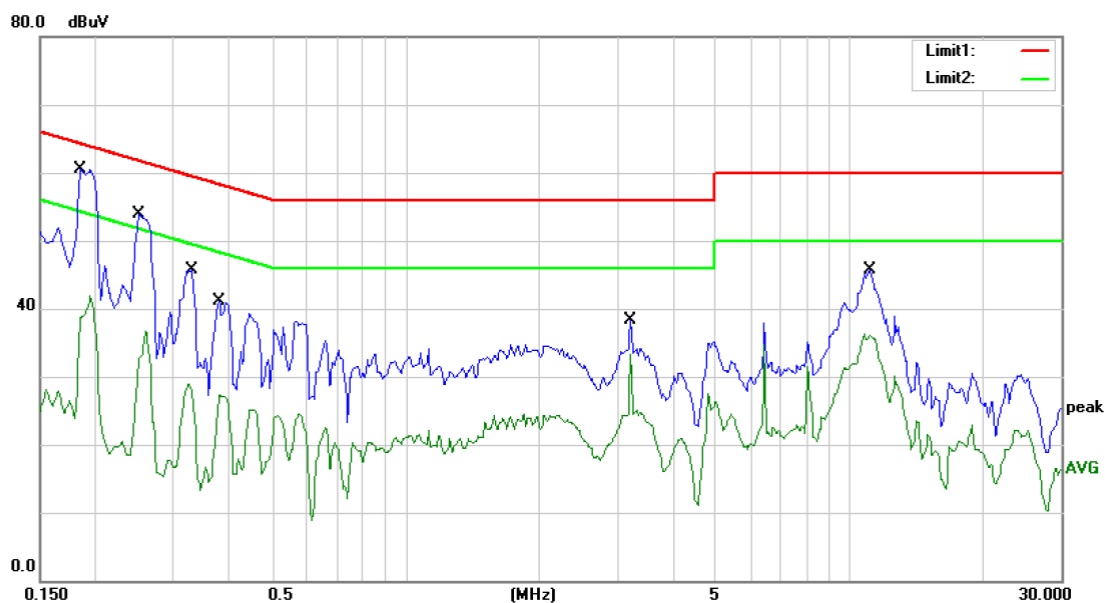
### 7.4.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

### 7.4.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.  
 Maximum procedure was performed on the highest emissions to ensure EUT compliance.  
 Repeat above procedures until all frequency measured were complete.

### 7.4.5 Test Results



Site Conduction #1

Phase: **L1**

Temperature: 26

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 120V/60Hz

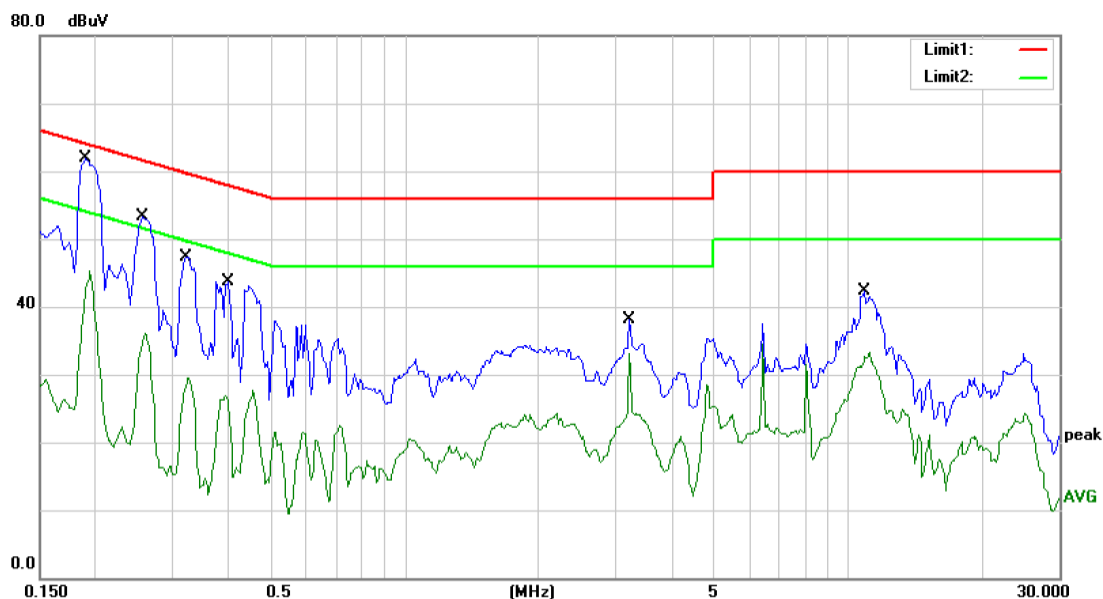
Humidity: 60 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1850	60.56	0.00	60.56	64.26	-3.70	QP	
2		0.1850	41.97	0.00	41.97	54.26	-12.29	AVG	
3		0.2500	53.96	0.00	53.96	61.76	-7.80	QP	
4		0.2500	36.71	0.00	36.71	51.76	-15.05	AVG	
5		0.3300	45.61	0.00	45.61	59.45	-13.84	QP	
6		0.3300	28.87	0.00	28.87	49.45	-20.58	AVG	
7		0.3800	41.10	0.00	41.10	58.28	-17.18	QP	
8		0.3800	27.31	0.00	27.31	48.28	-20.97	AVG	
9		3.2100	38.23	0.00	38.23	56.00	-17.77	QP	
10		3.2100	33.26	0.00	33.26	46.00	-12.74	AVG	
11		11.1250	45.62	0.00	45.62	60.00	-14.38	QP	
12		11.1250	36.32	0.00	36.32	50.00	-13.68	AVG	

\*:Maximum data    x:Over limit    !:over margin    Comment: Factor build in receiver.    Operator: CSL



Site Conduction #1

Phase: **N**

Temperature: 26

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 120V/60Hz

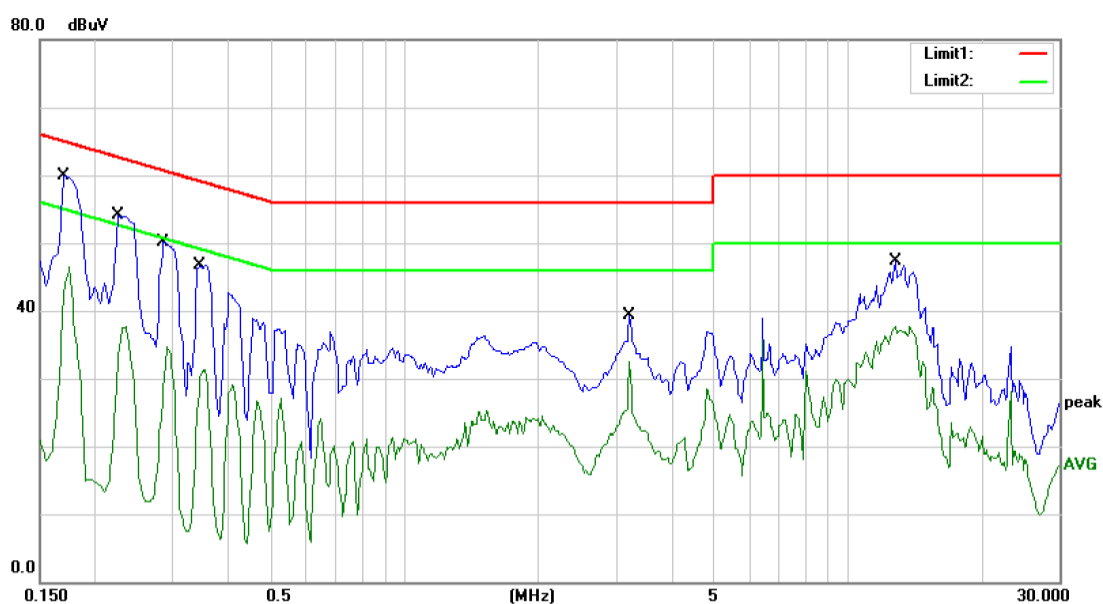
Humidity: 60 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1	*	0.1900	59.21	0.00	59.21	64.04	-4.83	QP	
2		0.1900	45.29	0.00	45.29	54.04	-8.75	AVG	
3		0.2550	53.30	0.00	53.30	61.59	-8.29	QP	
4		0.2550	36.03	0.00	36.03	51.59	-15.56	AVG	
5		0.3200	47.36	0.00	47.36	59.71	-12.35	QP	
6		0.3200	29.49	0.00	29.49	49.71	-20.22	AVG	
7		0.4000	43.76	0.00	43.76	57.85	-14.09	QP	
8		0.4000	27.63	0.00	27.63	47.85	-20.22	AVG	
9		3.2100	38.06	0.00	38.06	56.00	-17.94	QP	
10		3.2100	33.18	0.00	33.18	46.00	-12.82	AVG	
11		10.9250	42.34	0.00	42.34	60.00	-17.66	QP	
12		10.9250	33.29	0.00	33.29	50.00	-16.71	AVG	

\*:Maximum data    x:Over limit    !:over margin    Comment: Factor build in receiver.    Operator: CSL



Site Conduction #1

Phase: **L1**

Temperature: 26

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 240V/50Hz

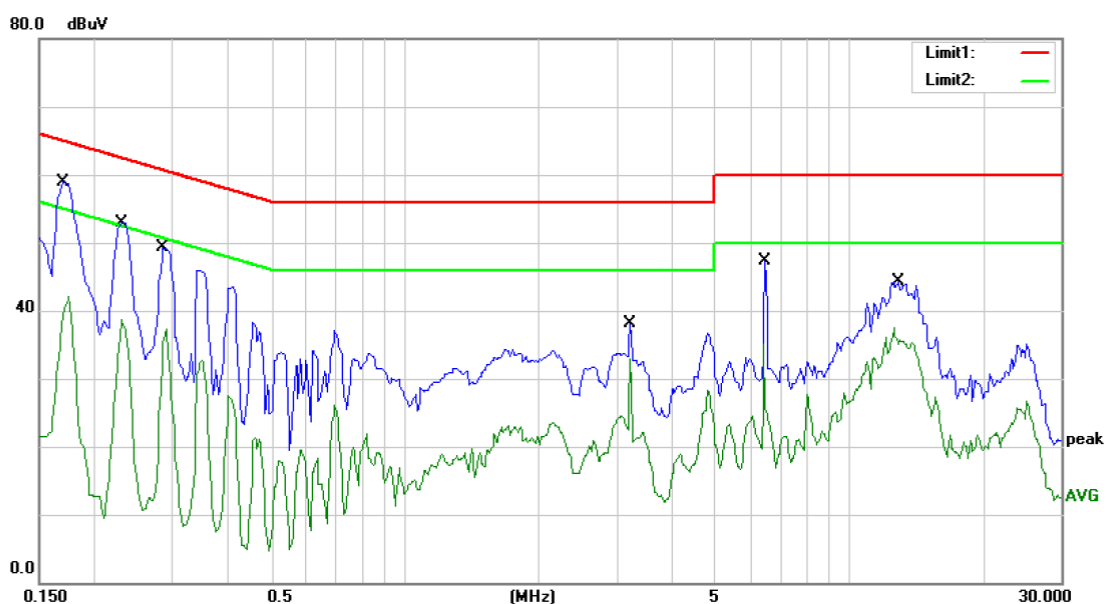
Humidity: 60 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1700	59.92	0.00	59.92	64.96	-5.04	QP	
2		0.1700	46.57	0.00	46.57	54.96	-8.39	AVG	
3		0.2250	54.11	0.00	54.11	62.63	-8.52	QP	
4		0.2250	37.62	0.00	37.62	52.63	-15.01	AVG	
5		0.2850	50.15	0.00	50.15	60.67	-10.52	QP	
6		0.2850	34.74	0.00	34.74	50.67	-15.93	AVG	
7		0.3450	46.69	0.00	46.69	59.08	-12.39	QP	
8		0.3450	31.36	0.00	31.36	49.08	-17.72	AVG	
9		3.2100	39.22	0.00	39.22	56.00	-16.78	QP	
10		3.2100	32.56	0.00	32.56	46.00	-13.44	AVG	
11		12.8000	47.25	0.00	47.25	60.00	-12.75	QP	
12		12.8000	37.77	0.00	37.77	50.00	-12.23	AVG	

\*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: CSL



Site Conduction #1

Phase: **N**

Temperature: 26

Limit: (CE)FCC PART 15 class B\_QP

Power: AC 240V/50Hz

Humidity: 60 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1700	58.89	0.00	58.89	64.96	-6.07	QP	
2		0.1700	42.03	0.00	42.03	54.96	-12.93	AVG	
3		0.2300	52.90	0.00	52.90	62.45	-9.55	QP	
4		0.2300	38.70	0.00	38.70	52.45	-13.75	AVG	
5		0.2850	49.24	0.00	49.24	60.67	-11.43	QP	
6		0.2850	37.37	0.00	37.37	50.67	-13.30	AVG	
7		3.2100	38.14	0.00	38.14	56.00	-17.86	QP	
8		3.2100	32.97	0.00	32.97	46.00	-13.03	AVG	
9		6.4700	47.34	0.00	47.34	60.00	-12.66	QP	
10		6.4700	35.11	0.00	35.11	50.00	-14.89	AVG	
11		12.9500	44.38	0.00	44.38	60.00	-15.62	QP	
12		12.9500	37.43	0.00	37.43	50.00	-12.57	AVG	

\*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: CSL

## 7.5 ANTENNA APPLICATION

### 7.5.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 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 use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

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.

### 7.5.2 Result

The EUT'S antenna is Integral antenna, and the antenna can't be replaced by the user, which in accordance to section 15.203, please refer to the internal photos. The antenna's gain is 1dBi and meets the requirement.

END OF REPORT