



**Spectrum Research & Testing Lab., Inc.**

No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 1 of 44  
Date: Dec. 18, 2013

Product Name: NS-6005, NS-6010, NS-6015  
Model No.: GM-130025/T  
Applicant: KYE SYSTEMS CORP. (Genius)  
No. 492, Sec. 5, Chongxin Rd., Sanchong Dist.,  
New Taipei City 24160, Taiwan (R.O.C.)  
Date of Receipt: Dec. 04, 2013  
Finished date of Test: Dec. 18, 2013  
Applicable Standards: 47 CFR Part 15, Subpart C  
47 CFR Part 15, Subpart B  
ANSI C63.4: 2003

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By : Richard Lin , Date: 2013/12/18  
(Richard Lin)

Approved By : Johnson Ho , Date: 12/18/2013  
( Johnson Ho, Director )



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# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 2 of 44  
Date: Dec. 18, 2013

## Revisions History

Report No.	Issue Date	Revisions
FCCA13120403	Dec. 18, 2013	Initial issue



## Table of Contents

1. DOCUMENT POLICY AND TEST STATEMENT.....	4
1.1 DOCUMENT POLICY .....	4
1.2 TEST STATEMENT .....	4
1.3 EUT MODIFICATION .....	4
2. DESCRIPTION OF EUT AND TEST MODE .....	5
2.1 GENERAL DESCRIPTION OF EUT.....	5
2.2 USED CHANNEL AND FREQUENCY TABLE.....	5
2.3 DESCRIPTION OF EUT INTERNAL DEVICE .....	5
2.4 EUT OPERATING CONDITION .....	6
2.5 DESCRIPTION OF TEST MODE .....	6
2.6 DESCRIPTION OF SUPPORT UNIT .....	7
2.7 DESCRIPTION OF MODEL DIFFERENCE .....	7
3. DESCRIPTION OF APPLIED STANDARDS.....	8
3.1 SUMMARY OF TEST RESULTS.....	8
4. TECHNICAL CHARACTERISTICS TEST .....	9
4.1 BAND EDGE TEST .....	9
4.1.1 LIMIT .....	9
4.1.2 TEST EQUIPMENT .....	10
4.1.3 TEST SETUP.....	11
4.1.4 TEST PROCEDURE.....	12
4.1.5 EUT OPERATING CONDITION.....	12
4.1.6 TEST RESULT.....	13
4.2 RADIATED EMISSION TEST.....	17
4.2.1 LIMIT .....	17
4.2.2 TEST EQUIPMENT .....	18
4.2.3 TEST SET-UP.....	19
4.2.4 TEST PROCEDURE.....	20
4.2.5 TEST RESULT.....	21
5. ANTENNA APPLICATION.....	37
5.1 ANTENNA REQUIREMENT .....	37
5.2 RESULT .....	37
6. PHOTOS OF TESTING .....	38
7. TERMS OF ABBREVIATION .....	44



**Spectrum Research &  
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No.167, Ln. 780, Shan-Tong  
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Chung-Li City, Taoyuan County  
320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 4 of 44  
Date: Dec. 18, 2013

## 1. DOCUMENT POLICY AND TEST STATEMENT

### 1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.

### 1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- DC power source, 1.5Vdc of AAA battery (Tx) and AC 120V/60Hz for PC (Rx, from USB port ), was used during the test.

### 1.3 EUT MODIFICATION

- No modification in SRT Lab.



## 2. DESCRIPTION OF EUT AND TEST MODE

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	NS-6005, NS-6010, NS-6015
<b>MODEL NO.</b>	GM-130025/T
<b>POWER SUPPLY</b>	DC power source of Tx from AAA battery : DC 1.5V AC power source of PC for Rx applied USB port : AC 120V/60Hz
<b>CABLE</b>	NA
<b>FREQUENCY BAND</b>	2.400 GHz ~ 2.4835 GHz
<b>CARRIER FREQUENCY</b>	2.409 GHz ~ 2.475 GHz
<b>NUMBER OF CHANNEL</b>	8
<b>RATED RF OUTPUT POWER</b>	78.57 dBuV/m (-16.66 dBm, 0.022 mW)
<b>MODULATION TYPE</b>	GFSK
<b>MODE OF OPERATION</b>	Duplex
<b>ANTENNA TYPE</b>	Printed PCB Antenna
<b>ANTENNA GAIN</b>	0 dBi
<b>OPERATING TEMPERATURE RANGE</b>	-20 ~ 55°C

**NOTE:**

For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

### 2.2 Used Channel and Frequency Table

Channel	Frequency	Channel	Frequency
CH01	2409 MHz	CH05	2445 MHz
CH02	2417 MHz	CH06	2455 MHz
CH03	2426 MHz	CH07	2465 MHz
CH04	2435 MHz	CH08	2476 MHz

### 2.3 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	FCC ID / DOC	REMARK
USB dongle	Genius	N/A	FSUGMZKO	N/A



## 2.4 EUT OPERATING CONDITION

1. Setup the EUT and all peripheral devices .
2. Turn on the power of all equipment and EUT.
3. Set the EUT under continuous transmission condition, standby and link mode.
4. The EUT was set to the highest available power level.

## 2.5 DESCRIPTION OF TEST MODE

Product	Mode		Frequency	
NS-6015	1	Tx	Tx-1	2409 MHz
	2		Tx-2	2435 MHz
	3		Tx-3	2476 MHz
	4		Standby	NA
	5	Rx	Link	NA

### NOTE:

1. The axis X,Y and Z we evaluate in chamber, the X axis is worst case.
2. The three product were different to external shell. We evaluate in chamber, the NS-6015 is worst case.

X axis:



Y axis:



Z axis:





## 2.6 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4:2003. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID/DOC	CABLE
1	PC	ACER	Aspire SA85	DoC	1.8m unshielded power cable
2	CRT Monitor	SAMSUNG	PG17IS	DoC	1.8m unshielded power cord 1.5m shielded data cable. with one core.
3	Keyboard	WinTEK	WM530	DoC	1.8m unshielded data cable.
4	Mouse	WinTEK	WSS30	DoC	1.5m unshielded data cable.
5	Modem	ACEEX	DM-1414	DoC	1.5m unshielded power cord 1.2m shielded data cable.
6	Printer	EPSON	STYLUS C20SX	N/A	1.5m unshielded power cord 1.2m shielded data cable.

**NOTE:**

For the actual test configuration, please refer to the photos of testing.

## 2.7 DESCRIPTION OF MODEL DIFFERENCE

Product \ Project	NS-6015	NS-6005	NS-6010
RF Module	○	○	○
Lay out	○	○	○
Antenna	○	○	○
I/O Port	○	○	○
Software	○	○	○
Power supply	○	○	○
Main Board	○	○	○
External shell	×	×	×
Switch	○	○	○

**NOTE :**

- is same, × is different.
- The three product were different to external shell.



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No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 8 of 44  
Date: Dec. 18, 2013

### 3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a wireless product. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

- 47 CFR Part 15, Subpart C
- 47 CFR Part 15, Subpart B
- ANSI C63.4: 2003

All tests have been performed and recorded as the above standards.

#### 3.1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

STANDARD SECTION	TEST TYPE AND LIMIT RESULTS	RESULTS
15.203	Antenna requirement Limit : max. 6dBi	PASS
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency (Reference Only)	PASS
15.33(a) 15.249	Transmitter Radiated Emissions Limit: Table 15.209	PASS





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# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 9 of 44  
Date: Dec. 18, 2013

## 4. TECHNICAL CHARACTERISTICS TEST

### 4.1 BAND EDGE TEST

#### 4.1.1 LIMIT

FCC Part15, Subpart C Section 15.247. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

OPERATING FREQUENCY RANGE (MHz)	SPURIOUS EMISSION FREQUENCY (MHz)	LIMIT	
		Peak power ration to emission(dBc)	Emission level(dBuV/m)
902 - 928	< 902	> 20	NA
	> 928	> 20	NA
	960 - 1240	NA	54
2400 - 2483.5	< 2400	> 20	NA
	> 2483.5 - 2500	NA	54
5725 - 5850	< 5350 - 5460	NA	54
	< 5725	> 20	NA
	> 5850	> 20	NA

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**TEST REPORT**Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 10 of 44  
Date: Dec. 18, 2013**4.1.2 TEST EQUIPMENT**

The following test equipment was used during the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER (INCLUDE SPECTRUM ANALYZER)	9 KHz ~ 6 GHz	ROHDE & SCHWARZ	ESL /100176	MAR. 28, 2014 ETC
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 12, 2014 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC 08, 2014 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	DEC. 12, 2014 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 10, 2014 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 09, 2014 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY 13, 2014 SRT
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 11, 2014 ETC
RF CABLE	UP TO 18 GHz 3.5 m	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 11, 2014 ETC
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNE R	SF102-46/2*11SK 252 /MY2611/2	MAR. 07, 2014 ETC
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNE R	SF 102-40/2*11 /23934/2	OCT. 20, 2014 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR

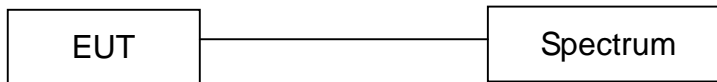
**NOTE:**

The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



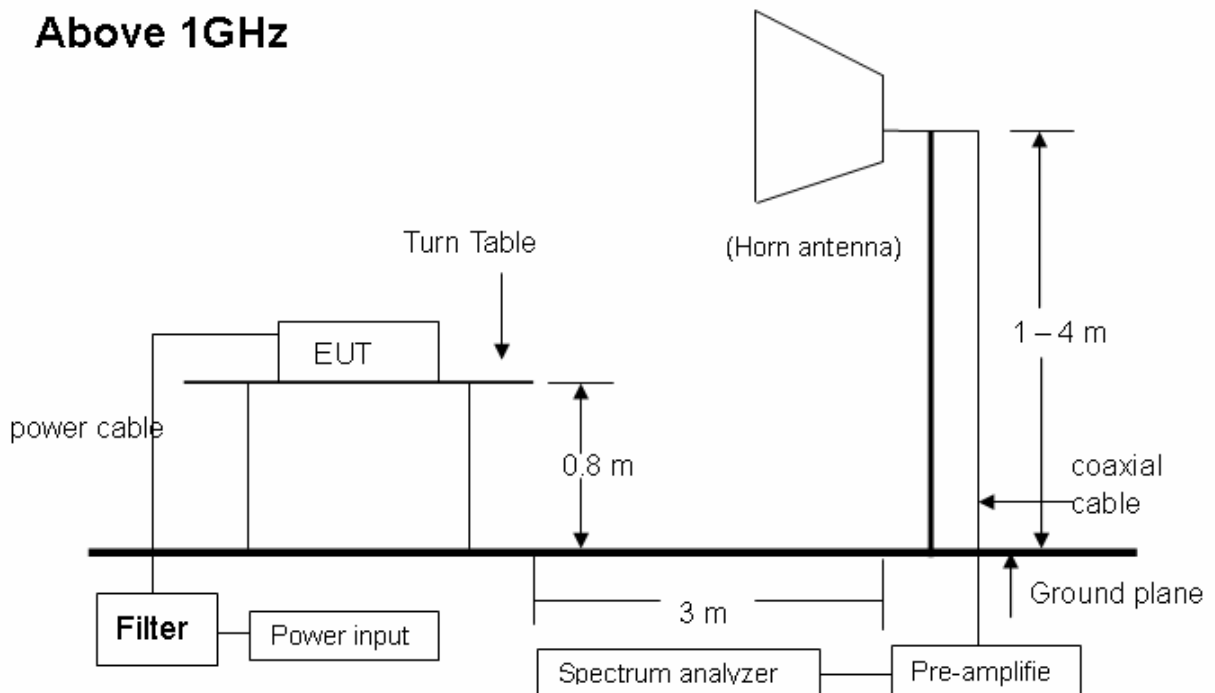
## 4.1.3 TEST SETUP

### FOR RF CONDUCTED TEST (dBc)



The EUT was connected to a spectrum through a 50Ω RF cable.

### Above 1GHz



**NOTE:**

The EUT system was put on a wooden table with 0.8m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.



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320, Taiwan (R.O.C.)

## **TEST REPORT**

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 12 of 44  
Date: Dec. 18, 2013

### **4.1.4 TEST PROCEDURE**

1. The EUT was operating in continuous transmission mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.
2. The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

### **4.1.5 EUT OPERATING CONDITION**

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.



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# TEST REPORT

Reference No.: A13120403  
 Report No.: FCCA13120403  
 FCC ID : FSUGMZL2  
 Page: 13 of 44  
 Date: Dec. 18, 2013

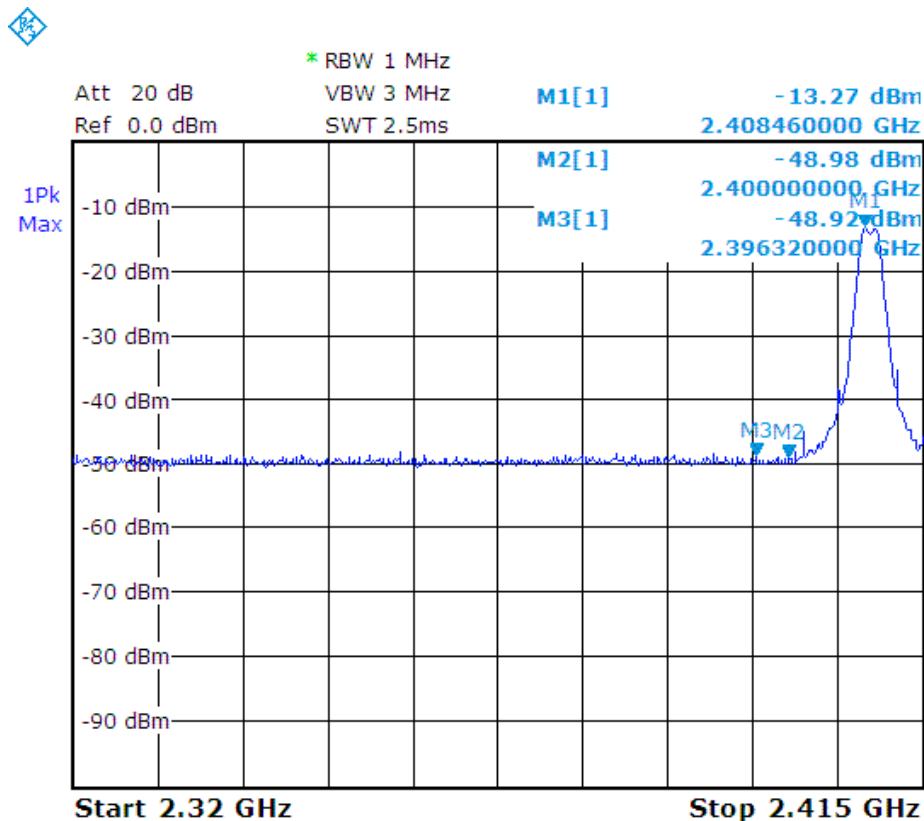
## 4.1.6 TEST RESULT

Temperature:	22 °C	Humidity:	58 %RH
Receiver Detector:	PK.	Tested Mode:	Tx-1, Tx-3
Frequency Range:	2.32 GHz – 2.57 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 17, 2013

### 1. Conducted test

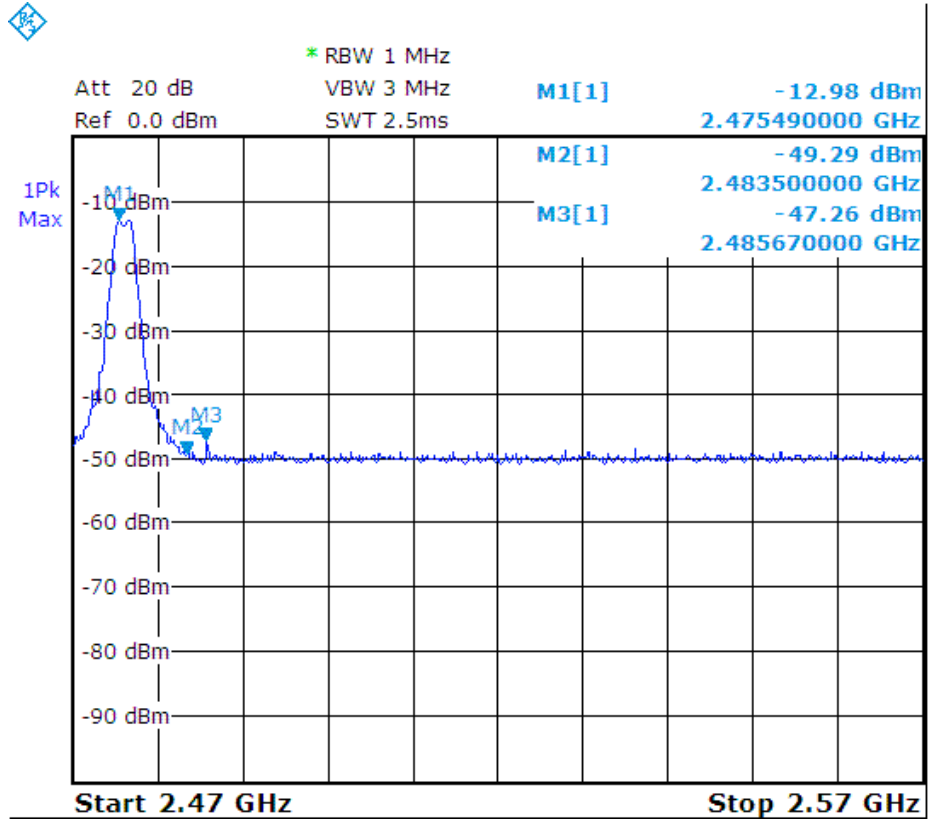
Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
< 2400	-13.27	-48.92	35.65	> 20dBc
> 2483.5	-12.98	-47.26	34.28	> 20dBc

Below 2400 MHz :





Above 2483.5 MHz :



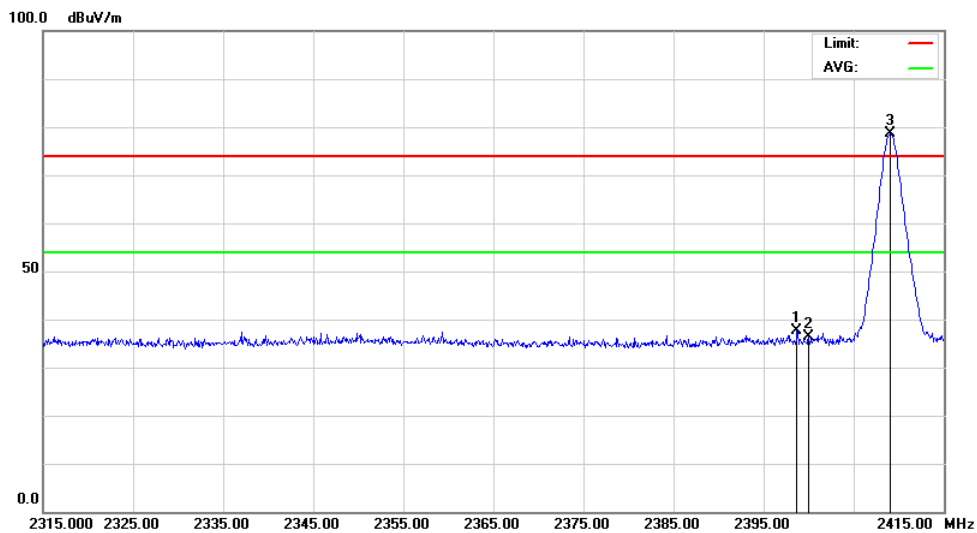


## 2. Radiated emission test :

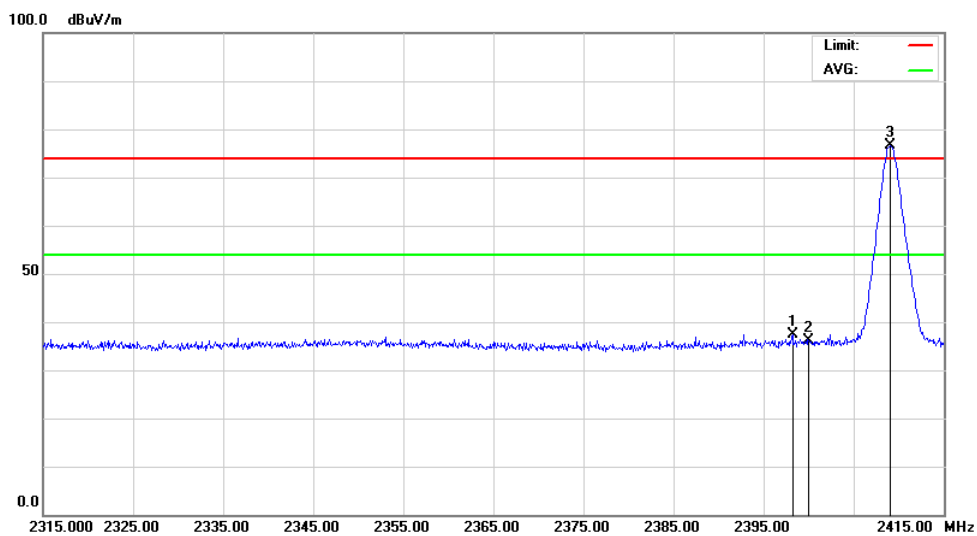
Below 2400 MHz (mode 1 of 2409 MHz emission)

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2398.75	-40.02	28.21	H	47.34	36.81	35.54	25.01	74.00	54.00	-38.46	-28.99
2398.28	-40.02	28.21	V	47.16	36.67	35.36	24.87	74.00	54.00	-38.64	-29.13
2400.00	-40.02	28.22	H	46.08	35.55	34.28	23.75	74.00	54.00	-39.72	-30.25
2400.00	-40.02	28.22	V	45.81	35.29	34.01	23.49	74.00	54.00	-39.99	-30.51

Horizontal :



Vertical :





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 No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

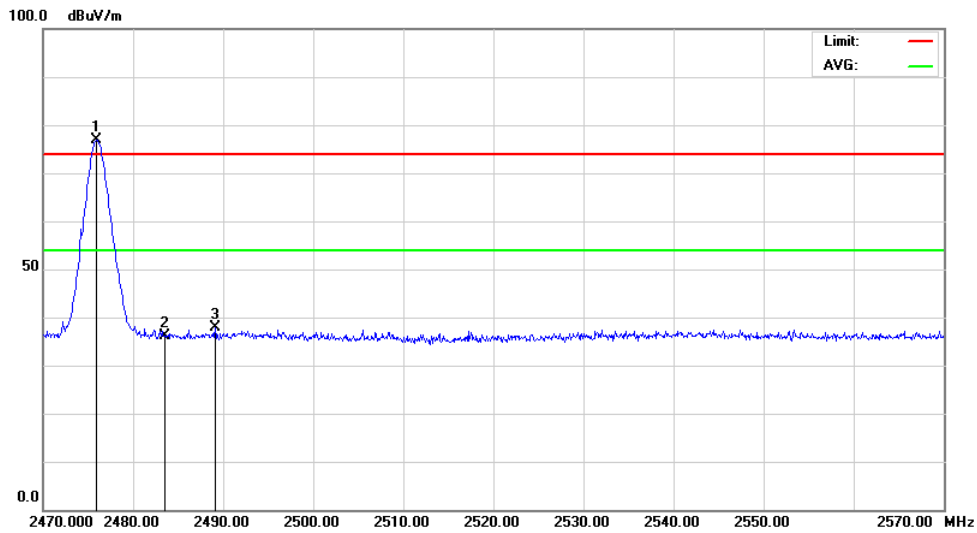
# TEST REPORT

Reference No.: A13120403  
 Report No.: FCCA13120403  
 FCC ID : FSUGMZL2  
 Page: 16 of 44  
 Date: Dec. 18, 2013

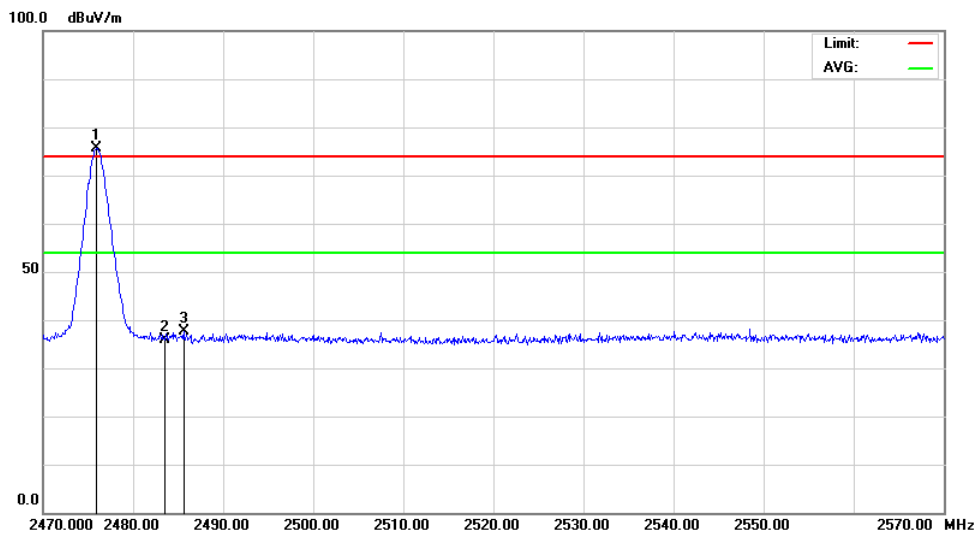
About 2483.5 MHz (mode 3 of 2476 MHz emission)

Frequency (MHz)	Correct Factor (dB)	Ant. Fac. (dB)	Ant. Pol. (H/V)	Reading (dBuV)		Emission (dBuV/m)		Limit Line (dBuV/m)		Over Limit (dBuV/m)	
				PK	AV	PK	AV	PK	AV	PK	AV
2483.50	-39.95	28.45	H	45.53	35.01	34.03	23.51	74.00	54.00	-39.97	-30.49
2483.50	-39.95	28.45	V	45.47	34.95	33.97	23.45	74.00	54.00	-40.03	-30.55
2489.14	-39.95	28.47	H	47.27	36.78	35.79	25.30	74.00	54.00	-38.21	-28.70
2485.63	-39.95	28.46	V	47.02	36.57	35.53	25.08	74.00	54.00	-38.47	-28.92

Horizontal :



Vertical :







## 4.2 RADIATED EMISSION TEST

### 4.2.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (dBmV/m)
0.009 - 0.490	300	2400/F(KHz)
0.490 - 1.705	30	24000/F(KHz)
1.705 - 30	30	30
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

**NOTE:**

- 30 dBuV (in 30m) = 70 dBuV (in 3m).
- Transmitters that require Crystal Controlled Oscillators with values below 30 MHz requires the Test Report to show "Spurious Radiated Emissions" results below 30 MHz per FCC Part 15.33(a).

FCC Part15, Subpart C Section 15.249 limit of radiated emission for frequency below1000MHz (Average).

FREQUENCY (MHz)	FIELD STRENGTH OF FUNDAMENTAL (millivolts/meter)	FIELD STRENGTH OF HARMONICS (millivolts/meter)
902 - 928	50	500
2400 - 2483.5	50	500
5725 - 5875	50	500
24000 - 24250	250	2500

**NOTE:**

- In the emission tables above , the tighter limit applies at the band edges.
- Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
- 50mV = 94dBuV

FCC Part 15, Section15.35(b) limit of radiated emission for frequency above 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0



## 4.2.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	DEC. 16, 2013 ETC
EMI TEST RECEIVER	20 MHz ~ 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	DEC. 08, 2014 ETC
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 12, 2014 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC 08, 2014 ETC
LOOP ANTENNA	9 kHz ~ 30 MHz	ETS.LINDGREN	HFH2-Z2/ 860605/002 (1162 1/2)	MAR. 06, 2014 ETC
BI-LOG ANTENNA	30 MHz ~ 2 GHz	SCHAFFNER	CBL6141A / 4181	JUN. 25, 2014 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	DEC. 12, 2014 ETC
HORN ANTENNA	18 ~ 40 GHZ	ETS-LINDGREN	3116 /00032255	JAN. 07, 2014 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 10, 2014 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 09, 2014 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY 13, 2014 SRT
COAXIAL CABLE	30 M	TIMES	LMR-400 / #30M(L1TCAB014 )	MAY. 21, 2014 ETC
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 11, 2014 ETC
RF CABLE	UP TO 18 GHz 3.5 m	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 11, 2014 ETC
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNER	SF102-46/2*11SK 252 /MY2611/2	MAR. 07, 2014 ETC
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNER	SF 102-40/2*11 /23934/2	OCT. 20, 2014 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943/ 869	NCR
CDN	0.15 MHz ~ 300 MHz	LUTHI	CDN L-801 M2/M3 / 2790	MAY. 24, 2014 ETC

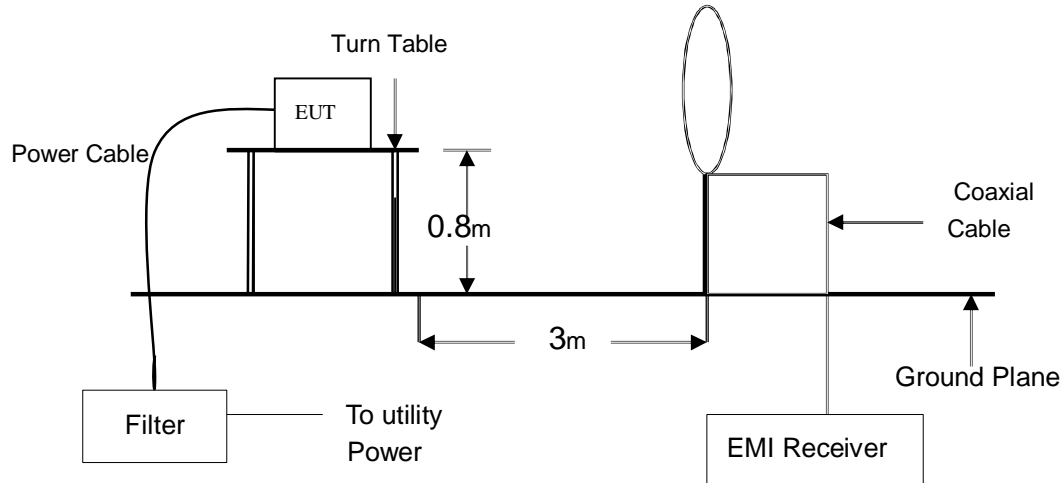
**NOTE:**

The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

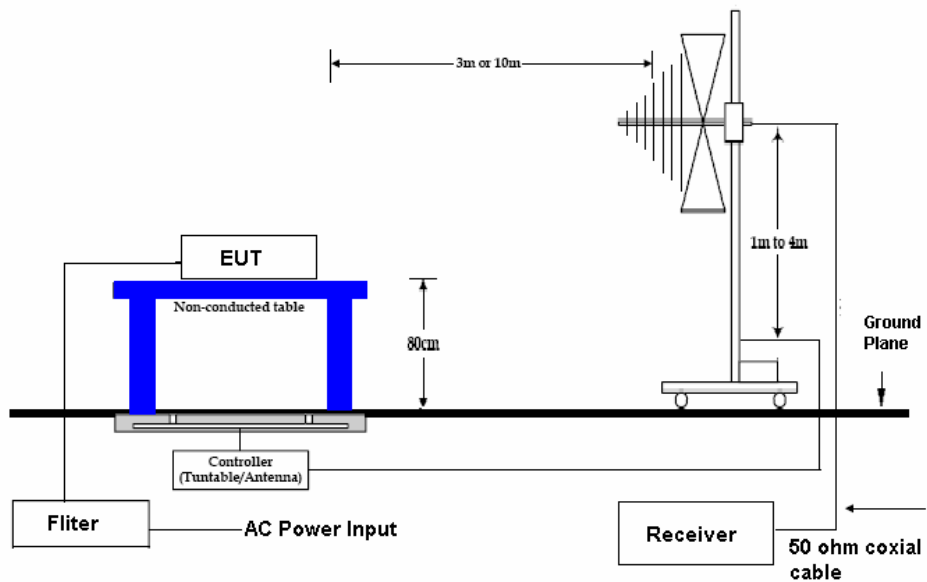


## 4.2.3 TEST SET-UP

### 9KHz ~ 30MHz

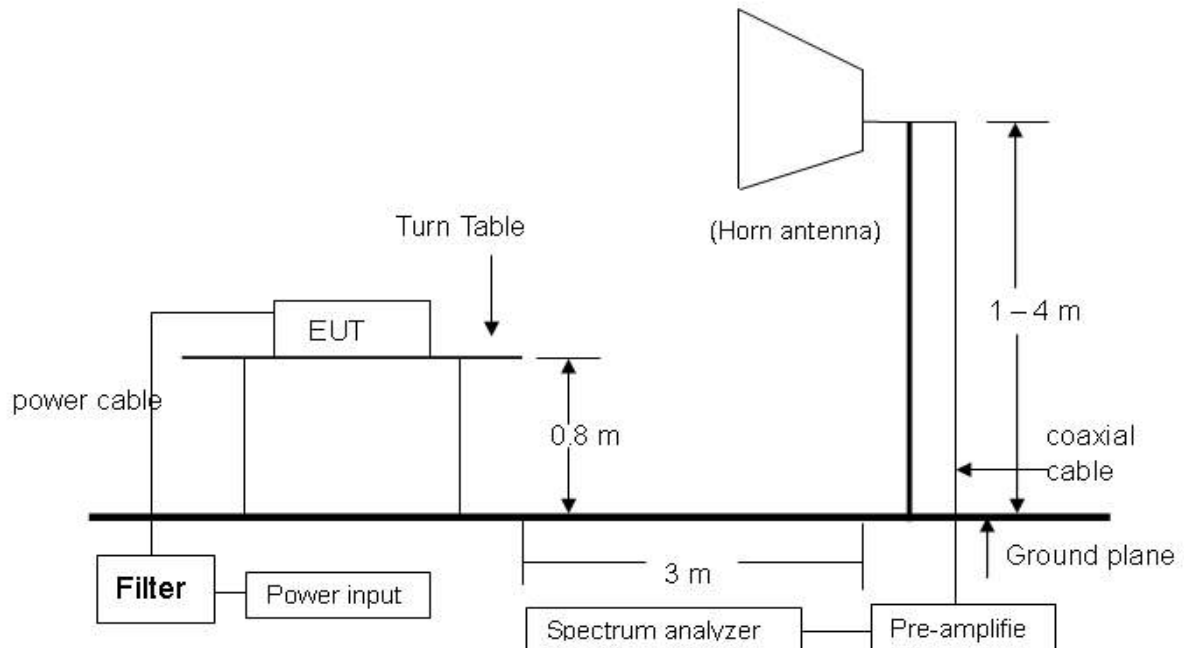


### 30 MHz ~ 1 GHz





## Above 1 GHz



### NOTE:

The EUT system was put on a wooden table with 0.8m heights above a ground plane. For the actual test configuration, please refer to the photos of testing.

## 4.2.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR 22:2003.

When the frequency spectrum measured started from 9 kHz to 30 MHz, then use antenna is a loop antenna.

The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz.

The frequency spectrum measured started from 9 kHz to 30MHz and 30 MHz to 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver.

Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver.

The EUT system was operated in all typical methods by users.

The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data.

The procedure is referred on the test procedure of SRT LAB.



**Spectrum Research & Testing Lab., Inc.**  
 No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
 Report No.: FCCA13120403  
 FCC ID : FSUGMZL2  
 Page: 21 of 44  
 Date: Dec. 18, 2013

## 4.2.5 TEST RESULT

Temperature:	<u>19 °C</u>	Humidity:	<u>60 %RH</u>
Frequency Range:	<u>9KHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>AV.</u>	Tested Mode:	<u>Tx-1</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Dec. 11, 2013</u>

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
5.54	0.42	20.32	7.92	28.66	70.00	-41.34
17.52	0.72	20.87	5.39	26.98	70.00	-43.02
18.04	0.73	20.90	5.84	27.47	70.00	-42.53
27.05	0.88	21.35	9.04	31.27	70.00	-38.73
28.53	0.91	21.43	7.08	29.41	70.00	-40.59
29.07	0.92	21.45	5.83	28.20	70.00	-41.80

Temperature:	<u>19 °C</u>	Humidity:	<u>60 %RH</u>
Frequency Range:	<u>9KHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>AV.</u>	Tested Mode:	<u>Tx-2</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Dec. 11, 2013</u>

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
2.38	0.27	20.20	6.03	26.50	70.00	-43.50
5.51	0.42	20.32	7.66	28.40	70.00	-41.60
18.01	0.73	20.90	7.45	29.08	70.00	-40.92
27.08	0.88	21.35	9.35	31.59	70.00	-38.41
28.05	0.90	21.40	4.99	27.29	70.00	-42.71
29.01	0.91	21.45	5.92	28.28	70.00	-41.72

**Spectrum Research & Testing Lab., Inc.**

No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

**TEST REPORT**Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 22 of 44  
Date: Dec. 18, 2013

Temperature:	<u>19 °C</u>	Humidity:	<u>60 %RH</u>
Frequency Range:	<u>9KHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>AV.</u>	Tested Mode:	<u>Tx-3</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Dec. 11, 2013</u>

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
5.49	0.42	20.32	7.83	28.57	70.00	-41.43
18.04	0.73	20.90	5.76	27.39	70.00	-42.61
19.41	0.76	20.97	3.24	24.96	70.00	-45.04
27.05	0.88	21.35	9.01	31.25	70.00	-38.75
28.52	0.91	21.43	8.01	30.34	70.00	-39.66
29.07	0.91	21.45	6.87	29.24	70.00	-40.76

Temperature:	<u>19 °C</u>	Humidity:	<u>60 %RH</u>
Frequency Range:	<u>9KHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>AV.</u>	Tested Mode:	<u>Standby</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Dec. 11, 2013</u>

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
5.49	0.42	20.32	8.82	29.55	70.00	-40.45
17.51	0.72	20.87	4.37	25.96	70.00	-44.04
18.02	0.73	20.90	6.69	28.32	70.00	-41.68
27.06	0.88	21.35	9.54	31.78	70.00	-38.22
28.55	0.91	21.43	7.58	29.91	70.00	-40.09
29.01	0.91	21.45	6.02	28.38	70.00	-41.62

**Spectrum Research & Testing Lab., Inc.**

No.167, Ln. 780, Shan-Tong  
Rd., Ling 8, Shan-Tong Li,  
Chung-Li City, Taoyuan County  
320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 23 of 44  
Date: Dec. 18, 2013

Temperature:	19 °C	Humidity:	60 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Link
Tested By:	Richard Lin	Tested Date:	Dec. 11, 2013

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dB $\mu$ V)	Emission (dB $\mu$ V/m)	Limit Line (dB $\mu$ V/m)	Margin (dB)
5.47	0.42	20.32	7.17	27.90	70.00	-42.10
17.52	0.72	20.87	4.04	25.63	70.00	-44.37
18.10	0.73	20.90	6.36	27.99	70.00	-42.01
27.06	0.88	21.35	8.84	31.08	70.00	-38.92
28.58	0.91	21.43	8.22	30.56	70.00	-39.44
29.03	0.91	21.45	7.10	29.47	70.00	-40.53



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 No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
 Report No.: FCCA13120403  
 FCC ID : FSUGMZL2  
 Page: 24 of 44  
 Date: Dec. 18, 2013

Temperature:	20 °C	Humidity:	64 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-1
Receiver Detector:	Q.P.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Nov. 10, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
70.92	1.34	8.10	7.69	17.13	40.0	-22.87	305	3.57
498.30	3.95	17.97	3.39	25.31	46.0	-20.69	192	2.59
514.17	4.04	18.20	10.72	32.96	46.0	-13.04	63	2.51
546.75	4.23	18.64	3.60	26.47	46.0	-19.53	155	2.44
670.34	4.77	20.62	3.17	28.56	46.0	-17.44	201	2.00
887.54	5.76	23.07	3.91	32.75	46.0	-13.25	345	1.38

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
49.15	1.15	14.78	14.42	30.35	40.0	-9.65	79	1.09
70.94	1.34	8.10	18.47	27.91	40.0	-12.09	81	1.15
491.79	3.91	17.87	8.03	29.82	46.0	-16.18	243	2.42
516.08	4.05	18.22	11.65	33.93	46.0	-12.07	177	2.56
786.34	5.32	21.97	3.93	31.22	46.0	-14.78	294	3.34
885.70	5.75	23.07	3.80	32.62	46.0	-13.38	50	3.52

**NOTE :**

1. Measurement uncertainty is 4.73dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



**Spectrum Research & Testing Lab., Inc.**

No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

**TEST REPORT**Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 25 of 44  
Date: Dec. 18, 2013

Temperature:	20 °C	Humidity:	64 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-2
Receiver Detector:	Q.P.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Nov. 10, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
64.70	1.29	9.60	5.51	16.40	40.0	-23.60	221	3.49
515.38	4.05	18.21	15.82	38.08	46.0	-7.92	327	2.50
601.08	4.44	19.62	3.19	27.25	46.0	-18.75	109	2.25
729.41	5.05	21.44	4.05	30.54	46.0	-15.46	270	1.83
756.15	5.18	21.91	3.68	30.77	46.0	-15.23	82	1.77
899.35	5.82	23.10	4.93	33.84	46.0	-12.16	44	1.32

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
44.13	1.09	17.18	9.58	27.85	40.0	-12.15	123	1.02
70.82	1.34	8.10	18.39	27.83	40.0	-12.17	56	1.14
497.32	3.94	17.96	4.45	26.35	46.0	-19.65	193	2.47
516.55	4.05	18.22	6.12	28.40	46.0	-17.60	57	2.55
876.02	5.71	23.05	3.60	32.37	46.0	-13.63	178	3.41
939.85	6.02	24.27	3.53	33.82	46.0	-12.19	29	3.57

**NOTE :**

1. Measurement uncertainty is 4.73dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

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No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

**TEST REPORT**Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 26 of 44  
Date: Dec. 18, 2013

Temperature:	20 °C	Humidity:	64 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-3
Receiver Detector:	Q.P.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Nov. 10, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	AZ(°)	EL(m)
57.06	1.22	11.71	3.87	16.80	40.0	-23.20	205	3.52
494.18	3.93	17.92	3.19	25.03	46.0	-20.97	325	2.51
514.67	4.04	18.20	14.92	37.16	46.0	-8.84	168	2.45
843.30	5.57	22.86	4.04	32.47	46.0	-13.53	59	1.49
892.50	5.78	23.08	3.56	32.43	46.0	-13.57	73	1.32
932.84	5.98	24.06	5.02	35.06	46.0	-10.94	106	1.22

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	AZ(°)	EL(m)
70.91	1.34	8.10	18.65	28.09	40.0	-11.91	324	1.17
499.25	3.95	17.99	9.06	31.00	46.0	-15.00	197	2.42
514.72	4.04	18.20	8.71	30.95	46.0	-15.05	253	2.53
570.84	4.33	19.06	4.75	28.14	46.0	-17.86	212	2.69
870.23	5.69	23.04	3.59	32.32	46.0	-13.68	67	3.35
946.48	6.05	24.48	3.64	34.17	46.0	-11.83	38	3.52

**NOTE :**

1. Measurement uncertainty is 4.73dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

**Spectrum Research & Testing Lab., Inc.**

No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

**TEST REPORT**Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 27 of 44  
Date: Dec. 18, 2013

Temperature:	20 °C	Humidity:	64 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Standby
Receiver Detector:	Q.P.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Nov. 10, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	AZ(°)	EL(m)
215.34	2.35	13.00	16.63	31.98	43.5	-11.52	125	3.41
602.78	4.45	19.64	9.21	33.30	46.0	-12.70	307	2.25
742.05	5.11	21.72	6.19	33.03	46.0	-12.97	92	1.80
811.94	5.44	22.22	3.57	31.23	46.0	-14.77	169	1.59
874.20	5.71	23.05	4.02	32.77	46.0	-13.23	36	1.37
935.38	6.00	24.15	3.73	33.88	46.0	-12.13	180	1.22

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	AZ(°)	EL(m)
55.11	1.21	12.45	10.63	24.29	40.0	-15.72	326	1.09
70.83	1.34	8.10	16.46	25.90	40.0	-14.10	134	1.15
229.37	2.43	12.41	19.37	34.21	46.0	-11.79	66	1.64
514.42	4.04	18.20	14.93	37.17	46.0	-8.83	119	2.51
602.71	4.45	19.64	11.65	35.74	46.0	-10.26	52	2.78
874.13	5.71	23.05	4.08	32.83	46.0	-13.17	239	3.54

**NOTE :**

1. Measurement uncertainty is 4.73dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

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No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

**TEST REPORT**Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 28 of 44  
Date: Dec. 18, 2013

Temperature:	20 °C	Humidity:	64 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Link
Receiver Detector:	Q.P.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Nov. 10, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
207.17	2.30	12.36	12.37	27.03	43.5	-16.47	193	3.46
215.49	2.35	13.00	17.35	32.70	43.5	-10.80	309	3.32
602.84	4.45	19.64	9.02	33.11	46.0	-12.89	177	2.28
742.06	5.11	21.72	6.29	33.13	46.0	-12.87	81	1.82
811.51	5.44	22.22	3.55	31.21	46.0	-14.79	35	1.57
874.25	5.71	23.05	3.67	32.42	46.0	-13.58	202	1.33

Antenna Polarization : Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
70.53	1.34	8.10	15.48	24.92	40.0	-15.08	138	1.10
118.40	1.72	11.62	15.45	28.79	43.5	-14.71	46	1.29
490.64	3.91	17.86	7.02	28.79	46.0	-17.21	158	2.45
541.94	4.20	18.57	6.81	29.58	46.0	-16.42	64	2.57
602.87	4.45	19.64	12.04	36.13	46.0	-9.87	277	2.79
860.03	5.64	23.02	3.86	32.52	46.0	-13.48	335	3.48

**NOTE :**

1. Measurement uncertainty is 4.73dB.
2. "\*\*": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.



# TEST REPORT

Temperature:	18 °C	Humidity:	60 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1
Receiver Detector:	PK. and AV.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 13, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1951.39	-40.34	26.92	51.81	40.36	38.40	26.95	74	54	-35.60	-27.05	105	2.23
2167.86	-40.19	27.57	54.26	43.78	41.63	31.15	74	54	-32.37	-22.85	262	2.14
2824.03	-39.94	29.60	47.24	36.72	36.90	26.38	74	54	-37.10	-27.62	217	1.96
3198.14	-39.88	30.64	53.97	43.45	44.73	34.21	74	54	-29.27	-19.79	322	1.83
3896.23	-39.47	32.25	46.28	35.76	39.07	28.55	74	54	-34.93	-25.45	68	1.65
5442.06	-37.83	34.13	44.09	33.57	40.39	29.87	74	54	-33.61	-24.13	40	1.18

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1942.34	-40.34	26.89	52.37	41.89	38.92	28.44	74	54	-35.08	-25.56	83	1.29
2117.51	-40.23	27.43	51.49	40.90	38.69	28.10	74	54	-35.31	-25.90	140	1.32
3198.19	-39.88	30.64	48.02	37.54	38.78	28.30	74	54	-35.22	-25.70	235	1.67
3829.17	-39.52	32.09	45.40	34.92	37.97	27.49	74	54	-36.03	-26.51	269	1.84
4074.81	-39.33	32.50	45.69	35.10	38.86	28.27	74	54	-35.14	-25.73	102	1.93
5635.99	-37.79	34.17	44.54	34.12	40.92	30.50	74	54	-33.08	-23.50	98	2.37

**NOTE :**

1. Measurement uncertainty is 3.92dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.

**Spectrum Research & Testing Lab., Inc.**

No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

**TEST REPORT**Reference No.: A13120403  
Report No.:FCCA13120403  
FCC ID : FSUGMZL2  
Page: 30 of 44  
Date: Dec. 18, 2013

Temperature:	18 °C	Humidity:	66 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1 (Fundamental)
Receiver Detector:	PK. and AV.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 13, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2409.00	-40.01	28.25	87.60	74.39	75.84	62.63	114	94	-38.16	-31.37	135	1.52
4818.00	-38.76	33.20	43.47	32.86	37.91	27.30	74	54	-36.09	-26.70	77	1.47
7227.00	-36.39	35.74	41.25	30.72	40.60	30.07	74	54	-33.40	-23.93	49	1.69
9636.00	-35.06	37.81	37.34	26.71	40.08	29.45	74	54	-33.92	-24.55	192	1.62
12045.00	-33.46	39.17	37.12	26.65	42.83	32.36	74	54	-31.17	-21.64	85	1.56
14454.00	-30.22	41.94	29.87	19.38	41.58	31.09	74	54	-32.42	-22.91	246	1.55

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2409.00	-40.01	28.25	90.33	78.15	78.57	66.39	114	94	-35.43	-27.61	280	1.43
4818.00	-38.76	33.20	41.93	31.40	36.37	25.84	74	54	-37.63	-28.16	103	1.64
7227.00	-36.39	35.74	41.45	30.96	40.80	30.31	74	54	-33.20	-23.69	55	1.39
9636.00	-35.06	37.81	36.87	26.42	39.61	29.16	74	54	-34.39	-24.84	327	1.36
12045.00	-33.46	39.17	36.90	26.38	42.61	32.09	74	54	-31.39	-21.91	165	1.57
14454.00	-30.22	41.94	29.54	19.01	41.25	30.72	74	54	-32.75	-23.28	90	1.63

**NOTE:**

1. Measurement uncertainty is 3.92dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	18 °C	Humidity:	60 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2
Receiver Detector:	PK. and AV.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 13, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1494.70	-40.50	25.29	49.03	38.56	33.82	23.35	74	54	-40.18	-30.65	309	2.37
2118.24	-40.23	27.43	49.92	38.43	37.12	25.63	74	54	-36.88	-28.37	128	2.14
3511.75	-39.78	31.33	45.70	35.19	37.25	26.74	74	54	-36.75	-27.26	50	1.75
4082.17	-39.32	32.50	46.07	35.54	39.25	28.72	74	54	-34.75	-25.28	107	1.59
5083.99	-38.46	33.70	45.05	34.58	40.29	29.82	74	54	-33.71	-24.18	56	1.28
5492.57	-37.74	34.19	43.68	33.12	40.13	29.57	74	54	-33.87	-24.43	152	1.13

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1498.19	-40.49	25.30	49.00	38.50	33.80	23.30	74	54	-40.20	-30.70	76	1.16
2116.32	-40.23	27.42	49.65	39.11	36.84	26.30	74	54	-37.16	-27.70	48	1.34
3027.72	-39.93	30.26	47.41	36.85	37.74	27.18	74	54	-36.26	-26.82	242	1.60
3472.91	-39.80	31.24	46.03	35.57	37.47	27.01	74	54	-36.53	-26.99	316	1.73
4081.85	-39.32	32.50	45.64	35.24	38.82	28.42	74	54	-35.18	-25.58	204	1.95
5454.66	-37.81	34.14	44.58	34.07	40.91	30.40	74	54	-33.09	-23.60	297	2.30

**NOTE :**

1. Measurement uncertainty is 3.92dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	18 °C	Humidity:	66 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2 (Fundamental)
Receiver Detector:	PK. and AV.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 13, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2435.00	-39.99	28.32	87.78	75.49	76.11	63.82	114	94	-37.89	-30.18	70	1.43
4870.00	-38.71	33.31	44.82	34.27	39.42	28.87	74	54	-34.58	-25.13	192	1.39
7305.00	-36.28	35.93	41.42	30.90	41.07	30.55	74	54	-32.93	-23.45	105	1.57
9740.00	-34.94	37.89	36.87	26.35	39.82	29.30	74	54	-34.18	-24.70	257	1.51
12175.00	-33.10	39.10	35.60	25.03	41.59	31.02	74	54	-32.41	-22.98	48	1.49
14610.00	-30.12	41.67	28.73	18.15	40.28	29.70	74	54	-33.72	-24.30	334	1.40

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2435.00	-39.99	28.32	89.83	77.51	78.16	65.84	114	94	-35.84	-28.16	229	1.65
4870.00	-38.71	33.31	44.49	33.96	39.09	28.56	74	54	-34.91	-25.44	121	1.63
7305.00	-36.28	35.93	41.46	30.92	41.11	30.57	74	54	-32.89	-23.43	92	1.57
9740.00	-34.94	37.89	36.67	26.15	39.62	29.10	74	54	-34.38	-24.90	43	1.54
12175.00	-33.10	39.10	35.81	25.29	41.80	31.28	74	54	-32.20	-22.72	278	1.47
14610.00	-30.12	41.67	30.51	19.95	42.06	31.50	74	54	-31.94	-22.50	165	1.41

**NOTE:**

1. Measurement uncertainty is 3.92dB.
2. "F": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



**Spectrum Research & Testing Lab., Inc.**

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**TEST REPORT**Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 33 of 44  
Date: Dec. 18, 2013

Temperature:	18 °C	Humidity:	60 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3
Receiver Detector:	PK. and AV.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 13, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1493.52	-40.50	25.29	49.38	38.82	34.17	23.61	74	54	-39.83	-30.39	236	2.31
2117.70	-40.23	27.43	50.82	40.29	38.02	27.49	74	54	-35.98	-26.51	128	2.17
3039.28	-39.93	30.29	46.50	35.97	36.86	26.33	74	54	-37.14	-27.67	219	1.86
3895.84	-39.47	32.25	46.45	35.81	39.23	28.59	74	54	-34.77	-25.41	101	1.65
4138.09	-39.29	32.50	46.47	36.01	39.68	29.22	74	54	-34.32	-24.78	153	1.51
5527.63	-37.74	34.19	44.13	33.68	40.58	30.13	74	54	-33.42	-23.87	61	1.17

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1844.90	-40.37	26.54	48.71	38.23	34.88	24.40	74	54	-39.12	-29.60	240	1.24
2117.35	-40.23	27.43	49.94	39.45	37.14	26.65	74	54	-36.86	-27.35	88	1.39
2821.06	-39.94	29.59	46.70	36.21	36.35	25.86	74	54	-37.65	-28.14	318	1.54
3637.89	-39.68	31.63	46.64	36.17	38.59	28.12	74	54	-35.41	-25.88	210	1.76
4247.50	-39.21	32.50	45.47	34.96	38.76	28.25	74	54	-35.24	-25.75	53	1.98
5516.94	-37.74	34.20	44.08	33.54	40.54	30.00	74	54	-33.46	-24.00	97	2.33

**NOTE :**

1. Measurement uncertainty is 3.92dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	18 °C	Humidity:	66 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3 (Fundamental)
Receiver Detector:	PK. and AV.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 13, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2476.00	-39.96	28.43	86.76	74.59	75.23	63.06	114	94	-38.77	-30.94	66	1.56
4952.00	-38.64	33.49	43.69	33.13	38.54	27.98	74	54	-35.46	-26.02	192	1.47
7428.00	-36.10	36.23	39.51	29.05	39.64	29.18	74	54	-34.36	-24.82	240	1.52
9904.00	-34.74	38.02	35.34	24.82	38.63	28.11	74	54	-35.37	-25.89	171	1.59
12380.00	-32.53	38.97	35.78	25.29	42.22	31.73	74	54	-31.78	-22.27	54	1.39
14856.00	-30.09	40.93	29.68	19.15	40.52	29.99	74	54	-33.48	-24.01	108	1.34

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2476.00	-39.96	28.43	87.70	75.14	76.17	63.61	114	94	-37.83	-30.39	83	1.46
4952.00	-38.64	33.49	43.81	33.29	38.66	28.14	74	54	-35.34	-25.86	340	1.49
7428.00	-36.10	36.23	39.89	29.38	40.02	29.51	74	54	-33.98	-24.49	151	1.62
9904.00	-34.74	38.02	36.87	26.45	40.16	29.74	74	54	-33.84	-24.26	273	1.35
12380.00	-32.53	38.97	35.82	25.32	42.26	31.76	74	54	-31.74	-22.24	183	1.47
14856.00	-30.09	40.93	29.75	19.29	40.59	30.13	74	54	-33.41	-23.87	52	1.35

**NOTE:**

1. Measurement uncertainty is 3.92dB.
2. "\*\*": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	18 °C	Humidity:	60 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Standby
Receiver Detector:	PK. and AV.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 13, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1024.43	-41.05	24.63	53.92	43.47	37.50	27.05	74	54	-36.50	-26.95	145	2.47
2151.89	-40.21	27.52	50.54	40.02	37.86	27.34	74	54	-36.14	-26.66	329	2.16
4147.51	-39.28	32.50	46.08	35.59	39.30	28.81	74	54	-34.70	-25.19	201	1.51
5112.93	-38.41	33.73	45.34	34.86	40.67	30.19	74	54	-33.33	-23.81	47	1.29
5538.65	-37.75	34.19	44.75	34.21	41.19	30.65	74	54	-32.81	-23.35	71	1.16
5939.22	-37.93	34.11	44.31	33.85	40.49	30.03	74	54	-33.51	-23.97	155	1.04

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1640.99	-40.44	25.80	57.72	47.26	43.08	32.62	74	54	-30.92	-21.38	258	1.17
1947.33	-40.34	26.91	55.94	45.44	42.51	32.01	74	54	-31.49	-21.99	49	1.29
2239.16	-40.14	27.77	52.30	41.88	39.93	29.51	74	54	-34.07	-24.49	33	1.36
2853.02	-39.94	29.70	51.85	41.35	41.61	31.11	74	54	-32.39	-22.89	227	1.57
4627.18	-38.93	32.78	45.67	35.13	39.52	28.98	74	54	-34.48	-25.02	196	2.06
5438.57	-37.84	34.13	43.69	33.17	39.98	29.46	74	54	-34.02	-24.54	89	2.35

**NOTE :**

1. Measurement uncertainty is 3.92dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



# TEST REPORT

Temperature:	18 °C	Humidity:	66 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Link
Receiver Detector:	PK. and AV.	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Dec. 13, 2013

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1927.34	-40.34	26.84	52.57	42.03	39.06	28.52	74	54	-34.94	-25.48	215	2.23
4141.85	-39.28	32.50	44.91	34.48	38.13	27.70	74	54	-35.87	-26.30	107	1.57
4567.73	-38.98	32.65	45.52	35.07	39.19	28.74	74	54	-34.81	-25.26	70	1.42
5108.91	-38.41	33.73	44.44	33.92	39.76	29.24	74	54	-34.24	-24.76	340	1.28
5506.25	-37.73	34.20	43.97	33.35	40.44	29.82	74	54	-33.56	-24.18	261	1.11
5957.52	-37.94	34.11	43.40	32.81	39.57	28.98	74	54	-34.43	-25.02	76	1.03

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB $\mu$ V)		Emission Level (dB $\mu$ V/m)		Limit (dB $\mu$ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1641.49	-40.44	25.81	57.16	46.67	42.53	32.04	74	54	-31.47	-21.96	153	1.17
1855.04	-40.37	26.58	54.63	44.28	40.84	30.49	74	54	-33.16	-23.51	47	1.25
2243.51	-40.14	27.78	52.75	42.26	40.40	29.91	74	54	-33.60	-24.09	140	1.37
2657.82	-39.94	29.03	52.29	41.79	41.38	30.88	74	54	-32.62	-23.12	228	1.52
2908.73	-39.94	29.89	55.30	44.85	45.25	34.80	74	54	-28.75	-19.20	306	1.59
5538.69	-37.75	34.19	44.36	33.84	40.80	30.28	74	54	-33.20	-23.72	259	2.34

**NOTE :**

1. Measurement uncertainty is 3.92dB.
2. "": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



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# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 37 of 44  
Date: Dec. 18, 2013

## 5. Antenna application

### 5.1 Antenna requirement

The EUT's antenna is met the requirement of FCC Part 15C section 15.203 and 15.204.

### 5.2 Result

The EUT's antenna used a Printed PCB Antenna. Gain of antenna types is 0 dBi that meet the requirement.



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# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 38 of 44  
Date: Dec. 18, 2013

## 6. PHOTOS OF TESTING

- Radiated test (below 30M , TX & Standby)





**Spectrum Research & Testing Lab., Inc.**  
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 39 of 44  
Date: Dec. 18, 2013

- Radiated test (below 30M , Link)





**Spectrum Research & Testing Lab., Inc.**  
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 40 of 44  
Date: Dec. 18, 2013

- Radiated test (below 1G , TX & Standby)







**Spectrum Research & Testing Lab., Inc.**  
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 41 of 44  
Date: Dec. 18, 2013

- Radiated test (below 1G , Link)





**Spectrum Research & Testing Lab., Inc.**  
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 42 of 44  
Date: Dec. 18, 2013

- Radiated test (above 1G , TX & Standby)





**Spectrum Research & Testing Lab., Inc.**  
No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

# TEST REPORT

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 43 of 44  
Date: Dec. 18, 2013

- Radiated test (above 1G , Link)



**Spectrum Research & Testing Lab., Inc.**

No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

**TEST REPORT**

Reference No.: A13120403  
Report No.: FCCA13120403  
FCC ID : FSUGMZL2  
Page: 44 of 44  
Date: Dec. 18, 2013

**7. TERMS OF ABBREVIATION**

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction