



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.: A12070504
Report No.: FCCA12070504
FCC ID : FSUGMZK4
Page: 1 of 47
Date: Jul. 17, 2012

Product Name: Ring Pro
Model No.: GM-120001/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: Jul. 05, 2012
Finished date of Test: Jul. 17, 2012
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: 7/19/2012
(Richard Lin)

Approved By : JH , Date: 7/17/2012
(Johnson Ho, Director)





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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, 5Vdc of battery (Tx) and AC 120 V/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

PRODUCT	Ring Pro
MODEL NO.	GM-120001/T
POWER SUPPLY	DC power source of Tx from battery : DC 5.0V AC power source of PC for Rx applied USB port : AC 120V/60Hz
CABLE	NA
FREQUENCY BAND	2.400 GHz ~ 2.4835 GHz
CARRIER FREQUENCY	2.402 GHz ~ 2.478 GHz
NUMBER OF CHANNEL	20
RATED RF OUTPUT POWER	92.55 dBuV/m
MODULATION TYPE	GFSK
MODE OF OPERATION	Duplex
ANTENNA TYPE	Chip Antenna
ANTENNA GAIN	3 dBi
OPERATING TEMPERATURE RANGE	-20 ~ 50°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
1	2402 MHz	11	2442 MHz
2	2406 MHz	12	2446 MHz
3	2410 MHz	13	2450 MHz
4	2414 MHz	14	2454 MHz
5	2418 MHz	15	2458 MHz
6	2422 MHz	16	2462 MHz
7	2426 MHz	17	2466 MHz
8	2430 MHz	18	2470 MHz
9	2434 MHz	19	2474 MHz
10	2438 MHz	20	2478 MHz



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2.3 DESCRIPTION OF EUT INTERNAL DEVICE

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

Mode			Frequency
1	Tx	Tx-1	2402 MHz
2		Tx-2	2446 MHz
3		Tx-3	2478 MHz
4		Standby	NA
5	Rx	Link	NA

NOTE : The axis X,Y and Z we evaluate in chamber, the X axis is worst case.

X axis:



Y axis:



Z axis:





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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	1.5m unshielded power cable
2	CRT Monitor	SAMSUNG	PG171S	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 1.5m 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.



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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
15.207	AC Power Conducted Emission	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



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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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	9 kHz ~ 6 GHz	ROHDE & SCHWARZ	ESL/ 100176	APR. 2013 ECT
SPECTRUM ANALYZER	9 kHz ~ 7 GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 2013 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC. 2012 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMC TEST	3115/ 6881	OCT. 2012 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	JAN. 2013 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	JUN. 2013 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	NOV. 2012 SRT
RF CABLE	UP TO 18 GHz	JYEBAO	A30A30-L 142 / EQF-0035(001)	JAN. 2013 ETC
RF CABLE	UP TO 18 GHz	JYEBAO	A30A30-L 142 / EQF-0036(002)	JAN. 2013 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.



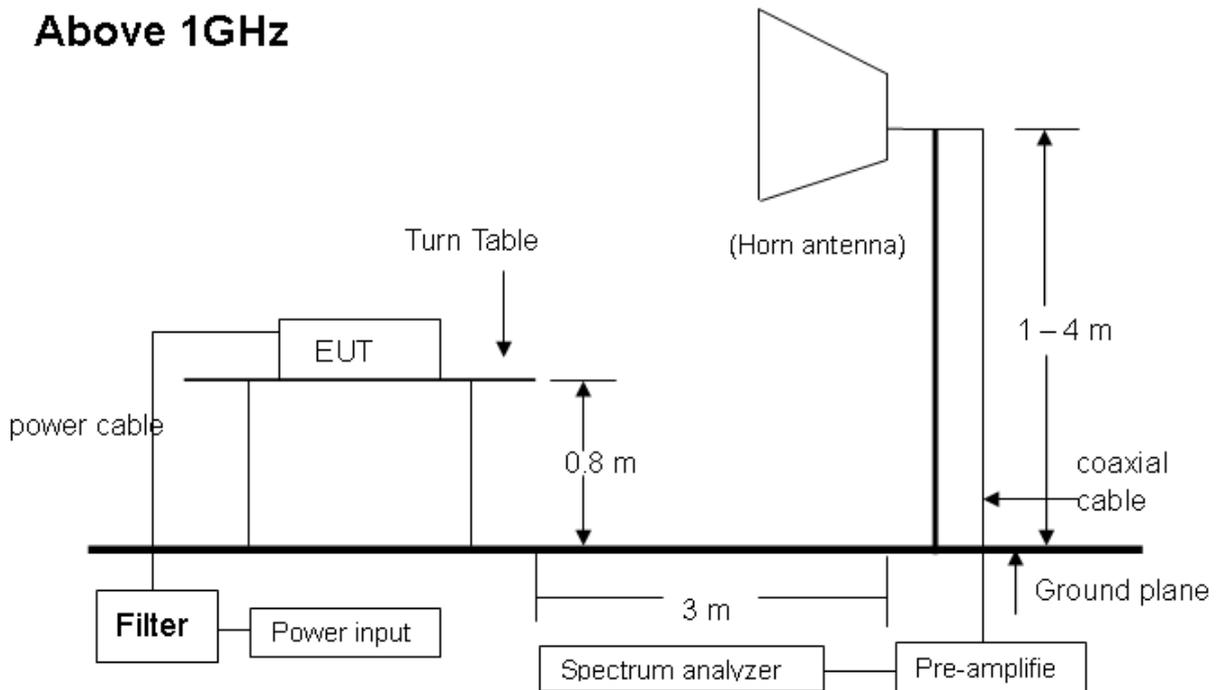
4.1.3 TEST SETUP

FOR RF CONDUCTED TEST (dBc)



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

Above 1GHz



NOTE :

1. 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.



4.1.4 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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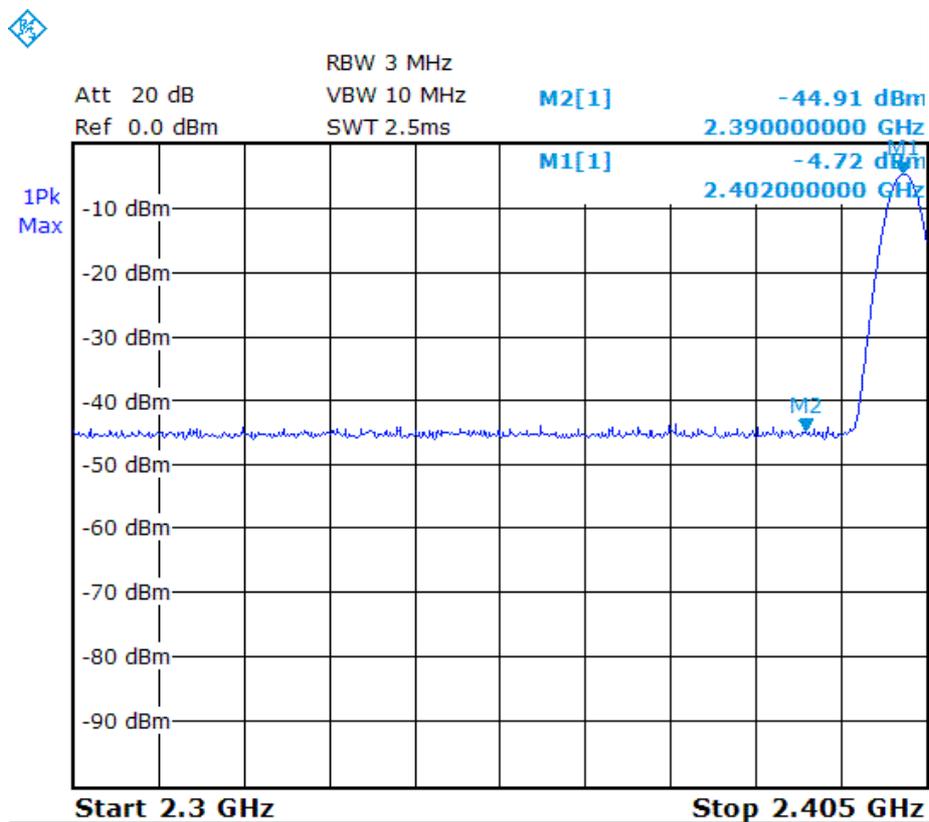
4.1.6 TEST RESULT

Temperature:	21 °C	Humidity:	62 %RH
Receiver Detector:	PK.	Tested Mode:	Tx-1, Tx-3
Frequency Range:	2.3 GHz – 2.5 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 09, 2012

1. Conducted test

Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	-4.72	-44.91	40.19	>20dBc
>2483.5	-3.66	-48.18	44.52	>20dBc

Below 2400MHz :



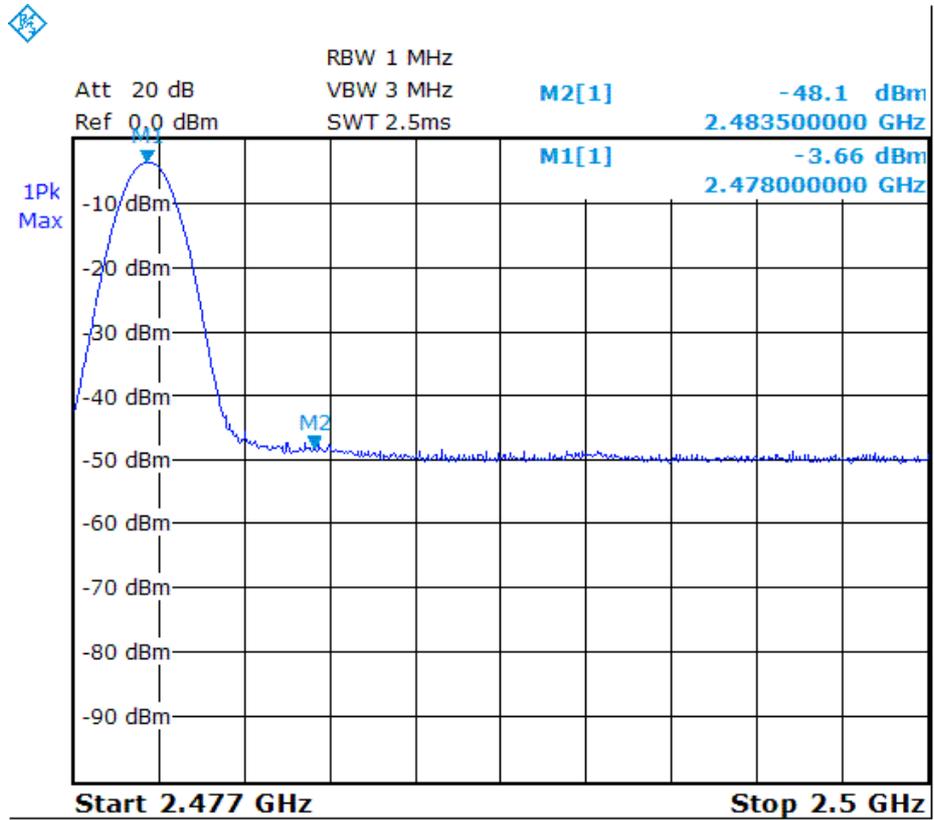


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Above 2483.5 MHz :



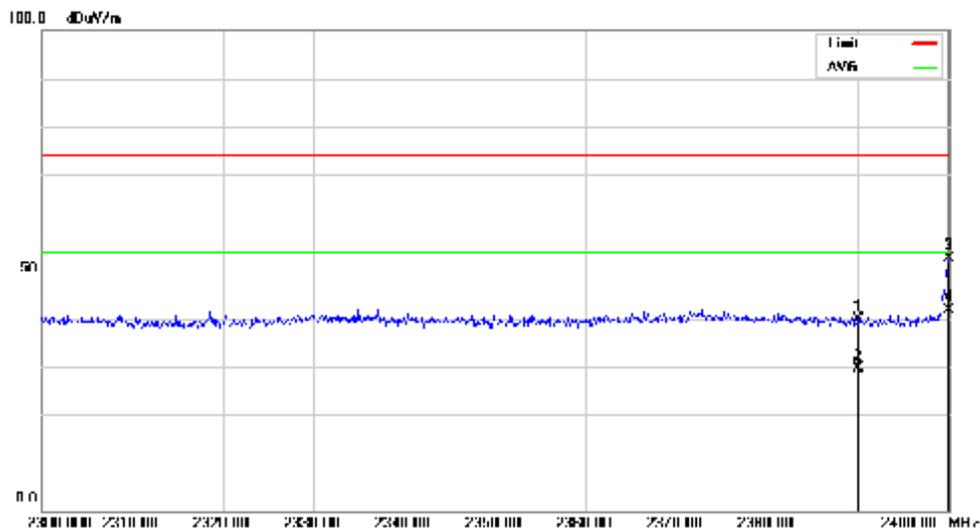


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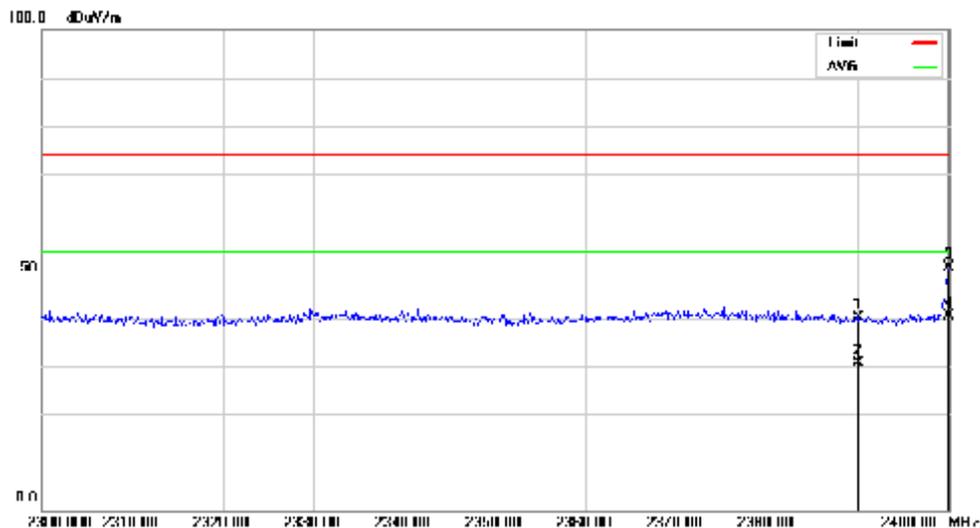
2. Radiated emission test :
 Below 2400MHz (mode 1 of 2402MHz emission)

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
2402.00	-31.15	28.18	H	90.25	78.16	87.29	75.20	114.00	94.00	-26.71	-18.80
2402.00	-31.15	28.18	V	95.38	83.64	92.42	80.68	114.00	94.00	-21.58	-13.32
2400.00	-31.15	28.18	H	53.60	42.60	50.63	39.63	74.00	54.00	-23.37	-14.37
2400.00	-31.15	28.18	V	51.30	41.25	48.33	38.28	74.00	54.00	-25.67	-15.72
2390.00	-31.16	28.16	H	40.82	30.68	37.82	27.68	74.00	54.00	-36.18	-26.32
2390.00	-31.16	28.16	V	41.09	31.44	38.09	28.44	74.00	54.00	-35.91	-25.56

Horizontal :



Vertical :





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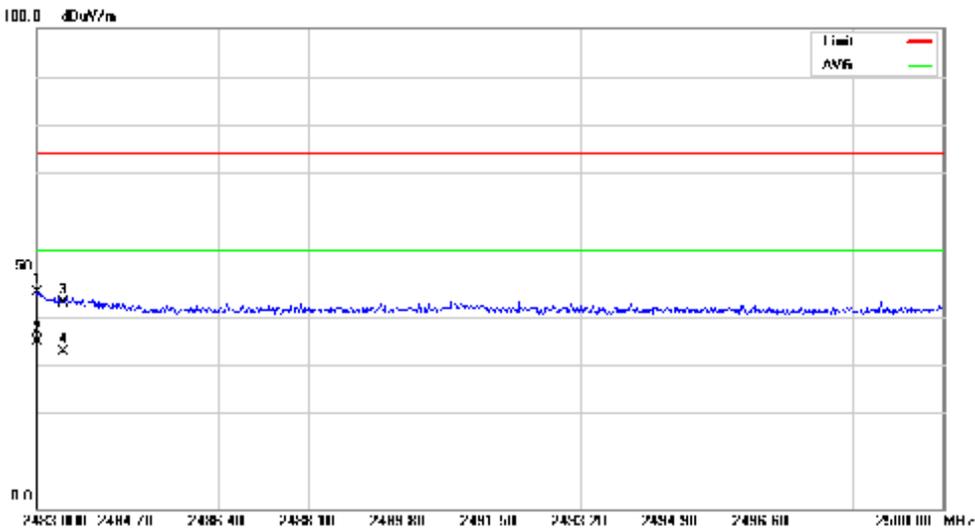
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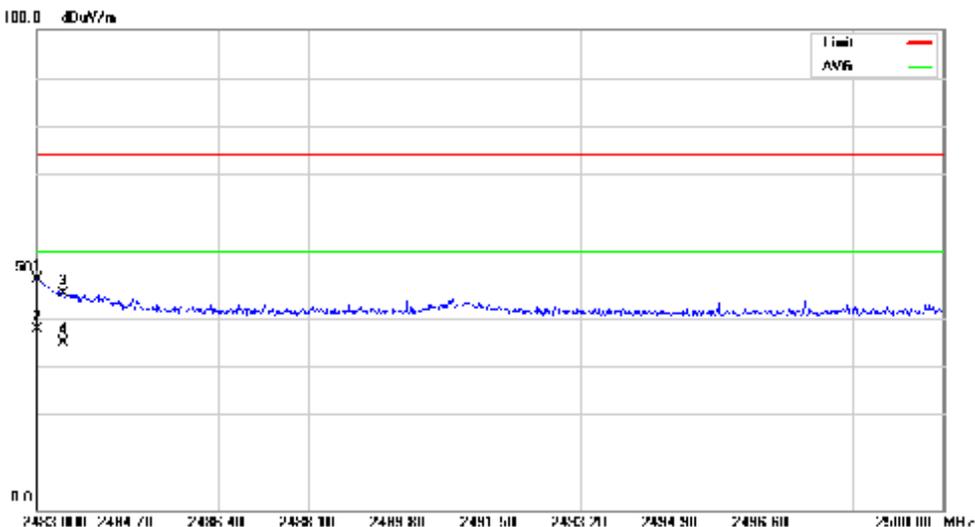
About 2483.5MHz (mode 3 of 2480MHz emission)

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
2478.00	-31.06	28.35	H	91.52	79.36	88.82	76.66	114.00	94.00	-25.18	-17.34
2478.00	-31.06	28.35	V	91.36	79.17	88.66	76.47	114.00	94.00	-25.34	-17.53
2483.00	-31.05	28.36	H	45.88	35.47	43.19	32.78	74.00	54.00	-30.81	-21.22
2483.00	-31.05	28.36	V	48.90	38.34	46.21	35.65	74.00	54.00	-27.79	-18.35
2483.50	-31.05	28.36	H	43.20	33.13	40.51	30.44	74.00	54.00	-33.49	-23.56
2483.50	-31.05	28.36	V	45.84	35.53	43.15	32.84	74.00	54.00	-30.85	-21.16

Horizontal :



Vertical :





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4.2 CONDUCTED EMISSION TEST

4.2.1 LIMIT

Frequency (MHz)	Class A (dB μ V)		Class B (dB μ V)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	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 0.50 MHz.

4.2.2 TEST EQUIPMENT

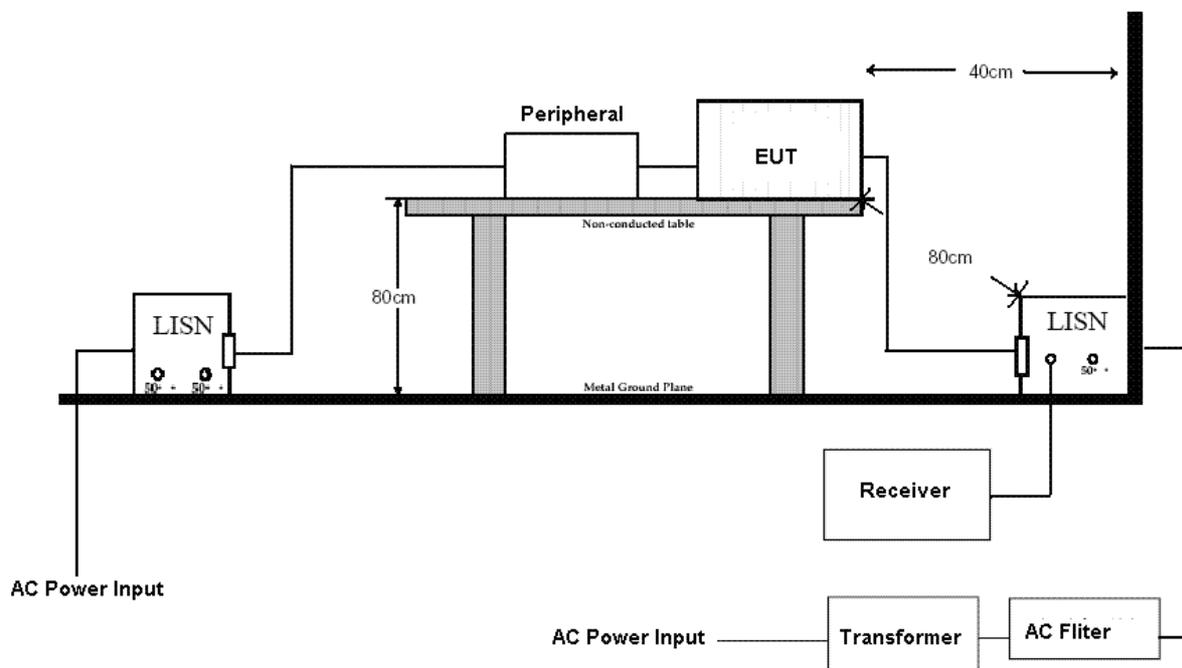
The following test equipment was used for the test:

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. 2012 ETC
EMI TEST RECEIVER	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	ESHS30 / 826003/008	FEB. 2013 ETC
LISN	50 μ H, 50 ohm	FCC	FCC-LISN-50-25-2 / 01017	JUN. 2013 ETC
LISN	50 μ H, 50 ohm	SOLAR	9252-50-R-24-BNC / 951315	OCT. 2012 ETC
LISN	50 μ H, 50 ohm	EMCO	3825/2 / 9204-1952	JUN. 2013 ETC
50 Ω BNC TYPE Terminal	50 ohm	N/A	B00-CD-204 / L1TEQU008	JUN. 2013 ETC
50 Ω BNC TYPE Terminal	50 ohm	N/A	B00-CD-357 / L1TEQU009	JUN. 2013 ETC
COAXIAL CABLE	5 M	HUBER+SUHNER	RG214/U / #5M(L1TCAB013)	MAY. 2013 ETC
Filter	2 LINE, 30 A	FIL.COIL	FC-943 / 771	NCR
GROUND PLANE	2 M (H) x 3 M (W)	SRT	N/A	NCR
GROUND PLANE	2.5 M (H) x 3 M (W)	SRT	N/A	NCR
PULSE LIMITER	0 MHz ~ 30 MHz	ROHDE & SCHWARZ	ESH3Z2 / 357.8810.52	MAR. 2013 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 SETUP



NOTE :

1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. 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 CISPR22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50 μ H as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and 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.



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4.2.5 TEST RESULT

Temperature:	23 °C	Humidity:	58 %RH
Tested By:	Richard Lin	Tested Mode:	Charge
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Jul. 11, 2012

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB μ V)		Emission Level (dB μ V)		Limit (dB μ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.15	41.15	38.27	41.30	38.42	66.00	56.00	-24.70	-17.58
3.903	0.05	30.45	29.05	30.50	29.10	56.00	46.00	-25.50	-16.90
4.427	0.06	30.01	28.27	30.07	28.33	56.00	46.00	-25.93	-17.67
8.410	0.12	34.43	32.41	34.55	32.53	60.00	50.00	-25.45	-17.47
8.634	0.13	34.34	32.18	34.47	32.31	60.00	50.00	-25.53	-17.69
18.044	0.29	33.26	26.98	33.55	27.27	60.00	50.00	-26.45	-22.73

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dB μ V)		Emission Level (dB μ V)		Limit (dB μ V)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.300	0.07	36.08	34.28	36.15	34.35	61.71	51.71	-25.56	-17.36
0.601	0.06	32.64	32.13	32.70	32.19	56.00	46.00	-23.30	-13.81
3.903	0.15	35.95	34.80	36.10	34.95	56.00	46.00	-19.90	-11.05
4.427	0.16	34.70	33.40	34.86	33.56	56.00	46.00	-21.14	-12.44
8.634	0.26	35.35	32.82	35.61	33.08	60.00	50.00	-24.39	-16.92
8.938	0.27	34.50	27.78	34.77	28.05	60.00	50.00	-25.23	-21.95

NOTE :

1. Measurement uncertainty is ± 3.61 dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies was very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

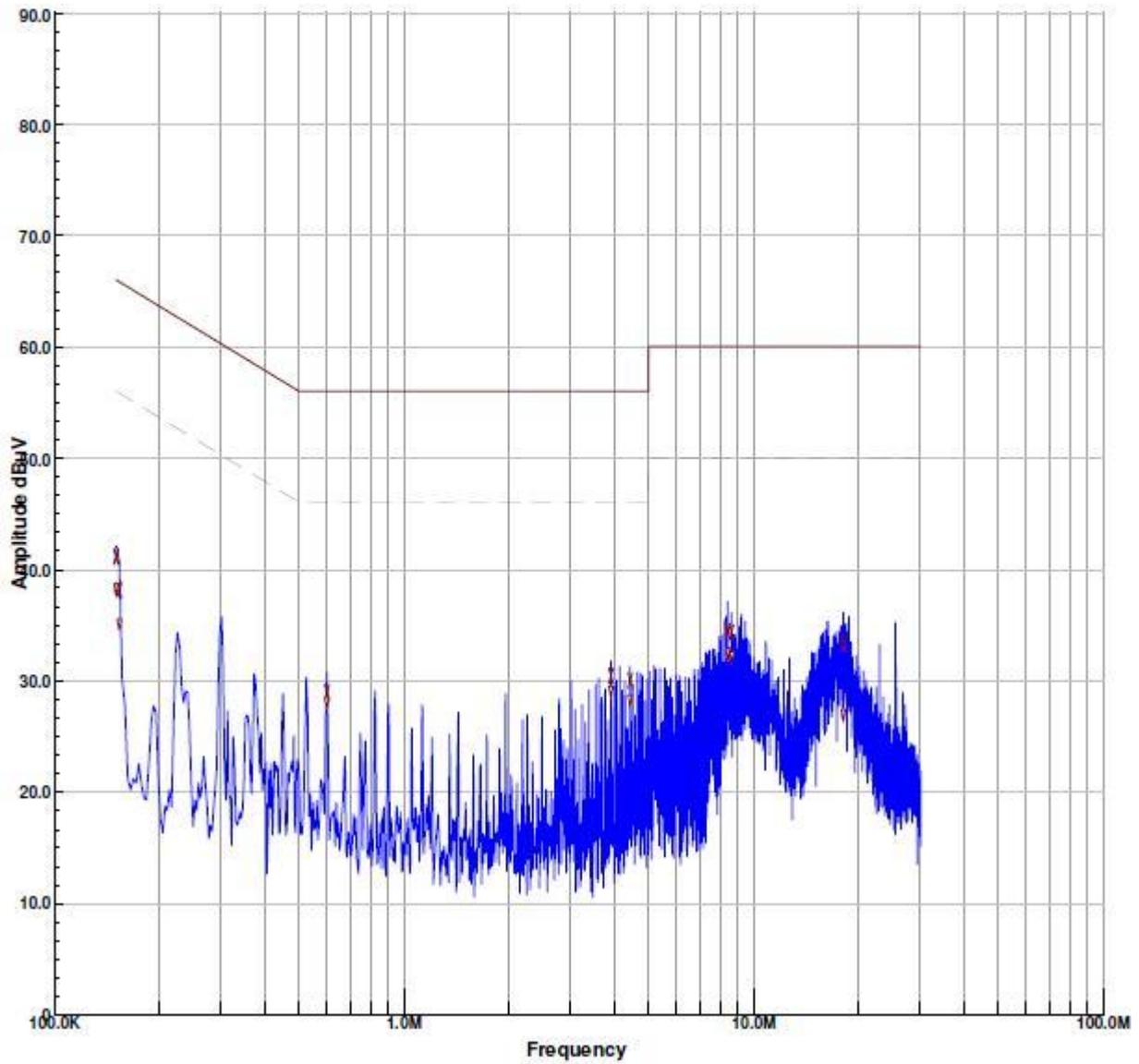


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Line :



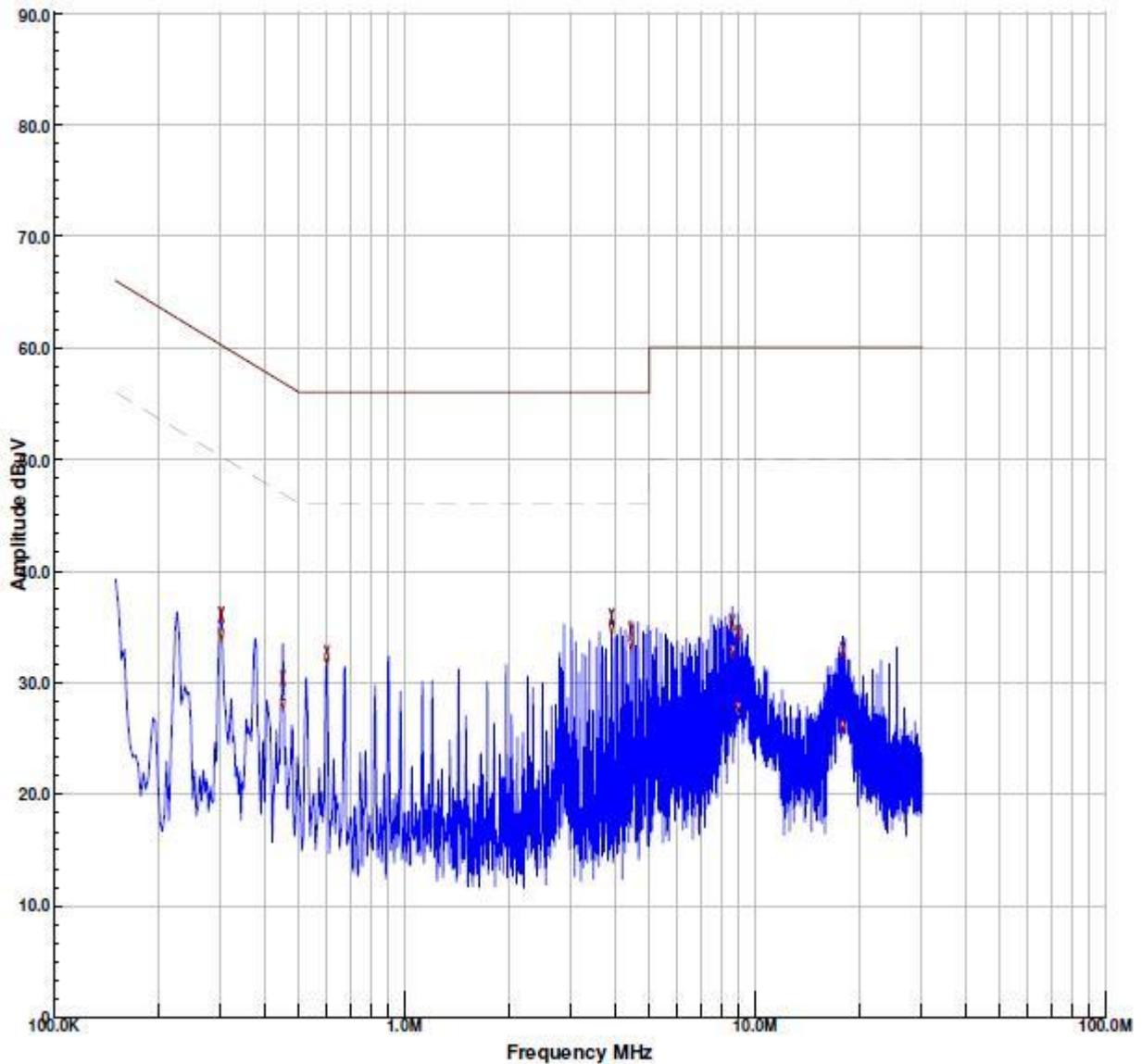


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Neutral :





4.3 RADIATED EMISSION TEST

4.3.1 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 (dB μ V/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 :**
1. 30 dBuV (in 30m) = 70 dBuV (in 3m).
 2. 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 :**
1. In the emission tables above , the tighter limit applies at the band edges.
 2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
 3. 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



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4.3.2 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	20 MHz ~ 1 GHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	NOV. 2012 ETC
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	APR. 2013 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC. 2012 ETC
BI-LOG ANTENNA	30 MHz ~ 2 GHz	SCHAFFNER	CBL6141A / 4181	JUN. 2013 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMC TEST	3115 / 6881	OCT. 2012 ETC
LOOP ANTENNA	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	HFH2-Z2 / 860 605/002	MAR. 2013 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B / 3008A01995	JAN. 2013 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	JUN. 2013 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	NOV. 2012 SRT
COAXIAL CABLE	30 M	TIMES	LMR-400 / #30M (L1TCAB014)	MAY. 2013 ETC
RF CABLE	UP TO 18 GHz	JYEBAO	A30A30-L 142 / EQF-0035(001)	JAN. 2013 ETC
RF CABLE	UP TO 18 GHz	JYEBAO	A30A30-L 142 / EQF-0036(002)	JAN. 2013 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. 2013 ETC

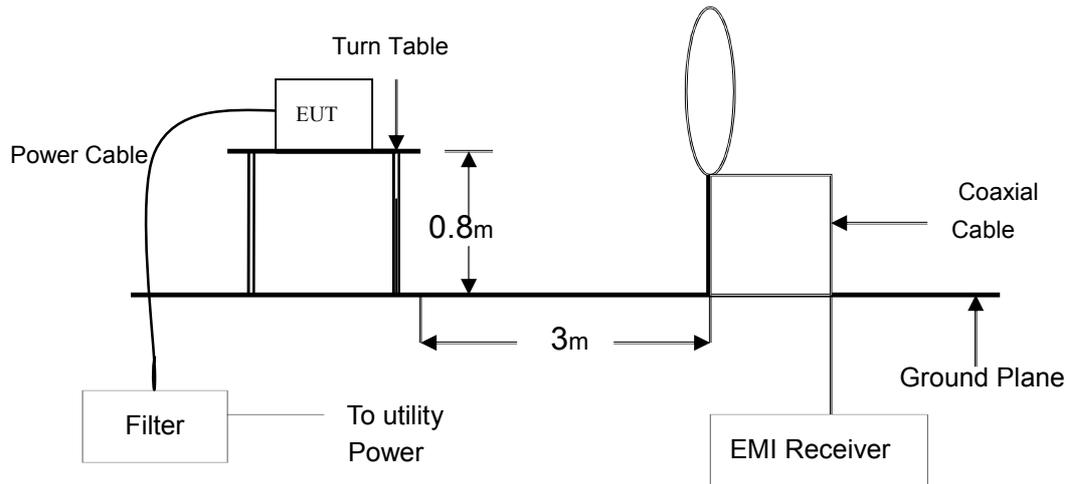
NOTE :

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

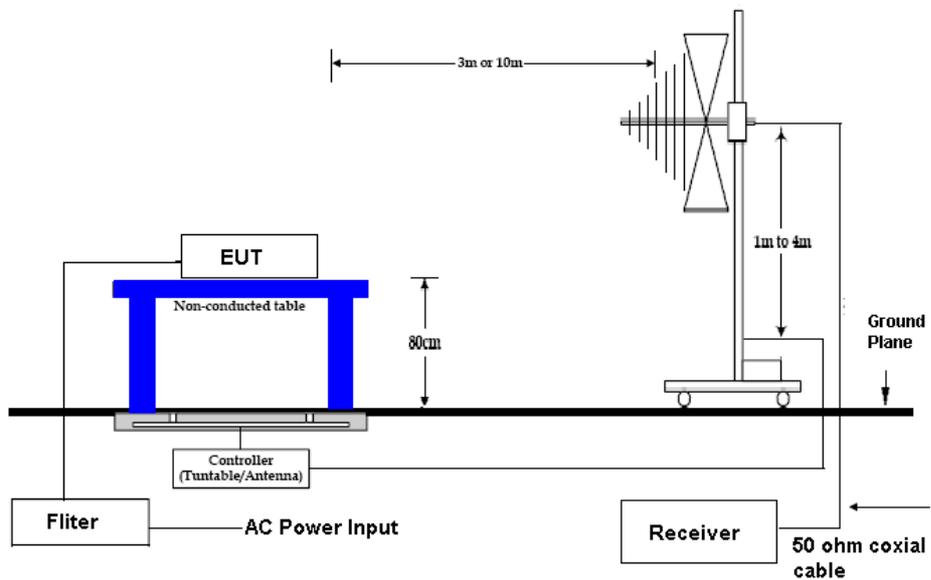


4.3.3 TEST SET-UP

9KHz ~ 30MHz

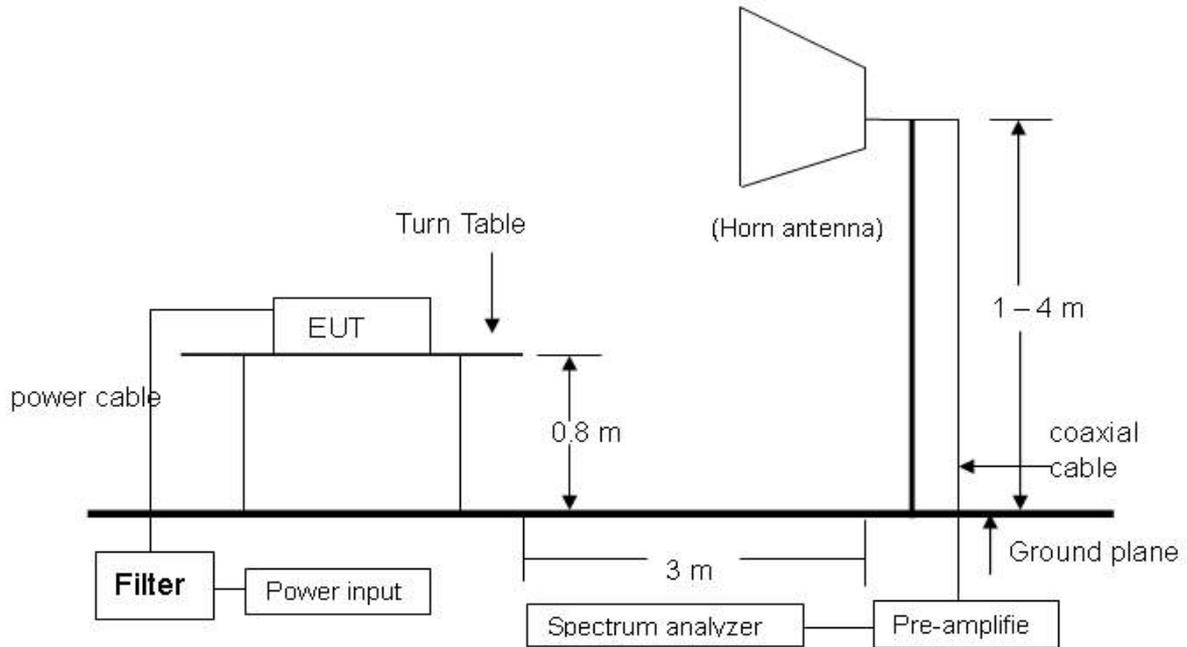


30MHz ~ 1GHz





Above 1GHz



NOTE :

1. 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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4.3.4 TEST PROCEDURE

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

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 9kHz 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.



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4.3.5 TEST RESULT

Temperature:	<u>23 °C</u>	Humidity:	<u>58 %RH</u>
Frequency Range:	<u>9 kHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>Q.P.</u>	Tested Mode:	<u>Tx-1</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Jul. 13, 2012</u>

Frequency (MHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBµV)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
5.77	0.43	20.33	8.91	29.67	70.00	-40.33
10.57	0.57	20.53	8.32	29.42	70.00	-40.58
14.04	0.65	20.70	8.05	29.40	70.00	-40.60
17.43	0.71	20.87	7.81	29.39	70.00	-40.61
17.91	0.72	20.89	7.88	29.49	70.00	-40.51
19.05	0.74	20.95	7.67	29.36	70.00	-40.64

Temperature:	<u>23 °C</u>	Humidity:	<u>58 %RH</u>
Frequency Range:	<u>9 kHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>Q.P.</u>	Tested Mode:	<u>Tx-2</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Jul. 13, 2012</u>

Frequency (MHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBµV)	Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
11.44	0.59	20.57	8.06	29.22	70.00	-40.78
11.77	0.60	20.59	7.85	29.04	70.00	-40.96
13.06	0.63	20.65	7.87	29.15	70.00	-40.85
13.81	0.64	20.69	7.26	28.59	70.00	-41.41
16.35	0.69	20.82	7.82	29.33	70.00	-40.67
26.37	0.86	21.32	6.43	28.61	70.00	-41.39



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Temperature:	<u>23 °C</u>	Humidity:	<u>58 %RH</u>
Frequency Range:	<u>9 kHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>Q.P.</u>	Tested Mode:	<u>Tx-3</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Jul. 13, 2012</u>

Frequency (MHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5.74	0.43	20.33	7.68	28.44	70.00	-41.56
7.60	0.49	20.40	7.95	28.84	70.00	-41.16
10.36	0.57	20.52	7.36	28.45	70.00	-41.55
14.34	0.65	20.72	7.12	28.49	70.00	-41.51
15.30	0.68	20.76	7.29	28.73	70.00	-41.27
18.42	0.73	20.92	7.11	28.76	70.00	-41.24

Temperature:	<u>23 °C</u>	Humidity:	<u>58 %RH</u>
Frequency Range:	<u>9 kHz – 30 MHz</u>	Measured Distance:	<u>3 m</u>
Receiver Detector:	<u>Q.P.</u>	Tested Mode:	<u>Standby</u>
Tested By:	<u>Richard Lin</u>	Tested Date:	<u>Jul. 13, 2012</u>

Frequency (MHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dBμV)	Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5.32	0.42	20.31	8.54	29.27	70.00	-40.73
10.24	0.57	20.51	7.48	28.56	70.00	-41.44
11.02	0.58	20.55	7.49	28.62	70.00	-41.38
11.62	0.60	20.58	7.32	28.50	70.00	-41.50
13.51	0.64	20.67	7.36	28.67	70.00	-41.33
18.60	0.73	20.93	7.03	28.69	70.00	-41.31



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Temperature: 23 °C Humidity: 58 %RH
Frequency Range: 9 kHz – 30 MHz Measured Distance: 3 m
Receiver Detector: Q.P. Tested Mode: Link
Tested By: Richard Lin Tested Date: Jul. 13, 2012

Frequency (MHz)	Cable Loss (dB)	Ant. Fac. (dB/m)	Reading (dB μ V)	Emission (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
4.87	0.40	20.29	7.86	28.56	70.00	-41.44
6.76	0.46	20.37	7.93	28.76	70.00	-41.24
10.84	0.58	20.54	7.45	28.57	70.00	-41.43
13.54	0.64	20.68	7.87	29.18	70.00	-40.82
23.10	0.81	21.15	6.85	28.81	70.00	-41.19
25.74	0.85	21.29	6.74	28.88	70.00	-41.12



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Temperature:	23 °C	Humidity:	58 %RH
Tested By:	Richard Lin	Tested Mode:	Tx-1
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Jul. 13, 2012

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)
54.06	1.17	12.72	5.18	19.07	40.0	-20.93	118	3.57
163.47	1.92	11.56	6.73	20.21	43.5	-23.29	235	3.08
530.27	3.86	18.24	7.63	29.73	46.0	-16.27	146	2.84
797.59	4.98	21.69	3.52	30.19	46.0	-15.81	192	2.51
883.93	5.28	22.83	4.18	32.29	46.0	-13.71	307	2.12
957.32	5.55	24.03	3.95	33.53	46.0	-12.47	88	1.84

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)
51.67	1.14	13.83	3.95	18.92	40.0	-21.08	93	1.79
530.29	3.86	18.24	6.28	28.38	46.0	-17.62	175	1.93
594.09	4.11	19.37	3.76	27.24	46.0	-18.76	67	2.35
747.34	4.77	21.43	3.54	29.74	46.0	-16.26	264	2.69
872.96	5.25	22.86	4.21	32.31	46.0	-13.69	209	2.98
957.34	5.55	24.03	3.28	32.86	46.0	-13.14	323	3.36

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:	23 °C	Humidity:	58 %RH
Tested By:	Richard Lin	Tested Mode:	Tx-2
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Jul. 13, 2012

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)
196.38	2.11	11.20	7.51	20.82	43.5	-22.68	144	3.47
530.82	3.86	18.24	7.36	29.46	46.0	-16.54	281	3.08
748.70	4.77	21.46	3.48	29.71	46.0	-16.29	105	2.82
797.06	4.98	21.69	3.57	30.24	46.0	-15.76	267	2.65
872.24	5.25	22.86	4.16	32.26	46.0	-13.74	315	2.23
908.44	5.36	22.99	3.75	32.10	46.0	-13.90	96	1.79

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)
52.45	1.15	13.46	5.32	19.93	40.0	-20.07	78	1.83
530.87	3.86	18.24	5.83	27.93	46.0	-18.07	124	1.96
597.09	4.12	19.43	3.26	26.81	46.0	-19.19	207	2.34
732.12	4.70	21.10	3.59	29.39	46.0	-16.61	85	2.68
825.34	5.09	22.30	3.61	31.00	46.0	-15.01	321	2.95
872.27	5.25	22.86	3.78	31.88	46.0	-14.12	309	3.42

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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Temperature:	23 °C	Humidity:	58 %RH
Tested By:	Richard Lin	Tested Mode:	Tx-3
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Jul. 13, 2012

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)
530.12	3.86	18.24	8.53	30.63	46.0	-15.37	271	3.54
747.50	4.77	21.43	4.38	30.58	46.0	-15.42	203	3.02
810.68	5.03	21.94	3.86	30.83	46.0	-15.17	135	2.85
872.06	5.25	22.86	3.57	31.67	46.0	-14.33	174	2.59
903.72	5.34	22.87	3.91	32.12	46.0	-13.88	312	2.14
957.26	5.55	24.03	3.62	33.20	46.0	-12.80	236	1.83

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)
497.39	3.70	17.94	3.47	25.11	46.0	-20.89	197	1.76
530.17	3.86	18.24	5.83	27.93	46.0	-18.07	229	1.95
622.51	4.23	19.76	3.69	27.69	46.0	-18.31	87	2.39
702.44	4.56	20.44	4.15	29.15	46.0	-16.85	64	2.67
797.69	4.98	21.69	3.36	30.03	46.0	-15.97	114	2.96
957.21	5.55	24.03	3.42	33.00	46.0	-13.00	152	3.41

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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Temperature:	23 °C	Humidity:	58 %RH
Tested By:	Richard Lin	Tested Mode:	Standby
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Jul. 13, 2012

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)
196.04	2.11	11.20	9.71	23.02	43.5	-20.48	108	3.52
530.13	3.86	18.24	6.79	28.89	46.0	-17.11	192	3.05
747.36	4.77	21.43	3.52	29.72	46.0	-16.28	235	2.89
797.52	4.98	21.69	3.46	30.13	46.0	-15.87	284	2.54
872.66	5.25	22.86	3.38	31.48	46.0	-14.52	305	2.13
899.54	5.33	22.80	3.09	31.22	46.0	-14.78	146	1.77

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)
53.41	1.16	13.09	4.95	19.20	40.0	-20.80	208	1.82
530.20	3.86	18.24	6.22	28.32	46.0	-17.68	162	2.06
791.38	4.95	21.66	4.46	31.08	46.0	-14.92	173	2.38
816.55	5.05	22.08	3.75	30.88	46.0	-15.12	226	2.75
877.63	5.26	22.85	3.35	31.46	46.0	-14.54	311	2.99
957.89	5.55	24.03	3.67	33.25	46.0	-12.75	267	3.45

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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Temperature:	23 °C	Humidity:	58 %RH
Tested By:	Richard Lin	Tested Mode:	Link
Receiver Detector:	Q.P. or AV.	Modulation Type:	GFSK
Frequency Range:	30 M – 1 GHz	Tested Date:	Jul. 13, 2012

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)
552.13	3.97	18.44	16.37	38.78	46.0	-7.22	163	3.54
595.65	4.11	19.39	14.69	38.19	46.0	-7.81	295	3.09
637.26	4.30	19.94	14.08	38.32	46.0	-7.68	182	2.82
839.41	5.14	22.64	10.36	38.13	46.0	-7.87	317	2.53
928.73	5.44	23.47	11.74	40.65	46.0	-5.35	302	2.17
961.52	5.57	24.04	16.02	45.63	54.0	-8.37	126	1.81

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)
597.23	4.12	19.43	13.27	36.82	46.0	-9.18	225	1.83
778.42	4.90	21.61	8.24	34.75	46.0	-11.25	198	1.96
823.56	5.08	22.25	7.33	34.66	46.0	-11.34	76	2.37
836.37	5.13	22.56	6.85	34.54	46.0	-11.46	99	2.65
841.06	5.15	22.68	9.26	37.09	46.0	-8.91	201	2.91
894.13	5.31	22.81	12.48	40.60	46.0	-5.40	132	3.46

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.: A12070504
 Report No.: FCC A12070504
 FCC ID : FSUGMZK4
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 Date: Jul. 17, 2012

Temperature:	23 °C	Humidity:	58 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-1
Frequency Range:	1 GHz – 6 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 13, 2012

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3758.17	-29.52	31.82	41.32	30.57	43.62	32.87	74.0	54.0	-30.38	-21.13	121	1.95
3924.05	-29.37	32.29	40.75	30.42	43.67	33.34	74.0	54.0	-30.33	-20.66	183	1.73
4212.82	-29.05	32.54	40.46	30.16	43.95	33.65	74.0	54.0	-30.05	-20.35	254	1.59
4407.70	-28.83	32.58	40.55	30.58	44.30	34.33	74.0	54.0	-29.70	-19.67	296	1.44
4653.27	-28.60	32.94	40.03	30.17	44.37	34.51	74.0	54.0	-29.63	-19.49	84	1.32
5192.33	-27.74	33.82	38.48	28.55	44.56	34.63	74.0	54.0	-29.44	-19.37	59	1.18

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3178.06	-30.36	30.46	42.87	32.65	42.97	32.75	74.0	54.0	-31.03	-21.25	107	1.22
3791.83	-29.49	31.91	41.09	31.43	43.51	33.85	74.0	54.0	-30.49	-20.15	226	1.45
3913.67	-29.38	32.26	39.94	29.85	42.82	32.73	74.0	54.0	-31.18	-21.27	204	1.56
4462.93	-28.76	32.59	39.49	29.39	43.32	33.22	74.0	54.0	-30.68	-20.78	139	1.69
5190.38	-27.75	33.81	37.81	27.66	43.88	33.73	74.0	54.0	-30.12	-20.27	97	1.75
5444.12	-26.98	33.97	36.17	26.53	43.16	33.52	74.0	54.0	-30.84	-20.48	312	1.88

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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:	23 °C	Humidity:	58 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-1(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 13, 2012

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-31.15	28.18	90.25	78.16	87.29	75.20	114.	94.0	-26.71	-18.80	67	1.57
4804.00	-28.48	33.27	41.85	31.18	46.64	35.97	74.0	54.0	-27.36	-18.03	183	1.63
7206.00	-27.05	35.74	35.96	25.82	44.64	34.50	74.0	54.0	-29.36	-19.50	251	1.29
9608.00	-25.66	37.79	37.23	27.19	49.35	39.31	74.0	54.0	-24.65	-14.69	294	1.78
12010.00	-23.89	39.19	38.87	28.65	54.17	43.95	74.0	54.0	-19.83	-10.05	165	1.56
14412.00	-21.16	42.03	40.54	30.38	61.41	51.25	74.0	54.0	-12.59	-2.75	318	1.61

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-31.15	28.18	95.38	83.64	92.42	80.68	114.	94.0	-21.58	-13.32	78	1.40
4804.00	-28.48	33.27	39.70	29.29	44.49	34.08	74.0	54.0	-29.51	-19.92	102	1.58
7206.00	-27.05	35.74	35.88	25.62	44.56	34.30	74.0	54.0	-29.44	-19.70	309	1.39
9608.00	-25.66	37.79	37.15	27.53	49.27	39.65	74.0	54.0	-24.73	-14.35	117	1.45
12010.00	-23.89	39.19	38.13	28.06	53.43	43.36	74.0	54.0	-20.57	-10.64	224	1.76
14412.00	-21.16	42.03	39.45	29.37	60.32	50.24	74.0	54.0	-13.68	-3.76	205	1.62

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.
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TEST REPORT

Reference No.: A12070504
 Report No.: FCC A12070504
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 Date: Jul. 17, 2012

Temperature:	23 °C	Humidity:	58 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-2
Frequency Range:	1 GHz – 6 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 13, 2012

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3731.55	-29.55	31.75	42.23	32.16	44.43	34.36	74.0	54.0	-29.57	-19.64	291	1.95
3828.14	-29.46	32.02	42.83	31.54	45.39	34.10	74.0	54.0	-28.61	-19.90	165	1.78
3892.63	-29.40	32.20	41.91	30.77	44.71	33.57	74.0	54.0	-29.29	-20.43	102	1.53
4377.95	-28.86	32.58	41.46	31.29	45.17	35.00	74.0	54.0	-28.83	-19.00	258	1.44
4626.83	-28.62	32.88	40.99	30.68	45.25	34.94	74.0	54.0	-28.75	-19.06	86	1.25
5229.36	-27.63	33.84	37.43	27.21	43.64	33.42	74.0	54.0	-30.36	-20.58	91	1.16

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1917.29	-31.76	26.97	51.60	41.36	46.81	36.57	74.0	54.0	-27.19	-17.43	124	1.19
2346.07	-31.21	28.06	46.46	36.28	43.31	33.13	74.0	54.0	-30.69	-20.87	237	1.35
3904.12	-29.39	32.23	41.75	31.70	44.59	34.54	74.0	54.0	-29.41	-19.46	312	1.54
4393.36	-28.84	32.58	40.69	30.82	44.42	34.55	74.0	54.0	-29.58	-19.45	309	1.68
4998.56	-28.32	33.70	38.55	28.46	43.92	33.83	74.0	54.0	-30.08	-20.17	267	1.79
5499.47	-26.81	34.00	36.55	26.48	43.74	33.67	74.0	54.0	-30.26	-20.33	155	1.84

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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:	23 °C	Humidity:	58 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-2(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 13, 2012

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2446.00	-31.09	28.28	95.36	83.09	92.55	80.28	114.	94.0	-21.45	-13.72	107	1.69
4892.00	-28.41	33.46	44.32	34.17	49.38	39.23	74.0	54.0	-24.62	-14.77	324	1.43
7338.00	-26.97	36.08	34.50	24.35	43.61	33.46	74.0	54.0	-30.39	-20.54	251	1.58
9784.00	-25.39	37.93	36.86	26.61	49.39	39.14	74.0	54.0	-24.61	-14.86	236	1.42
12230.00	-23.31	39.06	36.76	26.43	52.51	42.18	74.0	54.0	-21.49	-11.82	149	1.67
14676.00	-21.29	41.36	38.15	28.09	58.22	48.16	74.0	54.0	-15.78	-5.84	168	1.55

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2446.00	-31.09	28.28	95.11	82.86	92.30	80.05	114.	94.0	-21.70	-13.95	75	1.39
4892.00	-28.41	33.46	40.19	29.95	45.25	35.01	74.0	54.0	-28.75	-18.99	96	1.57
7338.00	-26.97	36.08	33.41	23.37	42.52	32.48	74.0	54.0	-31.48	-21.52	129	1.61
9784.00	-25.39	37.93	36.89	26.72	49.42	39.25	74.0	54.0	-24.58	-14.75	275	1.75
12230.00	-23.31	39.06	37.53	27.68	53.28	43.43	74.0	54.0	-20.72	-10.57	193	1.62
14676.00	-21.29	41.36	37.44	27.34	57.51	47.41	74.0	54.0	-16.49	-6.59	54	1.49

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.
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TEST REPORT

Reference No.: A12070504
 Report No.: FCC A12070504
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 Date: Jul. 17, 2012

Temperature:	23 °C	Humidity:	58 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-3
Frequency Range:	1 GHz – 6 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 13, 2012

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1734.89	-32.03	26.24	51.13	40.82	45.33	35.02	74.0	54.0	-28.67	-18.98	215	1.95
1928.04	-31.74	27.01	49.20	39.11	44.47	34.38	74.0	54.0	-29.53	-19.62	137	1.77
3237.28	-30.25	30.57	43.00	32.75	43.32	33.07	74.0	54.0	-30.68	-20.93	259	1.59
3766.57	-29.52	31.84	41.38	31.26	43.71	33.59	74.0	54.0	-30.29	-20.41	162	1.45
4502.31	-28.72	32.60	40.30	30.18	44.19	34.07	74.0	54.0	-29.81	-19.93	103	1.24
5201.49	-27.71	33.82	38.25	28.42	44.36	34.53	74.0	54.0	-29.64	-19.47	284	1.18

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
1923.08	-31.75	26.99	55.20	45.08	50.44	40.32	74.0	54.0	-23.56	-13.68	301	1.23
3772.13	-29.51	31.86	41.49	31.17	43.84	33.52	74.0	54.0	-30.16	-20.48	192	1.46
4304.56	-28.95	32.56	39.54	29.47	43.15	33.08	74.0	54.0	-30.85	-20.92	226	1.55
4393.76	-28.84	32.58	39.55	29.49	43.28	33.22	74.0	54.0	-30.72	-20.78	87	1.62
4647.92	-28.60	32.92	39.21	29.13	43.53	33.45	74.0	54.0	-30.47	-20.55	141	1.73
5211.05	-27.68	33.83	37.91	27.83	44.05	33.97	74.0	54.0	-29.95	-20.03	198	1.81

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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:	23 °C	Humidity:	58 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Tx-3(Fundamental)
Frequency Range:	1 GHz – 25 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 13, 2012

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2478.00	-31.06	28.35	91.52	79.36	88.82	76.66	114.	94.0	-25.18	-17.34	68	1.47
4956.00	-28.36	33.60	46.02	35.67	51.27	40.92	74.0	54.0	-22.73	-13.08	139	1.62
7434.00	-26.90	36.33	35.91	25.71	45.33	35.13	74.0	54.0	-28.67	-18.87	232	1.51
9912.00	-25.20	38.03	36.58	26.48	49.41	39.31	74.0	54.0	-24.59	-14.69	167	1.69
12390.00	-22.88	38.97	37.36	27.19	53.44	43.27	74.0	54.0	-20.56	-10.73	93	1.64
14868.00	-21.44	40.55	40.70	30.61	59.81	49.72	74.0	54.0	-14.19	-4.28	191	1.73

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2478.00	-31.06	28.35	91.36	79.17	88.66	76.47	114.	94.0	-25.34	-17.53	213	1.44
4956.00	-28.36	33.60	42.22	32.36	47.47	37.61	74.0	54.0	-26.53	-16.39	278	1.56
7434.00	-26.90	36.33	35.33	25.15	44.75	34.57	74.0	54.0	-29.25	-19.43	79	1.38
9912.00	-25.20	38.03	36.76	26.63	49.59	39.46	74.0	54.0	-24.41	-14.54	291	1.39
12390.00	-22.88	38.97	38.06	27.95	54.14	44.03	74.0	54.0	-19.86	-9.97	104	1.58
14868.00	-21.44	40.55	39.56	29.44	58.67	48.55	74.0	54.0	-15.33	-5.45	176	1.6

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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.: A12070504
 Report No.: FCC A12070504
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 Date: Jul. 17, 2012

Temperature:	23 °C	Humidity:	58 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Standby
Frequency Range:	1 GHz – 6 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 13, 2012

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3001.79	-30.69	30.10	41.85	31.68	41.26	31.09	74.0	54.0	-32.74	-22.91	271	1.84
3252.91	-30.22	30.60	42.06	31.89	42.44	32.27	74.0	54.0	-31.56	-21.73	132	1.76
3483.38	-29.79	31.07	41.24	31.12	42.51	32.39	74.0	54.0	-31.49	-21.61	195	1.62
3764.85	-29.52	31.84	41.59	31.37	43.91	33.69	74.0	54.0	-30.09	-20.31	317	1.53
4325.13	-28.92	32.57	38.68	28.49	42.32	32.13	74.0	54.0	-31.68	-21.87	164	1.27
5627.49	-27.09	34.03	34.35	24.31	41.29	31.25	74.0	54.0	-32.71	-22.75	233	1.16

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3201.81	-30.32	30.50	41.88	31.95	42.07	32.14	74.0	54.0	-31.93	-21.86	300	1.21
3762.50	-29.52	31.83	41.33	31.35	43.64	33.66	74.0	54.0	-30.36	-20.34	159	1.38
4073.67	-29.22	32.51	38.93	28.84	42.23	32.14	74.0	54.0	-31.77	-21.86	126	1.55
4387.23	-28.85	32.58	38.85	28.81	42.58	32.54	74.0	54.0	-31.42	-21.46	81	1.68
4552.80	-28.68	32.71	38.11	28.06	42.15	32.10	74.0	54.0	-31.85	-21.90	94	1.75
5543.79	-26.90	34.01	34.23	24.26	41.33	31.36	74.0	54.0	-32.67	-22.64	168	1.82

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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:	23 °C	Humidity:	58 %RH
Receiver Detector:	PK. or AV.	Tested Mode:	Link
Frequency Range:	1 GHz – 6 GHz	Modulation Type:	GFSK
Tested By:	Richard Lin	Tested Date:	Jul. 13, 2012

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3764.23	-29.52	31.84	41.87	31.65	44.19	33.97	74.0	54.0	-29.81	-20.03	102	1.92
4017.59	-29.28	32.50	40.32	30.17	43.54	33.39	74.0	54.0	-30.46	-20.61	175	1.79
4396.37	-28.84	32.58	40.63	30.58	44.37	34.32	74.0	54.0	-29.63	-19.68	163	1.67
4648.70	-28.60	32.93	40.63	30.49	44.95	34.81	74.0	54.0	-29.05	-19.19	227	1.54
5187.09	-27.76	33.81	37.96	27.84	44.02	33.90	74.0	54.0	-29.98	-20.10	281	1.33
5459.12	-26.93	33.98	36.09	26.06	43.13	33.10	74.0	54.0	-30.87	-20.90	314	1.19

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dB μ V)		Emission Level (dB μ V/m)		Limit (dB μ V/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
3728.66	-29.55	31.74	42.00	31.97	44.19	34.16	74.0	54.0	-29.81	-19.84	260	1.22
3871.08	-29.42	32.14	40.92	30.87	43.64	33.59	74.0	54.0	-30.36	-20.41	133	1.47
4547.12	-28.68	32.70	39.13	29.11	43.15	33.13	74.0	54.0	-30.85	-20.87	308	1.56
5062.78	-28.13	33.74	37.48	27.46	43.08	33.06	74.0	54.0	-30.92	-20.94	82	1.69
5293.02	-27.44	33.88	36.78	26.83	43.22	33.27	74.0	54.0	-30.78	-20.73	67	1.82
5491.94	-26.84	33.99	36.67	26.65	43.83	33.81	74.0	54.0	-30.17	-20.19	126	1.93

NOTE :

1. Measurement uncertainty is +/- 4.73dB.
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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Rd., Ling 8, Shan-Tong Li,
Chung-Li City, Taoyuan County
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TEST REPORT

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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 Chip antenna. Gain of antenna types is 3 dBi that meet the requirement.



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6. PHOTOS OF TESTING

- Conducted test (Charge)





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





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





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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