



Spectrum Research & Testing Lab., Inc.

No.167, Ln.780, Shan-Tong Rd., Ling8, Shan-Tong Li, Chung-Li City, Taoyuan County 320, Taiwan (R.O.C.)

TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 1 of 72
Date: Feb. 25, 2015

Product Name: SP-905BT
Model No.: GP-140001
Applicant: KYE SYSTEMS CORP. (Genius)
No. 492, Sec. 5, Chongxin Rd., Sanchong Dist.,
New Taipei City 24160, Taiwan (R.O.C.)
Date of Receipt: Jan. 15, 2015
Finished date of Test: Feb. 25, 2015
Applicable Standards: 47 CFR Part 15, Subpart C
47 CFR Part 15, Subpart B
ANSI C63.4: 2003
FCC Public Notice DA 00-705(March 2000)

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 : Leo Yang , Date: 2015/2/25
(Leo Yang)

Approved By : JH , Date: 2/25/2015
(Johnson Ho, Director)





**Spectrum Research &
Testing Lab., Inc.**
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320, Taiwan (R.O.C.)

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Page: 2 of 72
Date: Feb. 25, 2015

Revisions History

Report No.	Issue Date	Revisions
FCCA15011504	Feb. 11, 2015	Initial issue
FCCA15011504	Feb. 25, 2015	Add result in P32,P33
FCCA15011504	Mar. 04, 2015	Add description in P5,P6
FCCA15011504	Mar. 06, 2015	Modify the description in P6 Add test procedure description in P10,P13,P16,P18,P26,P32



Table of Contents

1. DOCUMENT POLICY AND TEST STATEMENT	5
1.1 DOCUMENT POLICY	5
1.2 TEST STATEMENT	5
1.3 EUT MODIFICATION	5
2. DESCRIPTION OF EUT AND TEST MODE	6
2.1 GENERAL DESCRIPTION OF EUT	6
2.2 DESCRIPTION OF EUT INTERNAL DEVICE	6
2.3 EUT OPERATING CONDITION	6
2.4 DESCRIPTION OF SYSTEM RECEIVER	6
2.5 USED CHANNEL AND FREQUENCY TABLE	7
2.6 DESCRIPTION OF TEST MODE	8
2.7 DESCRIPTION OF SUPPORT UNIT	8
3. DESCRIPTION OF APPLIED STANDARDS	9
3.1 SUMMARY OF TEST RESULTS	9
4. TECHNICAL CHARACTERISTICS TEST	10
4.1 CHANNEL SEPARATION TEST	10
4.1.1 LIMIT	10
4.1.2 TEST EQUIPMENT	10
4.1.3 TEST SET-UP	10
4.1.4 TEST PROCEDURE	10
4.1.5 TEST RESULT	11
4.2 20DB BANDWIDTH	13
4.2.1 LIMIT	13
4.2.2 TEST EQUIPMENT	13
4.2.3 TEST SET-UP	13
4.2.4 TEST PROCEDURE	13
4.2.5 TEST RESULT	14
4.3 QUANTITY OF HOPPING CHANNEL TEST	16
4.3.1 LIMIT	16
4.3.2 TEST EQUIPMENT	16
4.3.3 TEST SET-UP	16
4.3.4 TEST PROCEDURE	16
4.3.5 TEST RESULT	17
4.4 TIME OF OCCUPANCY (DWELL TIME)	18
4.4.1 LIMIT	18
4.4.2 TEST EQUIPMENT	18
4.4.3 TEST SET-UP	18
4.4.4 TEST PROCEDURE	18
4.4.5 TEST RESULT	19
4.5 PEAK POWER TEST	25
4.5.1 LIMIT	25
4.5.2 TEST EQUIPMENT	25
4.5.3 TEST SET-UP	25



TEST REPORT

4.5.4	TEST PROCEDURE	26
4.5.5	TEST RESULT	26
4.6	BAND EDGE TEST	29
4.6.1	LIMIT	29
4.6.2	TEST EQUIPMENT	30
4.6.3	TEST SETUP	31
4.6.4	TEST PROCEDURE	32
4.6.5	TEST RESULT	32
4.7	CONDUCTED EMISSION TEST.....	36
4.7.1	LIMIT	36
4.7.2	TEST EQUIPMENT	36
4.7.3	TEST SETUP	37
4.7.4	TEST PROCEDURE	37
4.7.5	TEST RESULT	38
4.8	RADIATED EMISSION TEST	43
4.8.1	LIMIT	43
4.8.2	TEST EQUIPMENT	44
4.8.3	TEST SET-UP	45
4.8.4	TEST PROCEDURE	46
5.	ANTENNA APPLICATION	63
5.1	ANTENNA REQUIREMENT	63
5.2	RESULT	63
5.3	DESCRIPTION OF RF EXPOSURE	63
6.	PHOTOS OF TESTING	64
7.	TERMS OF ABBREVIATION	72



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, 3.7Vdc of Li-ion battery
- AC 120V/60Hz for PC was used during the test.
- Frequency hopping systems between 2400 and 2483.5 MHz band use at least 75 nonoverlapping channels, except that as few as 15 nonoverlapping channels may be used for systems that intelligently modify their hopsets in accordance with Section 15.247(g)(h). Hopsets modified in this manner must be redetermined at least once every 30 seconds. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
- hopping channel sample :(From left to right, up to down)
18 58 16 76 29 61 69 59 74 51 75 41 09 49 68 66 21 43 61 16 37
14 17 28 10 27 06 62 59 70 65 32 51 73 69 67 22 43 62 17 57 38
52 36 30 49 27 46 06 67 05 26 41 58 54 31 59 71 69 28 58 39 16
78 75 74 29 47 69 62 45 62 02 40 17 38 16 57 37 56 11 76 32 50
27 26 05 46 24 17 15 38

1.3 EUT MODIFICATION

- No modification in SRT Lab.



2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	SP-905BT
MODEL NO.	GP-140001
POWER SUPPLY	DC power source from Li-ion battery : DC 3.7V AC power source of PC for USB port : AC 120V/60Hz
CABLE	0.7m unshielded USB cord
FREQUENCY BAND	2.400GHz ~ 2.4835GHz
CARRIER FREQUENCY	2.402GHz ~ 2.480GHz
NUMBER OF CHANNEL	79
RATED RF OUTPUT POWER	84.42 dBuV/m@2480 MHz
MODULATION TYPE	GFSK
MODE OF OPERATION	Duplex
ANTENNA TYPE	Printed PCB Antenna
ANTENNA GAIN	0 dBi
OPERATING TEMPERATURE RANGE	-20 ~ 55°C

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

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

Device	Brand	Model #	FCC ID/DoC	Cable
Li-ion battery	N/A	523443AR	N/A	DC 3.7 V, 500 mAh

2.3 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 mode.
4. The EUT was set to the highest available power level.

2.4 DESCRIPTION OF SYSTEM RECEIVER

1. Required setting (e.g. RBW) of Spectrum Analyzer (System Receiver) be decrypted into Test Procedure of each test item in Test Report.
2. For Bluetooth function, the EUT execute the RF utility which from the BT module supplier to provide channel selection, power level and data rate for transmitting and receiving signals continuously, therefore the Spectrum Analyzer(System Receiver) be set to measure these signals directly without synchronization.
3. Each frequency is used equally on the average by each transmitter.



4. The receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and they shift frequencies in synchronization with the transmitted signals.

2.5 Used Channel and Frequency Table

頻道	頻率	頻道	頻率	頻道	頻率	頻道	頻率
CH00	2402MHz	CH20	2422MHz	CH40	2442MHz	CH60	2462MHz
CH01	2403MHz	CH21	2423MHz	CH41	2443MHz	CH61	2463MHz
CH02	2404MHz	CH22	2424MHz	CH42	2444MHz	CH62	2464MHz
CH03	2405MHz	CH23	2425MHz	CH43	2445MHz	CH63	2465MHz
CH04	2406MHz	CH24	2426MHz	CH44	2446MHz	CH64	2466MHz
CH05	2407MHz	CH25	2427MHz	CH45	2447MHz	CH65	2467MHz
CH06	2408MHz	CH26	2428MHz	CH46	2448MHz	CH66	2468MHz
CH07	2409MHz	CH27	2429MHz	CH47	2449MHz	CH67	2469MHz
CH08	2410MHz	CH28	2430MHz	CH48	2450MHz	CH68	2470MHz
CH09	2411MHz	CH29	2431MHz	CH49	2451MHz	CH69	2471MHz
CH10	2412MHz	CH30	2432MHz	CH50	2452MHz	CH70	2472MHz
CH11	2413MHz	CH31	2433MHz	CH51	2453MHz	CH71	2473MHz
CH12	2414MHz	CH32	2434MHz	CH52	2454MHz	CH72	2474MHz
CH13	2415MHz	CH33	2435MHz	CH53	2455MHz	CH73	2475MHz
CH14	2416MHz	CH34	2436MHz	CH54	2456MHz	CH74	2476MHz
CH15	2417MHz	CH35	2437MHz	CH55	2457MHz	CH75	2477MHz
CH16	2418MHz	CH36	2438MHz	CH56	2458MHz	CH76	2478MHz
CH17	2419MHz	CH37	2439MHz	CH57	2459MHz	CH77	2479MHz
CH18	2420MHz	CH38	2440MHz	CH58	2460MHz	CH78	2480MHz
CH19	2421MHz	CH39	2441MHz	CH59	2461MHz		

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2.6 DESCRIPTION OF TEST MODE

Mode		Frequency
1	Tx-1	2402 MHz
2	Tx-2	2441 MHz
3	Tx-3	2480 MHz
4	Standby	NA
5	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:



2.7 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	LCD Monitor	Dell	U2410	DoC	1.8m unshielded power cable 1.5m shielded data cable
3	Keyboard	Acer	SK-9611	DoC	1.5m unshielded data cable.
4	Mouse	WinTEK	WSS30	DoC	1.5m unshielded data cable.
6	Printer	HP	C8991A	DoC	1.5m unshielded power cable 1.5m shielded data cable
7	Mobile	SAMSUNG	GT-I9300	DoC	NA
8	HDD	TERASYS	F12-U	DoC	1.5m shielded data cable.
9	Earphone	Hawk	MIC-4	N/A	2.4m unshielded data cable

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



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

Public Notice DA 00-705 (March 2000)

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
15.247(a)	Channel separation test Limit : minimum of 25 kHz or the 20 dB bandwidth	PASS
15.247(a)	20dB Bandwidth	PASS
15.247(a)(b)	Quantity of hopping channel test Limit : 75 non-overlapping hopping channels	PASS
15.247(a)	Time of occupancy (Dwell Time) Limit : greater than 0.4 seconds	PASS
15.247(b)	Peak power test Limit : 1 watt	PASS
15.247(d)	Band Edge Measurement Limit : 20dB less than the peak value of fundamental frequency	PASS
15.33(a) 15.249	Transmitter Radiated Emissions Limit : Table 15.209	PASS
15.203	Antenna requirement Limit : max. 6dBi	PASS



4. TECHNICAL CHARACTERISTICS TEST

4.1 CHANNEL SEPARATION TEST

4.1.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(1). Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Frequency Range (MHz)	Limit(kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

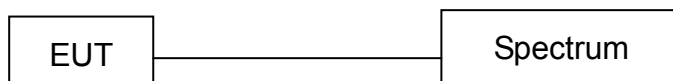
4.1.2 TEST EQUIPMENT

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

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9K TO 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC.10, 2015 ETC

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

4.1.3 TEST SET-UP



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

4.1.4 TEST PROCEDURE

- 1.The EUT is programmed to transmit signals continuously for all testing.
2. Use the following spectrum analyzer settings according to DA 00-705 guidance:
Span =2 to 3 times the 20 dB bandwidth; RBW $\geq$ 1% of 20 dB bandwidth; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
- 3.Printed out the test result from the spectrum by hard copy function.

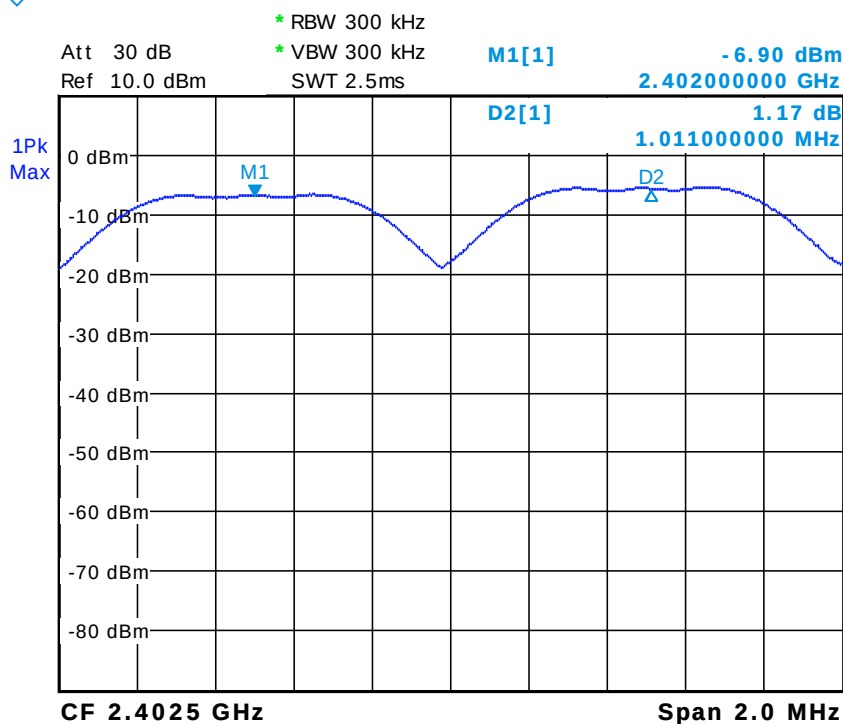


4.1.5 TEST RESULT

Temperature :	16°C	Humidity :	66%RH
Spectrum Detector :	PK	Tested by :	Leo Yang
Test Result :	PASS	Tested Date :	Feb. 09, 2015

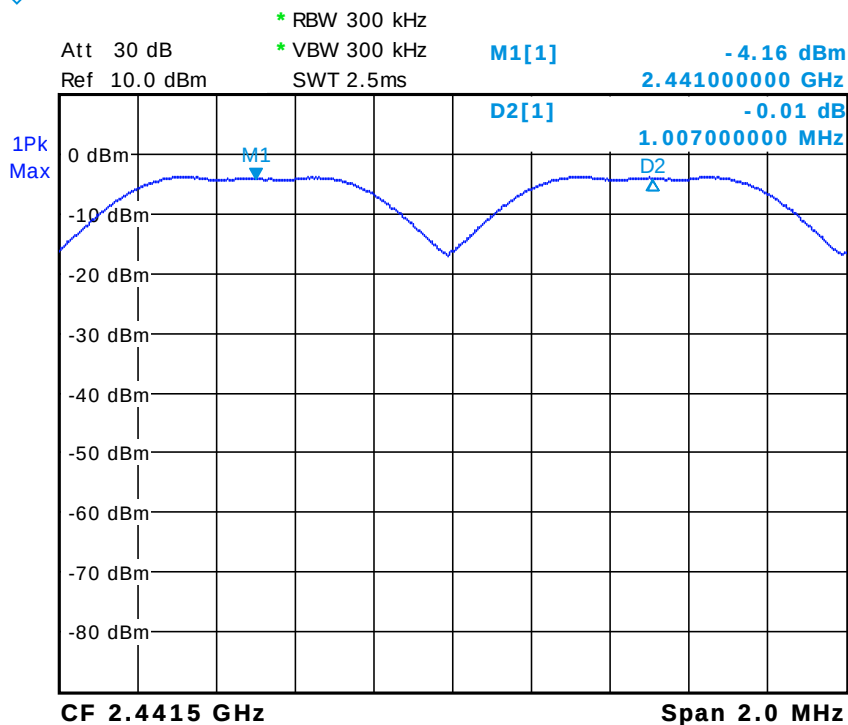
Channel Number	Channel Frequency (MHz)	Separation Read Value (kHz)	Minimum Limit(20dB Bandwidth) (kHz)
00	2402	1011	25
39	2441	1007	25
78	2480	1004	25

CH00 :

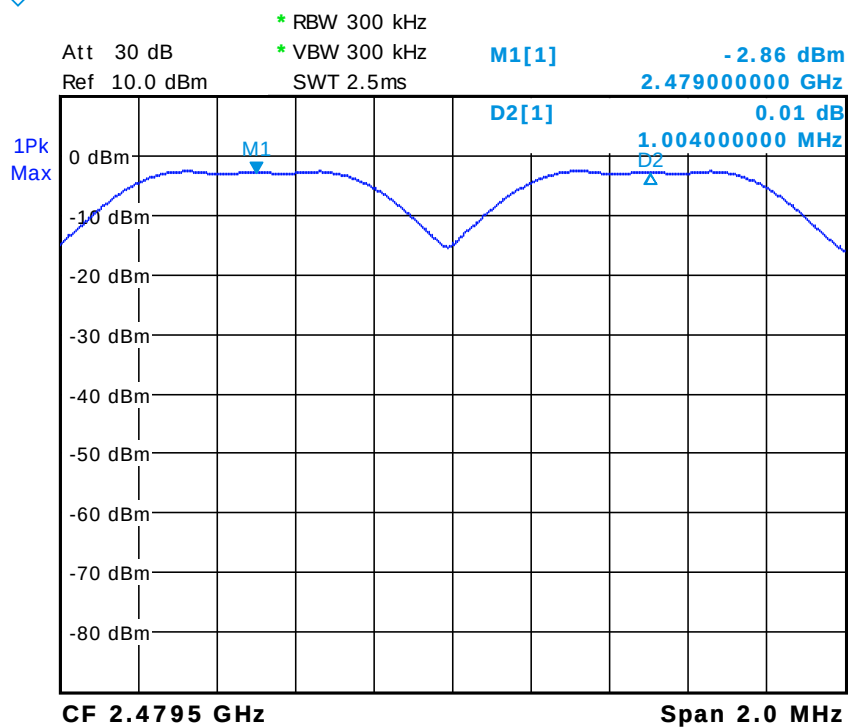




CH39 :



CH78 :





4.2 20dB Bandwidth

4.2.1 LIMIT

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

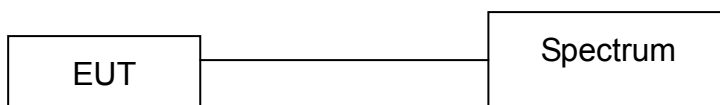
4.2.2 TEST EQUIPMENT

The following test equipment was used during the test :

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9K TO 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC.10, 2015 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



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

4.2.4 TEST PROCEDURE

- 1.The EUT is programmed to transmit signals continuously for all testing.
2. Use the following spectrum analyzer settings according to DA 00-705 guidance:
Span =2 to 3 times the 20 dB bandwidth; $RBW \geq 1\%$ of 20 dB bandwidth; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
- 3.Printed out the test result from the spectrum by hard copy function.

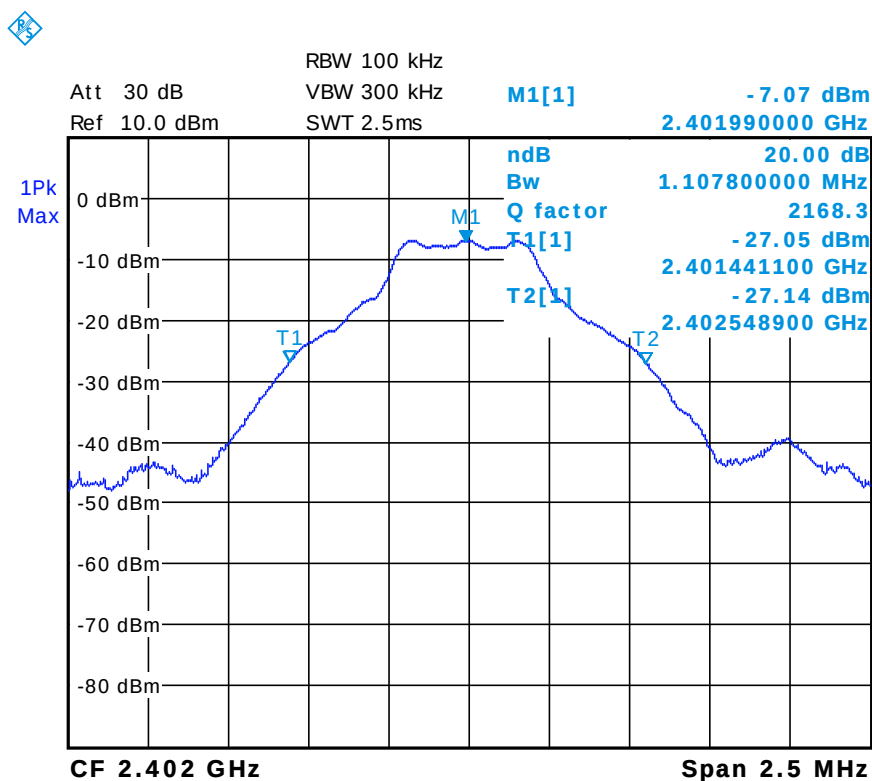


4.2.5 TEST RESULT

Temperature:	16°C	Humidity:	66%RH
Spectrum Detector:	PK	Tested by:	Leo Yang
Test Result:	PASS	Tested Date:	Feb. 09, 2015

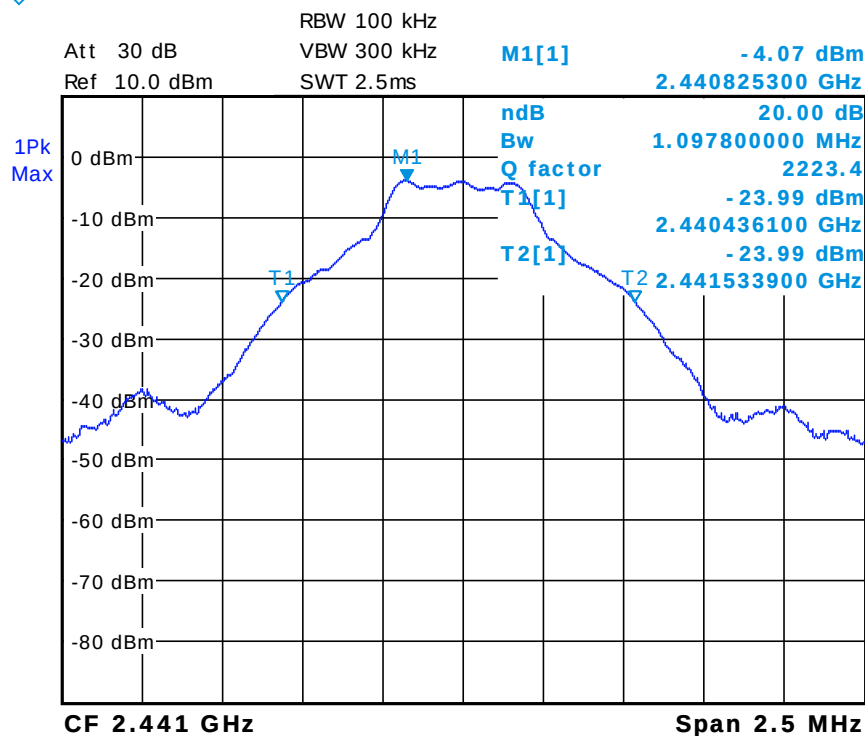
Channel Number	Channel Frequency (MHz)	20dB Down Bandwidth (KHz)
00	2402	1107.8
39	2441	1097.8
78	2480	1102.8

CH00 :

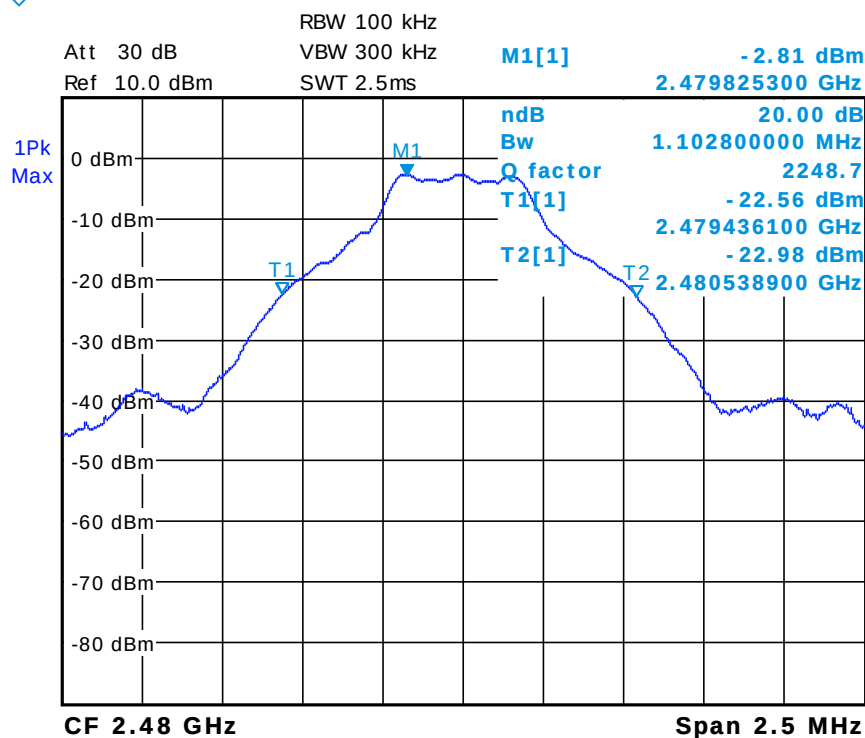




CH39 :



CH78 :





4.3 QUANTITY OF HOPPING CHANNEL TEST

4.3.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(b).

Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.

Frequency Range (MHz)	Limit (Quantity of Hopping Channel)			
	20dB Bandwidth <250kHz	20dB Bandwidth >250kHz	20dB Bandwidth <1MHz	20dB Bandwidth >1MHz
902-928	50	25	N/A	N/A
2400-2483.5	N/A	N/A	75	15
5725-5850	N/A	N/A	75	N/A

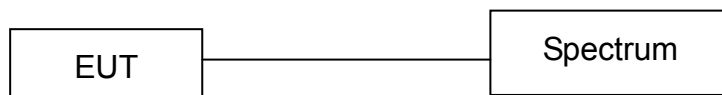
4.3.2 TEST EQUIPMENT

The following test equipment was used during the test :

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9K TO 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC.10, 2015 ETC

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

4.3.3 TEST SET-UP



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

4.3.4 TEST PROCEDURE

- 1.The EUT was operating in hopping mode or could be controlled its channel.
2. Use the following spectrum analyzer settings according to DA 00-705 guidance:
Span = the frequency band of operation; $RBW \geq 1\%$ of the SPAN; $VBW \geq RBW$;
Sweep = auto; Detector function = peak; Trace = max hold.
- 3.Printed out the test result from the spectrum by hard copy function.

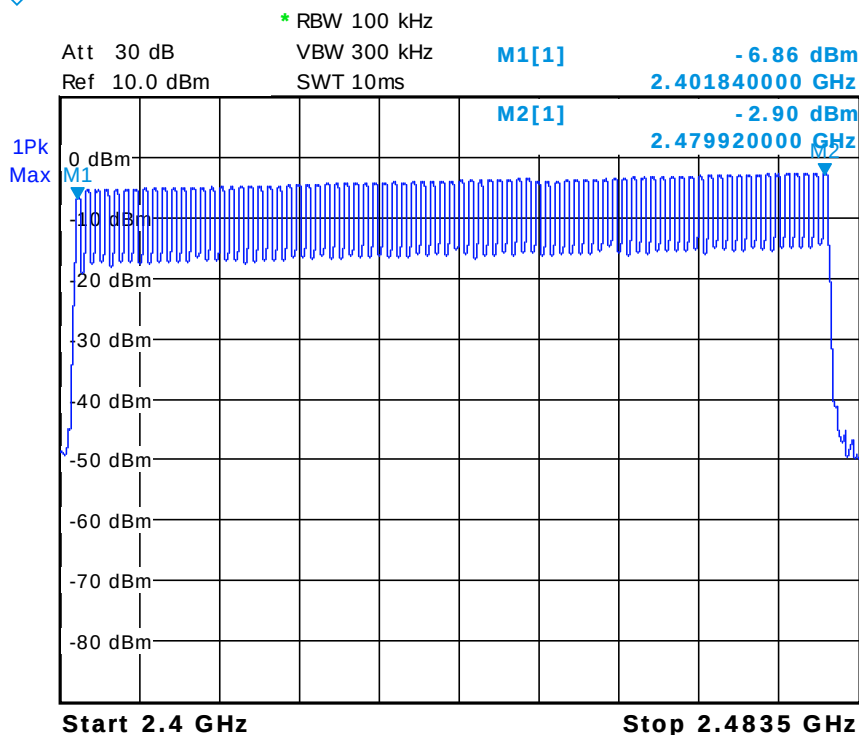


4.3.5 TEST RESULT

Temperature:	16°C	Humidity:	66%RH
Spectrum Detector:	PK	Tested by:	Leo Yang
Test Result:	PASS	Tested Date:	Feb. 09, 2015

Hopping Channel Frequency Range(MHz)	Quantity of Hopping Channel Read Value	Quantity of Hopping Channel Limit
2400~2483.5	79	75

CH00 ~ CH78 :



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4.4 TIME OF OCCUPANCY (Dwell Time)

4.4.1 LIMIT

FCC Part15, Subpart C Section 15.247(a).

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Frequency Range (MHz)	Limit (ms)		
	20dB Bandwidth <250kHz(50Channel)	20dB Bandwidth >250kHz(25Channel)	20dB Bandwidth <1MHz(75Channel)
902-928	400(20s)	400(10s)	NA
2400-2483.5	NA	NA	400(30s)
5725-5850	NA	NA	400(30s)

NOTE : The “()” is all channel’s average time of occupancy.

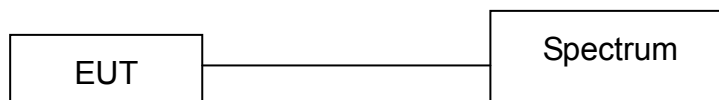
4.4.2 TEST EQUIPMENT

The following test equipment was used during the test :

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM ANALYZER	9K TO 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC.10, 2015 ETC

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

4.4.3 TEST SET-UP



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

4.4.4 TEST PROCEDURE

- 1.The EUT is programmed to transmit signals continuously for all testing.
2. Use the following spectrum analyzer settings according to DA 00-705 guidance:
 Span = zero SPAN, centered on a hopping channel; RBW = 1MHz; VBW ≥ RBW;
 Sweep = as necessary to capture the entire dwell time per hopping channel;
 Detector function = peak; Trace = max hold.
- 3.Printed out the test result from the spectrum by hard copy function.



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TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 19 of 72
Date: Feb. 25, 2015

4.4.5 TEST RESULT

Temperature:	22°C	Humidity:	61%RH
Spectrum Detector:	PK	Tested by:	Leo Yang
Test Result:	PASS	Tested Date:	Feb. 09, 2015

Channel Number	Channel Frequency (MHz)	Pulse Time (ms)	Period Time (s)	Time of Occupancy (Dwell Time) (ms)	Average Time of Occupancy Limit (ms)
CH00_DH1	2402.00	0.376	31.6	120.32	400
CH00_DH3	2402.00	1.640	31.6	262.40	400
CH00_DH5	2402.00	2.880	31.6	307.19	400
CH39_DH1	2441.00	0.380	31.6	121.60	400
CH39_DH3	2441.00	1.638	31.6	262.08	400
CH39_DH5	2441.00	2.880	31.6	307.19	400
CH78_DH1	2480.00	0.380	31.6	121.60	400
CH78_DH3	2480.00	1.628	31.6	260.48	400
CH78_DH5	2480.00	2.870	31.6	306.13	400

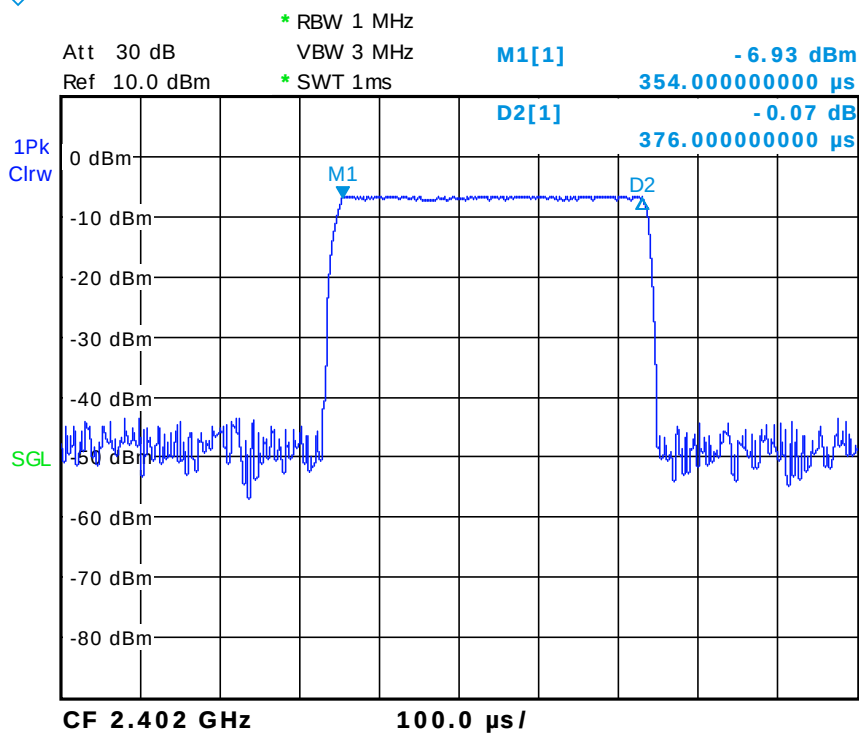
CH00_DH1 = 0.376(ms) x (1600 / 2 / 79) x 31.6 = 120.32(ms)
CH00_DH3 = 1.640(ms) x (1600 / 4 / 79) x 31.6 = 262.40(ms)
CH00_DH5 = 2.880(ms) x (1600 / 6 / 79) x 31.6 = 307.19(ms)

CH39_DH1 = 0.380(ms) x (1600 / 2 / 79) x 31.6 = 121.60(ms)
CH39_DH3 = 1.638(ms) x (1600 / 4 / 79) x 31.6 = 262.08(ms)
CH39_DH5 = 2.880(ms) x (1600 / 6 / 79) x 31.6 = 307.19(ms)

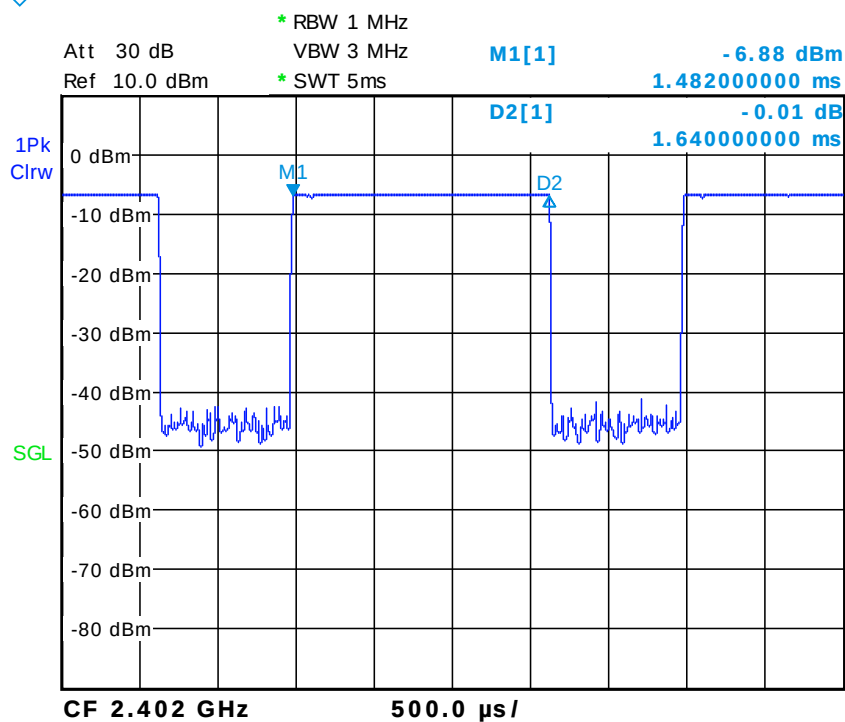
CH78_DH1 = 0.380(ms) x (1600 / 2 / 79) x 31.6 = 121.60(ms)
CH78_DH3 = 1.628(ms) x (1600 / 4 / 79) x 31.6 = 260.48(ms)
CH78_DH5 = 2.870(ms) x (1600 / 6 / 79) x 31.6 = 306.13(ms)



CH00_DH1 :

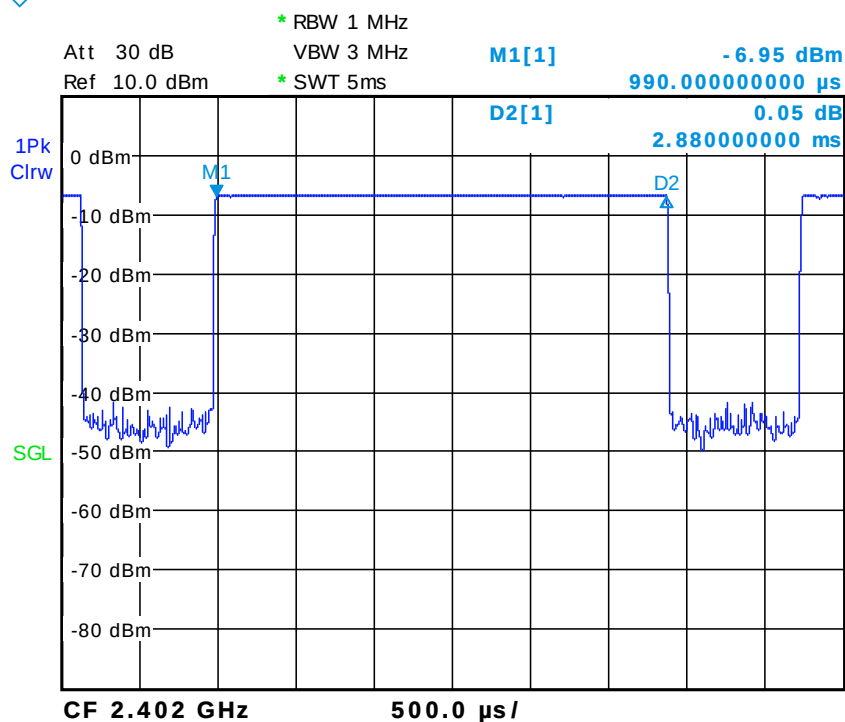


CH00_DH3 :

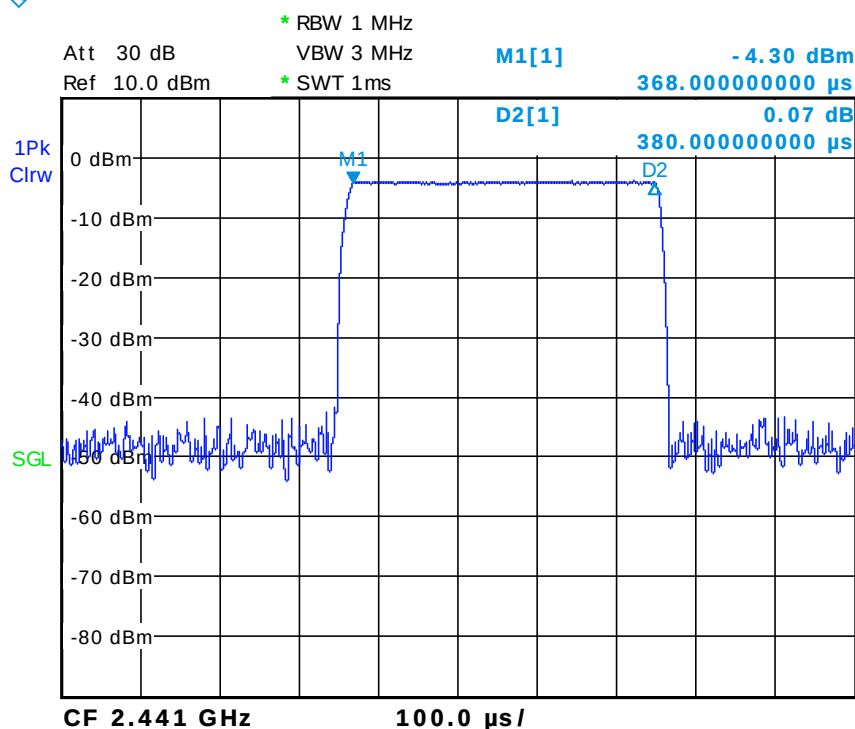




CH00_DH5 :

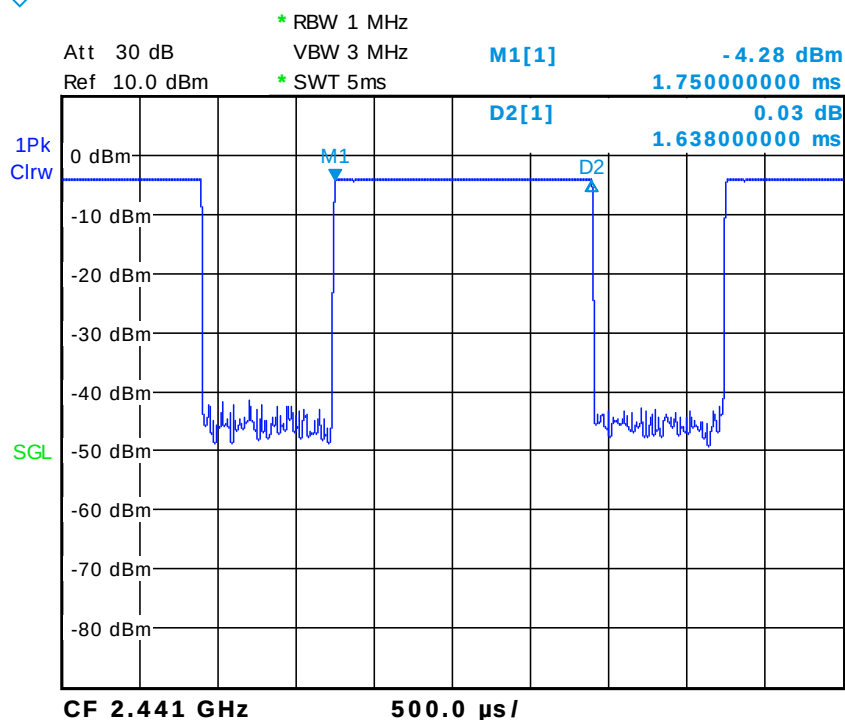


CH39_DH1 :

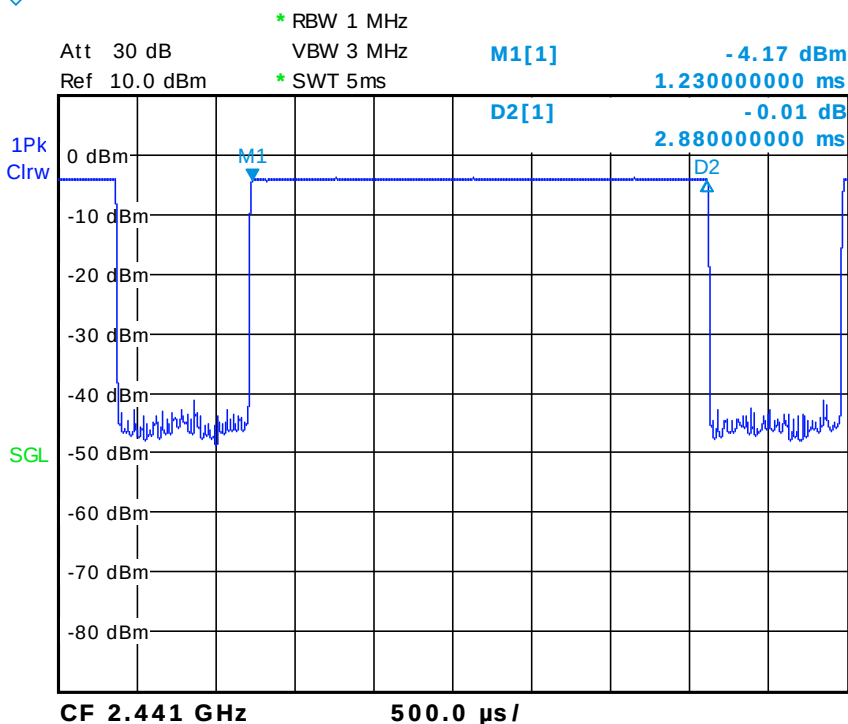




CH39_DH3 :

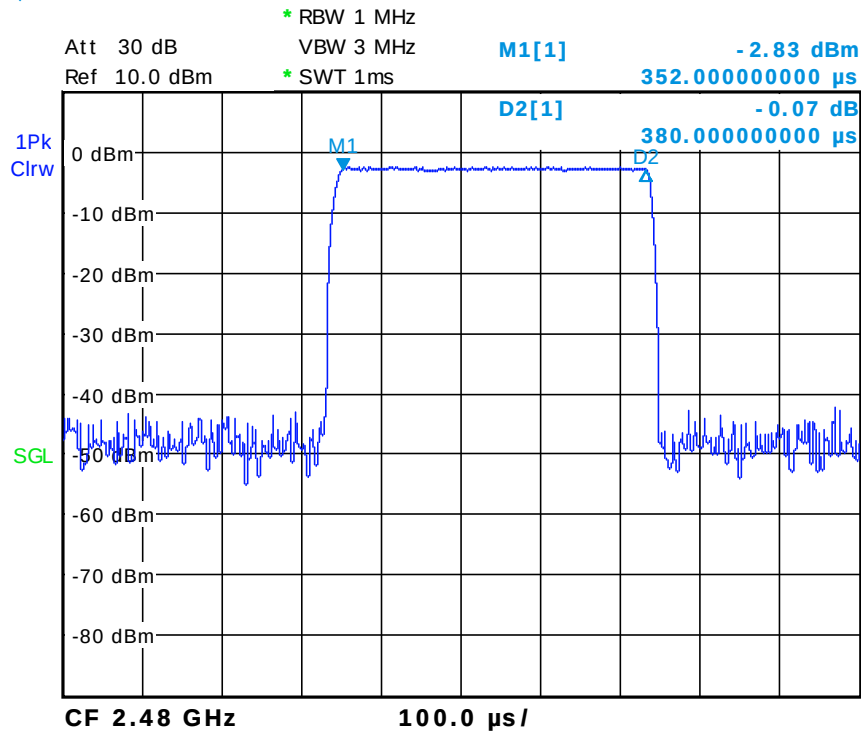


CH39_DH5 :

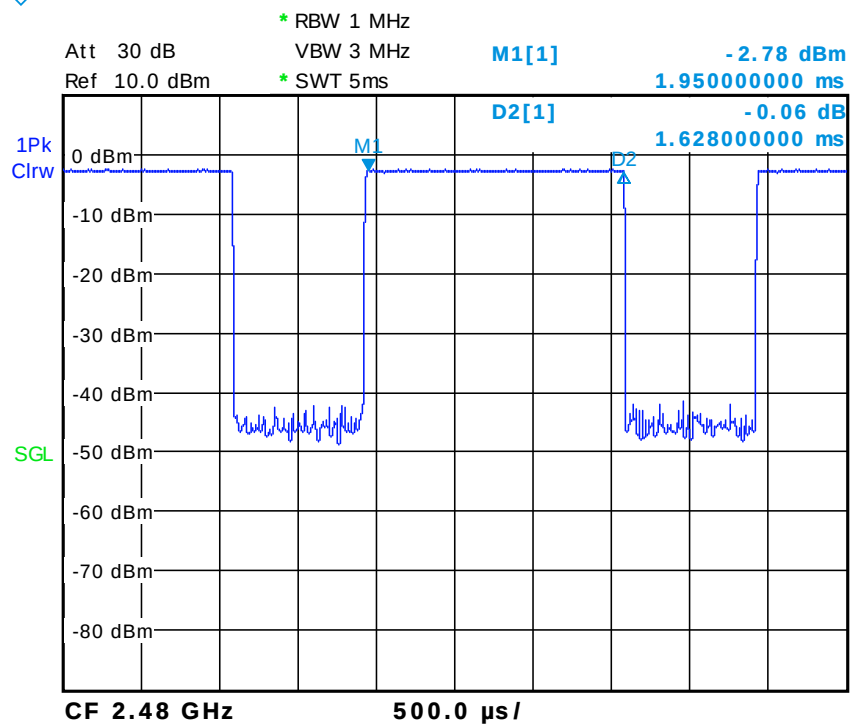


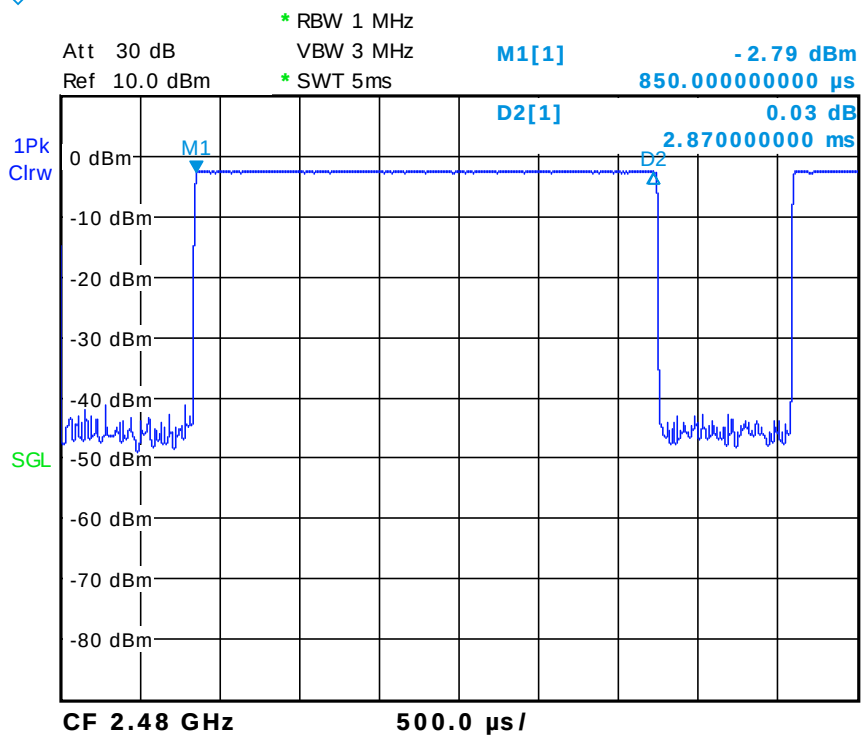


CH78_DH1 :



CH78_DH3 :





 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.: A15011504 Report No.: FCCA15011504 FCC ID : FSUGG000U Page: 25 of 72 Date: Feb. 25, 2015
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4.5 PEAK POWER TEST

4.5.1 LIMIT

FCC Part15, Subpart C Section 15.247.

Frequency Range (MHz)	Limit(W)				
	Quantity of Hopping Channel	50	25	15	75
902-928		1(30dBm)	0.125(21dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30dBm)
5725-5850		NA	NA	NA	1(30dBm)

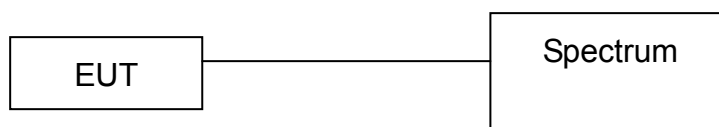
4.5.2 TEST EQUIPMENT

The following test equipment was used during the test :

Equipment/Facilities	Specifications	Manufacturer	Model#/Serial#	Due Date of Cal. & Cal. Center
SPECTRUM ANALYZER	9K TO 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC.10, 2015 ETC

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

4.5.3 TEST SET-UP



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



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.: A15011504
Report No.:FCCA15011504
FCC ID : FSUGG000U
Page: 26 of 72
Date: Feb. 25, 2015

4.5.4 TEST PROCEDURE

1. The EUT is programmed to transmit signals continuously for all testing.
2. Use the following spectrum analyzer settings according to DA 00-705 guidance:
Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel;
RBW > the 20 dB bandwidth of the emission being measured;
VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.
3. Printed out the test result from the spectrum by hard copy function.
4. Recorded the read value of the power meter.

4.5.5 TEST RESULT

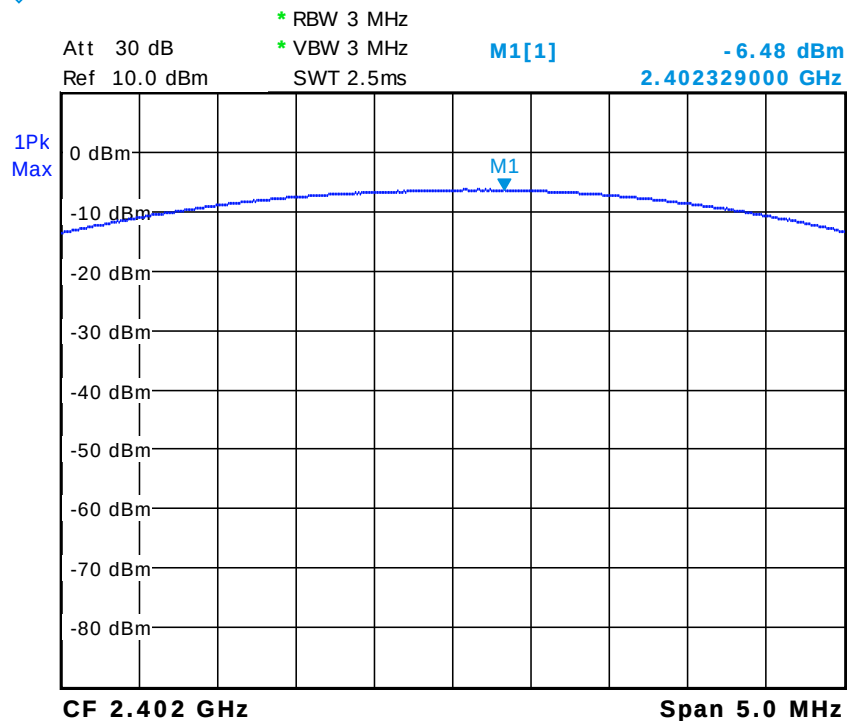
Temperature:	16°C	Humidity:	66%RH
Spectrum Detector:	PK	Tested by:	Leo Yang
Test Result:	PASS	Tested Date:	Feb. 09, 2015

Channel Number	Channel Frequency (MHz)	Peak Output Power (dBm)	Peak Power Limit (dBm)
00	2402.00	-6.48	30
39	2441.00	-3.84	30
78	2480.00	-2.62	30

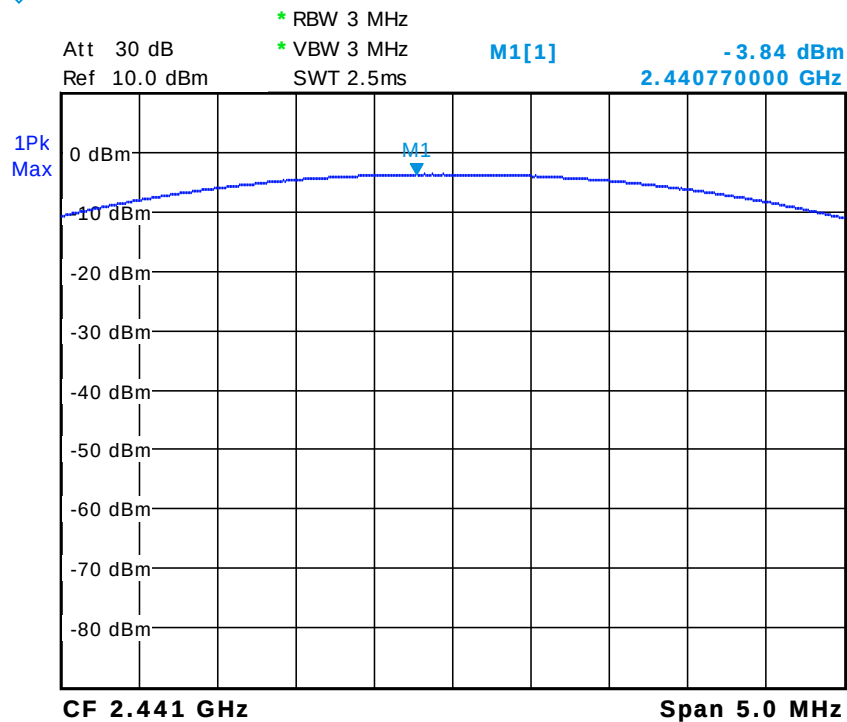


TEST REPORT

CH00 :



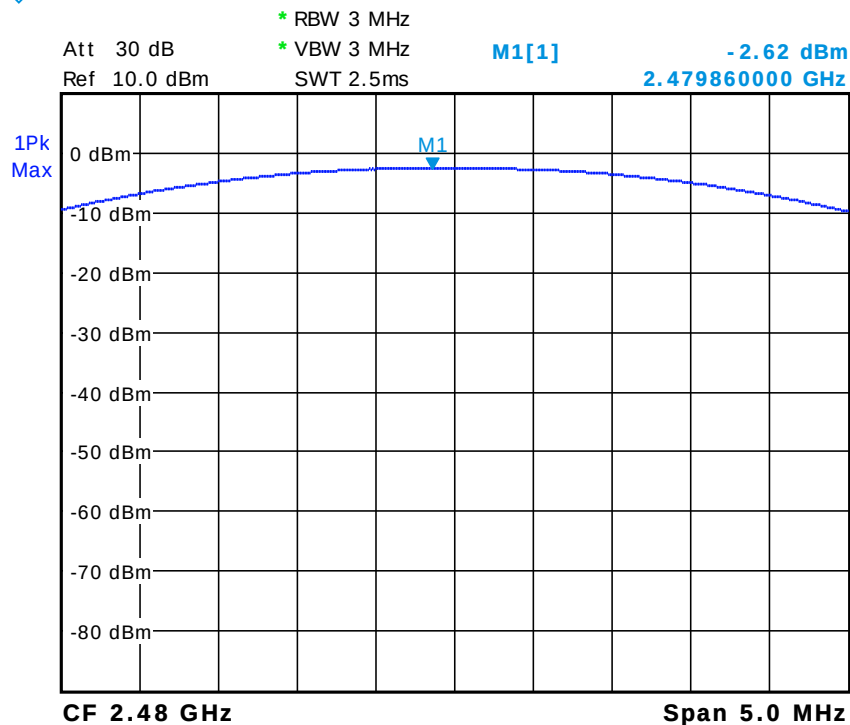
CH39 :





TEST REPORT

CH78 :





4.6 BAND EDGE TEST

4.6.1 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

 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.: A15011504 Report No.: FCCA15011504 FCC ID : FSUGG000U Page: 30 of 72 Date: Feb. 25, 2015
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4.6.2 TEST EQUIPMENT

The following test equipment was used during the test:

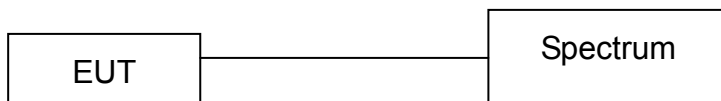
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	20 MHz TO 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	NOV.30, 2015 ETC
BI-LOG ANTENNA	30 MHz TO 2 GHz	SCHAFFNER	CBL6141A / 4181	JUN.18, 2015 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR.07, 2015 SRT
COAXIAL CABLE	30 M	TIMES	LMR-400 / #30M (L1TCAB014)	MAY.21, 2015 ETC
FILTER	2 LINE, 30 A	FIL.COIL	FC-943 / 869	NCR
SPECTRUM ANALYZER	9 kHz TO 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	MAY.04, 2015 ETC
SPECTRUM ANALYZER	9 kHz TO 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC.10,2015 ETC
HORN ANTENNA	1 GHz TO 18 GHz	EMCO	3115/ 9602-4681	DEC.03, 2015 ETC
PRE-AMPLIFIER	1 GHz TO 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC.09, 2015 ETC
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY.07, 2015 SRT
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 03, 2015 ETC
RF CABLE	UP TO 18 GHz 3.5 m	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 03, 2015 ETC

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



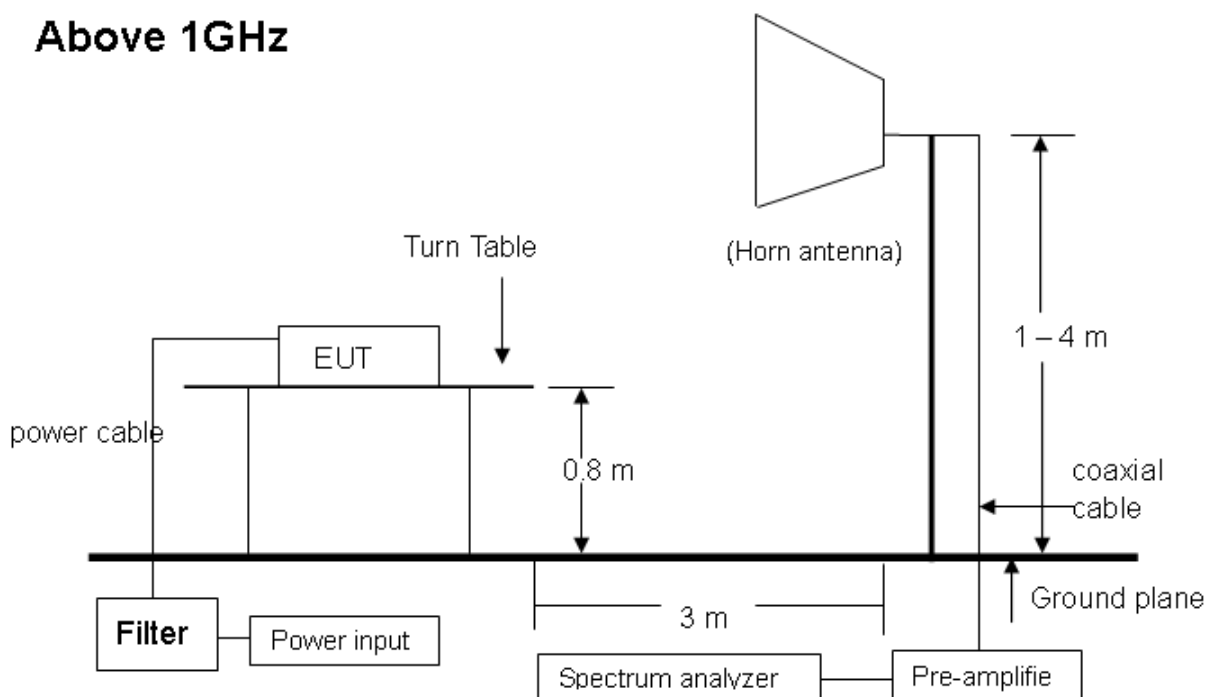
4.6.3 TEST SETUP

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.



4.6.4 TEST PROCEDURE

1. Conducted Test:

The EUT was operating in continuous transmission mode or could be controlled its channel.

Use the following spectrum analyzer settings according to DA 00-705 guidance:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation; RBW $\geq$ 1% of the SPAN; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold.

Printed out the test result from the spectrum by hard copy function.

2. Radiated emission test:

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.

4.6.5 TEST RESULT

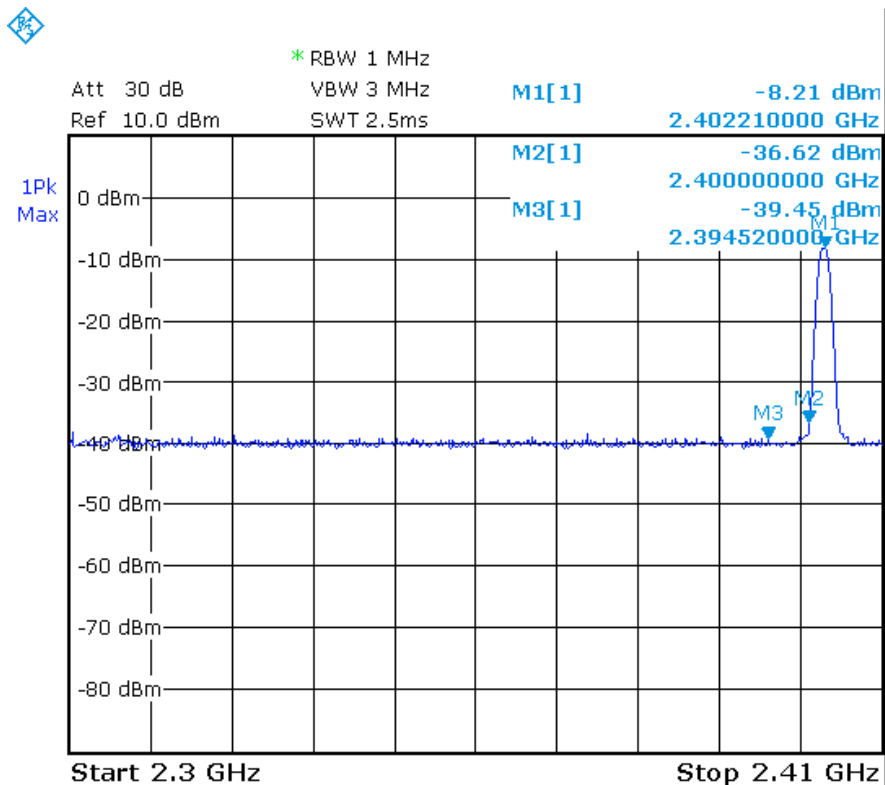
Temperature:	20°C	Humidity:	65%RH
Spectrum Detector:	PK. and AV.	Tested Mode:	TX1, TX3
Tested By:	Leo Yang	Tested Date:	Feb. 25, 2015

1. Conducted test

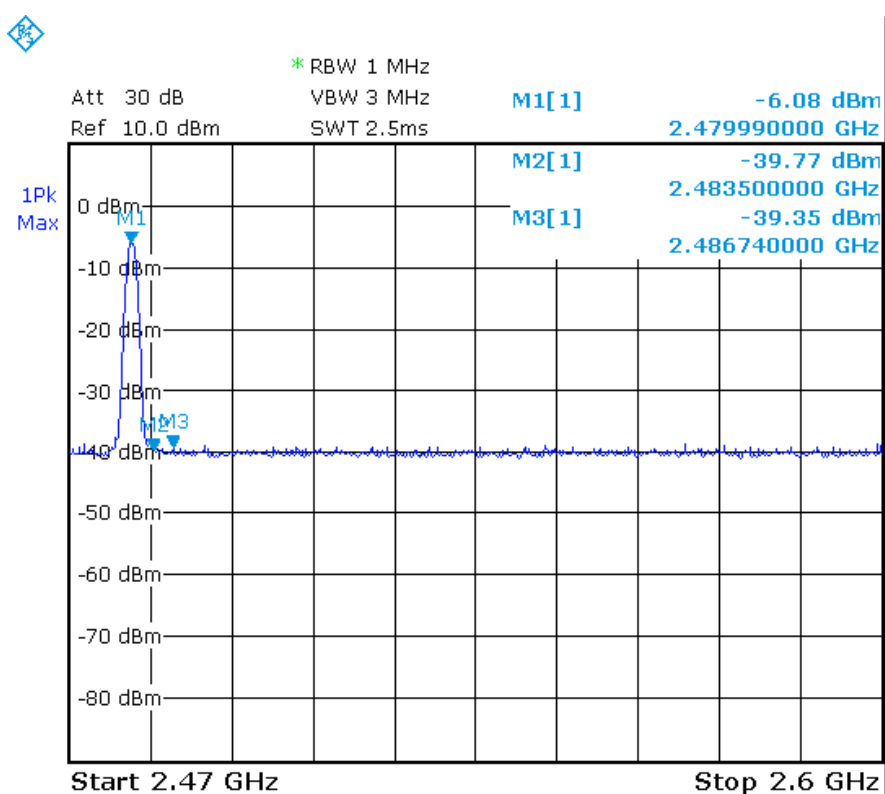
Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	-8.21	-39.45	31.24	>20dBc
>2483.5	-6.08	-39.35	33.27	>20dBc



Below 2400MHz :



Above 2483.5 MHz :





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.)

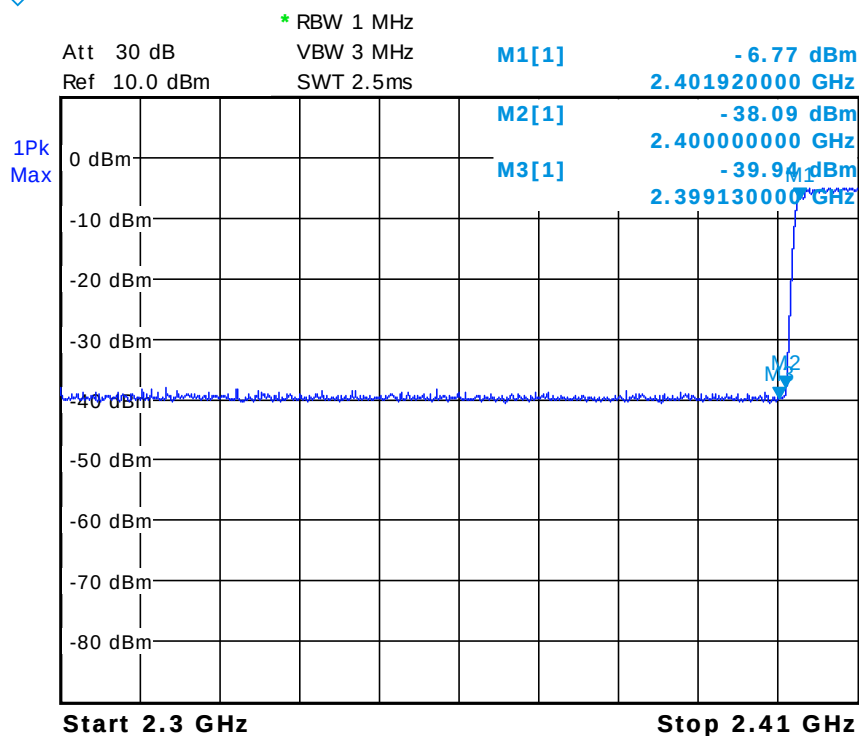
TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 34 of 72
Date: Feb. 25, 2015

Temperature:	16°C	Humidity:	66%RH
Spectrum Detector:	PK. and AV.	Tested Mode:	Link
Tested By:	Leo Yang	Tested Date:	Feb. 09, 2015

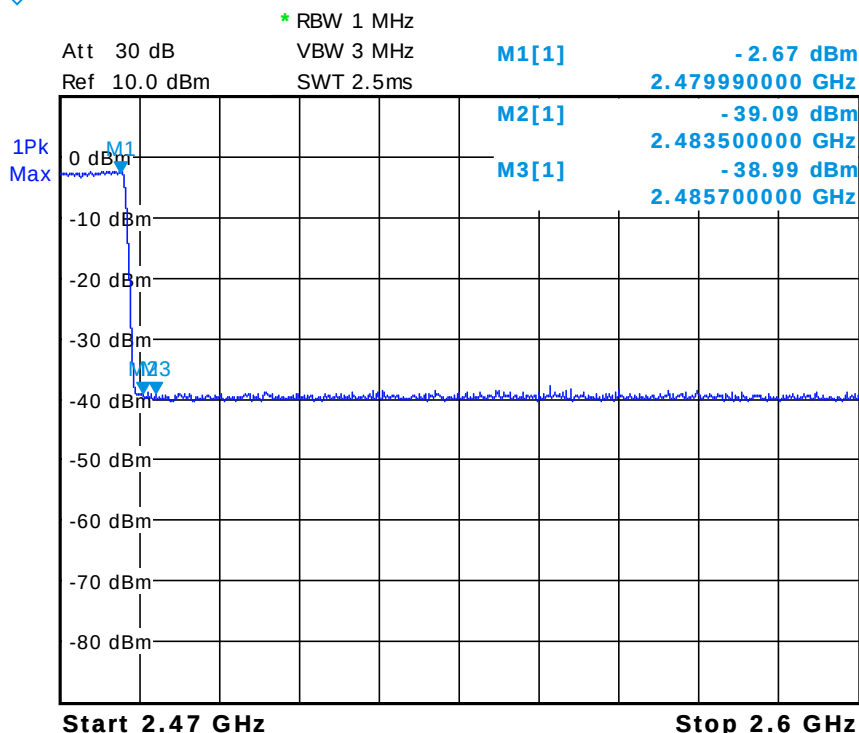
Frequency (MHz)	PEAK POWER OUTPUT (dBm)	Emission read Value(dBm)	Result of Band edge (dBc)	Band edge LIMIT (dBc)
<2400	-6.77	-39.94	33.17	>20dBc
>2483.5	-2.67	-38.99	36.32	>20dBc

Below 2400MHz :





Above 2483.5 MHz :



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
2400.00	-31.02	28.08	H	63.01	52.17	60.07	49.23	74.00	54.00	-13.93	-4.77
2400.00	-31.02	28.08	V	59.50	49.33	56.56	46.39	74.00	54.00	-17.44	-7.61
2396.80	-31.02	28.08	H	45.10	35.23	42.15	32.28	74.00	54.00	-31.85	-21.72
2394.60	-31.02	28.07	V	45.37	35.63	42.42	32.68	74.00	54.00	-31.58	-21.32

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
2483.50	-30.92	28.18	H	49.77	39.58	47.03	36.84	74.00	54.00	-26.97	-17.16
2483.50	-30.92	28.18	V	48.29	38.52	45.55	35.78	74.00	54.00	-28.45	-18.22
2487.70	-30.92	28.18	H	45.81	35.69	43.08	32.96	74.00	54.00	-30.92	-21.04
2488.70	-30.91	28.19	V	45.90	35.78	43.17	33.05	74.00	54.00	-30.83	-20.95

 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.: A15011504 Report No.: FCCA15011504 FCC ID : FSUGG000U Page: 36 of 72 Date: Feb. 25, 2015
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4.7 CONDUCTED EMISSION TEST

4.7.1 LIMIT

Frequency (MHz)	Class A (dBμV)		Class B (dBμV)	
	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.

4.7.2 TEST EQUIPMENT

The following test equipment was used for the test:

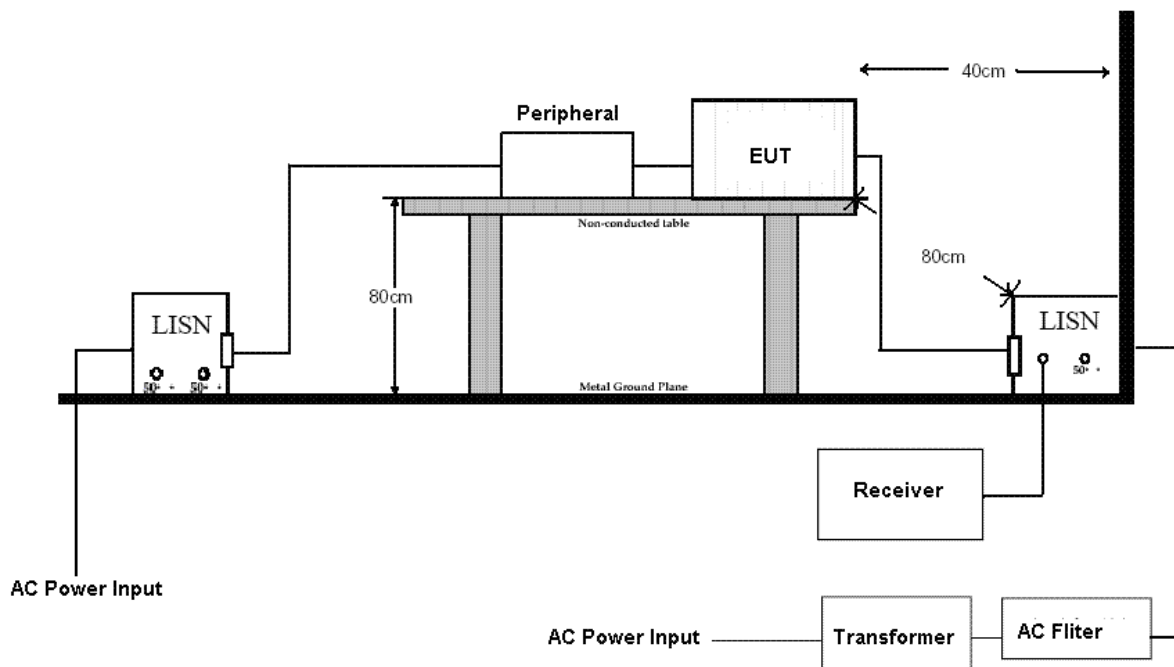
EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	DEC. 16, 2015 ETC
EMI TEST RECEIVER	9 kHz ~ 30 MHz	ROHDE & SCHWARZ	ESHS30 / 826003/008	JAN. 22, 2016 ETC
LISN	50 μH, 50 ohm	FCC	FCC-LISN-50-25-2 / 01017	JUN. 16, 2015 ETC
LISN	50 μH, 50 ohm	SOLAR	9252-50-R-24-BNC/ 951315	NOV. 13, 2015 ETC
LISN	50 μH, 50 ohm	EMCO	3825/2/ 9204-1952	MAY 30, 2015 ETC
50Ω BNC TYPE TERMINATOR	50 ohm	N/A	11593A/ L1TEQU005	DEC. 24, 2015 ETC
50Ω BNC TYPE TERMINATOR	50 ohm	N/A	B00-CD-357/ L1TEQU009	JUN. 17, 2015 ETC
COAXIAL CABLE	5 m	HUBER+SUHNER	RG214/U / #5M(L1TCAB013)	MAY. 21, 2015 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	9 kHz ~ 30 MHz Insertion Loss= 10dB±0.3dB	ROHDE & SCHWARZ	ESH3Z2/ L1TTES010	JAN. 07, 2016 ETC

NOTE:

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



4.7.3 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.

4.7.4 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.



TEST REPORT

4.7.5 TEST RESULT

Temperature:	15 °C	Humidity:	65 %RH
Tested By:	Leo Yang	Tested Mode:	TX-1
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Feb. 6, 2015

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.15	46.63	39.53	46.78	39.68	66.00	56.00	-19.22	-16.32
0.153	0.15	40.81	31.08	40.96	31.23	65.84	55.84	-24.88	-24.61
0.634	-0.02	25.06	23.23	25.04	23.21	56.00	46.00	-30.96	-22.79
14.653	0.26	32.24	29.98	32.50	30.24	60.00	50.00	-27.50	-19.76
14.957	0.27	27.95	19.32	28.22	19.59	60.00	50.00	-31.78	-30.41
15.287	0.27	35.79	33.01	36.06	33.28	60.00	50.00	-23.94	-16.72

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.09	47.98	40.12	48.07	40.21	66.00	56.00	-17.93	-15.79
0.153	0.09	41.38	31.43	41.47	31.52	65.84	55.84	-24.37	-24.32
0.509	-0.06	23.73	22.25	23.67	22.19	56.00	46.00	-32.33	-23.81
2.616	-0.03	22.31	19.01	22.28	18.98	56.00	46.00	-33.72	-27.02
14.653	0.26	32.60	30.46	32.86	30.72	60.00	50.00	-27.14	-19.28
15.287	0.28	35.97	33.44	36.25	33.72	60.00	50.00	-23.75	-16.28

NOTE :

1. Measurement uncertainty is 2.91dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
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.



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.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 39 of 72
Date: Feb. 25, 2015

Temperature:	15 °C	Humidity:	65 %RH
Tested By:	Leo Yang	Tested Mode:	TX-2
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Feb. 6, 2015

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.15	48.71	41.01	48.86	41.16	66.00	56.00	-17.14	-14.84
0.153	0.15	41.64	31.64	41.79	31.79	65.84	55.84	-24.05	-24.05
1.182	-0.01	23.06	11.21	23.05	11.20	56.00	46.00	-32.95	-34.80
1.269	-0.01	25.96	16.22	25.95	16.21	56.00	46.00	-30.05	-29.79
14.653	0.26	32.76	30.17	33.02	30.43	60.00	50.00	-26.98	-19.57
15.287	0.27	35.14	32.47	35.41	32.74	60.00	50.00	-24.59	-17.26

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.09	48.64	40.35	48.73	40.44	66.00	56.00	-17.27	-15.56
0.153	0.09	41.52	31.48	41.61	31.57	65.84	55.84	-24.23	-24.27
0.509	-0.06	23.75	22.25	23.69	22.19	56.00	46.00	-32.31	-23.81
2.616	-0.03	21.74	18.09	21.71	18.06	56.00	46.00	-34.29	-27.94
14.653	0.26	33.10	30.66	33.36	30.92	60.00	50.00	-26.64	-19.08
15.287	0.28	35.67	32.99	35.95	33.27	60.00	50.00	-24.05	-16.73

NOTE :

1. Measurement uncertainty is 2.91dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
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.



TEST REPORT

Temperature:	15 °C	Humidity:	65 %RH
Tested By:	Leo Yang	Tested Mode:	TX-3
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Feb. 6, 2015

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.15	49.17	41.41	49.32	41.56	66.00	56.00	-16.68	-14.44
0.153	0.15	40.95	31.72	41.10	31.87	65.84	55.84	-24.74	-23.97
1.191	-0.01	23.42	10.77	23.41	10.76	56.00	46.00	-32.59	-35.24
14.653	0.26	32.36	30.18	32.62	30.44	60.00	50.00	-27.38	-19.56
14.927	0.27	26.25	19.23	26.52	19.50	60.00	50.00	-33.48	-30.50
15.287	0.27	34.85	32.03	35.12	32.30	60.00	50.00	-24.88	-17.70

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.09	49.51	41.33	49.60	41.42	66.00	56.00	-16.40	-14.58
0.153	0.09	42.30	32.00	42.39	32.09	65.84	55.84	-23.45	-23.75
0.639	-0.06	25.73	22.76	25.67	22.70	56.00	46.00	-30.33	-23.30
14.653	0.26	32.72	30.75	32.98	31.01	60.00	50.00	-27.02	-18.99
14.866	0.27	28.84	23.50	29.11	23.77	60.00	50.00	-30.89	-26.23
15.287	0.28	34.77	31.83	35.05	32.11	60.00	50.00	-24.95	-17.89

NOTE :

1. Measurement uncertainty is 2.91dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
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.



**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.: A15011504
Report No.:FCCA15011504
FCC ID : FSUGG000U
Page: 41 of 72
Date: Feb. 25, 2015

Temperature:	15 °C	Humidity:	65 %RH
Tested By:	Leo Yang	Tested Mode:	Standby
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Feb. 6, 2015

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.15	46.37	39.00	46.52	39.15	66.00	56.00	-19.48	-16.85
0.153	0.15	40.85	30.72	41.00	30.87	65.84	55.84	-24.84	-24.97
0.634	-0.02	25.14	23.23	25.12	23.21	56.00	46.00	-30.88	-22.79
1.447	0.00	20.58	13.57	20.58	13.57	56.00	46.00	-35.42	-32.43
14.947	0.27	25.36	16.22	25.63	16.49	60.00	50.00	-34.37	-33.51
16.250	0.29	39.30	30.86	39.59	31.15	60.00	50.00	-20.41	-18.85

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.09	46.02	38.23	46.11	38.32	66.00	56.00	-19.89	-17.68
0.153	0.09	40.83	30.53	40.92	30.62	65.84	55.84	-24.92	-25.22
0.639	-0.06	23.80	22.48	23.74	22.42	56.00	46.00	-32.26	-23.58
2.606	-0.03	21.66	18.23	21.63	18.20	56.00	46.00	-34.37	-27.80
2.616	-0.03	22.61	11.45	22.58	11.42	56.00	46.00	-33.42	-34.58
16.250	0.31	39.66	30.39	39.97	30.70	60.00	50.00	-20.03	-19.30

NOTE :

1. Measurement uncertainty is 2.91dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
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.



TEST REPORT

Temperature:	15 °C	Humidity:	65 %RH
Tested By:	Leo Yang	Tested Mode:	Link
Receiver Detector:	Q.P. and AV.	Modulation Type:	GFSK
Frequency Range:	0.15 – 30 MHz	Tested Date:	Feb. 6, 2015

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.15	45.30	37.38	45.45	37.53	66.00	56.00	-20.55	-18.47
0.153	0.15	40.87	30.57	41.02	30.72	65.84	55.84	-24.82	-25.12
0.634	-0.02	25.12	23.66	25.10	23.64	56.00	46.00	-30.90	-22.36
1.230	-0.01	19.72	15.11	19.71	15.10	56.00	46.00	-36.29	-30.90
1.269	-0.01	20.21	16.53	20.20	16.52	56.00	46.00	-35.80	-29.48
16.250	0.29	41.19	31.83	41.48	32.12	60.00	50.00	-18.52	-17.88

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.09	45.96	37.39	46.05	37.48	66.00	56.00	-19.95	-18.52
0.153	0.09	41.16	30.46	41.25	30.55	65.84	55.84	-24.59	-25.29
0.639	-0.06	23.60	22.26	23.54	22.20	56.00	46.00	-32.46	-23.80
1.269	-0.05	18.00	14.95	17.95	14.90	56.00	46.00	-38.05	-31.10
14.967	0.27	25.26	17.31	25.53	17.58	60.00	50.00	-34.47	-32.42
16.250	0.31	40.29	30.90	40.60	31.21	60.00	50.00	-19.40	-18.79

NOTE :

1. Measurement uncertainty is 2.91dB
2. Emission level = Reading value + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
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.



4.8 RADIATED EMISSION TEST

4.8.1 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 :

- 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

 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.: A15011504 Report No.:FCCA15011504 FCC ID : FSUGG000U Page: 44 of 72 Date: Feb. 25, 2015
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4.8.2 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, 2015 ETC
EMI TEST RECEIVER	20 MHz ~ 1000 MHz	ROHDE & SCHWARZ	ESVS30 / 841977/003	NOV. 30, 2015 ETC
SPECTRUM ANALYZER	9 kHz ~ 7GHz	ROHDE & SCHWARZ	FSP7 / 100289	MAY. 04, 2015 ETC
SPECTRUM ANALYZER	9 kHz ~ 40GHz	ROHDE & SCHWARZ	FSP40 / 100093	DEC 10, 2015 ETC
LOOP ANTENNA	9 kHz ~ 30 MHz	ETS.LINDGREN	HFH2-Z2/ 860605/002 (1162 1/2)	MAR. 17, 2015 ETC
BI-LOG ANTENNA	30 MHz ~ 2 GHz	SCHAFFNER	CBL6141A / 4181	JUN. 18, 2015 ETC
HORN ANTENNA	1 GHz ~ 18 GHz	EMCO	3115/ 9602-4681	DEC. 03, 2015 ETC
HORN ANTENNA	18 ~ 40 GHz	ETS-LINDGREN	3116 /00032255	JAN. 09, 2016 ETC
PRE-AMPLIFIER	1 GHz ~ 26.5 GHz	AGILENT	8449B/ 3008A01995	DEC. 09, 2015 ETC
PRE-AMPLIFIER	0.1 ~ 1300 MHz	HP	8447D / 2944A06746	OCT. 14, 2015 ETC
OPEN AREA TEST SITE	3 – 10 M MEASUREMENT	SRT	A02 / SRT002	MAR. 07, 2015 SRT
ANECHOIC CHAMBER	3 M MEASUREMENT	SRT	A01 / SRT001	MAY. 07, 2015 SRT
RF CABLE	UP TO 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	DEC. 03, 2015 ETC
RF CABLE	UP TO 18 GHz 3.5 m	JYEBAO	A30A30-L 142 / EQF-0036(002)	DEC. 03, 2015 ETC
K-TYPE CABLE	UP TO 40 GHz 3 m	HUBER+SUHNE R	SF102-46/2*11SK 252 /MY2611/2	MAR. 09, 2015 ETC
K-TYPE CABLE	UP TO 40 GHz, 1 m	HUBER+SUHNE R	SF 102-40/2*11 /23934/2	OCT. 12, 2015 ETC
COAXIAL CABLE	30 M	TIMES	LMR-400 / #30M(L1TCAB014)	MAY. 21, 2015 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. 20, 2015 ETC

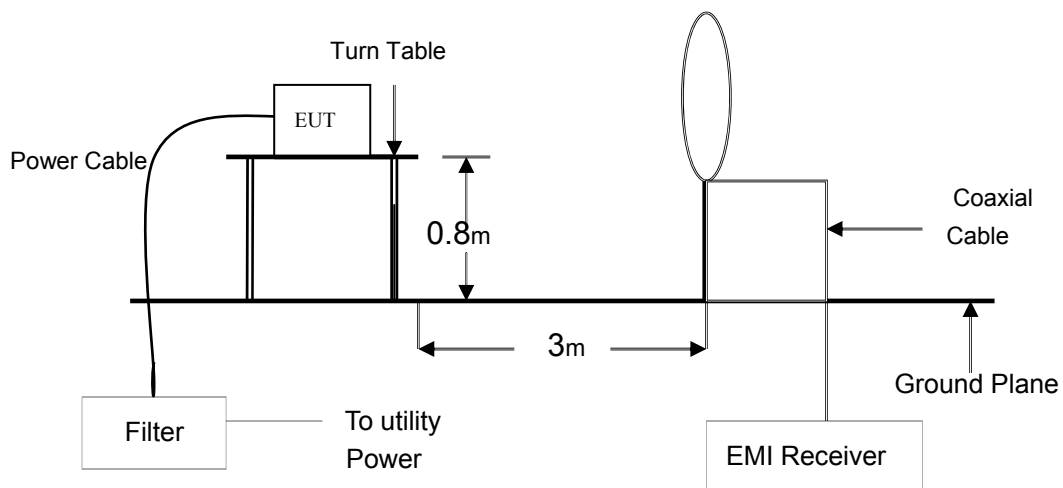
NOTE:

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

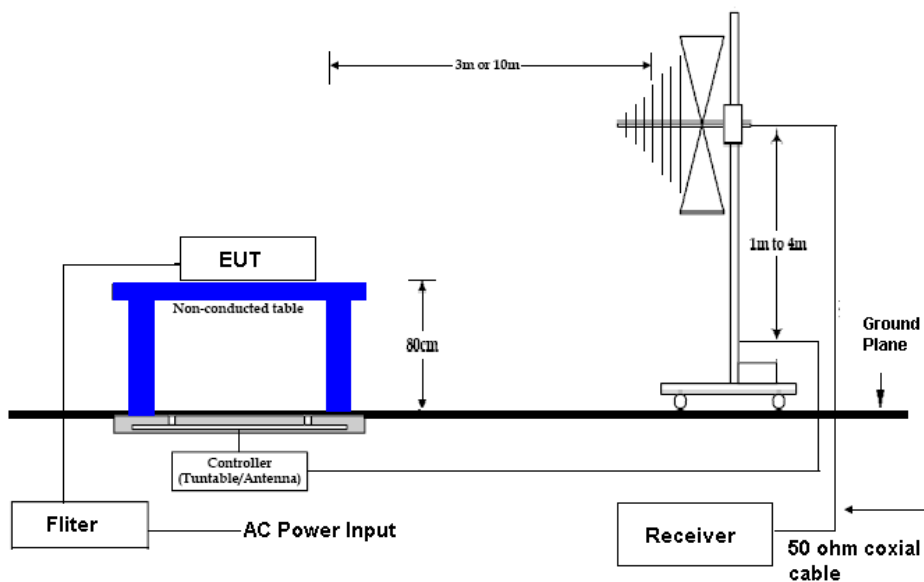


4.8.3 TEST SET-UP

9KHz ~ 30MHz

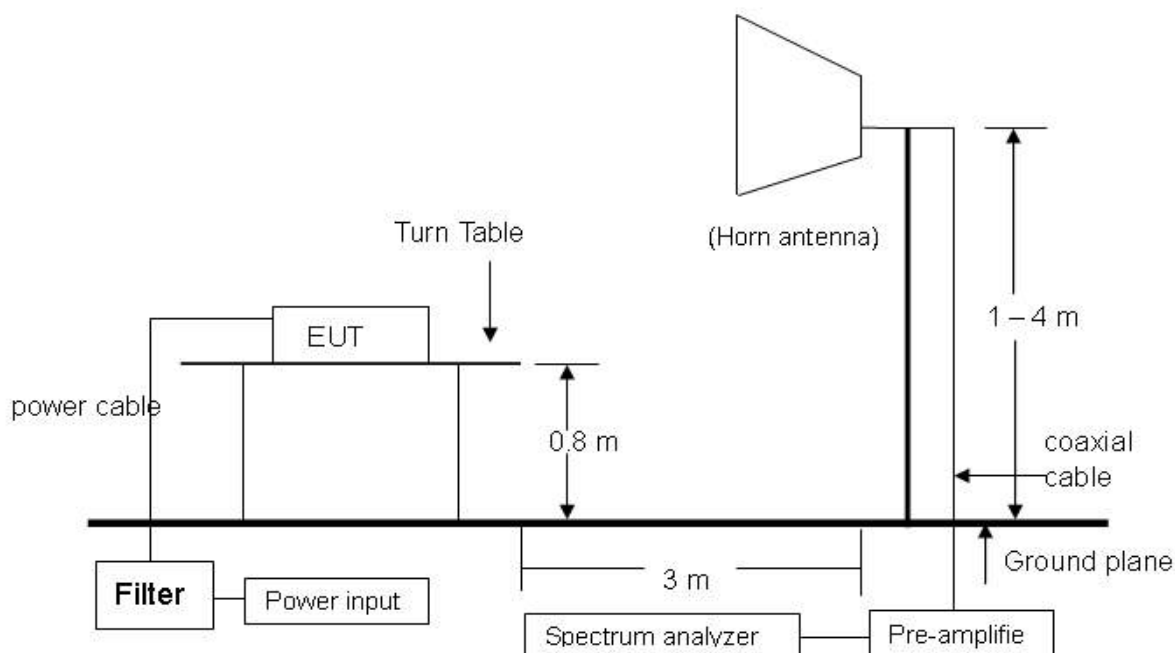


30MHz ~ 1GHz





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.

4.8.4 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 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.
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TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 47 of 72
Date: Feb. 25, 2015

Temperature:	14 °C	Humidity:	60 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-1
Tested By:	Leo Yang	Tested Date:	Feb. 10, 2015

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
4.23	0.45	20.01	5.26	25.72	70.00	-44.28
7.05	0.57	20.41	5.30	26.28	70.00	-43.72
17.52	0.91	21.52	3.32	25.75	70.00	-44.25
22.95	1.06	21.83	3.46	26.35	70.00	-43.65
24.78	1.11	21.85	3.05	26.01	70.00	-43.99
26.19	1.15	21.86	3.45	26.46	70.00	-43.54

Temperature:	14 °C	Humidity:	60 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-2
Tested By:	Leo Yang	Tested Date:	Feb. 10, 2015

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
4.26	0.46	20.02	5.85	26.32	70.00	-43.68
7.77	0.60	20.48	5.70	26.78	70.00	-43.22
10.65	0.70	20.77	5.08	26.55	70.00	-43.45
11.97	0.74	20.92	4.82	26.48	70.00	-43.52
16.62	0.89	21.42	4.03	26.34	70.00	-43.66
24.45	1.10	21.84	3.56	26.51	70.00	-43.49



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TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 48 of 72
Date: Feb. 25, 2015

Temperature:	14 °C	Humidity:	60 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Tx-3
Tested By:	Leo Yang	Tested Date:	Feb. 10, 2015

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
13.62	0.80	21.10	4.48	26.37	70.00	-43.63
15.90	0.87	21.35	3.92	26.13	70.00	-43.87
19.74	0.97	21.76	3.60	26.34	70.00	-43.66
23.34	1.07	21.83	3.81	26.72	70.00	-43.28
26.10	1.15	21.86	3.00	26.01	70.00	-43.99
28.08	1.19	21.88	4.11	27.18	70.00	-42.82

Temperature:	14 °C	Humidity:	60 %RH
Frequency Range:	9KHz – 30 MHz	Measured Distance:	3 m
Receiver Detector:	AV.	Tested Mode:	Standby
Tested By:	Leo Yang	Tested Date:	Feb. 10, 2015

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
3.99	0.44	19.95	5.96	26.35	70.00	-43.65
10.86	0.71	20.79	4.22	25.72	70.00	-44.28
13.41	0.79	21.08	4.78	26.64	70.00	-43.36
17.04	0.90	21.47	3.82	26.18	70.00	-43.82
18.21	0.93	21.60	4.00	26.53	70.00	-43.47
28.65	1.21	21.89	3.18	26.27	70.00	-43.73



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TEST REPORT

Reference No.: A15011504
Report No.:FCCA15011504
FCC ID : FSUGG000U
Page: 49 of 72
Date: Feb. 25, 2015

Temperature: 14 °C

Humidity: 60 %RH

Frequency Range: 9KHz – 30 MHz

Measured Distance: 3 m

Receiver Detector: AV.

Tested Mode: Link

Tested By: Leo Yang

Tested Date: Feb. 10, 2015

Frequency (KHz)	Cable Loss (dB)	Ant. Fac. (dB)	Reading (dBμV)	Emission (dBμV/m)	Limit Line (dBμV/m)	Margin (dB)
1.92	0.31	19.97	6.01	26.29	70.00	-43.71
7.23	0.58	20.42	6.11	27.11	70.00	-42.89
15.48	0.85	21.30	4.24	26.39	70.00	-43.61
17.94	0.92	21.57	4.23	26.72	70.00	-43.28
22.26	1.04	21.82	3.58	26.45	70.00	-43.55
27.03	1.17	21.87	4.42	27.46	70.00	-42.54

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TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 50 of 72
Date: Feb. 25, 2015

Temperature:	17 °C	Humidity:	68 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-1
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo Yang	Tested Date:	Feb. 6, 2015

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)
69.47	1.49	8.41	19.81	29.71	40	-10.29	145	3.33
311.72	3.07	15.42	11.86	30.35	46	-15.65	233	3.09
514.79	4.24	18.67	7.96	30.87	46	-15.13	189	2.72
647.68	4.85	20.85	6.67	32.37	46	-13.63	48	2.65
695.93	5.06	21.71	4.20	30.97	46	-15.03	252	2.56
935.59	6.16	24.15	3.15	33.46	46	-12.54	112	2.44

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)
78.74	1.56	7.24	26.15	34.95	40	-5.05	308	1.08
311.72	3.07	15.42	9.30	27.79	46	-18.21	164	1.15
493.36	4.13	18.40	5.77	28.30	46	-17.70	95	1.56
695.93	5.06	21.71	3.08	29.85	46	-16.15	115	2.22
788.15	5.55	22.30	3.17	31.02	46	-14.98	245	2.48
935.59	6.16	24.15	3.02	33.33	46	-12.67	33	3.44

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:	17 °C	Humidity:	68 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-2
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo Yang	Tested Date:	Feb. 6, 2015

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)
69.47	1.49	8.41	20.04	29.94	40	-10.06	332	3.38
311.72	3.07	15.42	14.30	32.79	46	-13.21	104	3.24
338.34	3.25	15.48	13.01	31.74	46	-14.26	284	3.09
448.40	3.90	17.76	9.87	31.53	46	-14.47	144	2.64
647.68	4.85	20.85	6.82	32.52	46	-13.48	98	2.52
800.51	5.60	22.40	5.30	33.30	46	-12.70	63	2.48

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)
78.74	1.56	7.24	24.93	33.73	40	-6.27	118	1.04
498.84	4.15	18.47	8.80	31.42	46	-14.58	99	1.16
515.49	4.25	18.68	8.60	31.53	46	-14.47	48	2.44
608.90	4.67	20.23	3.54	28.43	46	-17.57	166	2.58
695.93	5.06	21.71	5.52	32.29	46	-13.71	215	3.11
786.75	5.54	22.29	3.20	31.03	46	-14.97	270	3.59

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:	17 °C	Humidity:	68 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Tx-3
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo Yang	Tested Date:	Feb. 6, 2015

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)
78.74	1.56	7.24	18.41	27.21	40	-12.79	65	3.81
166.47	2.14	12.68	14.59	29.41	44	-14.09	249	3.38
215.42	2.46	12.05	14.64	29.15	44	-14.36	138	3.22
320.79	3.13	15.44	15.08	33.65	46	-12.35	286	2.64
368.05	3.43	15.97	12.52	31.92	46	-14.08	122	2.56
647.68	4.85	20.85	5.70	31.40	46	-14.60	79	2.41

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)
74.95	1.53	7.72	24.88	34.13	40	-5.87	33	1.18
311.72	3.07	15.42	9.88	28.37	46	-17.63	161	1.19
366.65	3.42	15.92	7.85	27.19	46	-18.81	284	2.51
496.45	4.14	18.44	7.84	30.42	46	-15.58	71	2.65
695.93	5.06	21.71	5.33	32.10	46	-13.90	258	3.21
788.15	5.55	22.30	3.13	30.98	46	-15.02	135	3.44

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:	17 °C	Humidity:	68 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Standby
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo Yang	Tested Date:	Feb. 6, 2015

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)
74.95	1.53	7.72	21.49	30.74	40	-9.26	49	2.53
212.33	2.44	12.20	14.20	28.84	44	-14.66	130	2.47
222.30	2.49	11.88	16.10	30.47	46	-15.53	253	2.31
673.80	4.96	21.31	4.02	30.30	46	-15.70	282	1.84
758.44	5.42	22.06	4.94	32.42	46	-13.58	138	1.66
934.10	6.16	24.14	5.13	35.43	46	-10.57	141	1.18

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)
37.37	1.32	14.09	8.06	23.47	40	-16.53	154	1.08
65.68	1.47	9.25	10.64	21.36	40	-18.64	261	1.17
80.14	1.57	7.00	17.97	26.54	40	-13.46	161	2.45
514.00	4.24	18.67	9.10	32.01	46	-13.99	316	3.12
787.45	5.54	22.30	3.25	31.09	46	-14.91	94	3.53
935.59	6.16	24.15	3.07	33.38	46	-12.62	108	3.79

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:	17 °C	Humidity:	68 %RH
Frequency Range:	30 M – 1 GHz	Tested Mode:	Link
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Leo Yang	Tested Date:	Feb. 6, 2015

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)
76.35	1.54	7.48	9.08	18.10	40	-21.90	135	3.48
215.42	2.46	12.05	16.04	30.55	44	-12.96	336	3.42
222.30	2.49	11.88	15.64	30.01	46	-15.99	158	2.56
496.45	4.14	18.44	15.94	38.52	46	-7.48	88	1.81
647.68	4.85	20.85	16.47	42.17	46	-3.83	192	1.57
742.29	5.33	21.97	17.02	44.32	46	-1.68	108	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)
78.74	1.56	7.24	17.07	25.87	40	-14.13	61	1.06
222.30	2.49	11.88	13.36	27.73	46	-18.27	176	2.35
514.00	4.24	18.67	4.74	27.65	46	-18.35	264	2.71
638.61	4.80	20.71	3.37	28.88	46	-17.12	279	3.21
788.15	5.55	22.30	3.16	31.01	46	-14.99	92	3.45
935.59	6.16	24.15	3.10	33.41	46	-12.59	58	3.68

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:	17 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Feb. 6, 2015
Tested By:	Leo Yang		

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.		
3094.28	-30.48	30.27	44.29	34.17	44.08	33.96	74	54	-29.92	-20.04	105	1.69
3474.37	-29.97	30.95	44.73	33.68	45.72	34.67	74	54	-28.28	-19.33	196	1.64
3994.81	-28.98	32.19	43.70	32.84	46.90	36.04	74	54	-27.10	-17.96	85	1.43
4494.35	-28.48	32.20	43.35	32.68	47.07	36.40	74	54	-26.93	-17.60	174	1.39
4999.11	-27.89	33.40	41.61	31.11	47.12	36.62	74	54	-26.88	-17.38	304	1.21
5289.25	-27.15	33.63	42.62	32.80	49.10	39.28	74	54	-24.90	-14.72	126	1.15

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.		
1329.57	-32.85	25.27	51.16	40.25	43.58	32.67	74	54	-30.42	-21.33	205	1.84
3034.40	-30.56	30.16	47.26	37.66	46.86	37.26	74	54	-27.14	-16.74	278	1.91
3464.69	-29.98	30.94	46.99	36.53	47.95	37.49	74	54	-26.05	-16.51	39	1.95
4009.32	-28.96	32.20	45.18	35.28	48.42	38.52	74	54	-25.58	-15.48	151	2.03
4999.11	-27.89	33.40	43.90	33.40	49.41	38.91	74	54	-24.59	-15.09	280	2.28
5299.42	-27.12	33.64	43.08	32.91	49.59	39.42	74	54	-24.41	-14.58	253	2.34

NOTE:

1. Measurement uncertainty is 3.81dB.
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.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 56 of 72
Date: Feb. 25, 2015

Temperature:	17 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-1 (Fundamental and Harmonics)
Detector:	PK. And AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Feb. 6, 2015
Tested By:	Leo Yang		

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.		
2402.00 (F)	-31.01	28.08	81.24	71.67	78.31	68.74	114	94	-35.69	-25.26	107	1.70
4804.00	-28.12	32.93	40.49	30.21	45.30	35.02	74	54	-28.70	-18.98	154	1.61
7206.00	-25.94	35.69	38.47	28.66	48.23	38.42	74	54	-25.77	-15.58	57	1.48
9608.00	-24.86	37.84	39.52	28.20	52.51	41.19	74	54	-21.49	-12.81	164	1.35
12010.00	-23.13	39.19	35.33	25.02	51.39	41.08	74	54	-22.61	-12.92	334	1.23
14412.00	-20.03	42.19	30.71	20.02	52.88	42.19	74	54	-21.12	-11.81	106	1.11

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.		
2402.00 (F)	-31.01	28.08	78.19	69.23	75.26	66.30	114	94	-38.74	-27.70	204	1.83
4804.00	-28.12	32.93	40.48	30.11	45.29	34.92	74	54	-28.71	-19.08	178	1.90
7206.00	-25.94	35.69	40.20	29.21	49.96	38.97	74	54	-24.04	-15.03	59	1.94
9608.00	-24.86	37.84	37.83	27.30	50.82	40.29	74	54	-23.18	-13.71	251	2.08
12010.00	-23.13	39.19	35.26	25.42	51.32	41.48	74	54	-22.68	-12.52	350	2.27
14412.00	-20.03	42.19	31.69	21.17	53.86	43.34	74	54	-20.14	-10.66	153	2.35

NOTE:

1. Measurement uncertainty is 3.81dB.
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:	17 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Feb. 6, 2015
Tested By:	Leo Yang		

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.		
2889.43	-30.67	29.68	45.94	35.28	44.94	34.28	74	54	-29.06	-19.72	118	1.72
3179.25	-30.37	30.42	44.76	34.91	44.82	34.97	74	54	-29.18	-19.03	215	1.62
3719.02	-29.51	31.53	43.00	33.71	45.02	35.73	74	54	-28.98	-18.27	316	1.58
4399.63	-28.57	32.20	43.10	32.52	46.73	36.15	74	54	-27.27	-17.85	14	1.42
4609.21	-28.34	32.46	43.46	33.37	47.58	37.49	74	54	-26.42	-16.51	351	1.27
4999.11	-27.89	33.40	41.00	32.08	46.51	37.59	74	54	-27.49	-16.41	139	1.12

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.		
2304.51	-31.13	27.96	46.37	36.25	43.21	33.09	74	54	-30.79	-20.91	76	1.66
2934.79	-30.65	29.85	45.64	35.69	44.84	34.89	74	54	-29.16	-19.11	212	1.76
3489.03	-29.94	30.98	45.61	34.79	46.65	35.83	74	54	-27.35	-18.17	147	1.86
4144.38	-28.83	32.20	44.41	34.55	47.78	37.92	74	54	-26.22	-16.08	92	1.96
4419.56	-28.55	32.20	44.40	33.67	48.05	37.32	74	54	-25.95	-16.68	258	2.06
4999.11	-27.89	33.40	41.32	31.28	46.83	36.79	74	54	-27.17	-17.21	185	2.36

NOTE:

1. Measurement uncertainty is 3.81dB.
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.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 58 of 72
Date: Feb. 25, 2015

Temperature:	17 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-2 (Fundamental and Harmonics)
Detector:	PK. And AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Feb. 6, 2015
Tested By:	Leo Yang		

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.		
2441.00 (F)	-30.97	28.13	80.83	70.37	77.99	67.53	114	94	-36.01	-26.47	274	1.82
4882.00	-28.03	33.12	41.06	31.51	46.15	36.60	74	54	-27.85	-17.40	199	1.73
7323.00	-25.84	35.98	39.57	29.38	49.70	39.51	74	54	-24.30	-14.49	95	1.68
9764.00	-24.75	37.91	38.22	28.15	51.38	41.31	74	54	-22.62	-12.69	291	1.50
12205.00	-22.55	39.00	35.74	25.19	52.19	41.64	74	54	-21.81	-12.36	332	1.48
14646.00	-20.03	41.72	30.87	20.09	52.56	41.78	74	54	-21.44	-12.22	156	1.33

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.		
2441.00 (F)	-30.97	28.13	81.58	71.23	78.74	68.39	114	94	-35.26	-25.61	71	1.47
4882.00	-28.03	33.12	41.27	31.68	46.36	36.77	74	54	-27.64	-17.23	182	1.59
7323.00	-25.84	35.98	38.89	28.27	49.02	38.40	74	54	-24.98	-15.60	45	1.64
9764.00	-24.75	37.91	39.62	28.55	52.78	41.71	74	54	-21.22	-12.29	237	1.77
12205.00	-22.55	39.00	35.17	25.30	51.62	41.75	74	54	-22.38	-12.25	209	1.89
14646.00	-20.03	41.72	29.57	19.63	51.26	41.32	74	54	-22.74	-12.68	163	1.91

NOTE:

1. Measurement uncertainty is 3.81dB.
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:	17 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Feb. 6, 2015
Tested By:	Leo Yang		

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.		
1929.48	-31.59	27.27	47.85	37.24	43.54	32.93	74	54	-30.46	-21.07	77	1.83
3034.04	-30.56	30.16	45.91	35.71	45.51	35.31	74	54	-28.49	-18.69	191	1.63
3599.15	-29.74	31.24	45.01	35.62	46.51	37.12	74	54	-27.49	-16.88	208	1.65
4044.32	-28.93	32.20	45.18	34.39	48.45	37.66	74	54	-25.55	-16.34	199	1.55
4329.53	-28.64	32.20	44.16	33.25	47.72	36.81	74	54	-26.28	-17.19	47	1.45
4999.11	-27.89	33.40	41.55	32.77	47.06	38.28	74	54	-26.94	-15.72	283	1.25

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.		
1334.75	-32.83	25.27	50.22	39.87	42.66	32.31	74	54	-31.34	-21.69	212	1.45
2764.54	-30.75	29.20	46.42	36.25	44.88	34.71	74	54	-29.12	-19.29	306	1.55
3489.67	-29.94	30.98	44.57	34.91	45.61	35.95	74	54	-28.39	-18.05	109	1.68
4139.18	-28.83	32.20	43.86	33.18	47.23	36.55	74	54	-26.77	-17.45	81	1.79
4534.95	-28.43	32.28	43.36	32.77	47.21	36.62	74	54	-26.79	-17.38	94	1.89
4999.11	-27.89	33.40	41.42	30.54	46.93	36.05	74	54	-27.07	-17.95	146	1.95

NOTE :

1. Measurement uncertainty is 3.81dB.
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.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 60 of 72
Date: Feb. 25, 2015

Temperature:	17 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Tx-3 (Fundamental and Harmonics)
Detector:	PK. And AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Feb. 6, 2015
Tested By:	Leo Yang		

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.		
2480.00 (F)	-30.92	28.18	79.81	70.27	77.06	67.52	114	94	-36.94	-26.48	82	2.33
4960.00	-27.94	33.30	41.54	31.77	46.91	37.14	74	54	-27.09	-16.86	99	2.00
7440.00	-25.75	36.26	40.27	29.31	50.78	39.82	74	54	-23.22	-14.18	284	1.72
9920.00	-24.64	37.97	38.90	28.20	52.22	41.52	74	54	-21.78	-12.48	135	1.47
12400.00	-21.97	38.80	34.28	24.10	51.11	40.93	74	54	-22.89	-13.07	77	1.36
14880.00	-20.08	40.78	31.74	21.06	52.44	41.76	74	54	-21.56	-12.24	299	1.29

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.		
2480.00 (F)	-30.92	28.18	84.42	73.25	81.67	70.50	114	94	-32.33	-23.50	148	1.15
4960.00	-27.94	33.30	41.35	30.55	46.72	35.92	74	54	-27.28	-18.08	230	1.41
7440.00	-25.75	36.26	39.27	29.12	49.78	39.63	74	54	-24.22	-14.37	2	1.89
9920.00	-24.64	37.97	38.09	28.10	51.41	41.42	74	54	-22.59	-12.58	144	2.01
12400.00	-21.97	38.80	34.81	24.30	51.64	41.13	74	54	-22.36	-12.87	75	2.23
14880.00	-20.08	40.78	30.65	20.87	51.35	41.57	74	54	-22.65	-12.43	359	2.37

NOTE:

1. Measurement uncertainty is 3.81dB.
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:	17 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Standby
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Feb. 6, 2015
Tested By:	Leo Yang		

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.		
3029.42	-30.57	30.15	45.42	34.81	45.00	34.39	74	54	-29.00	-19.61	108	2.01
3499.70	-29.93	31.00	45.92	35.33	46.99	36.40	74	54	-27.01	-17.60	269	1.81
4084.31	-28.89	32.20	43.71	32.67	47.02	35.98	74	54	-26.98	-18.02	197	1.68
4579.01	-28.38	32.39	43.86	33.55	47.87	37.56	74	54	-26.13	-16.44	143	1.55
4999.11	-27.89	33.40	40.06	30.27	45.57	35.78	74	54	-28.43	-18.22	79	1.43
5384.68	-26.91	33.71	42.11	32.91	48.91	39.71	74	54	-25.09	-14.29	280	1.23

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.		
3414.08	-30.05	30.85	45.92	35.71	46.72	36.51	74	54	-27.28	-17.49	223	1.68
3544.27	-29.85	31.11	45.07	34.28	46.33	35.54	74	54	-27.67	-18.46	111	1.75
4144.38	-28.83	32.20	43.96	33.87	47.33	37.24	74	54	-26.67	-16.76	204	1.95
4609.67	-28.34	32.46	43.35	32.69	47.47	36.81	74	54	-26.53	-17.19	300	2.11
4999.11	-27.89	33.40	41.64	31.74	47.15	37.25	74	54	-26.85	-16.75	96	2.23
5644.24	-26.81	33.80	41.19	30.88	48.18	37.87	74	54	-25.82	-16.13	35	2.31

NOTE :

1. Measurement uncertainty is 3.81dB.
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:	17 °C	Humidity:	68 %RH
Frequency Range:	1 GHz – 25 GHz	Tested Mode:	Link
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
VBW:	3 MHz	Tested Date:	Feb. 6, 2015
Tested By:	Leo Yang		

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.		
3079.26	-30.50	30.24	45.12	35.87	44.86	35.61	74	54	-29.14	-18.39	107	1.81
3599.15	-29.74	31.24	44.24	34.31	45.74	35.81	74	54	-28.26	-18.19	204	1.66
4144.33	-28.83	32.20	43.56	33.06	46.93	36.43	74	54	-27.07	-17.57	261	1.55
4634.42	-28.31	32.52	43.22	32.78	47.43	36.99	74	54	-26.57	-17.01	175	1.46
4999.11	-27.89	33.40	40.27	30.50	45.78	36.01	74	54	-28.22	-17.99	194	1.28
5134.59	-27.55	33.51	43.62	33.97	49.58	39.93	74	54	-24.42	-14.07	285	1.11

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.		
3739.21	-29.47	31.57	44.26	35.43	46.36	37.53	74	54	-27.64	-16.47	210	1.73
4024.32	-28.95	32.20	44.79	34.87	48.04	38.12	74	54	-25.96	-15.88	306	1.81
4339.35	-28.63	32.20	44.63	33.99	48.20	37.56	74	54	-25.80	-16.44	103	1.98
4529.78	-28.44	32.27	44.30	33.62	48.13	37.45	74	54	-25.87	-16.55	87	2.03
4999.11	-27.89	33.40	41.06	32.17	46.57	37.68	74	54	-27.43	-16.32	112	2.09
5489.16	-26.64	33.79	41.34	30.73	48.49	37.88	74	54	-25.51	-16.12	275	2.14

NOTE :

1. Measurement uncertainty is 3.81dB.
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.



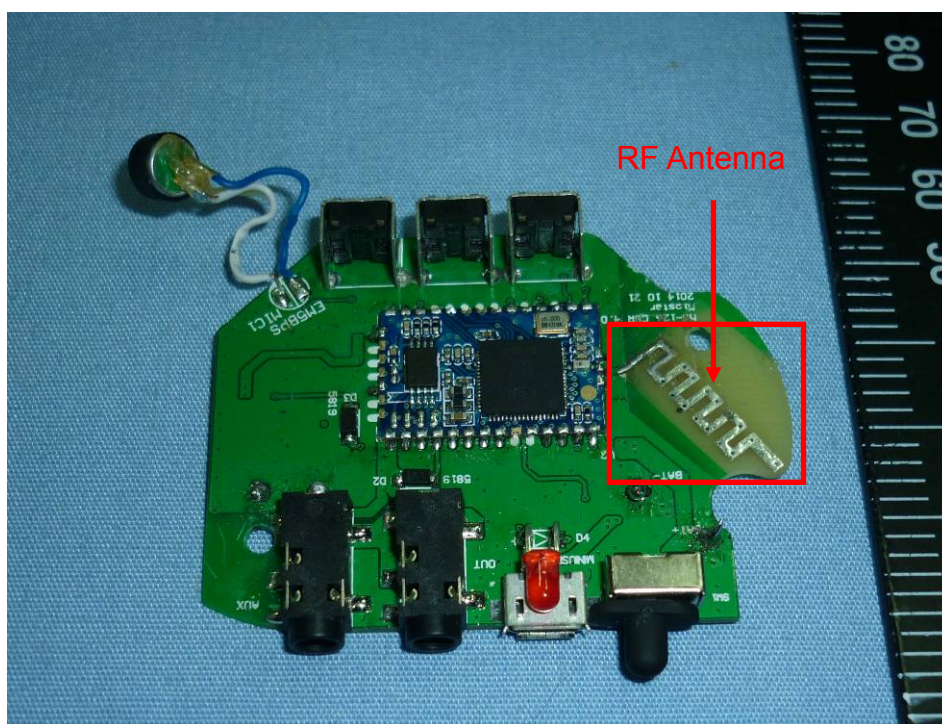
5. Antenna application

5.1 Antenna requirement

The EUT's antenna is met the requirement of FCC part15C section15.203 and 15.204.

5.2 Result

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



5.3 Description of RF Exposure

SAR compliance has been evaluated in the product(s), and can be used in host product(s) with substantially similar physical dimensions, construction, and electrical and RF characteristics. End-users must be provided with specific information required to satisfy RF exposure compliance for all final host devices. Compliance of this device in all final host configurations is the responsibility of the Grantee.

- The separation distance -20 cm must be clearly stated in the operating and/or installation manual that is supplied to the User.
- This application is being made on behalf of the "Grantee".



6. PHOTOS OF TESTING

- Conducted test (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.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 65 of 72
Date: Feb. 25, 2015

- Conducted test (Link)





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TEST REPORT

Reference No.: A15011504
Report No.:FCCA15011504
FCC ID : FSUGG000U
Page: 66 of 72
Date: Feb. 25, 2015

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



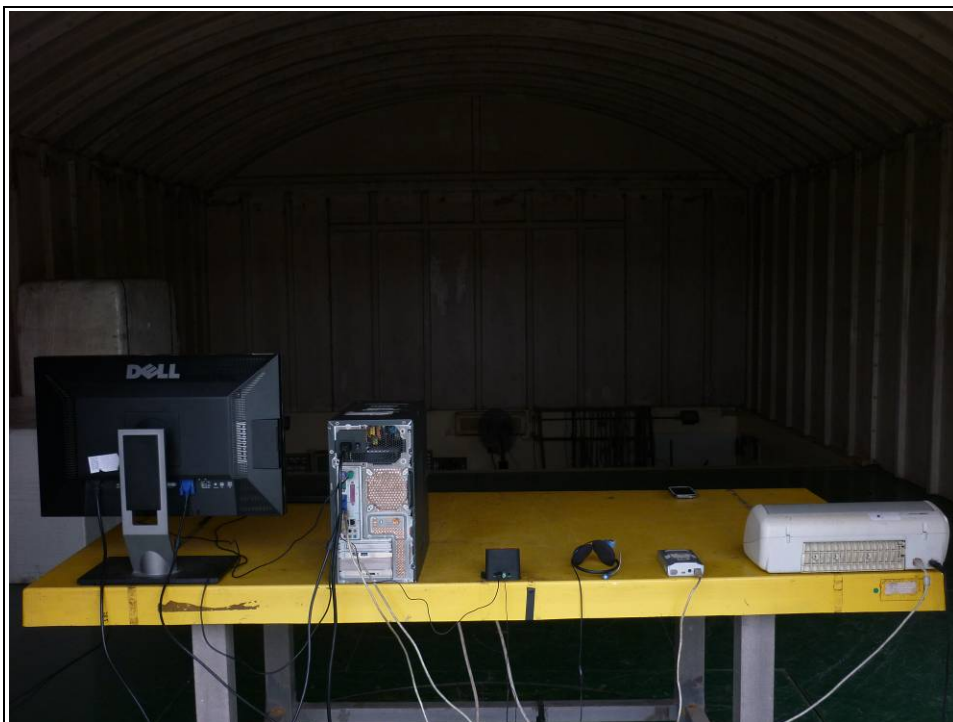


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Page: 67 of 72
Date: Feb. 25, 2015

- Radiated test (below 30M , Link)



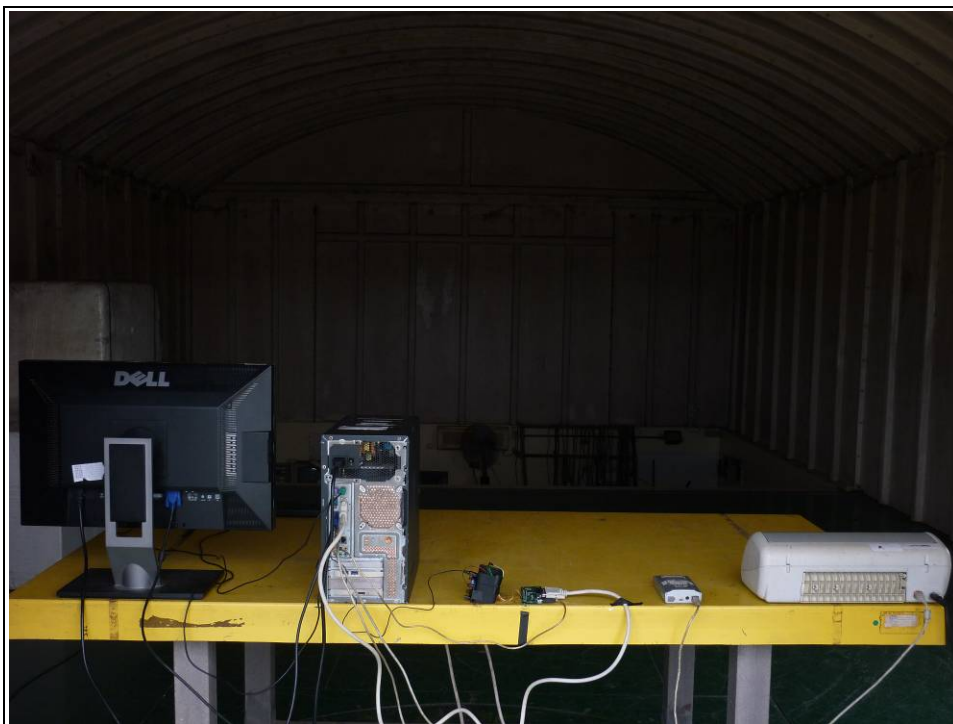


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TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 68 of 72
Date: Feb. 25, 2015

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



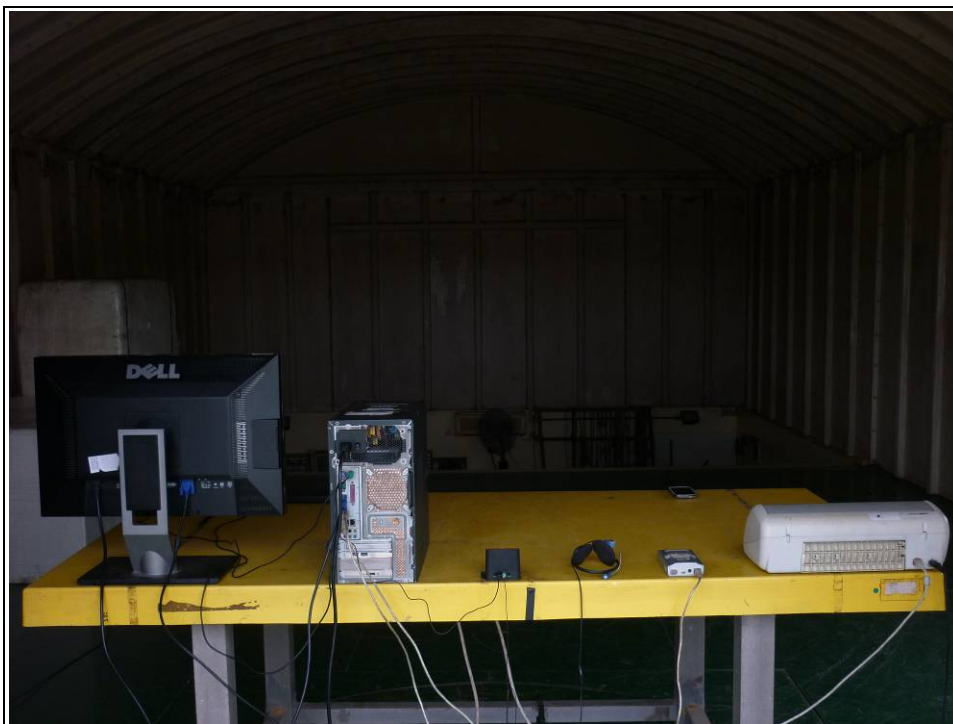


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Report No.:FCCA15011504
FCC ID : FSUGG000U
Page: 69 of 72
Date: Feb. 25, 2015

- Radiated test (below 1G , Link)





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TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 70 of 72
Date: Feb. 25, 2015

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TEST REPORT

Reference No.: A15011504
Report No.: FCCA15011504
FCC ID : FSUGG000U
Page: 71 of 72
Date: Feb. 25, 2015

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Reference No.: A15011504
Report No.:FCCA15011504
FCC ID : FSUGG000U
Page: 72 of 72
Date: Feb. 25, 2015

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