FCC Radio Test Report FCC ID: XW3I815R

This report concerns (check one): Original Grant Class II Change

Issued Date

: Jun. 09, 2010

Project No.

: 1004C048

Equipment

: Slim Star i815

Model Name : GK-090008/R:DR-9081RL

Applicant

: Dongguan Siliten Electronics CO.,LTD

Address

: Sijia Yewu Industrial estate, Shijie Town, Dongguan City, Guangdong Province, China

Tested by:

Neutron Engineering Inc. EMC Laboratory

Date of Receipt: Jun. 02, 2010

Date of Test:

Jun. 02, 2010 ~ Jun. 08, 2010

Testing Engineer

Technical Manager

Authorized Signatory

(Steven Lu)

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Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C.**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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1. CERTIFICATION

Equipment: Slim Star i815

Brand Name : Genius N/A

Model Name: GK-090008/R DR-9081RL

Applicant: Dongguan Siliten Electronics CO.,LTD.

Date of Test: Jun. 02, 2010 ~ Jun. 08, 2010 Test Item: ENGINEERING SAMPLE

Standards: FCC Part15, Subpart C(15.247) / ANSI C63.4: 2003

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-1004C048) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

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2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C				
Standard Section	Test Item	Judgment	Remark	
15.207	Conducted Emission	PASS		
15.247 (c)	Antenna conducted Spurious Emission	PASS		
15.247 (a)(1)	Hopping Channel Separation	PASS		
15.247 (b)(1)	Peak Output Power	PASS		
15.247 (c)	Radiated Spurious Emission	PASS		
15.247 (a)(1)(iii)	Number of Hopping Frequency	PASS		
15.247 (a)(1)(iii)	Dwell Time	PASS		
15.205	Restricted Bands	PASS		
15.203	Antenna Requirement	PASS		
1.1307 1.1310 2.1091 2.1093	RF Exposure Compliance	PASS		

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

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2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-C03/CB03** at the location of No.3, Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792 Neutron's test firm number is 319330

2.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The reported uncertainty of measurement $\mathbf{y} \pm \mathbf{U}$, where expended uncertainty \mathbf{U} is based on a standard uncertainty multiplied by a coverage factor of $\mathbf{k=2}$, providing a level of confidence of approximately 95 % \circ

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
DG-C03	CISPR	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	Ant. H / V	U,(dB)	NOTE
		30MHz ~ 200MHz	V	3.82	
CB03	CISPR	30MHz ~ 200MHz	Н	3.60	
CB03	CISER	200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	Н	3.94	

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3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Slim Star i815		
Trade Name	Genius N/A		
Model Name	GK-090008/R	DR-9	081RL
OEM Brand/Model Name	N/A		
Model Difference	Only difference is the mo	el nam	e.
Product Description	The EUT is a Slim Star i815 Operation Frequency: 2405~2476 MHz Modulation Type: GFSK Number Of Channel 64CH .Please see Note 2. Antenna Designation: Please see Note 3. Antenna Gain(Peak) Please see Note 3. Output Power: -8.67 dBm Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.		Please see Note 2. See Note 3. See Note 3. Sm s, or specification UT is considered as an ails of EUT technical
Channel List	Please refer to the Note	•	
Power Source	DC Voltage supplied from	PC sys	stem.
Power Rating	AC 120V/60Hz		
Connecting I/O Port(s)	Please refer to the User's Manual		
Products Covered	N/A		
EUT Modification(s)	N/A		

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

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2.

Group 1		Gro	oup 2
Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	33	2407
2	2406	34	2408
3	2409	35	2412
4	2410	36	2414
5	2411	37	2417
6	2412	38	2420
7	2415	39	2421
8	2416	40	2422
9	2418	41	2427
10	2419	42	2428
11	2423	43	2431
12	2425	44	2435
13	2429	45	2436
14	2430	46	2437
15	2432	47	2438
16	2434	48	2439
17	2443	49	2442
18	2444	50	2447
19	2446	51	2451
20	2448	52	2452
21	2449	53	2457
22	2453	54	2458
23	2455	55	2459
24	2456	56	2460
25	2462	57	2461
26	2463	58	2465
27	2464	59	2468
28	2466	60	2469
29	2467	61	2472
30	2470	62	2473
31	2471	63	2475
32	2474	64	2476

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed Antenna	N/A	1.02

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3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Tx CH01
Mode 2	TX CH48
Mode 3	TX CH64
Mode 4	Normal Link

	For Conducted Emission
Final Test Mode	Description
Mode 4	Normal Link

For Radiated Emission		
Final Test Mode	Description	
Mode 1	Tx CH01	
Mode 2	TX CH48	
Mode 3	TX CH64	

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

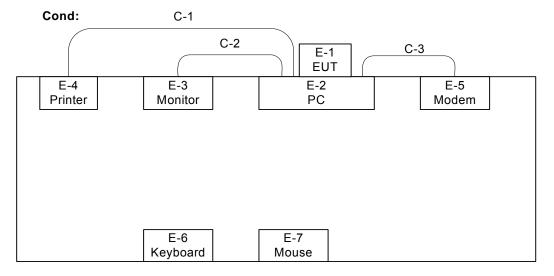
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

Test software Version	Test program: Hardware control			
Frequency	2405 MHz	2439MHz	2476MHz	
Parameters(1Mbps)	N/A	N/A	N/A	

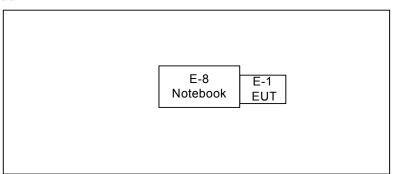
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3.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



Rad:



C-1: Parallel Cable C-2: D-SUB Cable C-3: RS232 Cable

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3.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	Slim Star i815	Genius	GK-090008/R	XW3I815R	N/A	EUT
E-2	PC	HP	Dx7400	DOC	CNG7430PWL	
E-3	LCD monitor	Dell	E177FPc	DOC	CNOFJ179-64180-6AG-1WNS	
E-4	Printer	SII	DPU-414	DOC	3018507 B	
E-5	Modem	ACEEX	DM-1414V	IFAXDm1414	0603002131	
E-6	Wireless Keyboard	Genius	GK-100005/K	DOC	N/A	
E-7	Wireless Mouse	Genius	GK-100005/T	DOC	N/A	
E-8	Notebook	Dell	Inspiron1420	DOC	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	1.5M	
C-2	YES	YES	1.5M	
C-3	YES	NO	1.5M	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in <code>[Length]</code> column.

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4. EMC EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
FREQUENCT (IVITIZ)	Quasi-peak	Average	Quasi-peak	Average	Stanuaru
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

4.1.2 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	EMCO	3816/2	00052765	May.26.2011
2	LISN	Rolf Heine	NNB-2-16Z	99044	May.26.2011
3	50Ω Terminator	SHX	TF2-3G-A	08122901	May.26.2011
4	Transient Limiter	Agilent	11947A	3107A03668	May.26.2011
5	Test Cable	N/A	C-06_C03	N/A	Nov.16.2010
6	EMI TEST RECEIVER	R&S	ESCS30	8333641017	May.26.2011

Remark: "N/A" denotes No Model No., Serial No. or No Calibration specified.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

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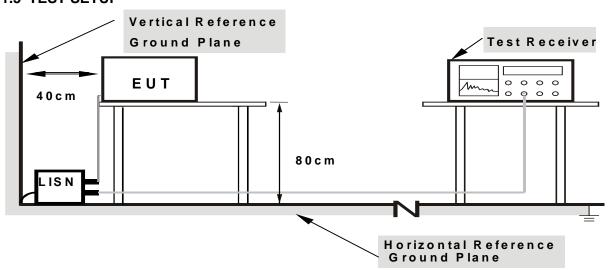
4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

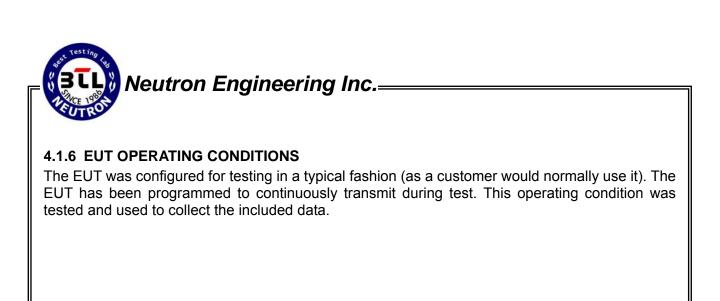
4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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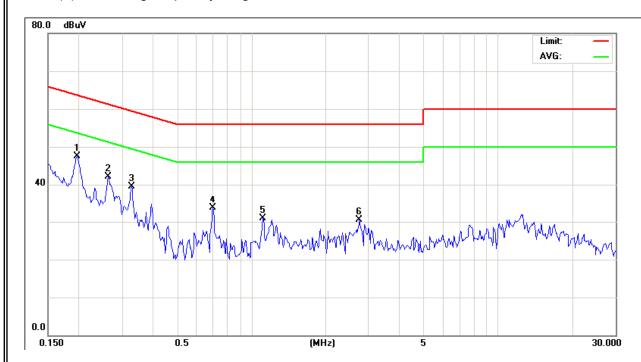
4.1.7 TEST RESULTS

EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	23 ℃	Relative Humidity:	50 %
Pressure:	1010hPa	Test Power :	AC 120V/60Hz
Test Mode:	Normal Link		

Freq.	Terminal	Measure	d(dBuV)	Limits((dBuV)	Margin	Note
(MHz)	L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dB)	Note
0.20	Line	47.49	*	63.76	53.76	-16.27	(QP)
0.26	Line	42.08	*	61.34	51.34	-19.26	(QP)
0.33	Line	39.56	*	59.54	49.54	-19.98	(QP)
0.70	Line	33.79	*	56.00	46.00	-22.21	(QP)
1.11	Line	30.99	*	56.00	46.00	-25.01	(QP)
2.75	Line	30.51	*	56.00	46.00	-25.49	(QP)

Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of Note ... If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform on this case, a " * " marked in AVG Mode column of Interference Voltage Measured on the North AVG Mode column of Interference Voltage Measured on
- (2) Measuring frequency range from 150KHz to 30MHz.



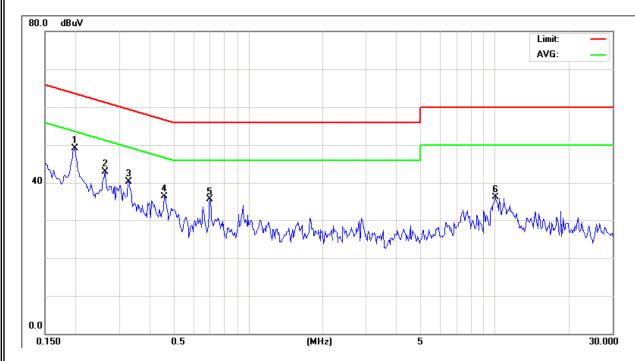
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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	23 ℃	Relative Humidity:	50 %
Pressure:	1010hPa	Test Power :	AC 120V/60Hz
Test Mode :	Normal Link		

Freq.	Terminal	Measure	d(dBuV)	Limits((dBuV)	Margin	Note
(MHz)	L/N	QP-Mode	AV-Mode	QP-Mode	AV-Mode	(dB)	NOLE
0.20	Neutral	49.20	*	63.71	53.71	-14.51	(QP)
0.26	Neutral	42.83	*	61.34	51.34	-18.51	(QP)
0.33	Neutral	40.39	*	59.53	49.53	-19.14	(QP)
0.46	Neutral	36.34	*	56.76	46.76	-20.42	(QP)
0.70	Neutral	35.47	*	56.00	46.00	-20.53	(QP)
10.07	Neutral	36.04	*	60.00	50.00	-23.96	(QP)

Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of Note ... If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform on this case, a " * " marked in AVG Mode column of Interference Voltage Measured on the North AVG Mode column of Interference Voltage Measured on
- (2) Measuring frequency range from 150KHz to 30MHz.



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4.2 RADIATED EMISSION MEASUREMENT

4.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBu	V/m) (at 3M)	Class B (dBuV/m) (at 3M)		
PREQUENCT (MITZ)	PEAK	AVERAGE	PEAK	AVERAGE	
Above 1000	80	60	74	54	

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

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4.2.2 MEASUREMENT INSTRUMENTS LIST ANS SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	ETS	3115	00075789	May.12.2011
2	Amplifier	Agilent	8449B	3008A02274	May.26.2011
3	Spectrum	Agilent	E4408B	US39240143	Nov.16.2010
4	Test Cable	HUBER+SUHNER	CB03 High Fre	N/A	May.03.2011
5	Antenna	Schwarbeck	VULB9160	9160-3232	May.26.2011
6	Amplifier	HP	8447D	2944A09673	May.26.2011
7	Test Receiver	R&S	ESCI	100895	May.26.2011
8	Test Cable	N/A	C-01_CB03	N/A	Jul.05.2011
9	Controller	CT	SC100	N/A	N/A

Remark: "N/A" denotes No Model Name / Serial No. and No Calibration specified.

Spectrum Parameter	Setting		
Attenuation	Auto		
Start Frequency	1000 MHz		
Stop Frequency	10th carrier harmonic		
RB / VB (emission in restricted	1 MHz / 1 MHz for Dook Average=DK duety evels		
band)	1 MHz / 1 MHz for Peak, Average=PK-dycty cycle		

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

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DUTY CYCLE: TX 2405MHz (1Mbps)

Dwell time=ON/ON+OFF

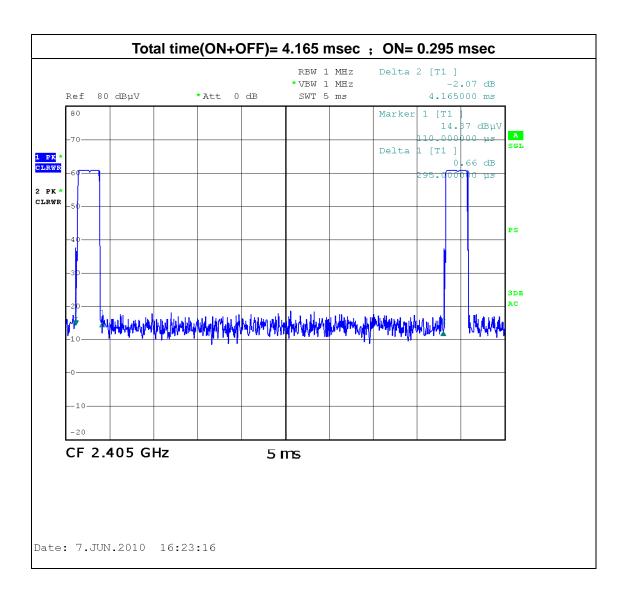
ON:0.295msec

ON+OFF:(total time):4.165msec

Dwell time:7.08%

AV=PK+20 log(Dwell time)

AV=PK-23.0



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4.2.3 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

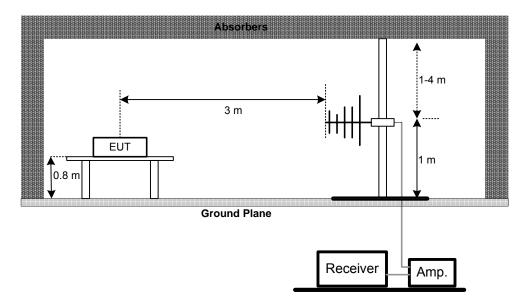
f. For the actual test configuration, please refer to the related Item –EUT Test Photos. 4.2.4 DEVIATION FROM TEST STANDARD No deviation

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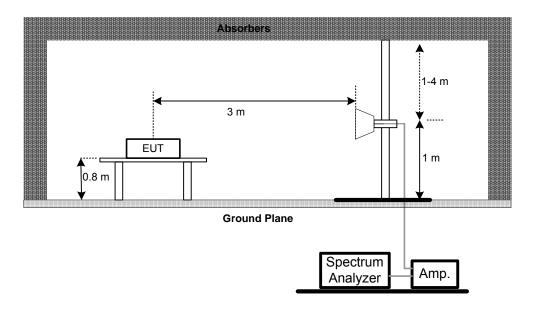


4.2.5 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



4.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

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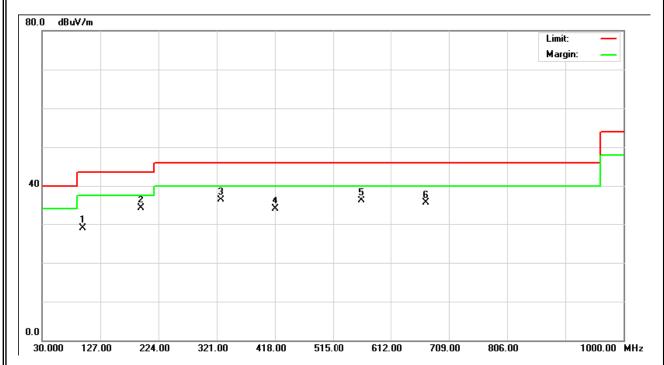
4.2.7 TEST RESULTS (BETWEEN30 - 1000 MHZ)

EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	24 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX Mode 2405MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
95.50	V	47.42	-18.48	28.94	43.50	- 14.56	
194.90	V	50.81	-16.66	34.15	43.50	- 9.35	
325.90	V	47.70	-11.43	36.27	46.00	- 9.73	
415.60	V	42.72	-8.74	33.98	46.00	- 12.02	
561.10	V	41.36	-5.22	36.14	46.00	- 9.86	·
667.80	V	38.79	-3.28	35.51	46.00	- 10.49	

Remark:

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz $^{\circ}$
- (2) All readings are Peak unless otherwise stated QP in column of <code>『Note』</code>. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform \circ
- (3) Measuring frequency range from 30MHz to 1000MHz o
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table \circ



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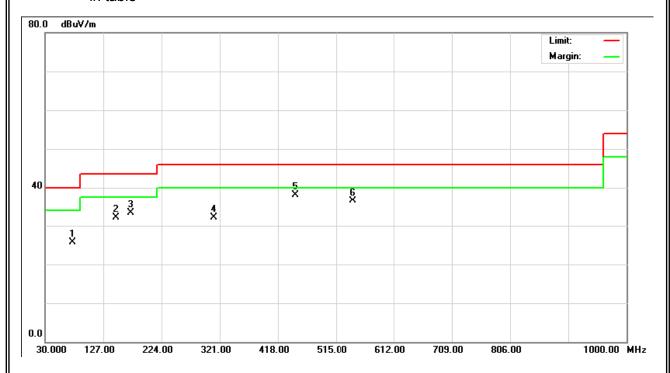


EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	24 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX Mode 2405MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
73.70	Н	44.36	-18.69	25.67	40.00	- 14.33	
148.80	Η	49.73	-17.58	32.15	43.50	- 11.35	
170.70	Ι	50.51	-17.27	33.24	43.50	- 10.26	
311.30	Η	43.85	-11.79	32.06	46.00	- 13.94	
444.70	Η	46.39	-8.21	38.18	46.00	- 7.82	
544.10	Н	42.23	-5.71	36.52	46.00	- 9.48	

Remark:

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = $0.3 \text{ sec./MHz} \circ$
- (2) All readings are Peak unless otherwise stated QP in column of \lceil Note \rceil . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform \circ
- (3) Measuring frequency range from 30MHz to 1000MHz \circ
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table \circ



4.2.8 TEST RESULTS (ABOVE 1000 MHZ)

EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	24 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2405MHz		

Freq.	Ant.Pol.	Rea	ding	Ant./CF	A	ct.	Lir	mit	
		Peak	AV		Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	V	20.64	-2.36	31.37	52.01	29.01	74.00	54.00	X/E
2405.15	V	63.73	40.73	31.35	95.08	72.08			X/F
4810.23	V	57.12	34.12	5.49	62.61	39.61	74.00	54.00	X/H

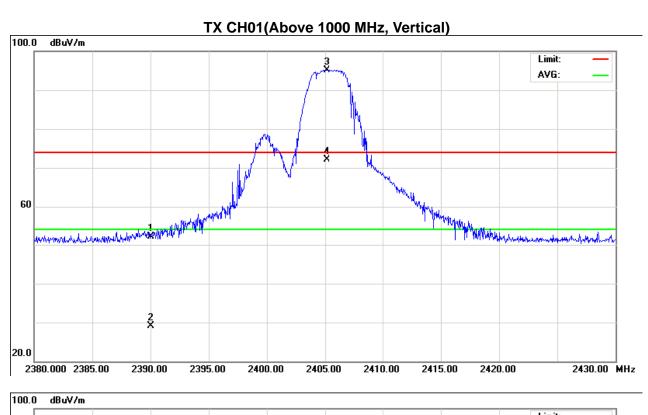
Remark:

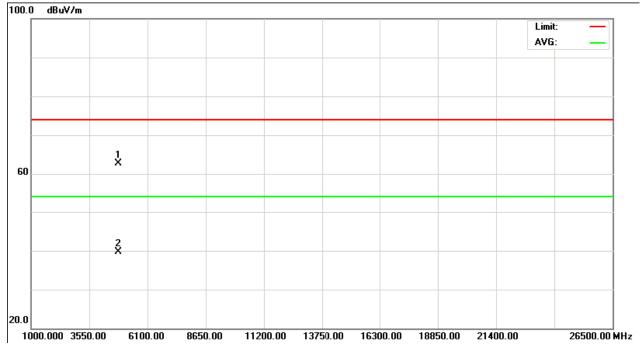
- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission •
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:

 Average = Peak value + 20log(Duty cycle) , Final AV=PK-23.0

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	24 °C	Relative Humidity:	58 %
Pressure:	1010hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2405MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		
		Peak	AV		Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	Н	21.36	-1.64	31.37	52.73	29.73	74.00	54.00	X/E
2405.55	Н	63.90	40.90	31.35	95.25	72.25			X/F
4810.30	Н	51.46	28.46	5.49	56.95	33.95	74.00	54.00	X/H

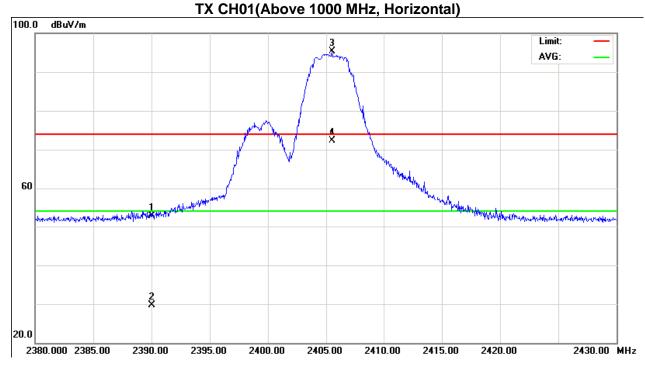
Remark:

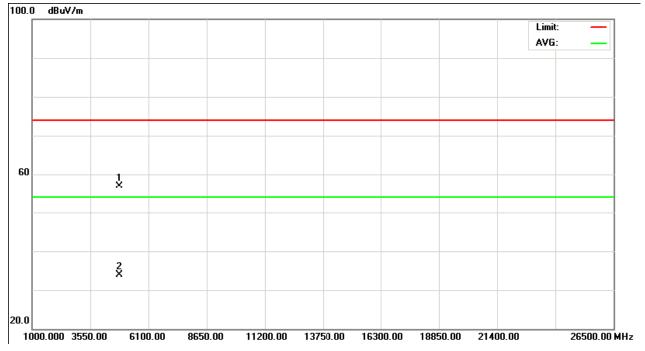
- (1) All readings are Peak unless otherwise stated QP in column of ${}^{\mathbb{F}}$ Note $_{\mathbb{J}}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform \circ
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ∘
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:

 Average = Peak value + 20log(Duty cycle) , Final AV=PK-23.0

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	24 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2439MHz		

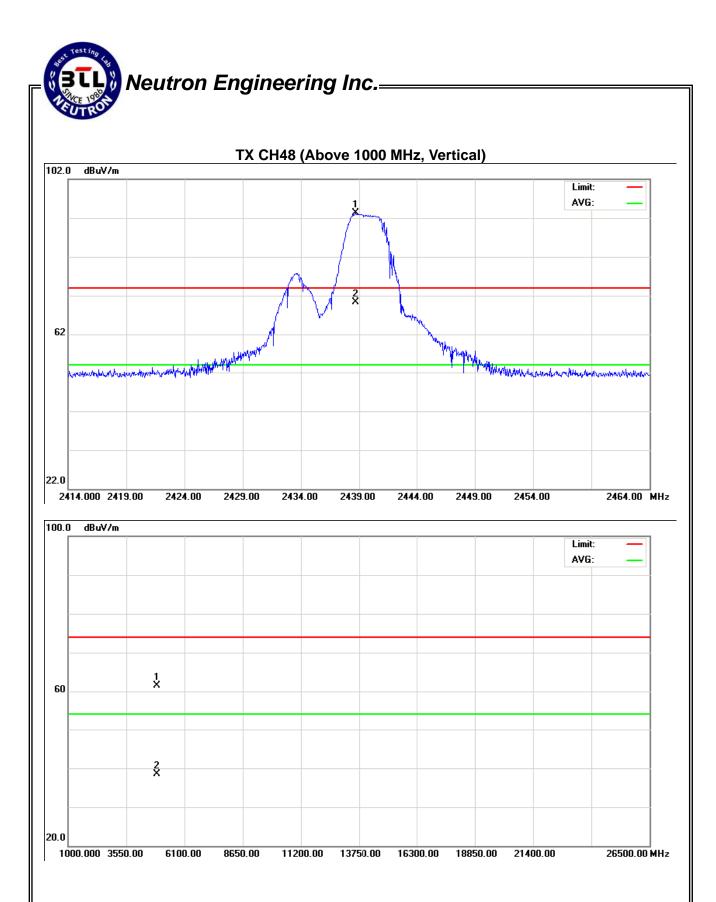
Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		
		Peak	AV		Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2438.70	V	61.97	38.97	31.28	93.25	70.25			X/F
4878.23	V	55.68	32.68	5.87	61.55	38.55	74.00	54.00	X/H

Remark:

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ∘
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ∘
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:

 Average = Peak value + 20log(Duty cycle) , Final AV=PK-23.0

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	24 °C	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2439MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	A	Act.		Limit	
		Peak	AV		Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2438.85	H	62.69	39.69	31.28	93.97	70.97			X/F
4878.25	Н	52.63	29.63	5.87	58.50	35.50	74.00	54.00	X/H

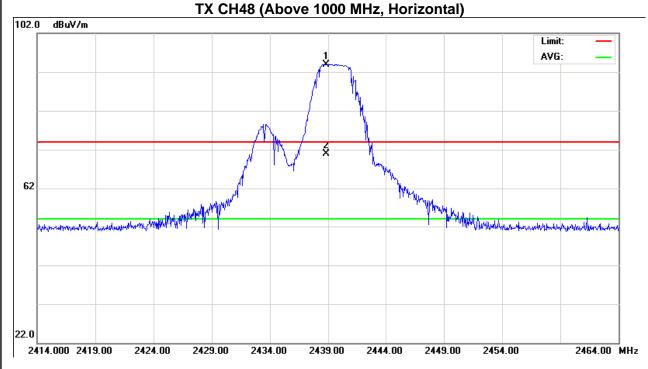
Remark:

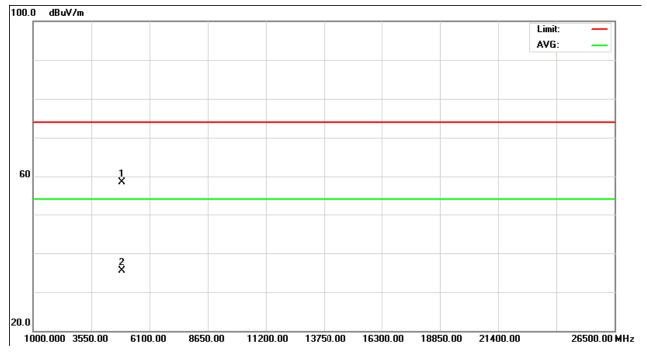
- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission •
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:

 Average = Peak value + 20log(Duty cycle) , Final AV=PK-23.0

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	24 °C	Relative Humidity:	58 %
Pressure:	1010hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2476MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		
		Peak	AV		Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2475.90	٧	60.73	37.73	31.22	91.95	68.95			X/F
2483.50	V	26.32	3.32	31.20	57.52	34.52	74.00	54.00	X/E
4951.40	V	53.40	30.40	6.29	59.69	36.69	74.00	54.00	X/H

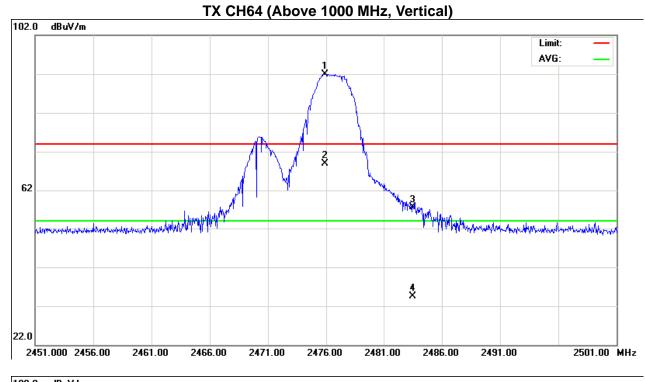
Remark:

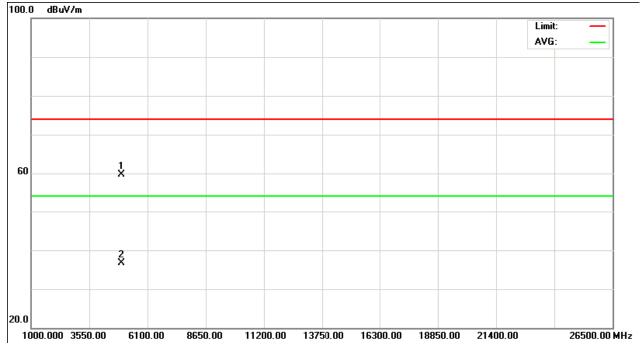
- (1) All readings are Peak unless otherwise stated QP in column of ${}^{\mathbb{F}}$ Note ${}_{\mathbb{F}}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ${}^{\circ}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ∘
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:

 Average = Peak value + 20log(Duty cycle) , Final AV=PK-23.0

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	24 ℃	Relative Humidity:	58 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	TX 2476MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		
		Peak	AV		Peak	AV	Peak	AV	Note
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2475.85	Н	60.07	37.07	31.22	91.29	68.29			X/F
2483.50	Н	26.84	3.84	31.20	58.04	35.04	74.00	54.00	X/E
4952.35	Н	49.46	26.46	6.29	55.75	32.75	74.00	54.00	X/H

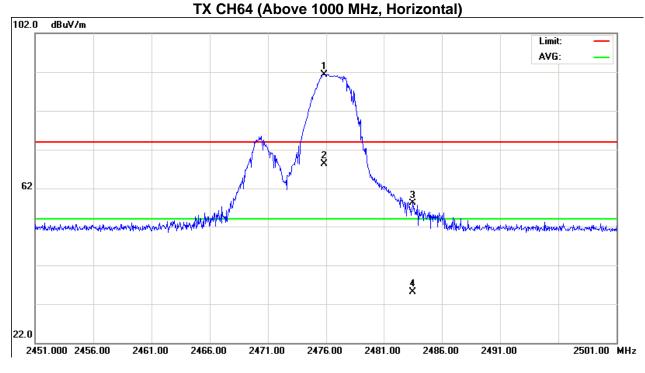
Remark:

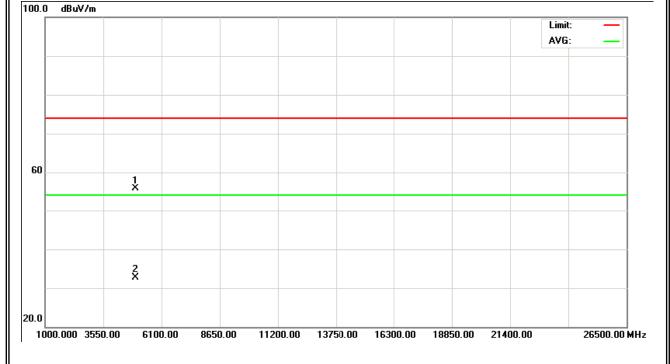
- (1) All readings are Peak unless otherwise stated QP in column of \lceil Note $_{
 m J}$. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform $_{
 m O}$
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission \circ
- (4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis:
 - "X" denotes Laid on Table; "Y" denotes Vertical Stand; "Z" denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:

 Average = Peak value + 20log(Duty cycle) , Final AV=PK-23.0

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Neutron Engineering Inc.— TX CH64 (Above 1000 M





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5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Frequency Range (MHz)	Result	
15.247 (a)(1)(iii)	Number of Hopping Channel	2400-2483.5	PASS	

5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.27.2010

Remark: "N/A" denotes No Model Name, Serial No. or No Calibration specified.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.1.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

5.1.3 DEVIATION FROM STANDARD

No deviation.

5.1.4 TEST SETUP



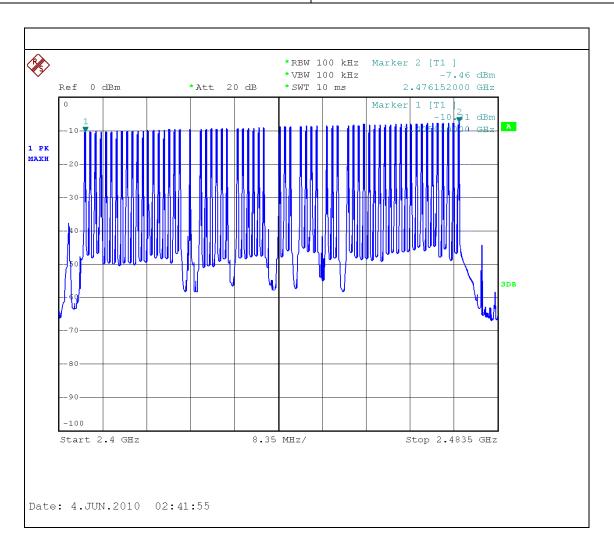
5.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	25 ℃	Relative Humidity:	60 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Hopping Mode		

Number of Hopping Channel	64
riamber of Hopping Chainlei	,



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6. AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.1.1 MEASUREMENT INSTRUMENTS LIST

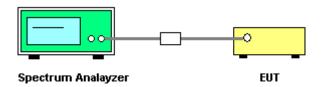
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.27.2010

Remark: "N/A" denotes No Model Name, Serial No. or No Calibration specified.

6.1.2. TEST PROCEDURES

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
- C. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f Measure the maximum time duration of one single pulse.
- g. Set the EUT for packet transmitting.
- h Measure the maximum time duration of one single pulse.

6.1.3. TEST SETUP LAYOUT



6.1.4. TEST DEVIATION

There is no deviation with the original standard.

6.1.5. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting/Hopping mode.

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	25 ℃	Relative Humidity:	60%
Pressure:	1015 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	Hopping Mode		

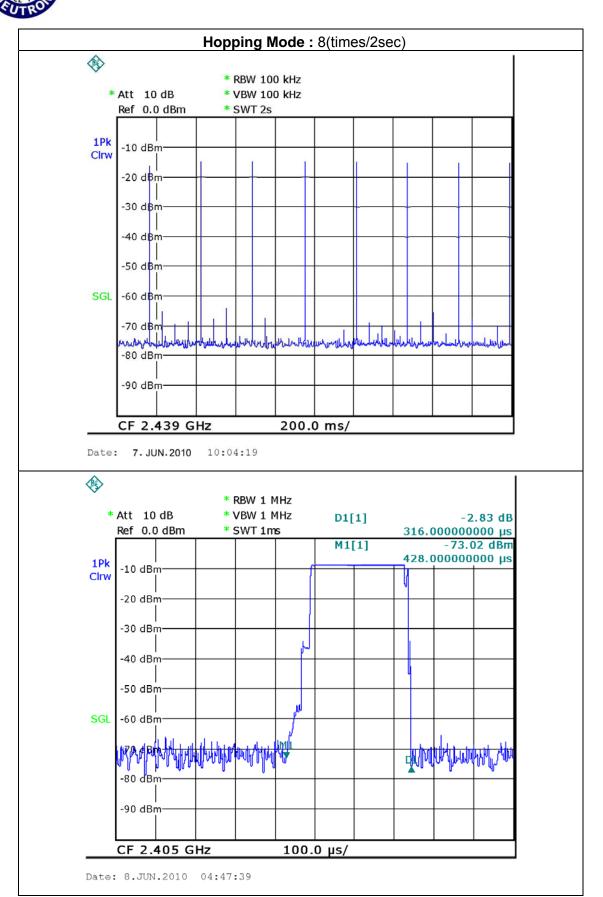
Mode	Number of transmission in a 12.8 (32Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
2439 MHz	(8/2) *12.8=51.2 times Note1	0.316	16.1792	400

Note1: 8 times of occupied channels per 2 second

	Results
Measured cycle (sec)	32 CH*0.4=12.8
The total number of frequency-hopping per second	((8/2)*32)=128
The number of occupied channels per second	128/32=4(number/sec)
occupied time for each channel(1)	0.316ms
The total number of channels occupied within one	(8/2) *12.8=51.2 times
cycle (2)	
The average time of occupancy within one cycle(1)*(2)	16.1792msec
LIMIT (msec)	400msec

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7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

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.

7.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

	Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
-	1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.27.2010

Remark: "N/A" denotes No Model Name, Serial No. or No Calibration specified.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

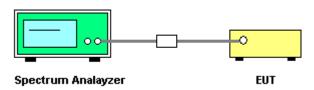
7.1.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- c. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

7.1.3 DEVIATION FROM STANDARD

No deviation.

7.1.4 TEST SETUP



7.1.5 EUT OPERATION CONDITIONS

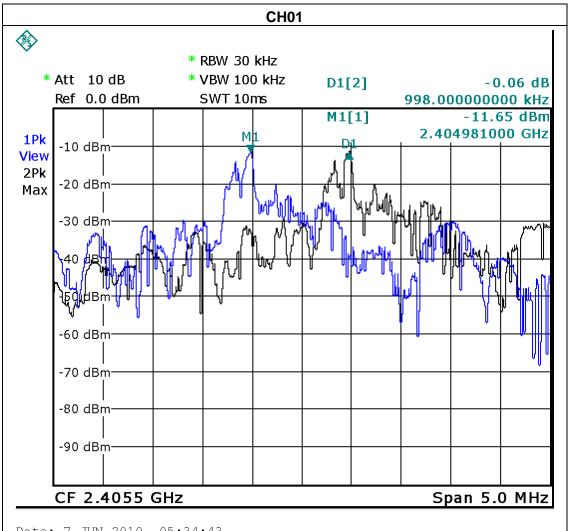
The EUT was programmed to be in continuously transmitting mode.

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	25 ℃	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH01 / CH48/ CH64		

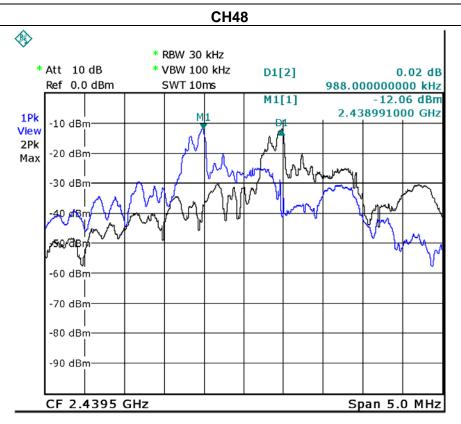
Frequency	Ch. Separation (MHz)	20d Bandwidth B (MHz)	Result
2405 MHz	1	0.788	Complies
2439 MHz	1	0.569	Complies
2476 MHz	1	0.559	Complies

Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth

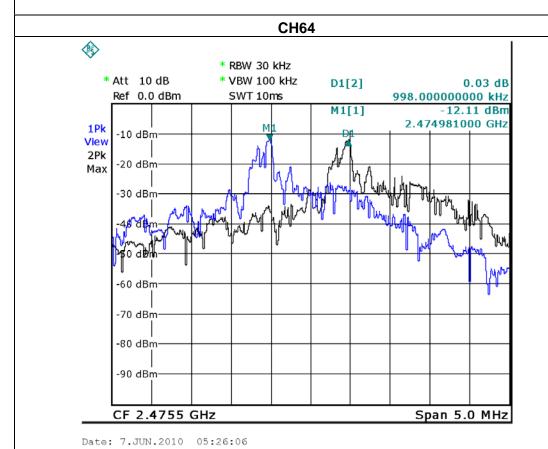


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8. BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

	FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247	Bandwidth	<= 1 MHz	2400-2483.5	PASS		
(a)(2)	Banawiati	(20dB bandwidth)	2100 2100.0	17.00		

8.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

ĺ	Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
	1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.27.2010

Remark: "N/A" denotes No Model Name, Serial No. or No Calibration specified.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.1.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 10KHz, VBW=100KHz, Sweep time = Auto.

8.1.3 DEVIATION FROM STANDARD

No deviation.

8.1.4 TEST SETUP



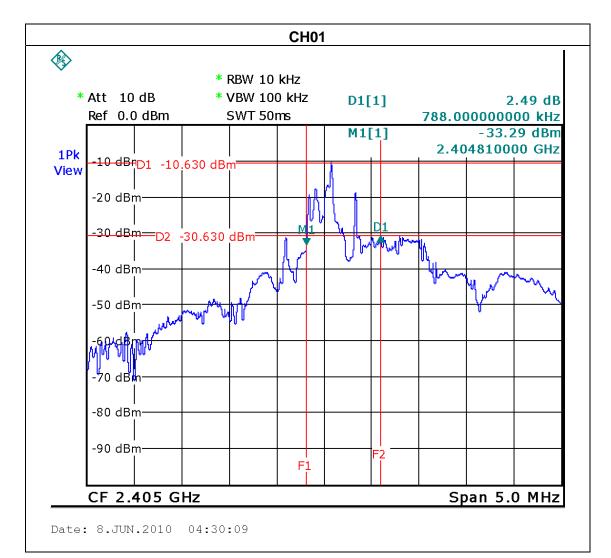
8.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

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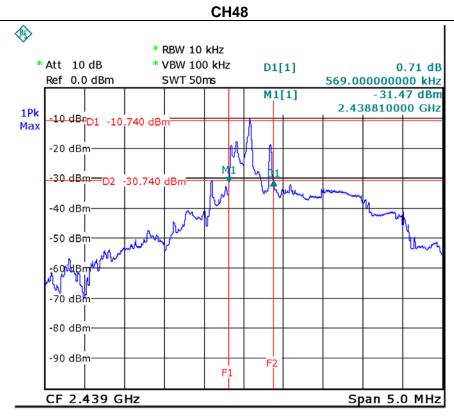
EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	25 ℃	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH01 / CH48/ CH64		

Frequency	20dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2405 MHz	0.788	<= 1MHz	PASS
2439 MHz	0.569	<= 1MHz	PASS
2476 MHz	0.559	<= 1MHz	PASS

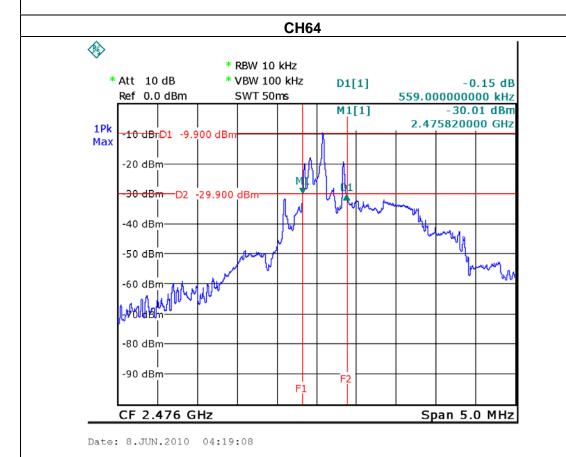


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9. PEAK OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

	FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247 (b)(1)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS		

9.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.27.2010

Remark: "N/A" denotes No Model Name, Serial No. or No Calibration specified.

9.1.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 1MHz, VBW= 1MHz, Sweep time = Auto.

9.1.3 DEVIATION FROM STANDARD

No deviation.

9.1.4 TEST SETUP



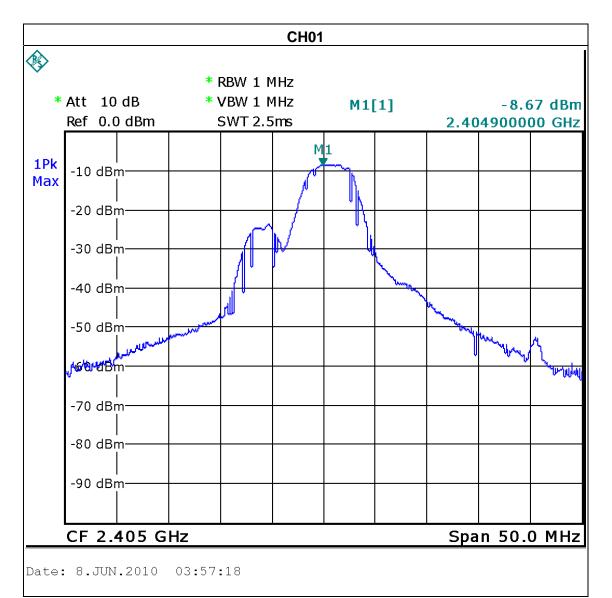
9.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

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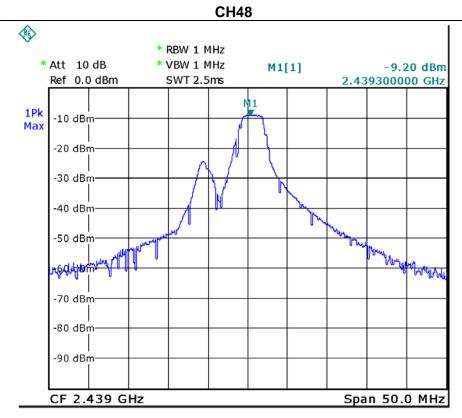
EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	25 ℃	Relative Humidity:	60%
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH01 / CH48/ CH64		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
CH01	2405	-8.67	30	1
CH48	2439	-9.20	30	1
CH64	2476	-9.28	30	1

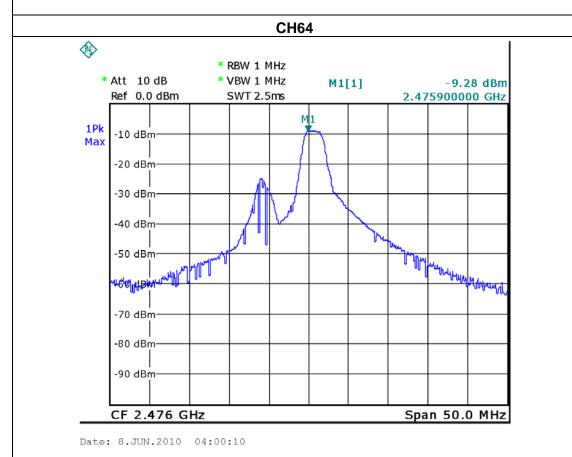


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10. ANTENNA CONDUCTED SPURIOUS EMISSION

10.1 APPLIED PROCEDURES / LIMIT

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

10.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.27.2010

Remark: "N/A" denotes No Model Name, Serial No. or No Calibration specified.

The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting		
Attenuation	Auto		
Span Frequency	100 MHz		
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average		
RB / VB (other emission)	100 KHz /100 KHz for Peak		

10.1.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

10.1.3 DEVIATION FROM STANDARD

No deviation.

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Neutron Engineering Inc. 10.1.4 TEST SETUP			_
EUT		SPECTRUM	
		ANALYZER	

10.1.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

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EUT:	Slim Star i815	Model Name :	GK-090008/R
Temperature:	25 ℃	Relative Humidity:	60 %
Pressure:	1010 hPa	Test Voltage :	AC 120V/60Hz
Test Mode :	CH01 / CH64		

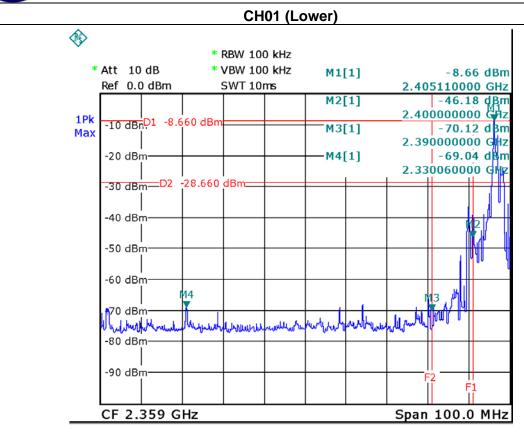
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.		
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)	
2330.06	-69.04	2483.50	-61.71	
Popult				

Result

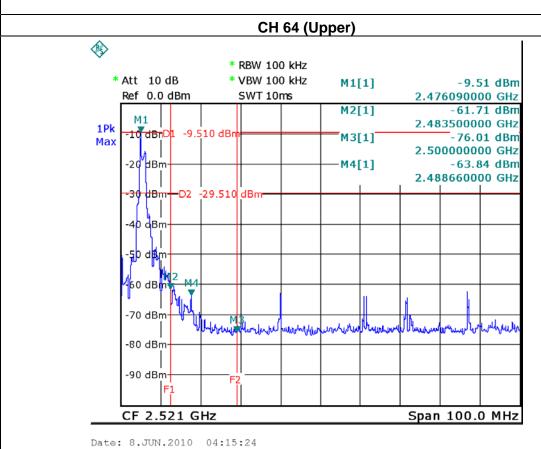
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.

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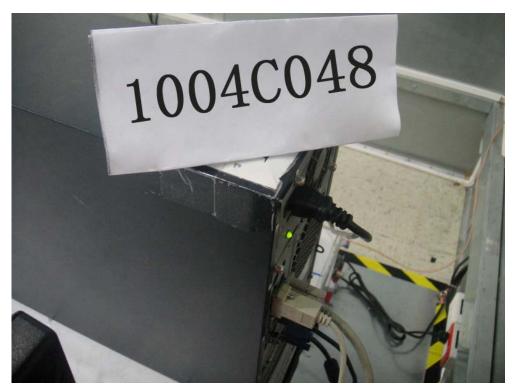
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11. EUT TEST PHOTO

Conducted Measurement Photos

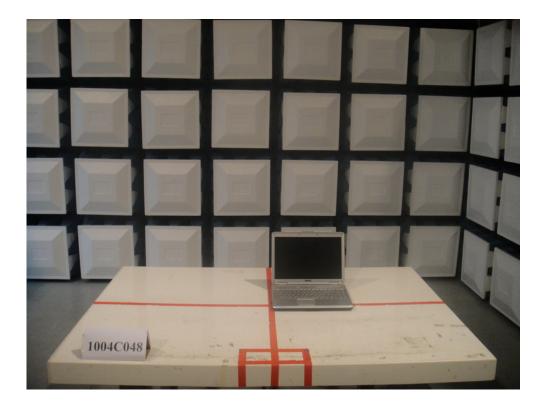




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Radiated Measurement Photos





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