

Report No.: EH/2010/90038 **Issue Date: Oct. 14, 2010** 

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# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C AND CANADA RSS-210 REQUIREMENT

OF

**Product Name: MIXAMP 5.8** 

ASTRO GAMING<sup>TM</sup> **Brand Name:** 

MIXAMP 5.8 TX **Model Name:** 

**Model Difference:** N/A

FCC ID: **YQ6-204M03AG046** 

IC: 9207A-204M03AG046

EH/2010/90038 **Report No.:** 

**Issue Date:** Oct. 14, 2010

**FCC Rule Part: §15.249** 

**IC Rule Part:** RSS-210 issue 7:2007, Annex 2.9

**Prepared for: Astro Gaming, Inc** 

348 Sixth Street, San Francisco, CA. 94103, US

Prepared by: SGS Taiwan Ltd.

**Electronics & Communication Laboratory** 

No. 134, Wu Kung Rd., Wuku Industrial Zone,

Taipei County, Taiwan.





Testing Laboratory 0513

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### VERIFICATION OF COMPLIANCE

**Applicant:** Astro Gaming, Inc

348 Sixth Street, San Francisco, CA. 94103, US

**Product Description:** MIXAMP 5.8

FCC ID: YQ6-204M03AG046 IC: 9207A-204M03AG046 ASTRO GAMING<sup>TM</sup> **Brand Name:** 

MIXAMP 5.8 TX Model No.:

**Model Difference:** N/A

File Number: EH/2010/90038

**Date of test:** Sep. 30, 2010 ~ Oct. 13, 2010

**Date of EUT Received:** Sep. 30, 2010

# We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd., Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.249 and RSS-210 issue 7: 2007 Annex 2.9.

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

Test By:	Brian Chang	Date:	Oct. 14, 2010
-	Brian Chang / Engineer		
Prepared By:	Gigi yeh	Date:	Oct. 14, 2010
	Gigi Yeh / Clerk	_	
Approved By:	Almo Hsieh	Date:	Oct. 14, 2010
_	Arno Hsieh / Asst. Supervisor	_	

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#### 1. **GENERAL INFORMATION**

#### 1.1. **Product Description**

Product Name:	MIXAMP 5.8			
Brand Name:	ASTRO GAM	$IING^{TM}$		
Model Name:	MIXAMP 5.8	TX		
Model Difference:	N/A			
Operation Frequency:	5736 ~ 5814 MHz			
Channel number:	3 channels			
Modulation Type:	DSSS			
	100~240VAC	adapter		
Power Supply Adapter:		Model name: 208-ACCXAG-0042 Supplier: Kuantech (Shenzhen) Co., Ltd Model name: KSAS0100500200D5 Supplier: Kuantech (Shenzhen) Co., Ltd		

#### 1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: YQ6-204M03AG046 filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules and IC: 9207A-204M03AG046 filing to comply with Industry Canada RSS-210 issue 7: 2007 Annex 2.9.

#### 1.3. **Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003) and RSS-Gen: 2007. Radiated testing was performed at an antenna to EUT distance 3 meters.

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#### **Test Facility** 1.4.

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

#### 1.5. **Special Accessories**

Not available for this EUT intended for grant.

#### 1.6. **Equipment Modifications**

Not available for this EUT intended for grant.

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#### SYSTEM TEST CONFIGURATION 2.

#### 2.1. **EUT Configuration**

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

#### 2.2. **EUT Exercise**

The Transmitter was operated in the engineering operating mode, the Tx frequency was fixed at 5736, 5762 and 5814MHz which were for the purpose of the measurements.

#### 2.3. **Test Procedure**

### 2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003 and RSS-Gen: 2007. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and Average detector mode.

### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003 and RSS-Gen: 2007.

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#### 2.4. Limitation

### (1) Conducted Emission

According to section 15.207(a) and RSS-Gen §7.2.2 Conducted Emission Limits is as following.

Frequency	Conducted Limit (dBuV)		
(MHz)	Quasi-Peak	Average	
0.15 - 0.5	66 - 56	56 - 46	
0.5 - 5	56	46	
5 - 30	60	50	

# (2) Radiated Emission 15.249(a) and RSS-210 issue 7,§A2.9(a)

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following.

Frequency	Field strength of	Field strength of	Distance (m)
(MHz)	Fundamental	Harmonics	
902 - 928	50 mV/m	500 uV/m	3
	(94dBuV/m)	(54dBuV/m)	
2400 - 2483.5	50 mV/m	500 uV/m	3
	(94dBuV/m)	(54dBuV/m)	
5725 – 5875	50 mV/m	500 uV/m	3
	(94dBuV/m)	(54dBuV/m)	

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# (3) Radiated Emission15.249 (d) and RSS-210 issue 7,§A2.9(b)

Emission Radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209 and RSS-210 issue 7,§A2.9(a) as below, whichever is the lesser attenuation.

Frequency	Frequency Field strength		Field strength at 3m
(MHz)	μV/m		dBμV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

# (4) Radiated Emission 15.249(e) and RSS-210 issue 7

For frequencies above 1000MHz, the above field strength limits are based on average limits. The peak filed strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

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

- 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
- 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of  $\xi$  15.205
- 4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of  $\xi$ 15.205, then the general radiated emission limits in  $\xi$ 15.209 apply.

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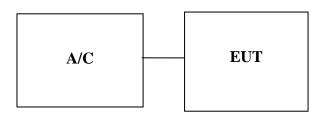


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#### 2.5. **Configuration of Tested System**

Fig. 2-1 Configuration of TX



**Table 2-2 Equipment Used in Tested System** 

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	N/A						

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

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#### **3.** SUMMARY OF TEST RESULTS

FCC Rules	<b>Description Of Test</b>	Result
§15.207/	Conducted Emission	Compliant
RSS-Gen §7.2.2		
§15.249(a)(d)	Field Strength Measurement	Compliant
RSS-210 issue 7,§A2.9(a)		
§15.249(e)	TX Spurious Emission	Compliant
RSS-210 issue 7,§A2.9(b)		
§15.249(d)	20dB band width Measurement	Compliant
RSS-Gen §4.4.1	99% Power Bandwidth	Compliant

## **Description of test modes**

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting mode is programmed.

Channel low (5736MHz) · mid (5762MHz) and high (5814MHz) with highest data rate are chosen for full testing.

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Report No.: EH/2010/90038 **Issue Date: Oct. 14, 2010** 

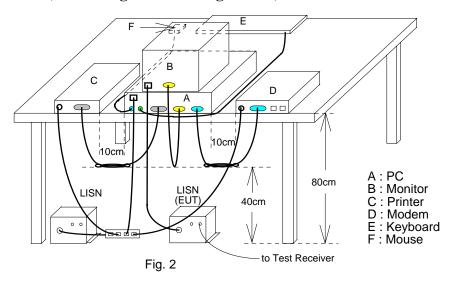
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#### 4. CONDUCTED EMISSIONS TEST

#### 4.1 **Measurement Procedure:**

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

#### 4.2 **Test SET-UP (Block Diagram of Configuration)**



#### 4.3 **Measurement Equipment Used:**

Conducted Emission Test Site						
EQUIPMENT MFR MODEL SERIAL LAST						
TYPE		NUMBER	NUMBER	CAL.		
EMI Test Receiver	R&S	ESCS30	828985/004	09/15/2010	09/14/2011	
LISN	Rolf-Heine	NNB-2/16Z	99012	02/02/2010	02/01/2011	
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	02/02/2010	02/01/2011	
Coaxial Cables	N/A	WK CE Cable	N/A	11/28/2009	11/27/2010	

#### 4.4 **Measurement Result:**

N/A, this application is modular approval and the power supply is 5Vdc.

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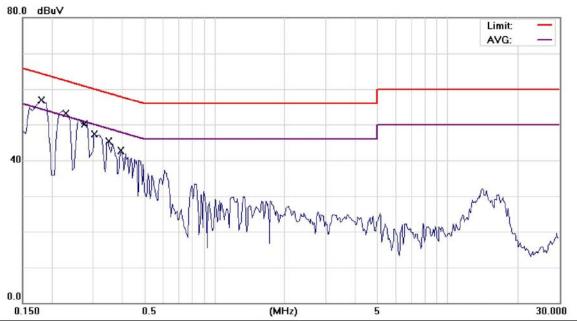


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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Normal mode	Test Date:	Oct. 12, 2010
		Test By:	Brain



Site SGS CONDUCTED #1

Limit: FCC Class B Conduction(QP)

**EUT: MIXAMP 5.8** M/N: MIXAMP 5.8 TX Note: Operation mode

Phase:	L1	remperature:	24 0
Power:	AC 120V/60Hz	Humidity:	57 %
Distance:		Air Pressure:	hpa

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1802	53.61	0.13	53.74	64.48	-10.74	QP	
2		0.1802	34.80	0.13	34.93	54.48	-19.55	AVG	
3		0.2322	48.93	0.12	49.05	62.37	-13.32	QP	
4		0.2322	29.18	0.12	29.30	52.37	-23.07	AVG	
5		0.2769	45.65	0.12	45.77	60.91	-15.14	QP	
6		0.2769	25.51	0.12	25.63	50.91	-25.28	AVG	
7		0.3050	47.26	0.12	47.38	60.11	-12.73	QP	
8		0.3500	45.24	0.12	45.36	58.96	-13.60	QP	
9		0.3950	42.51	0.12	42.63	57.96	-15.33	QP	

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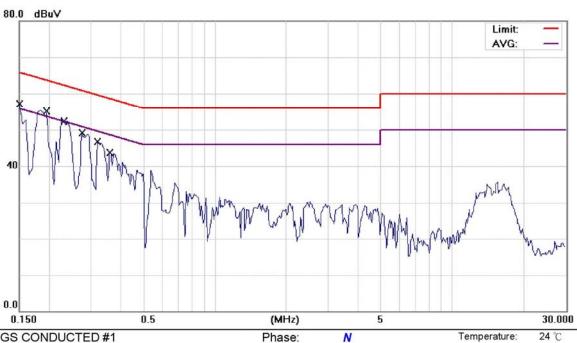
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Humidity:

Air Pressure:

57 %

hpa



Power:

Distance:

AC 120V/60Hz

Site SGS CONDUCTED #1

Limit: FCC Class B Conduction(QP)

**EUT: MIXAMP 5.8** M/N: MIXAMP 5.8 TX Note: Operation mode

9

0.3600

No.	Mk.	Freq.	Reading Level	Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1506	53.14	0.14	53.28	65.97	-12.69	QP	
2		0.1506	34.27	0.14	34.41	55.97	-21.56	AVG	
3		0.1932	51.73	0.13	51.86	63.90	-12.04	QP	
4		0.1932	35.16	0.13	35.29	53.90	-18.61	AVG	
5		0.2334	48.00	0.13	48.13	62.33	-14.20	QP	
6		0.2334	28.17	0.13	28.30	52.33	-24.03	AVG	
7	*	0.2750	48.93	0.13	49.06	60.97	-11.91	QP	
8		0.3200	46.58	0.12	46.70	59.71	-13.01	QP	
							2120770000		

58.73

-14.93

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QP

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43.68

0.12

43.80



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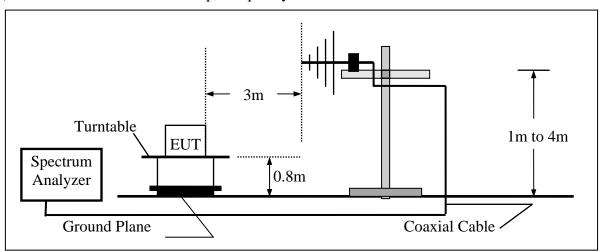
#### **5.** RADIATED EMISSION TEST

#### 5.1 **Measurement Procedure**

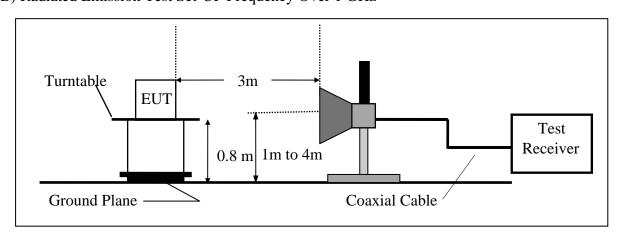
- 1. The EUT was placed on a turntable that is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 4. Repeat above procedures until all frequency measured were complete.

# **Test SET-UP (Block Diagram of Configuration)**

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



## (B) Radiated Emission Test Set-UP Frequency Over 1 GHz



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# **Measurement Equipment Used:**

	90	66 Chamber			
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	02/12/2010	02/11/2011
Bilog Antenna	SCHWAZBECK	VULB9160	3136	11/19/2009	11/18/2010
Horn antenna	SCHWAZBECK	BBHA 9120D	309/320	03/09/2009	03/08/2011
Pre-Amplifier	Agilent	8447D	1937A02834	11/28/2009	11/28/2010
Pre-Amplifier	Agilent	8449B	3008A01973	01/05/2010	01/04/2011
Radio Communication Analyzer	R & S	CMU200	111787	10/31/2008	10/30/2010
DC Block	Agilent	BLK-18	155452	07/05/2010	07/04/2011
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10M	10m	01/05/2010	01/04/2011
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	01/05/2010	01/04/2011
3m Site	SGS	966 chamber	N/A	11/08/2009	11/09/2010

#### **5.4 Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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#### 5.5 **Measurement Result**

## Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH Low **Test Date** Oct. 06, 2010

Fundamental Frequency 5736MHz Test By Brain Temperature 25 °C Pol Ver./Hor

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	<b>Actual FS</b>	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
159.98	V	Peak	47.71	-13.40	34.31	43.50	-9.19
232.73	V	Peak	53.71	-14.37	39.34	46.00	-6.66
256.98	V	Peak	47.58	-13.67	33.91	46.00	-12.09
308.39	V	Peak	52.83	-12.82	40.01	46.00	-5.99
332.64	V	Peak	46.87	-12.16	34.71	46.00	-11.29
381.14	V	Peak	48.44	-10.69	37.75	46.00	-8.25
885.54	V	Peak	37.02	-1.27	35.75	46.00	-10.25
159.98	Н	Peak	51.51	-13.40	38.11	43.50	-5.39
232.73	Н	Peak	56.22	-14.37	41.85	46.00	-4.15
284.14	Н	Peak	50.58	-13.28	37.30	46.00	-8.70
308.39	Н	Peak	54.71	-12.82	41.89	46.00	-4.11
332.64	Н	Peak	49.17	-12.16	37.01	46.00	-8.99
381.14	H	Peak	51.69	-10.69	41.00	46.00	-5.00

### Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

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## Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH Mid Test Date Oct. 06, 2010

Fundamental Frequency 5762MHz Test By Brain Temperature Pol 25 °C Ver./Hor

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
159.98	V	Peak	46.89	-13.40	33.49	43.50	-10.01
232.73	V	Peak	53.77	-14.37	39.40	46.00	-6.60
256.98	V	Peak	47.51	-13.67	33.84	46.00	-12.16
284.14	V	Peak	47.27	-13.82	33.45	46.00	-12.55
308.39	V	Peak	51.58	-12.82	38.76	46.00	-7.24
381.14	V	Peak	48.62	-10.69	37.93	46.00	-8.07
885.54	V	Peak	36.87	-1.27	35.60	46.00	-10.40
159.98	H	Peak	51.47	-13.40	38.07	43.50	-5.43
232.73	H	Peak	55.90	-14.37	41.53	46.00	-4.47
284.14	H	Peak	50.46	-13.28	37.18	46.00	-8.82
308.39	H	Peak	54.73	-12.82	41.91	46.00	-4.09
332.64	H	Peak	49.05	-12.16	36.89	46.00	-9.11
381.14	H	Peak	51.59	-10.69	40.90	46.00	-5.10

### Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

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# Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode TX CH High Test Date Oct. 06, 2010

Fundamental Frequency 5814MHz Test By Brain
Temperature 25 °C Pol Ver./Hor

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
159.98	V	Peak	47.41	-13.40	34.01	43.50	-9.49
232.73	V	Peak	53.65	-14.37	39.28	46.00	-6.72
256.98	V	Peak	47.49	-13.67	33.82	46.00	-12.18
284.14	V	Peak	47.23	-13.28	33.95	46.00	-12.05
308.39	V	Peak	52.42	-12.82	39.60	46.00	-6.40
381.14	V	Peak	47.76	-10.69	37.07	46.00	-8.93
885.54	V	Peak	35.89	-1.27	34.62	46.00	-11.38
135.73	Н	Peak	50.21	-14.02	36.19	43.50	-7.31
1599.98	Н	Peak	51.27	-13.40	37.87	54.00	-16.13
208.48	Н	Peak	51.23	-15.32	35.91	43.50	-7.59
232.73	Н	Peak	55.97	-14.37	41.60	46.00	-4.40
284.14	Н	Peak	50.49	-13.28	37.21	46.00	-8.79
308.39	H	Peak	54.39	-12.82	41.57	46.00	-4.43
381.14	Н	Peak	51.73	-10.69	41.04	46.00	-4.96

### Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX CH Low Test Date: Oct. 06, 2010

Fundamental Frequency: 5736MHz Test By: Brain Pol: Temperature: 25 °C Vertical

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	<b>AV</b> Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5736.0	V	83.35	73.01	8.08	91.43	81.09	114.00	94.00	-12.91	F
4328.0	V	35.07		4.79	39.86		74.00	54.00	-14.14	S
11472.0	V						74.00	54.00		Н
17208.0	V						74.00	54.00		Н
22944.0	V						74.00	54.00		Н
28680.0	V						74.00	54.00		Н
34416.0	V						74.00	54.00		Н
40152.0	V						74.00	54.00		Н
45888.0	V						74.00	54.00		Н
51624.0	V						74.00	54.00		Н
57360.0	V						74.00	54.00		Н

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX CH Low Test Date: Oct. 06, 2010

Fundamental Frequency: 5736MHz Test By: Brain Pol: Temperature: 25 °C Horizontal

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	<b>AV</b> Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5736.0	Н	84.10	73.86	8.08	92.18	81.94	114.00	94.00	-12.06	F
4295.5	H	34.61		4.65	39.26		74.00	54.00	-14.74	S
11472.0	Н						74.00	54.00		Н
17208.0	H						74.00	54.00		Н
22944.0	Н						74.00	54.00		Н
28680.0	Н						74.00	54.00		Н
34416.0	Н						74.00	54.00		Н
40152.0	Н						74.00	54.00		Η
45888.0	Н						74.00	54.00		Η
51624.0	H						74.00	54.00		Н
57360.0	H						74.00	54.00		Н

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX CH Mid Test Date: Oct. 06, 2010

Fundamental Frequency: 5762MHz Test By: Brain Pol: Temperature: 25 °C Vertical

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	AV Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5762.0	V	84.39	74.07	8.14	92.53	82.21	114.00	94.00	-11.79	F
4295.5	V	34.59		4.65	39.24		74.00	54.00	-14.76	S
11524.0	V						74.00	54.00		Н
17286.0	V						74.00	54.00		Н
23048.0	V						74.00	54.00		Η
28810.0	V						74.00	54.00		Η
34572.0	V						74.00	54.00		Η
40334.0	V						74.00	54.00		Η
46096.0	V						74.00	54.00		Н
51858.0	V						74.00	54.00		Н
57620.0	V						74.00	54.00		Н

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX CH Mid Test Date: Oct. 06, 2010

Fundamental Frequency: 5762MHz Test By: Brain Pol: Temperature: 25 °C Horizontal

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	AV Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5762.0	Н	86.47	77.52	8.14	94.61	85.66	114.00	94.00	-8.34	F
4211.0	Н	34.84		4.38	39.22		74.00	54.00	-14.78	S
11524.0	Н						74.00	54.00		Н
17286.0	Н						74.00	54.00		Η
23048.0	Н						74.00	54.00		Η
28810.0	Н						74.00	54.00		Н
34572.0	Н						74.00	54.00		Н
40334.0	Н						74.00	54.00		Н
46096.0	Н						74.00	54.00		Н
51858.0	Н						74.00	54.00		Н
57620.0	Н						74.00	54.00		Н

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX CH High Test Date: Oct. 06, 2010

Fundamental Frequency: 5814MHz Test By: Brain Pol: Temperature: 25 °C Vertical

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	AV Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5814.0	V	84.39	74.65	8.29	92.68	82.94	114.00	94.00	-11.06	F
4276.0	V	34.97		4.60	39.57		74.00	54.00	-14.43	S
11524.0	V						74.00	54.00		Н
17286.0	V						74.00	54.00		Н
23048.0	V						74.00	54.00		Н
28810.0	V						74.00	54.00		Н
34572.0	V						74.00	54.00		Н
40334.0	V						74.00	54.00		H
46096.0	V						74.00	54.00		Н
51858.0	V						74.00	54.00		Н
57620.0	V						74.00	54.00		Н

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: TX CH High Test Date: Oct. 06, 2010

Fundamental Frequency: 5814MHz Test By: Brain Pol: Temperature: 25 °C Horizontal

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	AV Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5814.0	Н	86.47	75.89	8.29	94.76	84.18	114.00	94.00	-9.82	F
4406.0	H	32.91		5.00	37.91		74.00	54.00	-16.09	S
11524.0	Н						74.00	54.00		Н
17286.0	H						74.00	54.00		Н
23048.0	H						74.00	54.00		Н
28810.0	H						74.00	54.00		Н
34572.0	H						74.00	54.00		Н
40334.0	H						74.00	54.00		Н
46096.0	H						74.00	54.00		Н
51858.0	H						74.00	54.00		Н
57620.0	H						74.00	54.00		Η

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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## Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode RX CH Low Test Date Oct. 06, 2010

Fundamental Frequency 5736MHz Test By Brain Ver./Hor Temperature Pol 25 °C

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
101.78	V	Peak	47.61	-16.87	30.74	43.50	-12.76
111.48	V	Peak	47.19	-16.10	31.09	43.50	-12.41
159.98	V	Peak	43.85	-13.40	30.45	43.50	-13.05
232.73	V	Peak	48.52	-14.37	34.15	46.00	-11.85
308.39	V	Peak	44.75	-12.82	31.93	46.00	-14.07
381.14	V	Peak	42.85	-10.69	32.16	46.00	-13.84
111.48	H	Peak	47.75	-16.10	31.65	43.50	-11.85
135.73	Н	Peak	48.91	-14.02	34.89	43.50	-8.61
159.98	H	Peak	45.24	-13.40	31.84	43.50	-11.66
184.23	H	Peak	47.83	-14.78	33.05	43.50	-10.45
232.73	Н	Peak	46.92	-14.37	32.55	46.00	-13.45
308.39	Н	Peak	50.77	-12.82	37.95	46.00	-8.05

### Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

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## Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode RX CH Mid Test Date Oct. 06, 2010

Fundamental Frequency 5762MHz Test By Brain Temperature Pol Ver./Hor 25 °C

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
101.78	V	Peak	47.09	-16.87	30.22	43.50	-13.28
111.48	V	Peak	46.82	-16.10	30.72	43.50	-12.78
159.98	V	Peak	44.37	-13.40	30.97	43.50	-12.53
232.73	V	Peak	48.71	-14.37	34.34	46.00	-11.66
308.39	V	Peak	44.66	-12.82	31.84	46.00	-14.16
381.14	V	Peak	42.30	-10.69	31.61	46.00	-14.39
111.48	Н	Peak	48.08	-16.10	31.98	43.50	-11.52
135.73	Н	Peak	48.54	-14.02	34.52	43.50	-8.98
159.98	Н	Peak	44.89	-13.40	31.49	43.50	-12.01
184.23	Н	Peak	48.03	-14.78	33.25	43.50	-10.25
232.73	Н	Peak	46.52	-14.37	32.15	46.00	-13.85
308.39	Н	Peak	50.65	-12.82	37.83	46.00	-8.17

### Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

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### Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode RX CH High Test Date Oct. 06, 2010

Fundamental Frequency 57814MHz Test By Brain Temperature Pol Ver./Hor 25 °C

Humidity 65 %

Freq.	Ant.Pol.	Detector Mode	Reading	Factor	Actual FS	Limit3m	Safe Margin
(MHz)	H/V	(PK/QP)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
101.78	V	Peak	47.58	-16.87	30.71	43.50	-12.79
111.48	V	Peak	47.07	-16.10	30.97	43.50	-12.53
159.98	V	Peak	44.68	-13.40	31.28	43.50	-12.22
232.73	V	Peak	48.65	-14.37	34.28	46.00	-11.72
308.39	V	Peak	44.67	-12.82	31.85	46.00	-14.15
381.14	V	Peak	43.09	-10.69	32.40	46.00	-13.60
885.54	V	Peak	36.08	-1.27	34.81	46.00	-11.19
111.48	H	Peak	48.21	-16.10	32.11	43.50	-11.39
135.73	H	Peak	49.00	-14.02	34.98	43.50	-8.52
159.98	H	Peak	45.18	-13.40	31.78	43.50	-11.72
184.23	H	Peak	47.84	-14.78	33.06	43.50	-10.44
232.73	H	Peak	46.37	-14.37	32.00	46.00	-14.00
284.14	Н	Peak	45.35	-13.28	32.07	46.00	-13.93
308.39	Н	Peak	50.55	-12.82	37.73	46.00	-8.27

### Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak / QP detector mode.
- 4 Measurement result 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 The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz, VBW=300KHz.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: RX CH Low Test Date: Oct. 06, 2010

Fundamental Frequency: 5736MHz Test By: Brain Pol: V/H Temperature: 25 °C

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	<b>AV</b> Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5736.0	V	33.02		8.08	41.10		74.00	54.00	-12.90	S
11472.0	V						74.00	54.00		Н
17208.0	V						74.00	54.00		Н
22944.0	V						74.00	54.00		Η
28680.0	V						74.00	54.00		Н
5736.0	H	33.92		8.08	42.00		74.00	54.00	-12.00	S
11472.0	H						74.00	54.00		Н
17208.0	Н						74.00	54.00		Η
22944.0	Н						74.00	54.00		Н
28680.0	Н						74.00	54.00		Н

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: RX CH Mid Test Date: Oct. 06, 2010

Fundamental Frequency: 5762MHz Test By: Brain Pol: V/H Temperature: 25 °C

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	<b>AV</b> Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5762.0	V	33.07		8.14	41.21		74.00	54.00	-12.79	S
11524.0	V						74.00	54.00		Н
17286.0	V						74.00	54.00		Н
23048.0	V						74.00	54.00		Н
28810.0	V						74.00	54.00		Н
5762.0	H	33.06		8.14	41.20		74.00	54.00	-12.80	S
11524.0	H						74.00	54.00		Н
17286.0	H						74.00	54.00		Н
23048.0	H						74.00	54.00		Н
28810.0	Н						74.00	54.00		Н

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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## Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode: RX CH High Test Date: Oct. 06, 2010

Fundamental Frequency: 5814MHz Test By: Brain Pol: V/H Temperature: 25 °C

Humidity: 65 %

		Peak	$\mathbf{AV}$		Actual	Actual	Peak Limit	AV Limit		
Freq.	Ant.Pol.	Reading	Reading	Factor	Peak FS	AV FS	at 3m	at 3m	Margin	
(MHz)	H/V	(dBuV)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
5762.0	Н	33.06		8.14	41.20		74.00	54.00	-12.80	S
11524.0	V						74.00	54.00		Η
17286.0	V						74.00	54.00		Η
23048.0	V						74.00	54.00		Н
28810.0	V						74.00	54.00		Н
4406.0	Н	32.91		5.00	37.91		74.00	54.00	-16.09	S
5814.0	Н	33.16		8.29	41.45		74.00	54.00	-12.55	S
11524.0	Н						74.00	54.00		Н
17286.0	Н						74.00	54.00		Н
23048.0	Н						74.00	54.00		Н
28810.0	Н						74.00	54.00		Н

### Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 "F" denotes fundamental frequency; "H" denotes harmonics frequency. "S" denotes spurious frequency.
- 4 Measurement of data 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 Spectrum Peak mode IF bandwidth Setting: 1GHz-26GHz, RBW=1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 6 Spectrum AV mode if bandwidth Setting: 1GHz-26GHz, RBW=1MHz, VBW=10Hz, Sweep time= 200 ms.

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#### 20 DB BAND WIDTH MEASUREMENT 6.

#### 6.1 **Measurement Procedure**

- The EUT was placed on a turn table which is 0.8m above ground plane.
- Set ETU normal operating mode.
- 3. Set SPA Center Frequency = fundamental frequency, RBW = 100kHz, VBW = 300kHz, Span =30MHz.
- 4. Set SPA Max hold. Mark peak, -20dB.

#### **Test SET-UP (Block Diagram of Configuration)** 6.2

Same as 4.2 Radiated Emission Measurement.

#### **Measurement Equipment Used:** 6.3

Same as 4.2 Radiated Emission Measurement.

#### 6.4 **Measurement Results:**

5736 Channel = 17.302 MHz

5762 Channel = 17.176 MHz

5814 Channel = 17.053 MHz

Refer to attached data chart.

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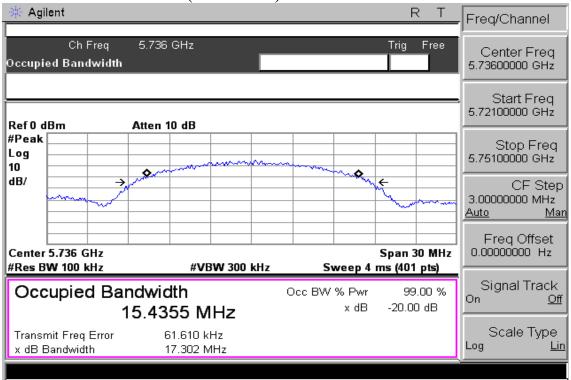
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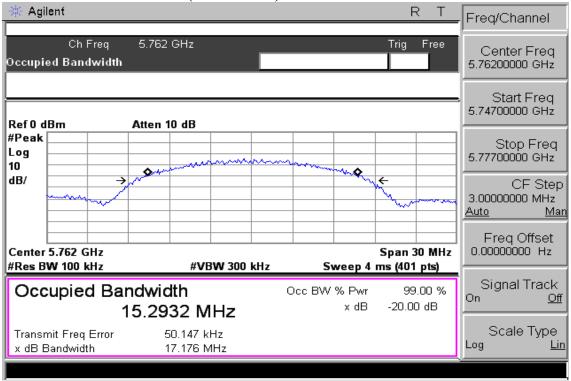
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# 20dB Band Width test Plot (5736 MHz)



# 20dB Band Width test Plot (5762 MHz)



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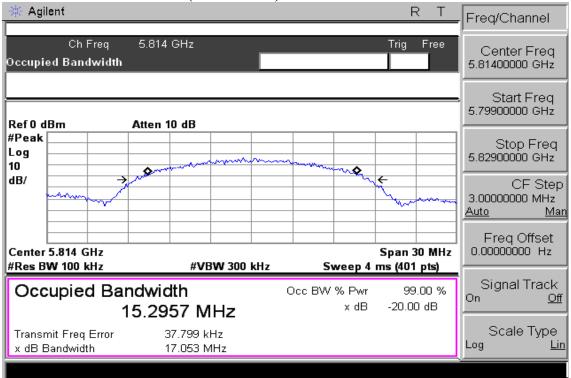
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# 20dB Band Width test Plot (5814 MHz)



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#### 7. 99% BAND WIDTH MEASUREMENT

### **Measurement Procedure**

- Place the EUT on the table and set it in transmitting mode.
- Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- Set the spectrum analyzer as RBW=1% of the approximate emission bandwidth, VBW = 3 times RBW, Span= approximately 20dB below the peak level. Sweep=auto
- Turn on the 99% bandwidth function, max reading..
- Repeat above procedures until all frequency measured were complete.

#### 7.2 **Test SET-UP (Block Diagram of Configuration)**

Same as 4.2 Radiated Emission Measurement.

#### 7.3 **Measurement Equipment Used:**

Same as 4.2 Radiated Emission Measurement.

#### 7.4 **Measurement Results:**

5736 Channel = 15.4355 MHz

5762 Channel = 15.2932MHz

5814 Channel = 15.2957MHz

Refer to attached data chart.

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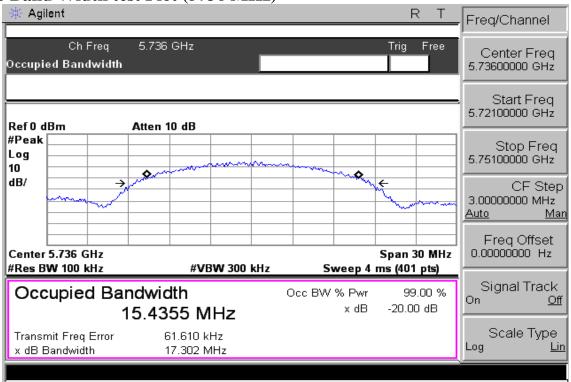
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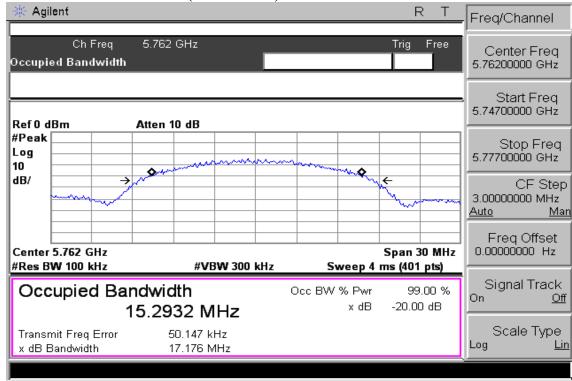
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# 99% Band Width test Plot (5736 MHz)



# 99% Band Width test Plot (5762 MHz)



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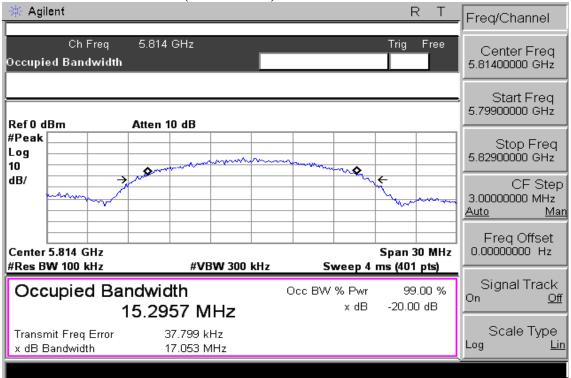
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# 99% Band Width test Plot (5814 MHz)



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