



FCC Test Report

Report No.: AGC00334130601FE03

FCC ID : QLPSAM88
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : SAM88
BRAND NAME : SOSTARK
MODEL NAME : SAM88
CLIENT : Sostark Pte Ltd
DATE OF ISSUE : June 25,2013
STANDARD(S) : FCC Part 15 Rules
REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd



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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	June 25,2013	Valid	Original Report

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APPENDIX B: PHOTOGRAPHS OF EUT 43

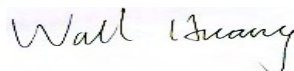
1. VERIFICATION OF CONFORMITY

Applicant	Sostark Pte Ltd
Address	20 Sin Ming Lane,#08-52,Midview City,Singapore 573968
Manufacturer	Zhangzhou Shadow Electron Industry Co.,Ltd
Address	88#,Xiangjing Road,Beidou Industrial Park,Jinfeng Industrial District,363000,Zhangzhou,Fujian,China
Product Designation	SAM88
Brand Name	SOSTARK
Test Model	SAM88
Date of test	Jun. 17,2013 to Jun. 22,2013
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BGN/RF (2013-03-01)

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. 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 requirement of FCC Part 15 Rules requirement.

Prepared By



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June 25,2013


Checked By



Forrest Lei

June 25,2013

Authorized By



Solger Zhang

June 25,2013

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as “SAM88”. It is designed by way of utilizing the DSSS technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	5180MHZ~5240MHZ
Max. Output Power	10.93dBm
Modulation	QPSK
Number of channels	3
Hardware Version	N/A
Software Version	N/A
Antenna Designation	Integrated Antenna
Antenna Gain	-5dBi

2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
5180~5240MHZ	1	5180 MHZ
	2	5210 MHZ
	3	5240 MHZ

2.3. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: QLPSAM88** filing to comply with the FCC Part 15 requirements.

2.5. TEST METHODOLOGY

Because the EUT received power from lithium battery, so only radiated testing was performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

3. MEASUREMENT UNCERTAINTY

Conducted measurement: +/- 2.75dB

Radiated measurement: +/- 3.2dB

4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
Note: test at maximum power condition.	

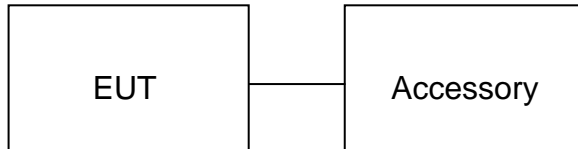
Note:

1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency individually.
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.

5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	SAM88	SOSTARK	SAM88	EUT
2	Battery	N/A	N/A	Accessory

Note: All the accessories have been used during the test in conduction emission test.

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.407 (e)	Indoor operation only	Compliant
§15.407(a)(1)	26 dB Bandwidth	Compliant
§15.407(a)(1)	Output Power	Compliant
§15.407(a)(1)	Power SPECTRAL Density	Compliant
§15.407(a)(6)	Peak Excursion	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.209	Radiated Emission	Compliant
§15.207	Line Conduction Emission	N/A
§15.203	Antenna Requirement	Compliant

Note: The EUT received power from lithium battery and has PCB antenna.

N/A means not applicable.

6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2003.

ALL TEST EQUIPMENT LIST

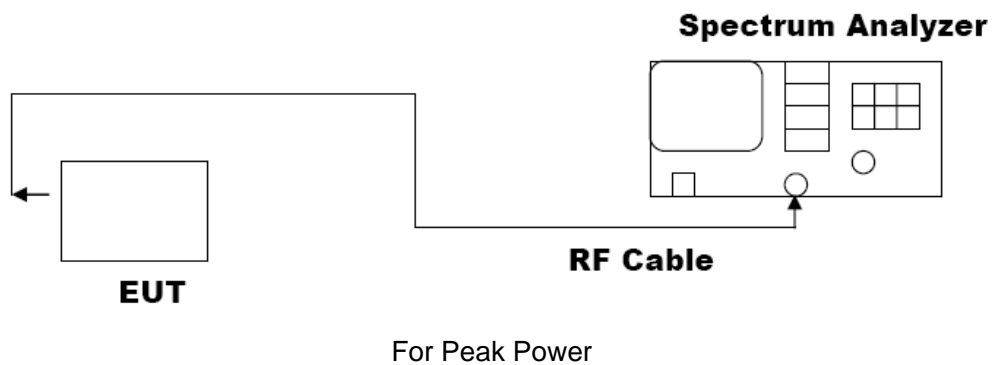
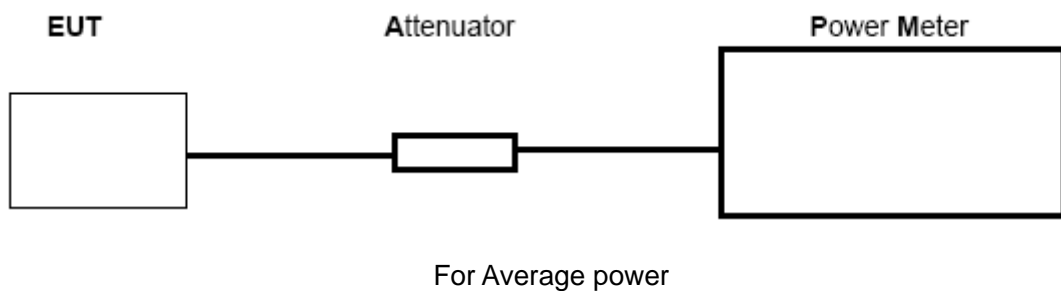
Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power meter	R&S	NRP-Z23	100323	07/18/2012	07/17/2013
Power Sensor	R&S	NRV-Z51	100712	07/18/2012	07/17/2013
RF attenuator	N/A	RFA20db	68	N/A	N/A
Spectrum Analyzer	Agilent	E4440A	US41421290	07/18/2012	07/17/2013
Amplifier	EM	EM30180	0607030	07/18/2012	07/17/2013
Horn Antenna	EM	EM-AH-10180	67	04/21/2013	04/20/2014
Horn Antenna	A.H. Systems Inc.	SAS-574	--	07/18/2012	07/17/2013
EMI Test Receiver	Rohde & Schwarz	ESCI	100694	07/18/2012	07/17/2013
Biological Antenna	A.H. Systems Inc.	SAS-521-4	26	06/08/2012	06/07/2013
Loop Antenna	A.H.	SAS-526B	264	07/15/2012	07/14/2013

7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Connect EUT RF output port to power meter or spectrum analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Record the maximum power.
5. The maximum peak power shall be less 50mW or $4\text{dBm} + 10 \log B$

7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



7.3. LIMITS AND MEASUREMENT RESULT

TEST ITEM	Output Power
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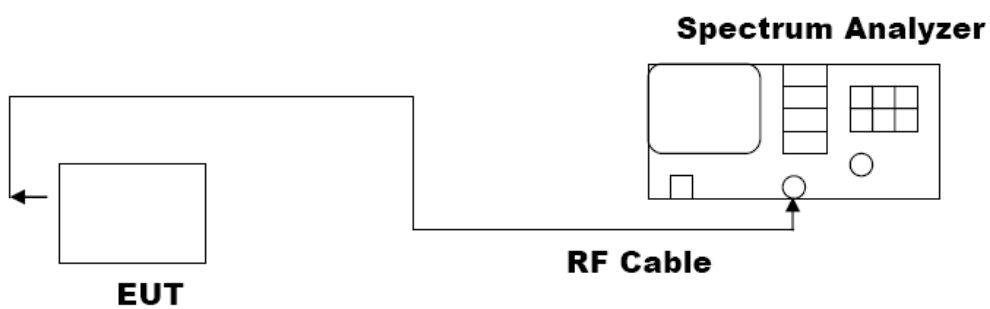
LIMITS AND MEASUREMENT RESULT				
Frequency (GHz)	Average Power (dBm)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail
5.180	9.54	10.93	16.079	Pass
5.210	9.34	10.54	16.079	Pass
5.240	9.25	10.49	16.079	Pass

8. EMISSION BANDWIDTH

8.1. MEASUREMENT PROCEDURE

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= approximately 1% of the emission bandwidth, $VBW \geq RBW$.
4. Set SPA Trace 1 Max hold, then View.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

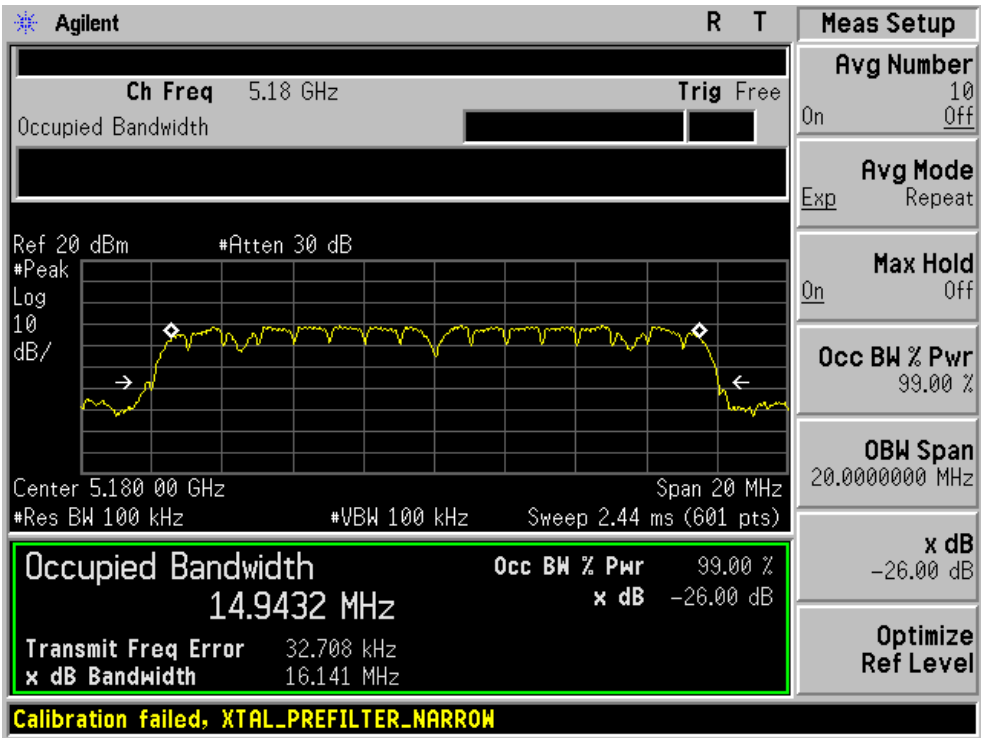


8.3. LIMITS AND MEASUREMENT RESULTS

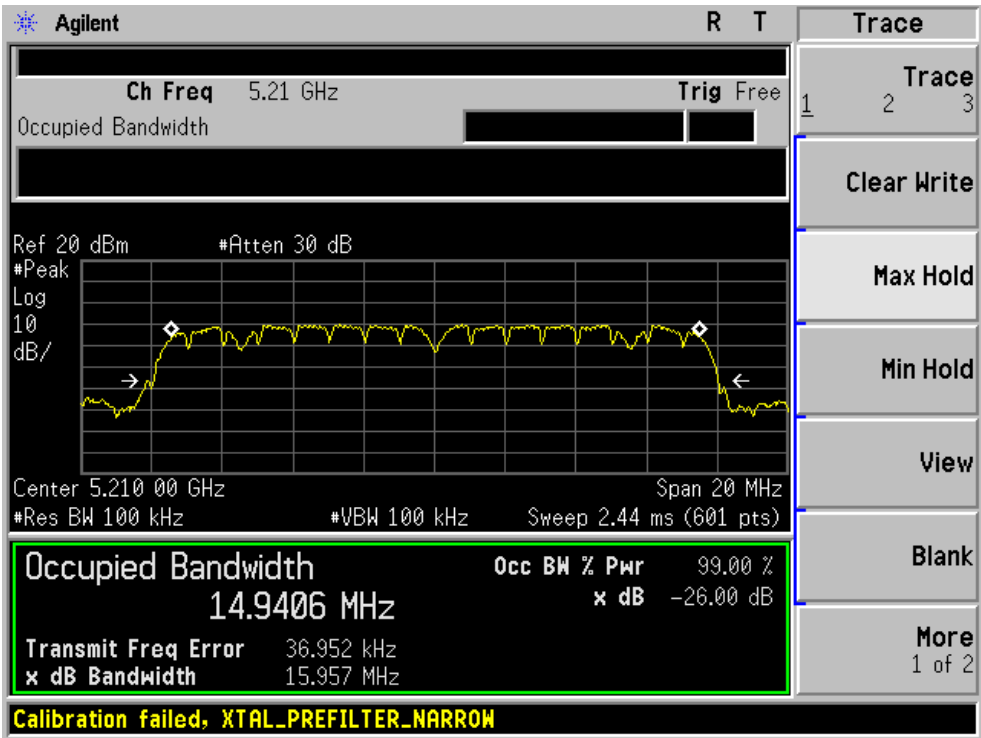
TEST ITEM	EMISSION BANDWIDTH
-----------	--------------------

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (MHz)		Criteria
N/A	Low Channel	16.14	PASS
	Middle Channel	15.96	PASS
	High Channel	15.97	PASS

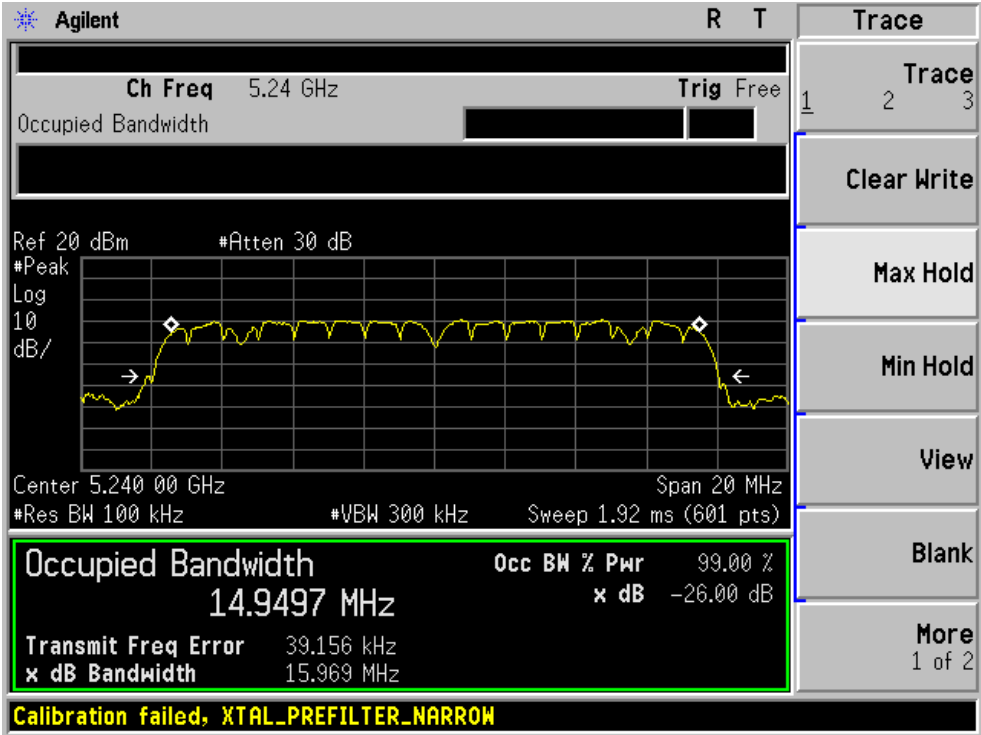
TEST RESULT
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



9. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

9.1 MEASUREMENT PROCEDURE

- (1). The EUT was placed on a turn table which is 0.8m above ground plane.
- (2). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (3). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (4). Set SPA Trace 1 Max hold, then View.

9.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 8.2.

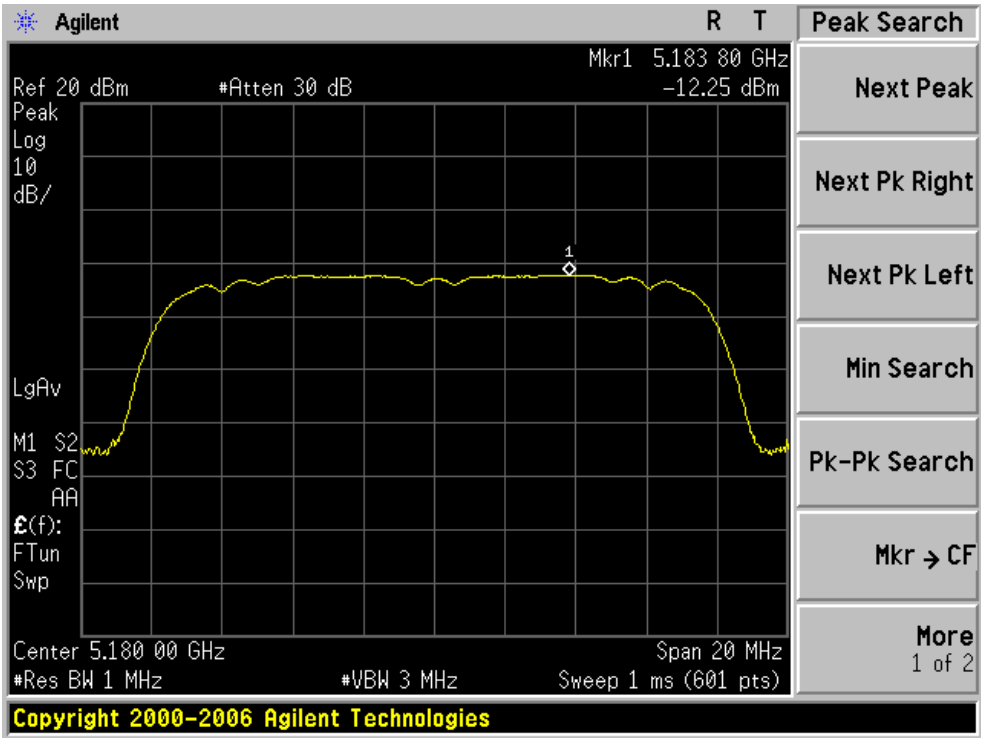
9.3 MEASUREMENT EQUIPMENT USED

Refer To Section 6.

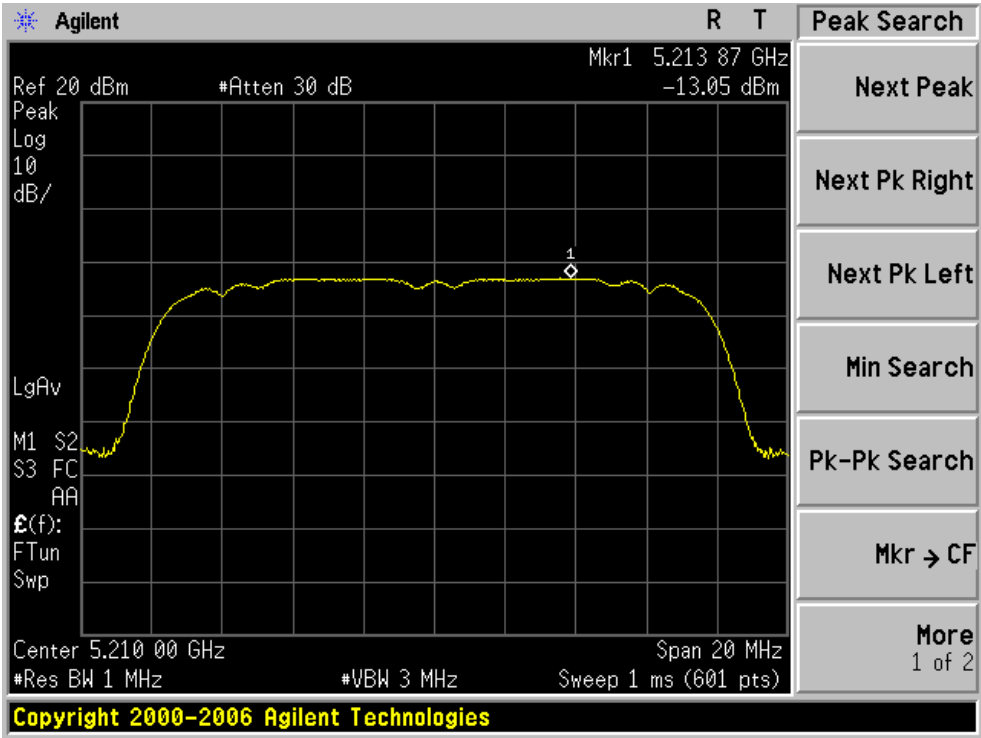
9.4 LIMITS AND MEASUREMENT RESULT

TEST ITEM	POWER PECTRAL DENSITY		
Channel No.	PSD (dBm)	Limit (dBm)	Result
Low Channel	-12.25	4	Pass
Middle Channel	-13.05	4	Pass
High Channel	-12.67	4	Pass

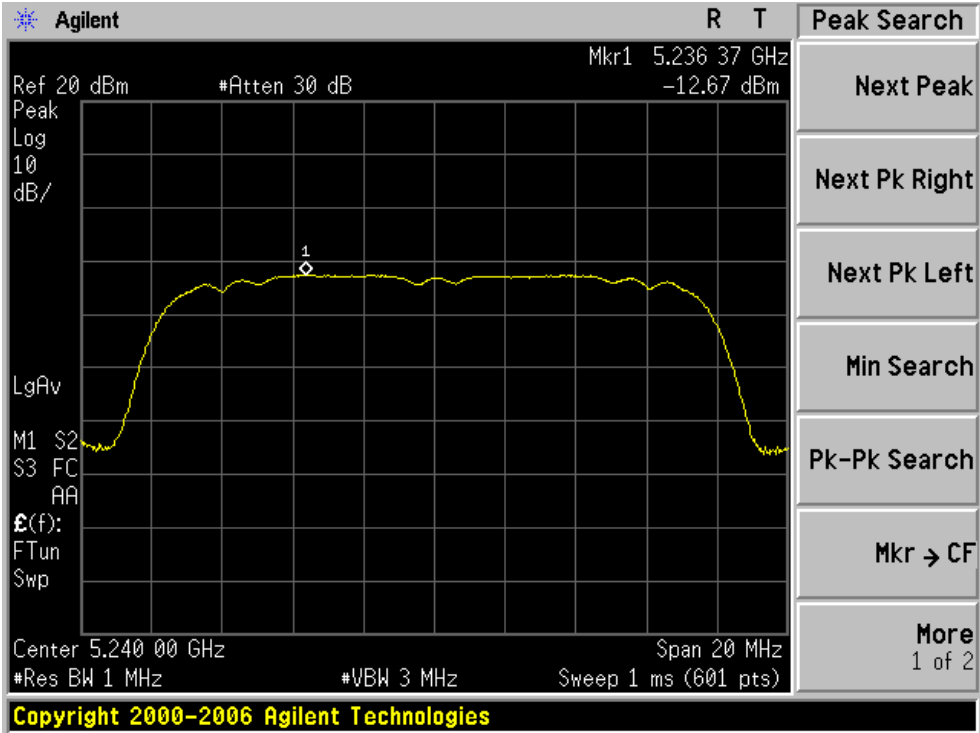
TEST RESULT
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



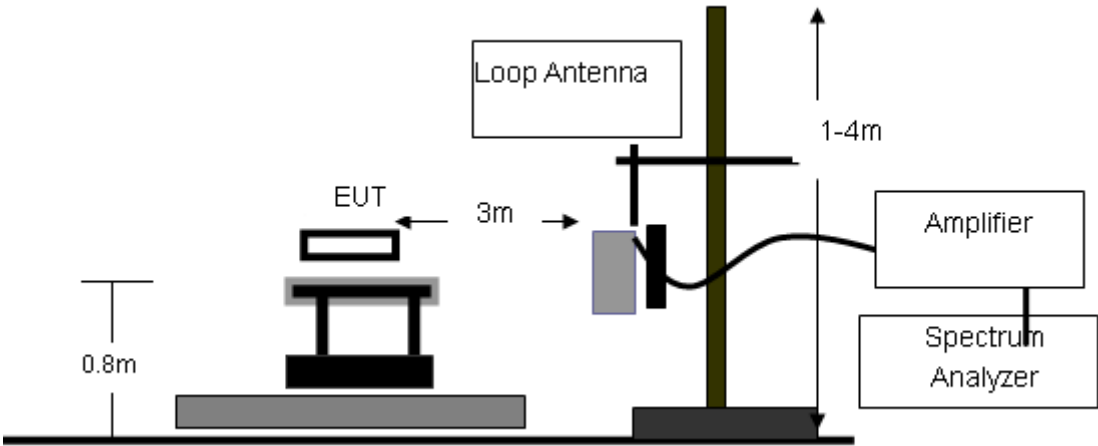
10. RADIATED EMISSION

10.1. MEASUREMENT PROCEDURE

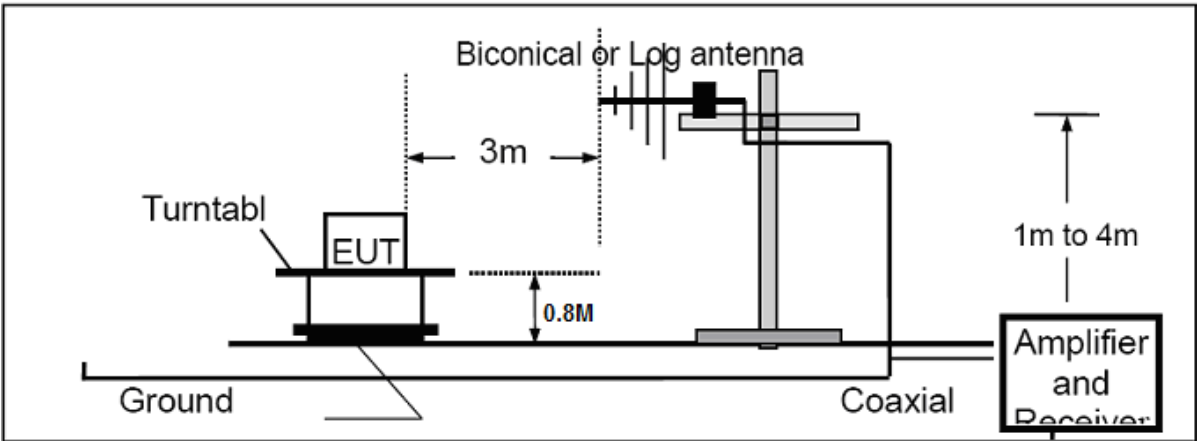
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

10.2. TEST SETUP

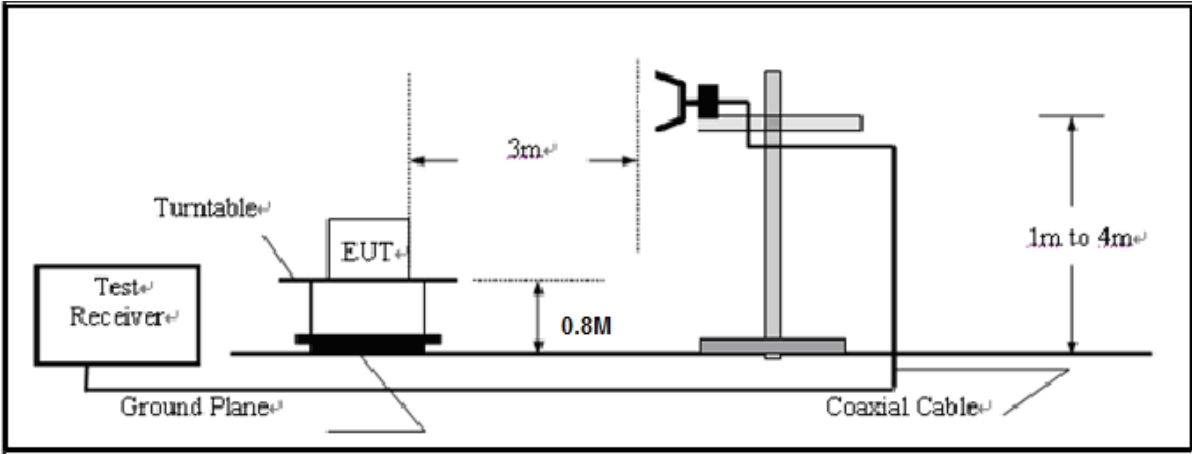
RADIATED EMISSION TEST SETUP BELOW 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



10.3. LIMITS AND MEASUREMENT RESULT

15.209(a) Limit in the below table 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

Note: All modes were tested For restricted band radiated emission,
the test records reported below are the worst result compared to other modes.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
5150~5250	68.2dBuv/m	3

Note: Above is unrestricted emission results.

10.4. TEST RESULT

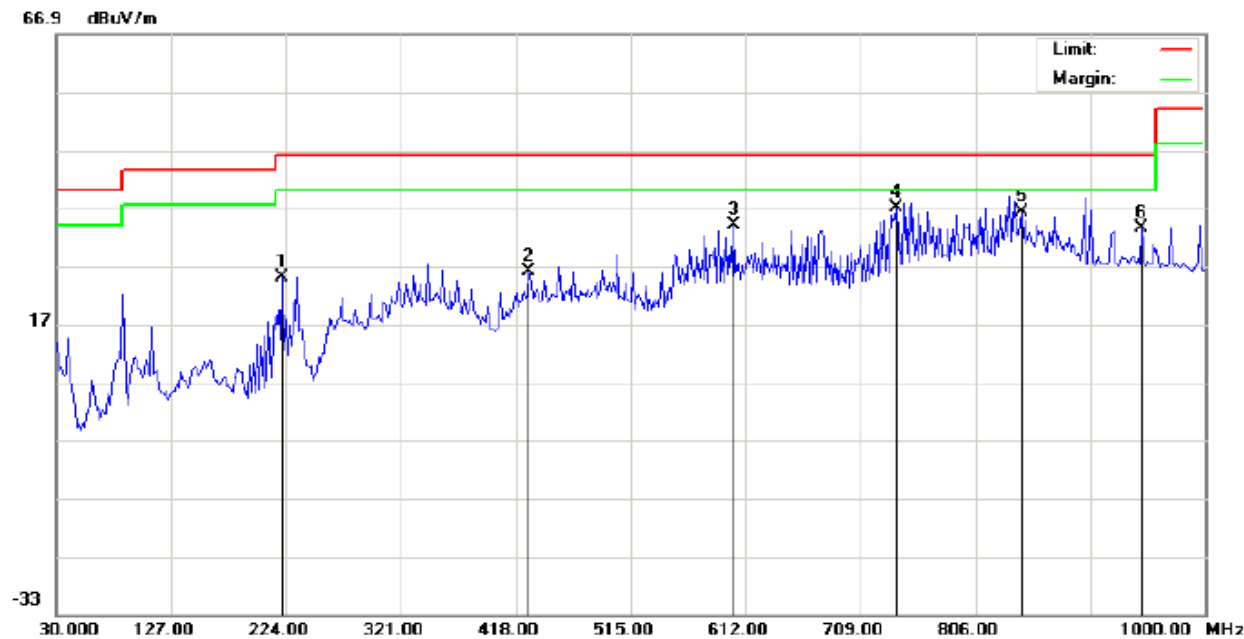
RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	5180MHZ TX	Antenna	Horizontal

Radiated Emission Measurement



Site: site #1

Limit: FCC Class B 3M Radiation

EUT: SAM88

M/N: SAM88

Mode: Low Channel TX

Note:

Polarization: *Horizontal*

Power:

Distance:

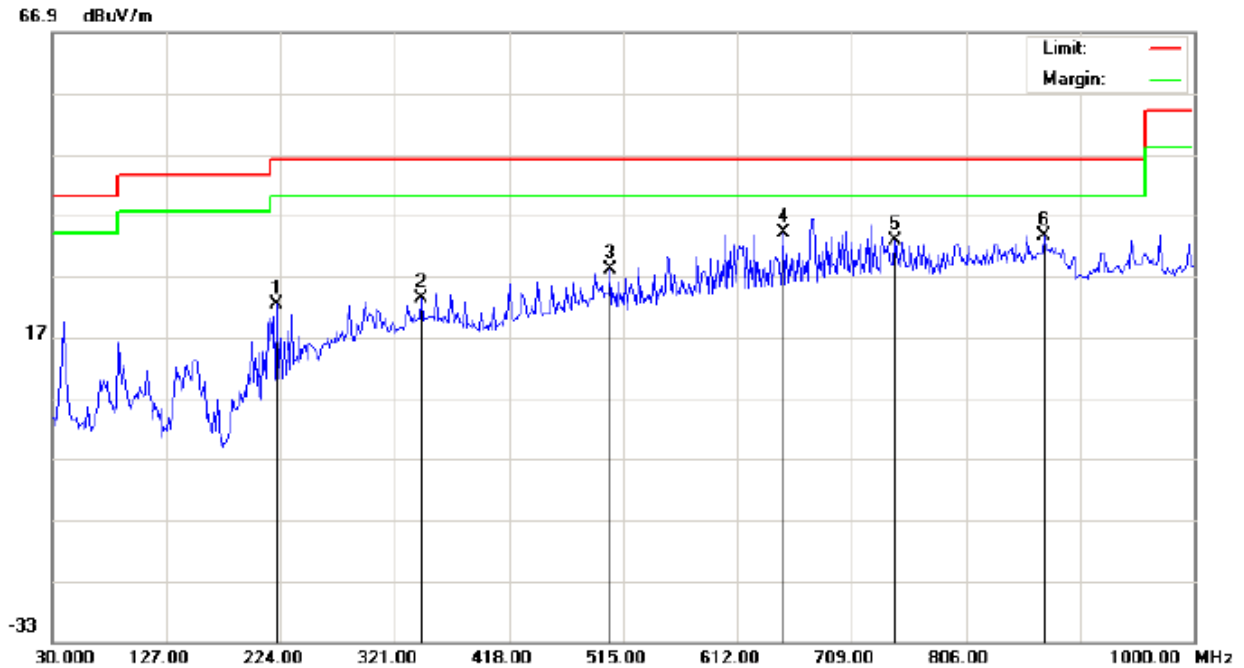
Temperature: 26

Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		220.7667	12.37	12.75	25.12	46.00	-20.88	peak			
2		429.3167	5.10	20.81	25.91	46.00	-20.09	peak			
3		602.3000	8.88	25.04	33.92	46.00	-12.08	peak			
4	*	739.7167	9.89	27.05	36.94	46.00	-9.06	peak			
5		844.8000	4.22	32.04	36.26	46.00	-9.74	peak			
6		946.6500	6.31	27.16	33.47	46.00	-12.53	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	5180MHZ TX	Antenna	Vertical

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: SAM88
M/N: SAM88
Mode: Low Channel TX
Note:

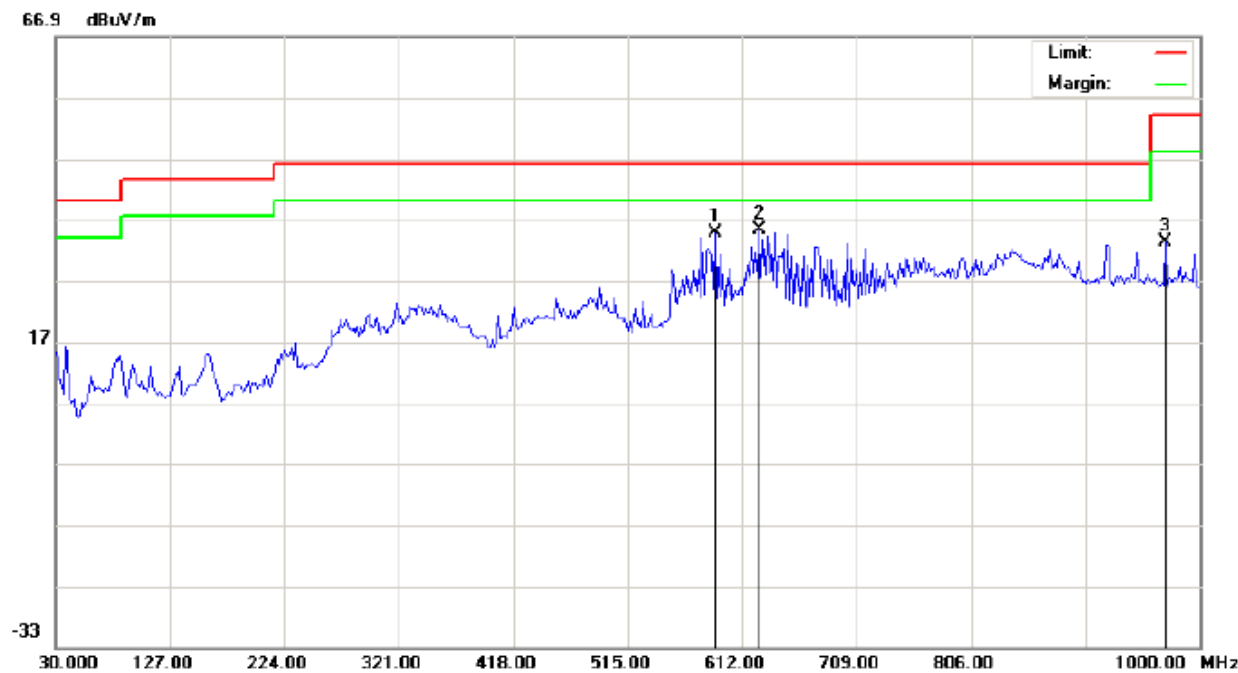
Polarization: **Vertical**
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq. MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		220.7667	14.52	7.84	22.36	46.00	-23.64	peak			
2		343.6333	2.99	20.30	23.29	46.00	-22.71	peak			
3		503.6833	5.27	22.66	27.93	46.00	-18.07	peak			
4	*	650.8000	8.21	25.71	33.92	46.00	-12.08	peak			
5		746.1833	3.85	28.97	32.82	46.00	-13.18	peak			
6		872.2833	2.53	31.06	33.59	46.00	-12.41	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	5210MHZ TX	Antenna	Horizontal

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: SAM88
M/N: SAM88
Mode: Middle Channel TX
Note:

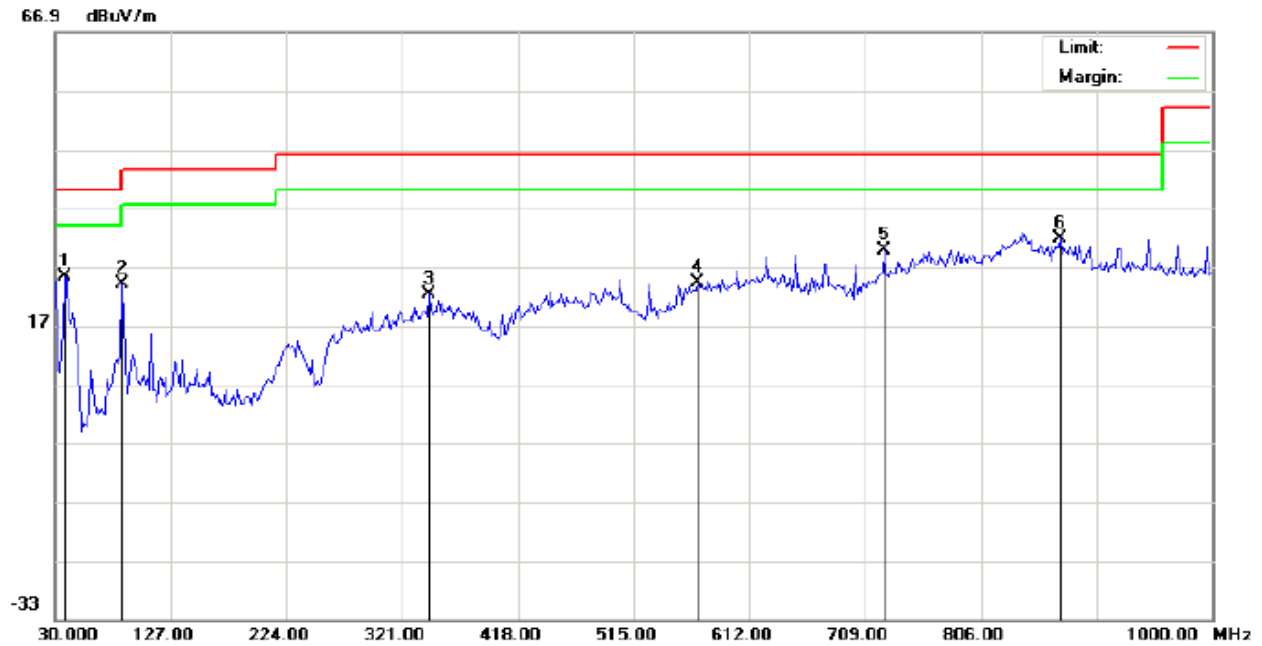
Polarization: *Horizontal*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		589.3667	9.95	24.73	34.68	46.00	-11.32	peak			
2	*	626.5500	9.51	25.76	35.27	46.00	-10.73	peak			
3		970.9000	6.54	26.75	33.29	54.00	-20.71	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	5210MHZ TX	Antenna	Vertical

Radiated Emission Measurement



Site: site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: SAM88

Distance:

M/N: SAM88

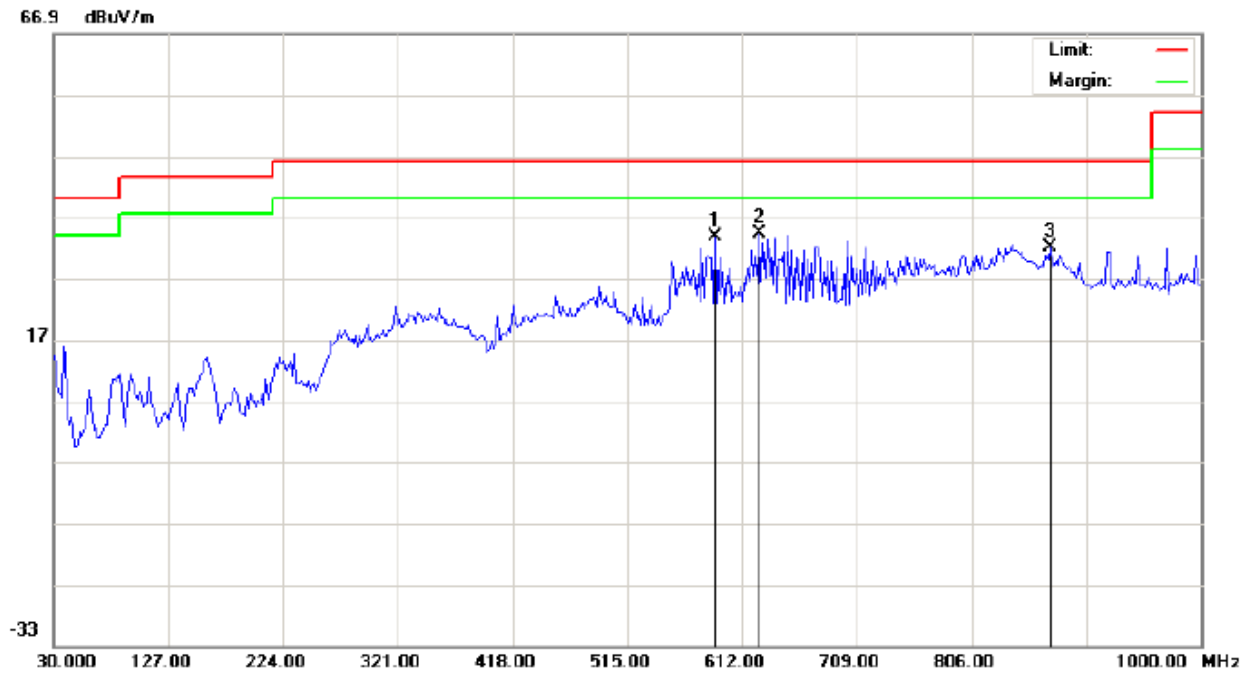
Mode: Middle Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		38.0833	16.67	8.60	25.27	40.00	-14.73	peak			
2		86.5833	14.51	9.48	23.99	40.00	-16.01	peak			
3		343.6333	2.02	20.30	22.32	46.00	-23.68	peak			
4		568.3500	0.06	24.12	24.18	46.00	-21.82	peak			
5		725.1667	3.76	25.93	29.69	46.00	-16.31	peak			
6	*	872.2833	1.50	30.32	31.82	46.00	-14.18	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	5240MHZ TX	Antenna	Horizontal

Radiated Emission Measurement



Site: site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: SAM88

Distance:

M/N: SAM88

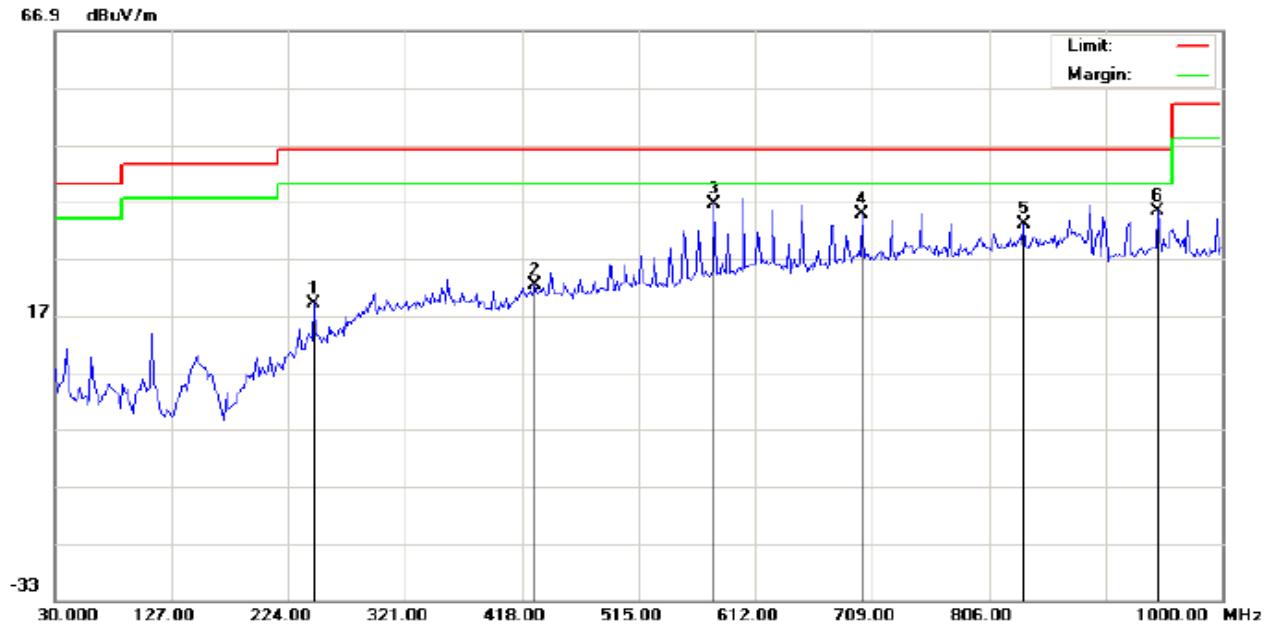
Mode: High Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		589.3667	8.95	24.73	33.68	46.00	-12.32	peak			
2	*	626.5500	8.51	25.76	34.27	46.00	-11.73	peak			
3		872.2833	1.64	30.32	31.96	46.00	-14.04	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	5240MHZ TX	Antenna	Vertical

Radiated Emission Measurement



Site: site #1

Polarization: *Vertical*

Temperature: 26

Limit: FCC Class B 3M Radiation

Power:

Humidity: 60 %

EUT: SAM88

Distance:

M/N: SAM88

Mode: High Channel TX

Note:

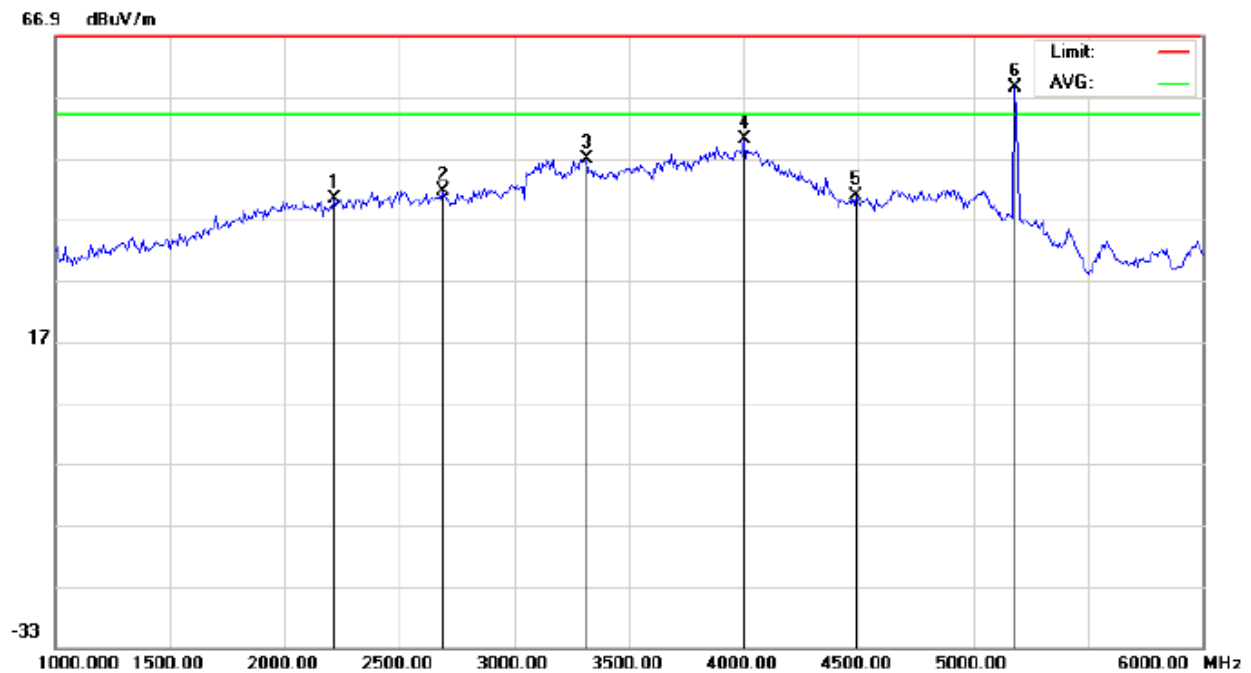
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		245.0167	6.82	12.33	19.15	46.00	-26.85	peak			
2		429.3167	1.06	21.34	22.40	46.00	-23.60	peak			
3	*	578.0500	12.13	24.49	36.62	46.00	-9.38	peak			
4		700.9167	7.14	27.63	34.77	46.00	-11.23	peak			
5		835.1000	3.03	30.07	33.10	46.00	-12.90	peak			
6		946.6500	6.77	28.53	35.30	46.00	-10.70	peak			

Note: Measurement= Reading + Factor, Over=Measure-Limit.

RADIATED EMISSION ABOVE 1GHZ

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	5180MHZ TX	Antenna	Horizontal

Radiated Emission Measurement



Site: site #1

Polarization: *Horizontal*

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: SAM88

Distance:

M/N: SAM88

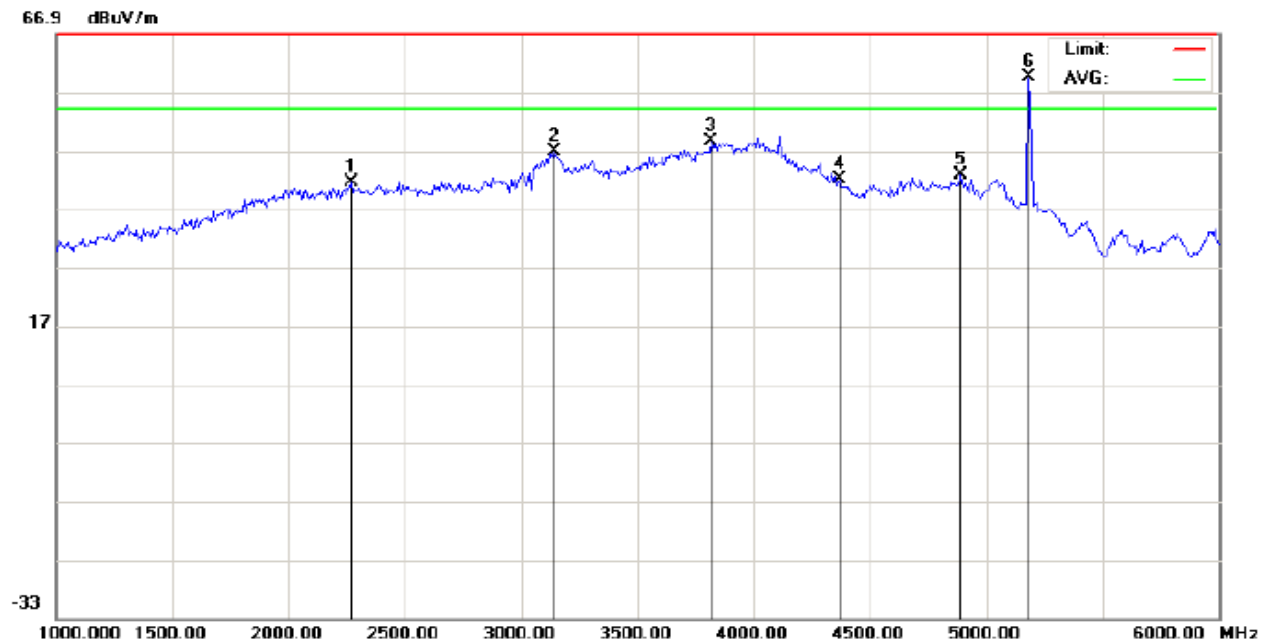
Mode: Low Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2216.667	30.22	10.12	40.34	74.00	-33.66	peak			
2		2691.667	30.56	10.89	41.45	74.00	-32.55	peak			
3		3316.667	34.72	11.94	46.66	74.00	-27.34	peak			
4		4000.000	34.78	15.19	49.97	74.00	-24.03	peak			
5		4491.667	33.68	7.03	40.71	74.00	-33.29	peak			
6	*	5183.333	54.11	4.53	58.64	74.00	-15.36	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	5180MHZ TX	Antenna	Vertical

Radiated Emission Measurement



Site: site #1

Polarization: **Vertical**

Temperature: 26

Limit: FCC Class B 3M Radiation above 1GHZ(PK)

Power:

Humidity: 60 %

EUT: SAM88

Distance:

M/N: SAM88

Mode: Low Channel TX

Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2266.667	31.48	10.17	41.65	74.00	-32.35	peak			
2		3141.667	34.97	11.77	46.74	74.00	-27.26	peak			
3		3816.667	34.44	14.06	48.50	74.00	-25.50	peak			
4		4366.667	32.84	9.10	41.94	74.00	-32.06	peak			
5		4891.667	34.86	7.92	42.78	74.00	-31.22	peak			
6	*	5183.333	55.10	4.53	59.63	74.00	-14.37	peak			

Note: Measurement= Reading + Factor, Over=Measure-Limit.

All modes radiation emission Above 6GHz at least have 20dB margin.

11. BAND EDGE EMISSION

11.1. MEASUREMENT PROCEDURE

1. Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency = Operation Frequency, $RBW \geq 1\% \text{span}$, $VBW \geq RBW$
3. The band edges was measured and recorded.

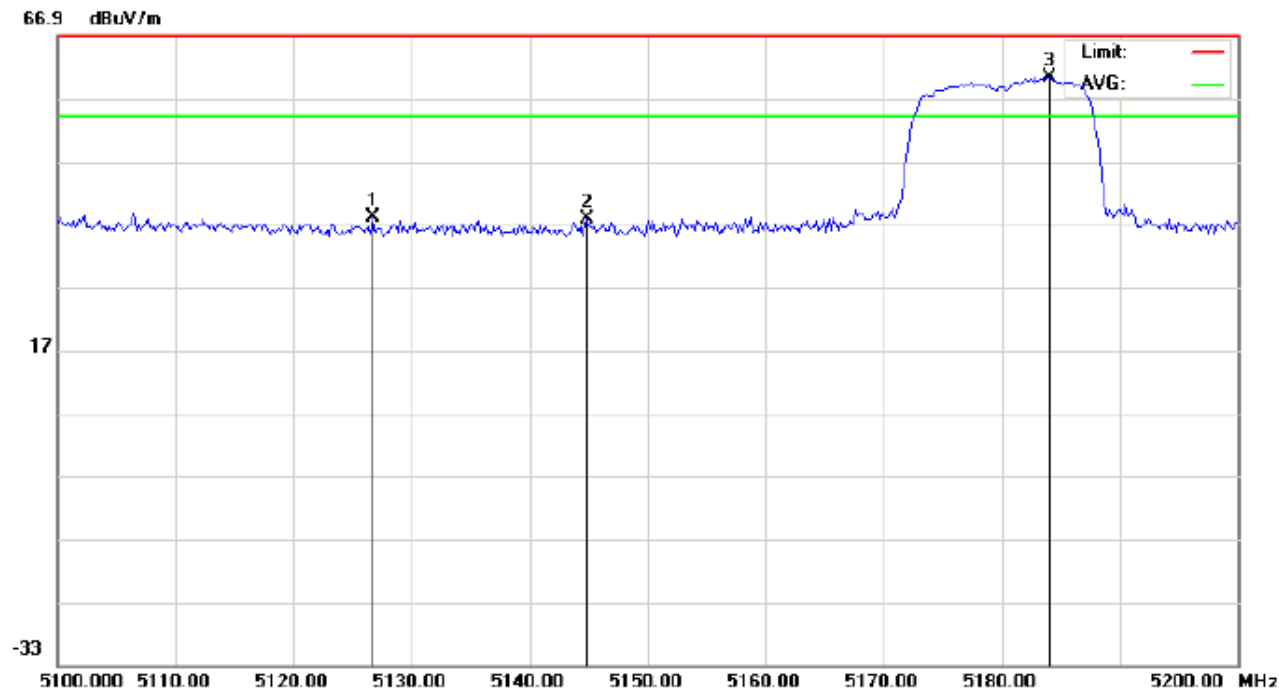
11.2. TEST SET-UP

Radiated same as 11.2

11.3. TEST RESULT

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Low Channel TX	Antenna	Horizontal

Radiated Emission Measurement

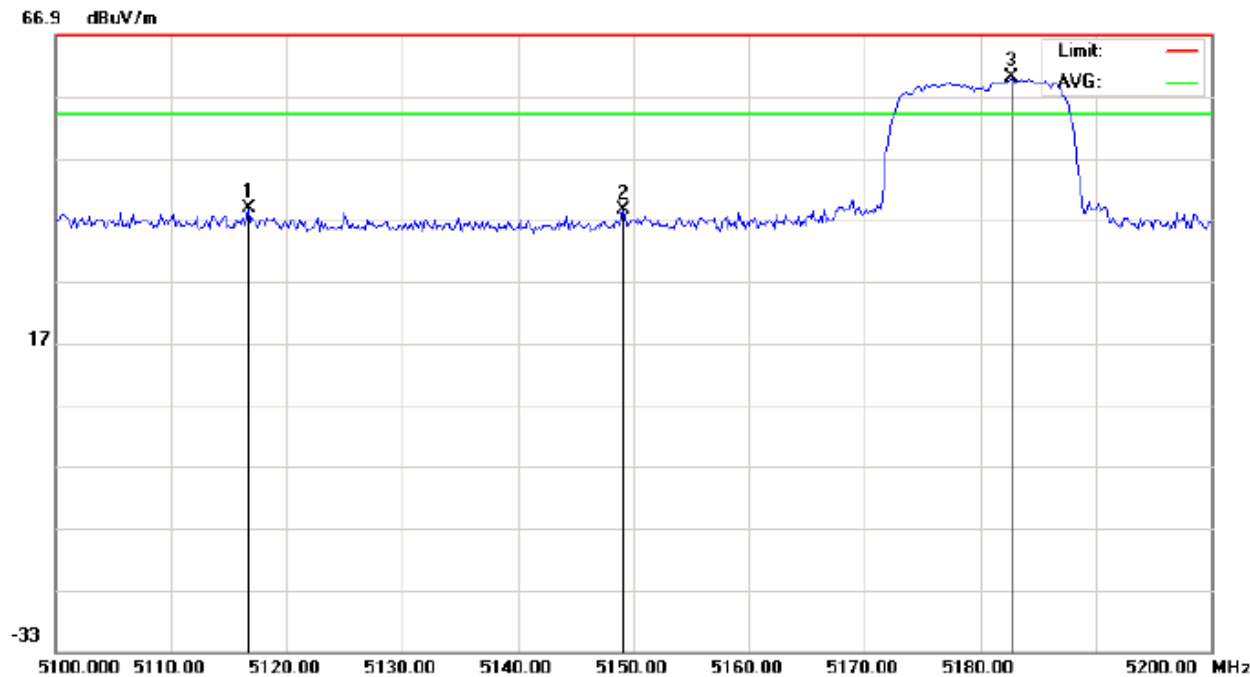


Site: site #1 Polarization: *Horizontal* Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: SAM88 Distance:
M/N: SAM88
Mode: Low Channel TX
Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		5126.667	32.43	5.66	38.09	74.00	-35.91	peak			
2		5144.833	32.47	5.30	37.77	74.00	-36.23	peak			
3	*	5184.000	55.73	4.52	60.25	74.00	-13.75	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Low Channel TX	Antenna	Vertical

Radiated Emission Measurement

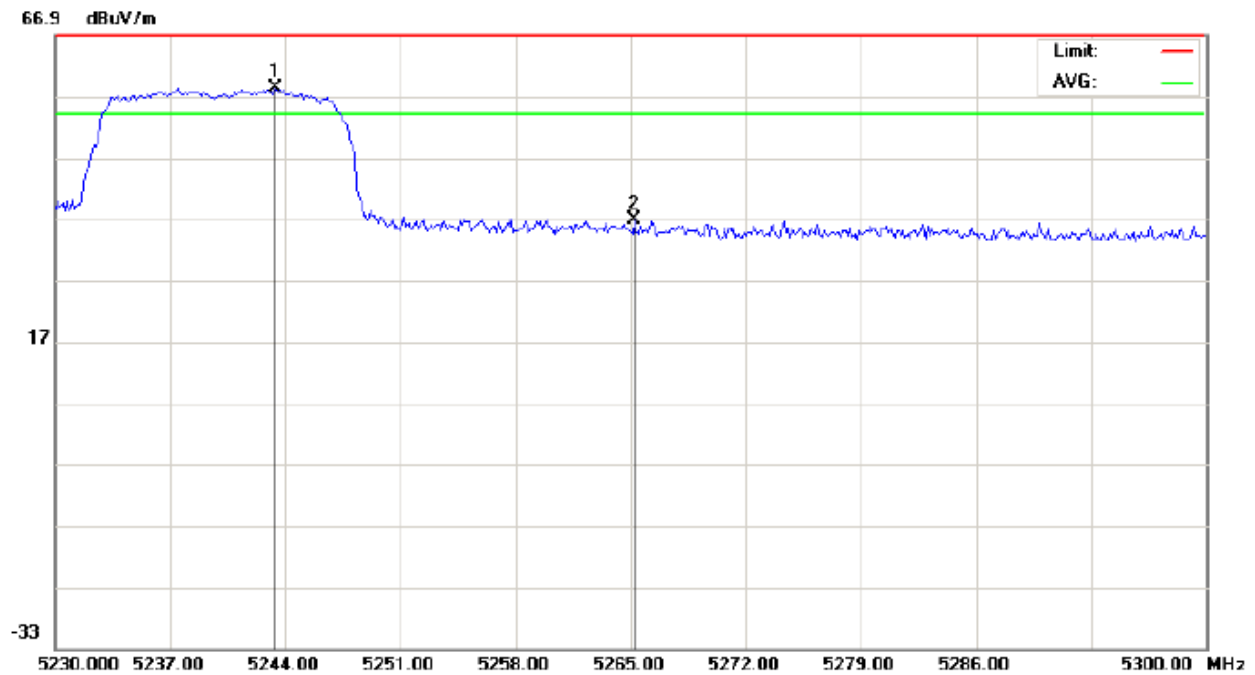


Site: site #1 Polarization: **Vertical** Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: SAM88 Distance:
M/N: SAM88
Mode: Low Channel TX
Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		5116.667	32.81	5.86	38.67	74.00	-35.33	peak			
2		5149.167	33.23	5.21	38.44	74.00	-35.56	peak			
3	*	5182.667	55.41	4.54	59.95	74.00	-14.05	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	High Channel TX	Antenna	Horizontal

Radiated Emission Measurement

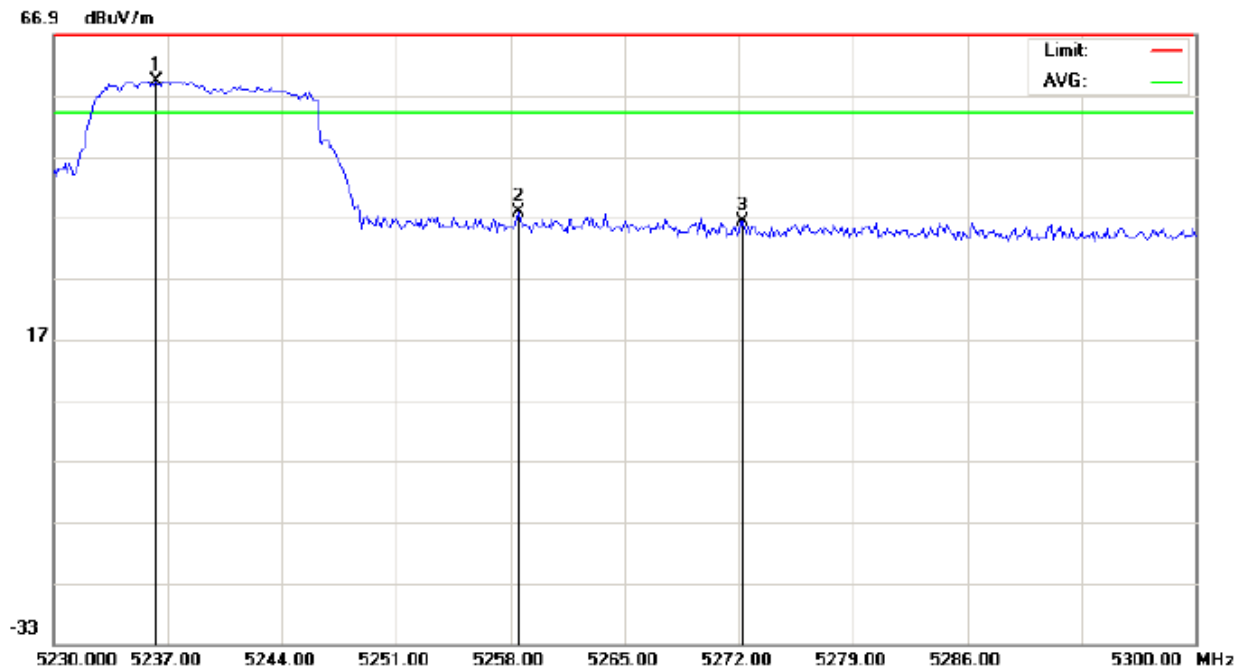


Site: site #1 Polarization: *Horizontal* Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: SAM88 Distance:
M/N: SAM88
Mode: High Channel TX
Note:

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	5243.417	54.98	3.33	58.31	74.00	-15.69	peak			
2		5265.233	33.90	2.89	36.79	74.00	-37.21	peak			

EUT	SAM88	Model Name	SAM88
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	High Channel TX	Antenna	Vertical

Radiated Emission Measurement



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHz(PK)
EUT: SAM88
M/N: SAM88
Mode: High Channel TX
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	5236.300	55.93	3.47	59.40	74.00	-14.60	peak			
2		5258.467	34.65	3.03	37.68	74.00	-36.32	peak			
3		5272.233	33.46	2.75	36.21	74.00	-37.79	peak			

Note: Measurement= Reading + Factor, Over=Measure-Limit.

12. FCC LINE CONDUCTED EMISSION TEST

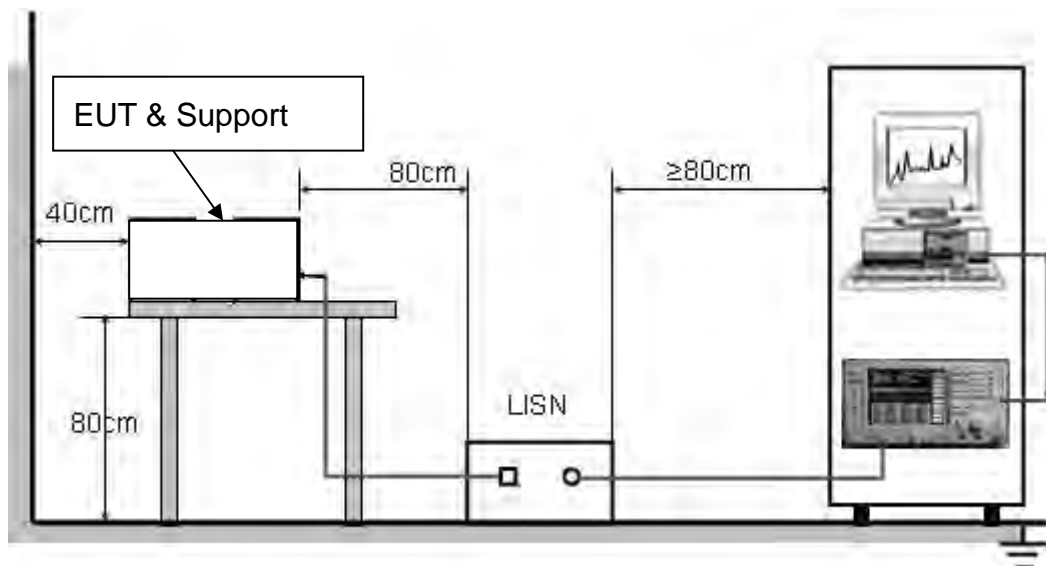
12.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC Voltage.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

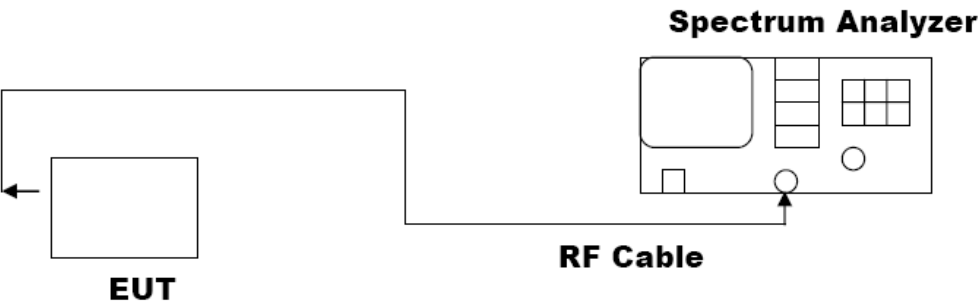
N/A

13 PEAK EXCURSION

13.1. PEAK EXCURSION LIMIT

Peak excursion of the modulation envelope shall not exceed 13 dB across any 1MHz bandwidth

13.2. BLOCK DIAGRAM OF PEAK EXCURSION TEST



13.3. TEST PROCEDURES

- 1.Set RBW=1MHz,VBW=3MHz,Detector=Peak
2. Trace mode=max-hold, Allow the sweeps to continue until the trace stabilizes.
3. Use the peak search function to find the peak of the spectrum.
4. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD

13.4. TEST RESULT

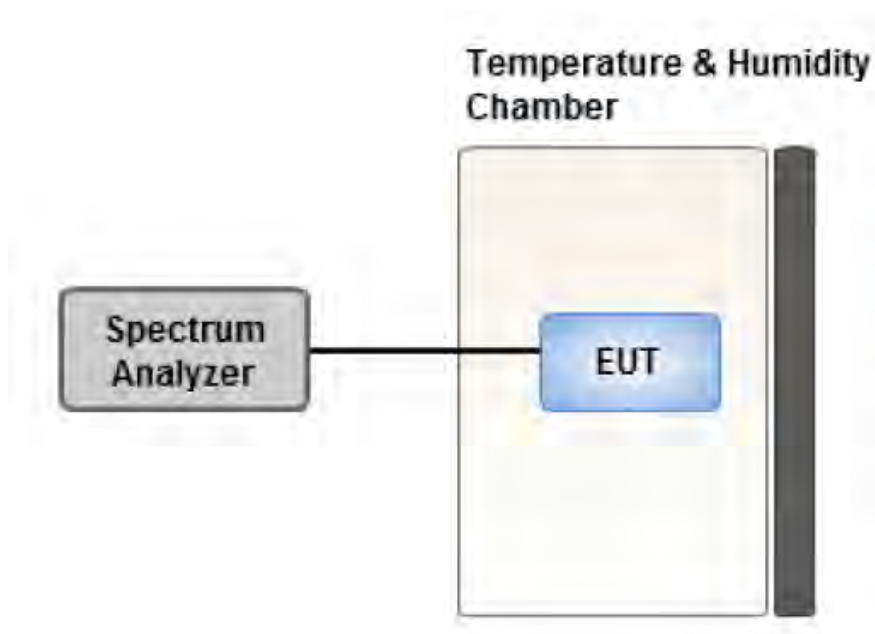
Channel	Peak Excursion	Limit	Result
Low	8.73	13	Pass
Middle	8.52	13	Pass
High	8.64	13	Pass

14 FREQUENCY STABILITY

14.1. LIMIT OF FREQUENCY STABILITY

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

14.2. BLOCK DIAGRAM OF PEAK EXCURSION TEST



14.3. TEST PROCEDURES

1. The EUT is placed in an environment test chamber with external power source.
2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT
3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.
4. When temperature is stabilized, measure the frequency stability.
5. The test shall be performed under -10 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.

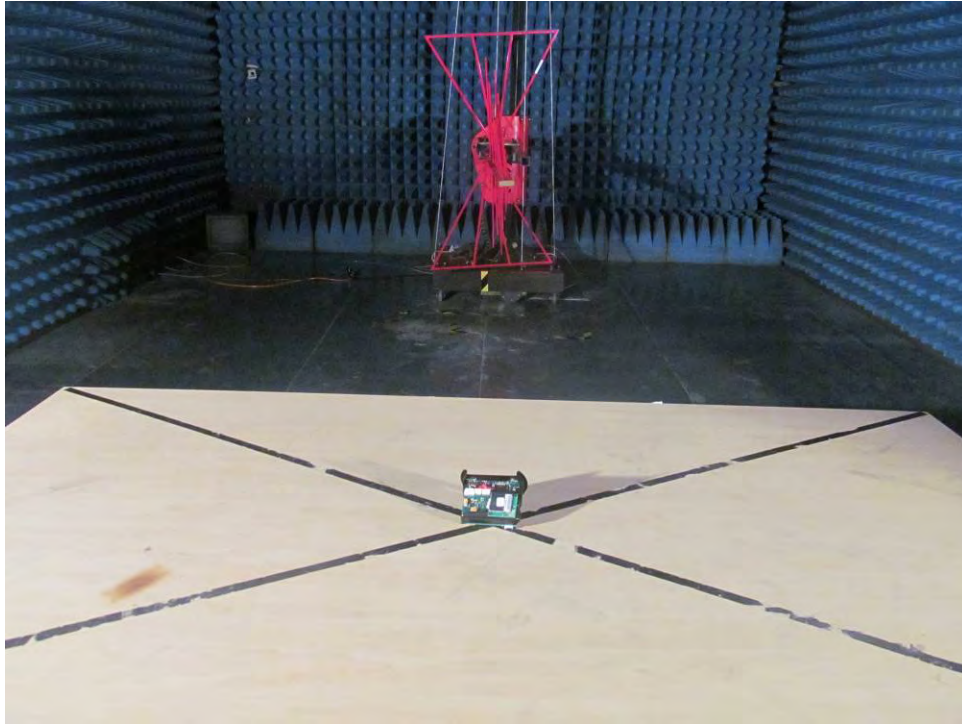
14.4. TEST RESULT

Worst Test Case: Low Channel

Temperature(°C)	Frequency Drift(ppm)		
	DC3.7V	DC3.5V	DC4.2V
50	1.33	3.24	2.15
40	2.54	2.64	2.47
30	0.65	-0.23	2.68
20	1.77	2.38	1.54
10	5.32	3.14	1.47
0	1.56	1.42	3.16
-10	2.34	2.34	2.54

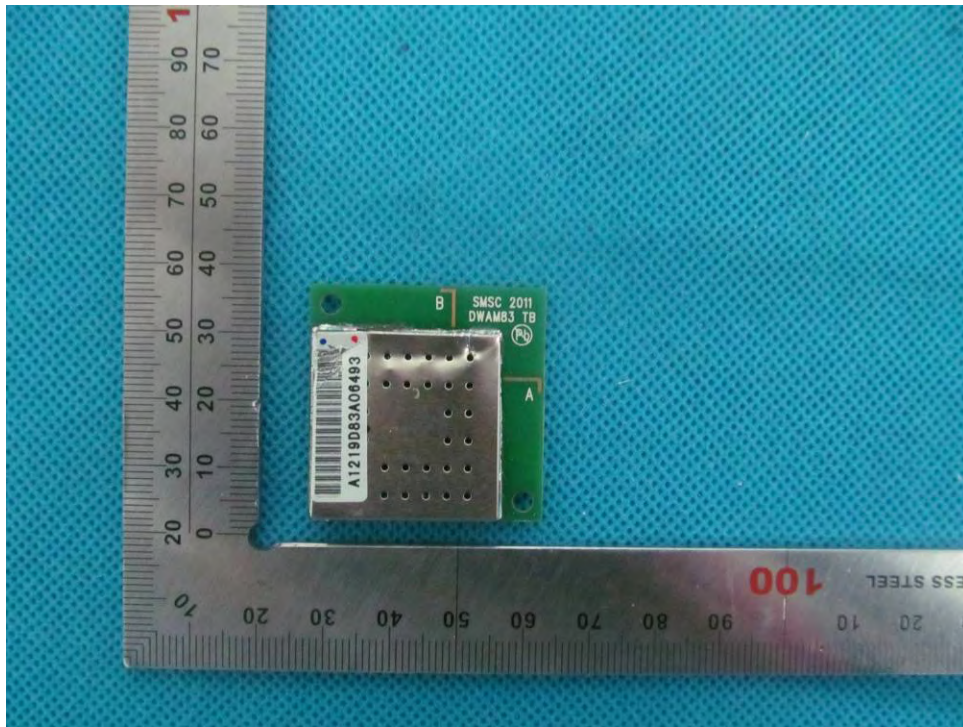
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC RADIATED EMISSION TEST SETUP

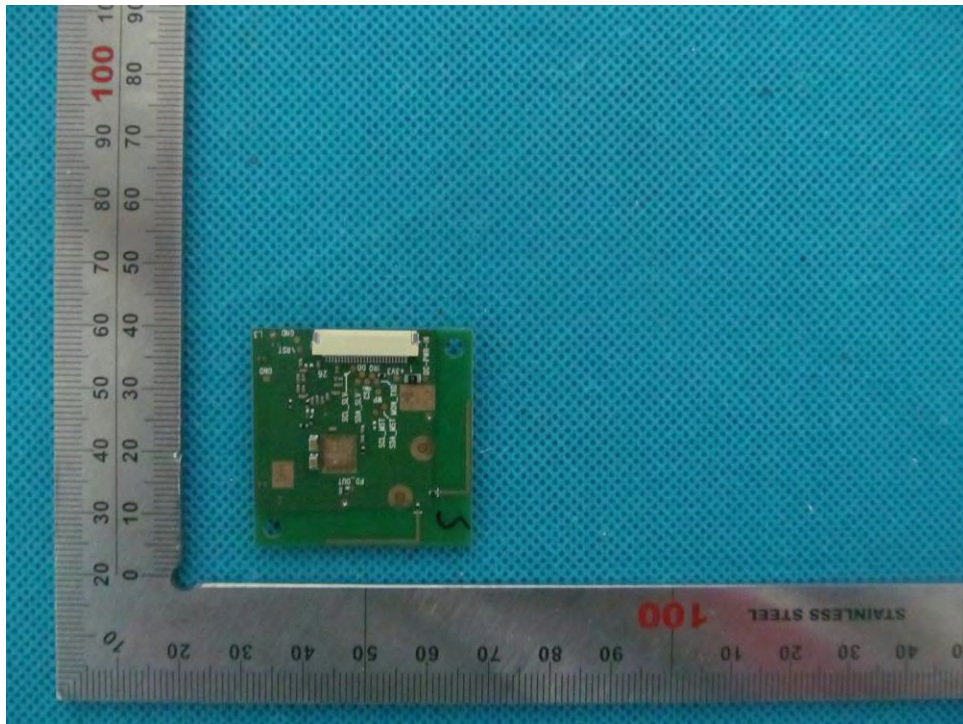


APPENDIX B: PHOTOGRAPHS OF EUT

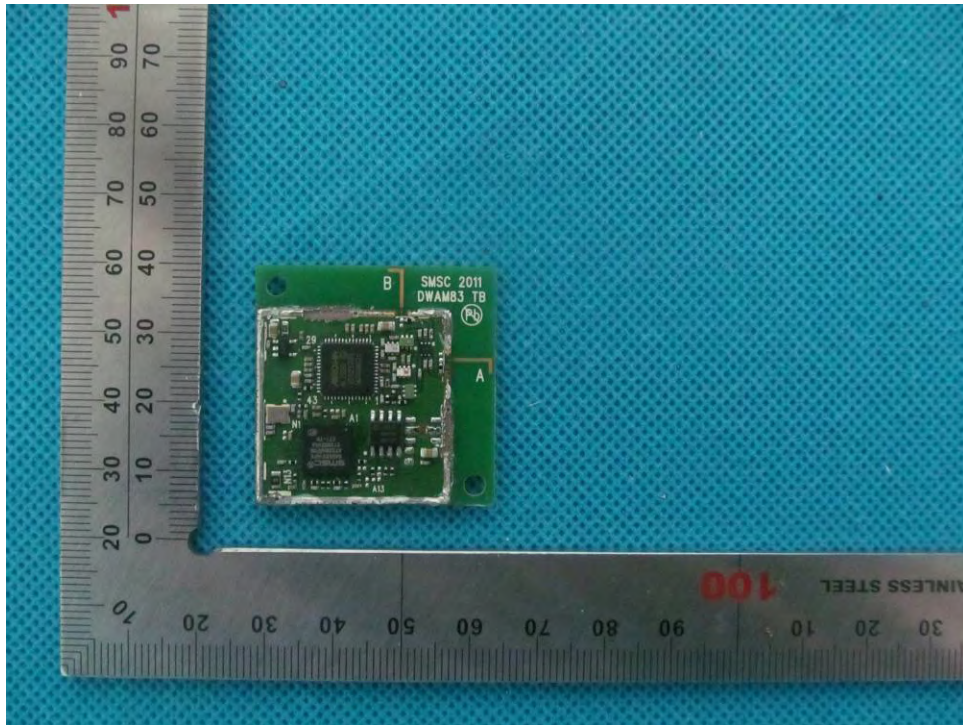
TOP VIEW OF EUT



BOTTOM VIEW OF EUT



OPEN VIEW OF EUT



-----END OF REPORT-----