

FCC Radio Test Report

FCC ID: ZZT-MED2XKEY

Report No. : TB-FCC111946
Applicant : Sanji Electronics(pty)., Ltd.
Equipment Under Test (EUT)
EUT Name : wireless keyboard
Model No. : MED2XKEY
Serial No. : AK601, KB2119, BK-1816.
Brand Name : N/A
Receipt Date : 2011-09-01
Test Date : 2011-09-02 to 2011-09-09
Issue Date : 2011-09-14
Standards : FCC Part 15, Subpart C (15.249)
Test Method : ANSI C63.4:2003
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC requirements

Test/Witness Engineer : *Ray Lai*

Approved& Authorized : *Sachy Wong*

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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1. General Information About EUT

1.1 Client Information

Applicant	:	Sanji Electronics(pty)., Ltd.
Address	:	106,16th Road, Midrand, Gauteng, South Africa.
Manufacturer	:	Acutech Inc.
Address	:	Room B, 15F, No.354, Zhengan Road Centrel, Zhangan Town, Dongguan, GuangDong, China

1.2 General Description of EUT (Equipment Under Test)

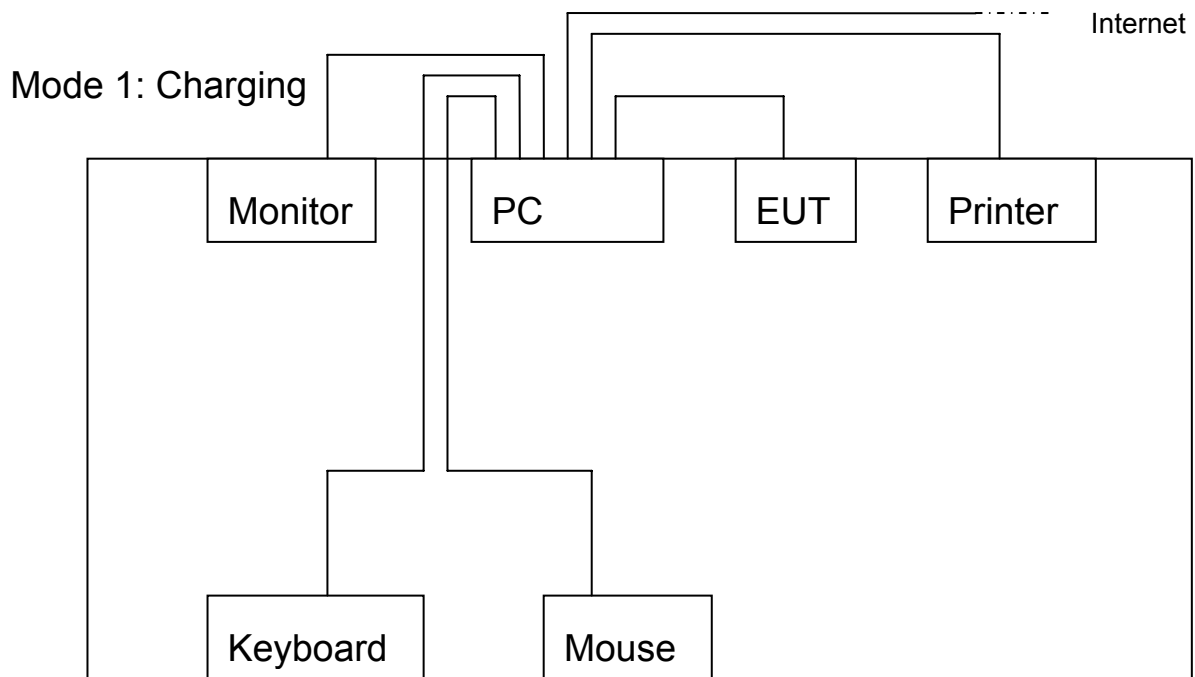
EUT Name	:	wireless keyboard	
Models No.	:	MED2XKEY, AK601, KB2119, BK-1816.	
Model Difference	:	The different models are identical in schematic, structure and critical component, the only different is the appearance.	
Product Description	:	Operation Frequency: 2407MHz~2476MHz	
		Number of Channel:	3 Channels see note (2)
		Out Power	77.44 dBuV/m (AV Max)
		Antenna Gain:	0 dBi
		Modulation Type:	FSK
Power Supply	:	DC Voltage supplied from Host System DC Voltage supplied from Li-ion batter	
Power Rating	:	DC 5.0V from Host System DC 3.7V from Li-ion battery	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

Note:

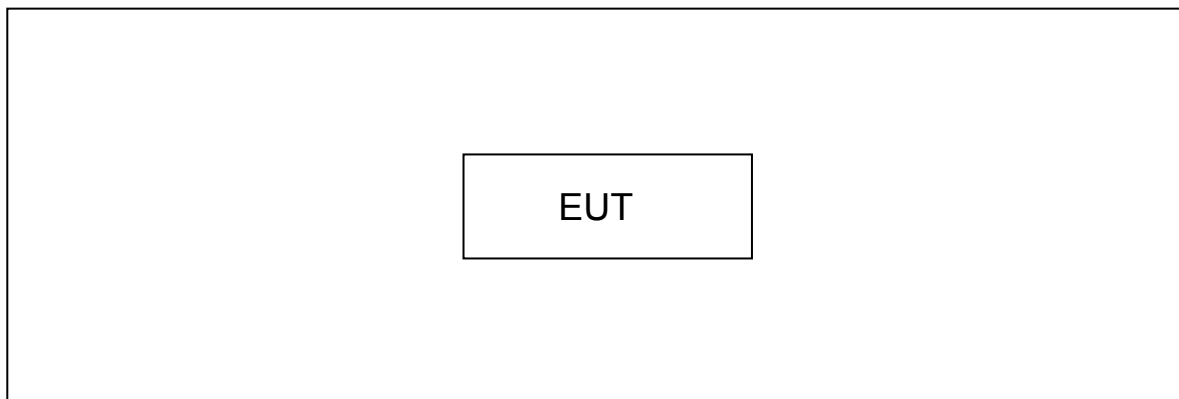
- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) Channel List:

Channel 1	Channel 2	Channel 3
2407MHz	2440MHz	2476MHz

1.3 Block Diagram Showing the Configuration of System Tested



Mode 2: TX Mode



1.4 Description of Support Units

Name	Model	S/N	Manufacturer	Used “√”
Printer	HP1505n	VNF3G06957	HP	√
LCD Monitor	E170Sc	----	DELL	√
PC	OPTIPLEX380	----	DELL	√
Keyboard	L100	U01C	DELL	√
Mouse	M-UARDEL7	----	DELL	√

1.5 Description of Test Mode

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 follow was evaluated respectively.

For Conducted Test	
Final Test Mode	Description
Mode 1	Charging Mode

For Radiated Test	
Final Test Mode	Description
Mode 2	TX Mode Channel 1/2/3

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) During the testing procedure, the continuously transmitting mode was programmed by the customer.

1.6 Test Facility

The tests were performed at:

Bontek Compliance Testing Laboratory Ltd

1/F., Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, 518055 China

Tel: 86-755-86337020 Fax: 86-755-86337028

At the time of testing, the Laboratory is accredited. It is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 338263.

The test report was fulfilled by Shenzhen Meihua Electronic Co., Ltd. Shenzhen Meihua Electronic Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements results.

2. Test Summary

FCC Part 15 Subpart C(15.249)			
Standard Section	Test Item	Judgment	Remark
15.203	Antenna Requirement	PASS	N/A
15.207	Conducted Emission	PASS	N/A
15.205	Restricted Bands	PASS	N/A
15.209,15.249	Radiated Emission	PASS	N/A
15.249	Antenna Conducted Spurious Emission	PASS	N/A
Note: N/A is an abbreviation for Not Applicable.			

3. Conducted Emission Test

3.1 Test Standard and Limit

3.1.1 Test Standard
FCC Part 15.207

3.1.2 Test Limit

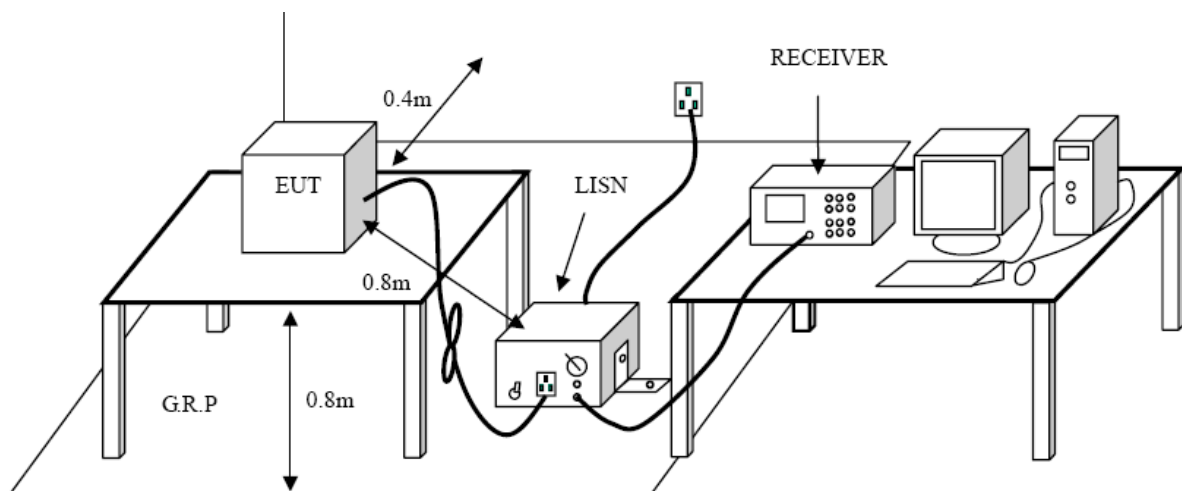
Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Notes:

- (1) *Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3.2 Test Setup



3.3 Test Procedure

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.

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.

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.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

3.4 Test Equipment Used

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
EMI Test Receiver	ROHDE& SCHWARZ	ESC30	DE25181	2011-08-11	2012-08-11
50ΩCoaxial Switch	Anritsu	MP59B	X10321	2011-08-11	2012-08-11
L.I.S.N	EMCO	3624/1	00063417	2011-08-11	2012-08-11
L.I.S.N	EMCO	3624/1	00063417	2011-08-11	2012-08-11

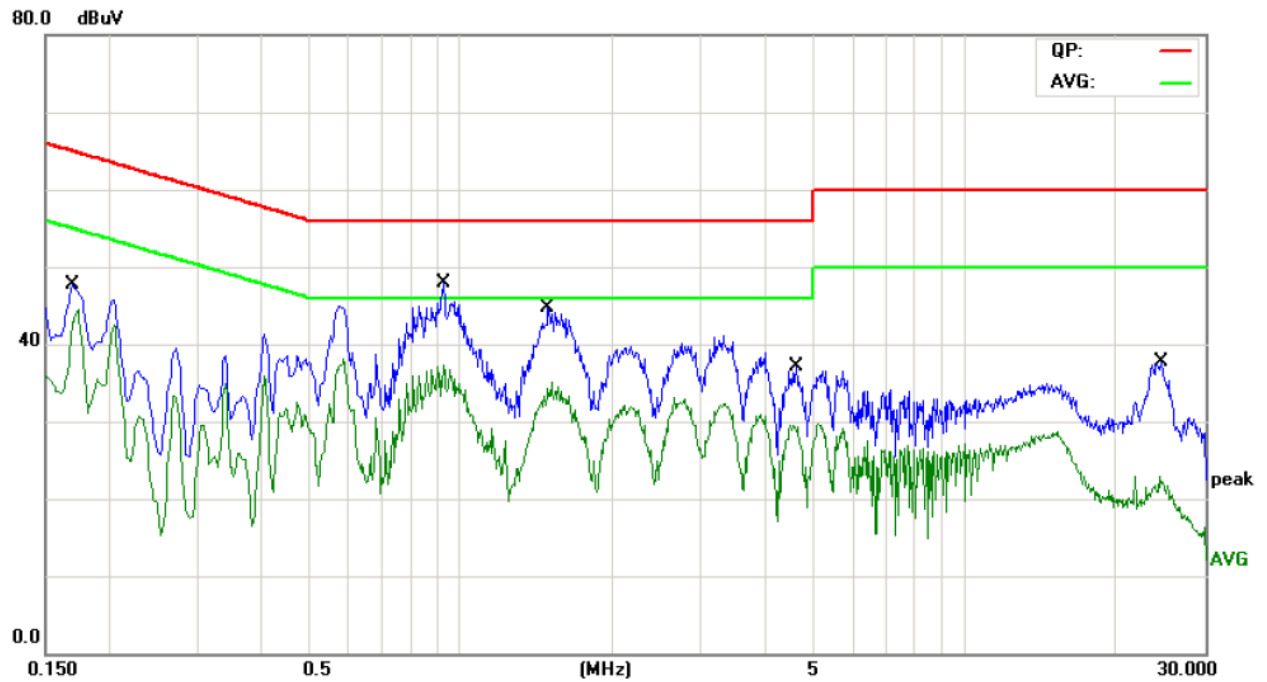
3.5 EUT Operating Mode

Please refer to the description of test mode.

3.6 Test Data

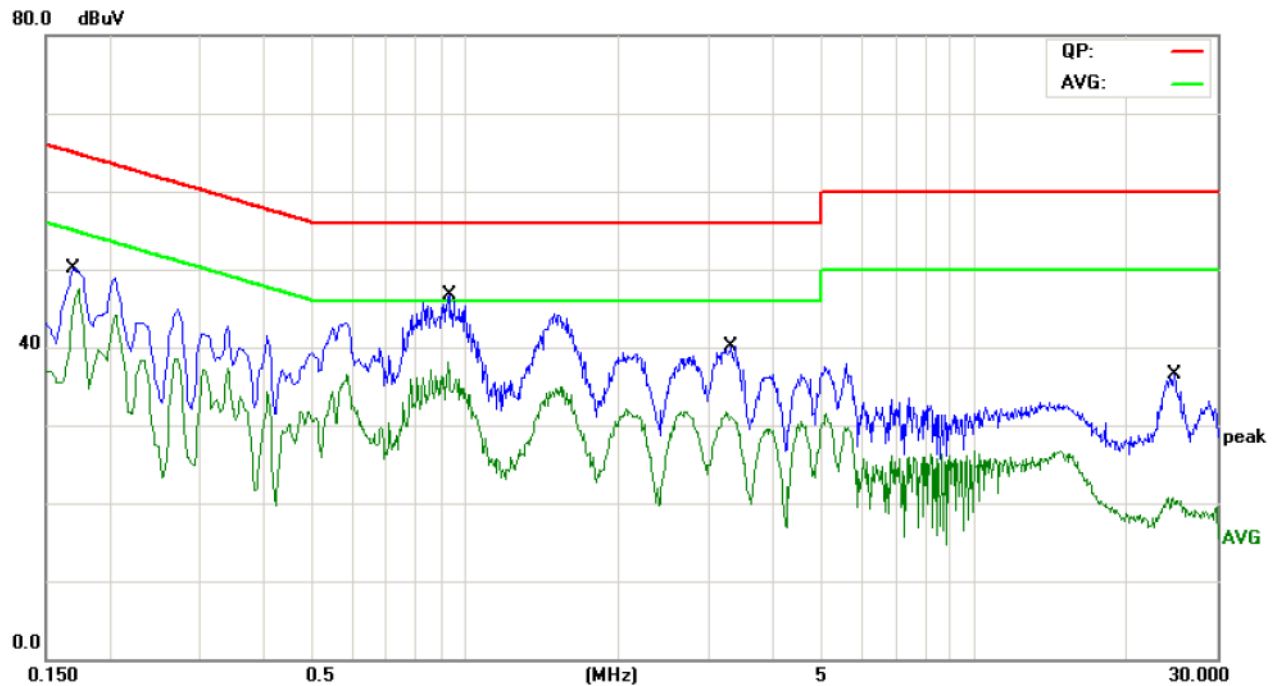
Please see the next page.

E.U.T :	wireless keyboard	Model Name :	MED2XKEY
Temperature :	23°C	Relative Humidity :	51 %
Terminal	Line		
Test Voltage :	AC 120 V / 60Hz		
Test Mode :	Charging Mode		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	38.66	10.67	49.33	64.96	-15.63	QP	
2	*	0.1700	35.83	10.67	46.50	54.96	-8.46	AVG	
3		0.9260	33.60	9.36	42.96	56.00	-13.04	QP	
4		0.9260	28.03	9.36	37.39	46.00	-8.61	AVG	
5		1.4900	30.85	9.32	40.17	56.00	-15.83	QP	
6		1.4900	25.08	9.32	34.40	46.00	-11.60	AVG	
7		4.6299	23.00	9.43	32.43	56.00	-23.57	QP	
8		4.6299	19.73	9.43	29.16	46.00	-16.84	AVG	
9		24.5300	14.97	10.16	25.13	60.00	-34.87	QP	
10		24.5300	3.43	10.16	13.59	50.00	-36.41	AVG	

E.U.T :	wireless keyboard	Model Name :	MED2XKEY
Temperature :	23°C	Relative Humidity :	51 %
Terminal	Neutral		
Test Voltage :	AC 120 V / 60Hz		
Test Mode :	Charging Mode		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	38.68	10.67	49.35	64.96	-15.61	QP	
2	*	0.1700	35.75	10.67	46.42	54.96	-8.54	AVG	
3		0.9300	32.50	9.36	41.86	56.00	-14.14	QP	
4		0.9300	26.77	9.36	36.13	46.00	-9.87	AVG	
5		3.3340	25.77	9.39	35.16	56.00	-20.84	QP	
6		3.3340	21.09	9.39	30.48	46.00	-15.52	AVG	
7		24.7180	19.30	10.23	29.53	60.00	-30.47	QP	
8		24.7180	8.02	10.23	18.25	50.00	-31.75	AVG	

4. Radiated Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard

FCC Part 15.209

FCC Part 15.249

4.1.2 Test Limit

Radiated Emission Limit (9kHz~1000MHz) (15.209)

Frequency (MHz)	Field Strength (microvolt/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

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or comply with the radiated emissions limits specified in section 15.209(a) limit in the table below has to be followed.

Radiated Emission Limit (Above 1000MHz) (15.209)

Frequency (MHz)	Class A (dBuV/m)(at 3 M)		Class B (dBuV/m)(at 3 M)	
	Peak	Average	Peak	Average
Above 1000	80	60	74	54

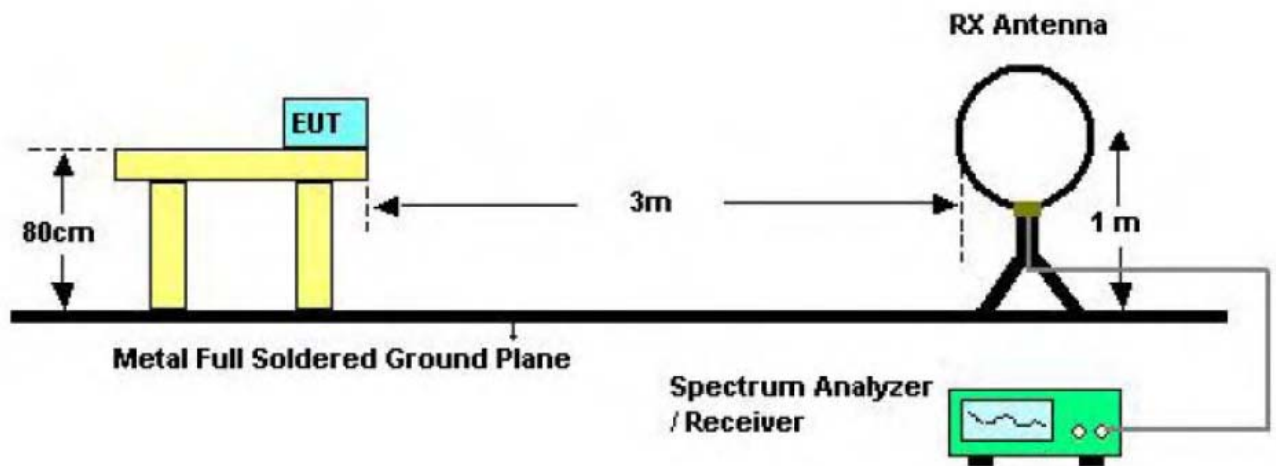
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level(dBuV/m)=20log Emission Level(Uv/m)

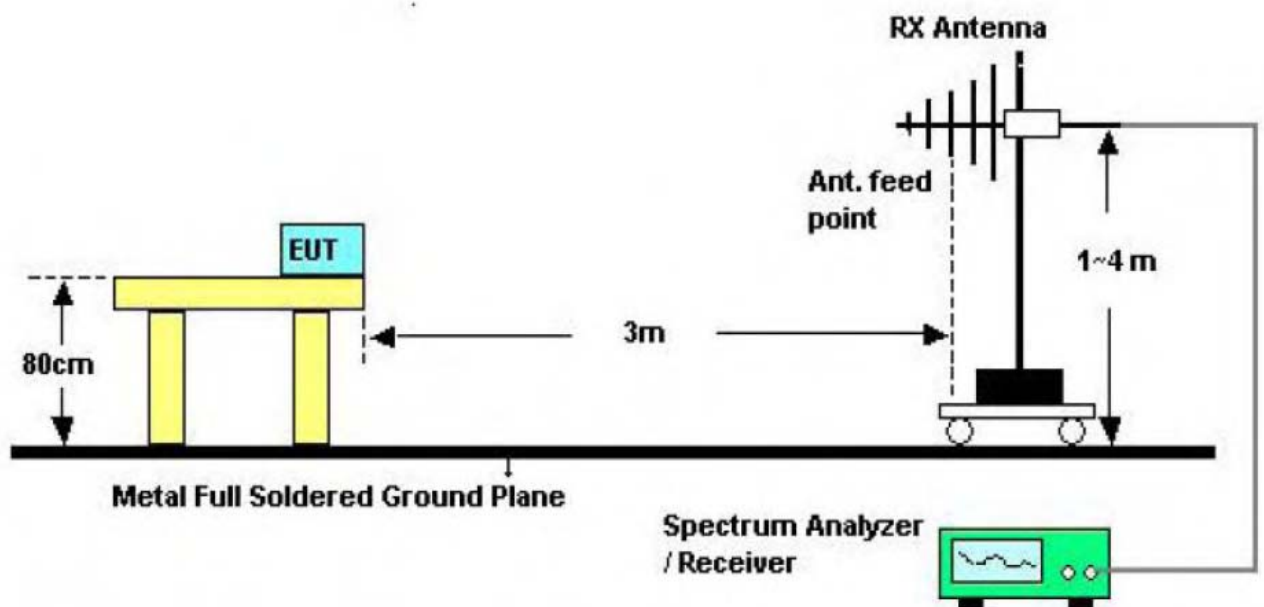
Limits of radiated emission measurement (15.249)

FCC Part 15 (15.249), Subpart C	
Limit	Frequency Range (MHz)
Field strength of fundamental 50000 μ V/m (94 dB μ V/m) @ 3 m	2400~2483.5
Field strength of fundamental 500 μ V/m (94 dB μ V/m) @ 3 m	Above 2483.5

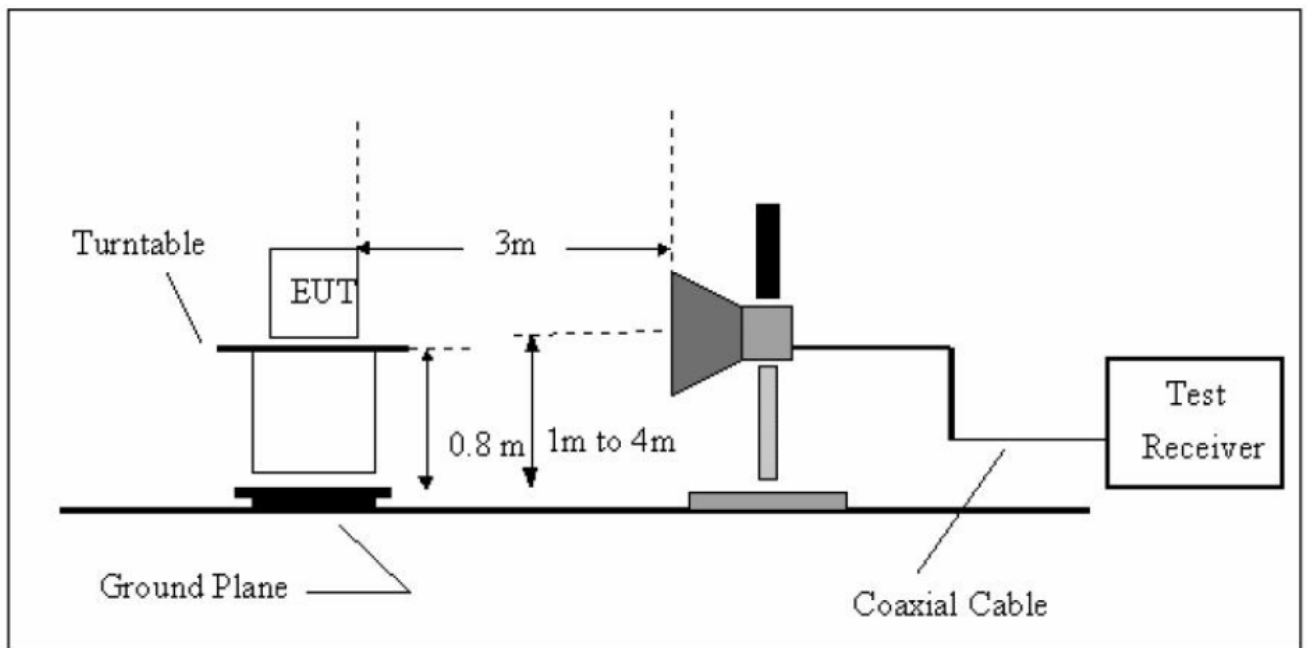
4.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



Above 1GHz Test Setup

4.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) 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.
- (4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (5) For the actual test configuration, please see the test setup photo.

4.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

4.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	2011-08-12	2012-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2011-08-12	2012-08-11
Trilog Broadband Antenna	SCHWARZBEC K	VULB9163	9163-333	2011-07-21	2012-07-20
Horn Antenna	SCHWARZBEC K	BBHX 9120	9120-426	2011-07-21	2012-07-20
RF Switch	EM	EMSW18	SW060023	2011-08-12	2012-08-11
Amplifier	Agilent	8447F	3113A06717	2011-08-12	2012-08-11
Coaxial Cable	SCHWARZBEC K	AK9513	9513-10	2011-08-12	2012-08-11
EMI Test Receiver	ROHDE& SCHWARZ	ESPI	25498514	2011-08-12	2012-08-11
EMI Test Receiver	ROHDE& SCHWARZ	ESI26	838786/103	2011-08-12	2012-08-11
Receiver Horn Antenna	ROHDE& SCHWARZ	HF906	100013	2011-08-12	2012-08-11

4.6 Test Data

Please see the next page.

Operation Mode: TX 2407MHz Test Date : September 04, 2011
 Frequency Range: 30~1000MHz Temperature : 28 °C
 Measured Distance: 3m Humidity : 65 %
 Test Voltage: DC 3.7V

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit (3m) (dBuV/m)	Margin (dB)	Note
345.25	H	22.41	46.00	23.59	PK
434.97	H	27.06	46.00	18.94	PK
585.32	H	31.08	46.00	14.92	PK
641.10	H	30.31	46.00	15.69	PK
791.45	H	34.24	46.00	11.76	PK
936.95	H	37.31	46.00	8.69	PK
99.90	V	23.64	43.50	19.86	PK
198.35	V	24.68	43.50	18.82	PK
266.83	V	25.80	46.00	20.20	PK
356.02	V	27.06	46.00	18.94	PK
469.35	V	28.41	46.00	17.59	PK
620.41	V	30.07	46.00	15.93	PK

Note:

- (1) All Readings are Peak Value.
- (2) Emission Level= Reading Level+ Probe Factor +Cable Loss
- (3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode: TX 2440MHz Test Date : September 04, 2011
 Frequency Range: 30~1000MHz Temperature : 28 °C
 Measured Distance: 3m Humidity : 65 %
 Test Voltage: DC 3.7V

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit (3m) (dBuV/m)	Margin (dB)	Note
321.04	H	30.05	46.00	15.95	PK
412.62	H	28.64	46.00	17.36	PK
540.08	H	29.47	46.00	16.53	PK
585.14	H	35.30	46.00	10.70	PK
640.05	H	36.07	46.00	9.93	PK
814.45	H	36.69	46.00	9.31	PK
110.50	V	29.20	43.50	14.30	PK
186.41	V	28.43	43.50	15.07	PK
245.30	V	32.06	46.00	13.94	PK
354.06	V	31.42	46.00	14.58	PK
392.14	V	33.27	46.00	12.73	PK
467.08	V	33.69	46.00	12.31	PK

Note:

- (1) All Readings are Peak Value.
- (2) Emission Level= Reading Level+ Probe Factor +Cable Loss
- (3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode: TX 2476MHz Test Date : September 04, 2011
 Frequency Range: 30~1000MHz Temperature : 28 °C
 Measured Distance: 3m Humidity : 65 %
 Test Voltage: DC 3.7V

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)	Limit (3m) (dBuV/m)	Margin (dB)	Note
340.25	H	24.52	46.00	21.48	PK
412.62	H	27.85	46.00	18.15	PK
550.14	H	32.65	46.00	13.35	PK
625.09	H	30.78	46.00	15.22	PK
770.82	H	31.27	46.00	14.73	PK
824.67	H	32.49	46.00	13.51	PK
65.22	V	24.92	40.00	15.08	PK
126.30	V	26.05	43.50	17.45	PK
198.42	V	27.61	43.50	15.59	PK
280.05	V	29.06	46.00	16.94	PK
375.92	V	31.69	46.00	14.31	PK
460.74	V	32.78	46.00	13.22	PK

Note:

- (1) All Readings are Peak Value.
- (2) Emission Level= Reading Level+ Probe Factor +Cable Loss
- (3) The average measurement was not performed when the peak measured data under the limit of average detection.

Duty Cycle TX 2407MHz

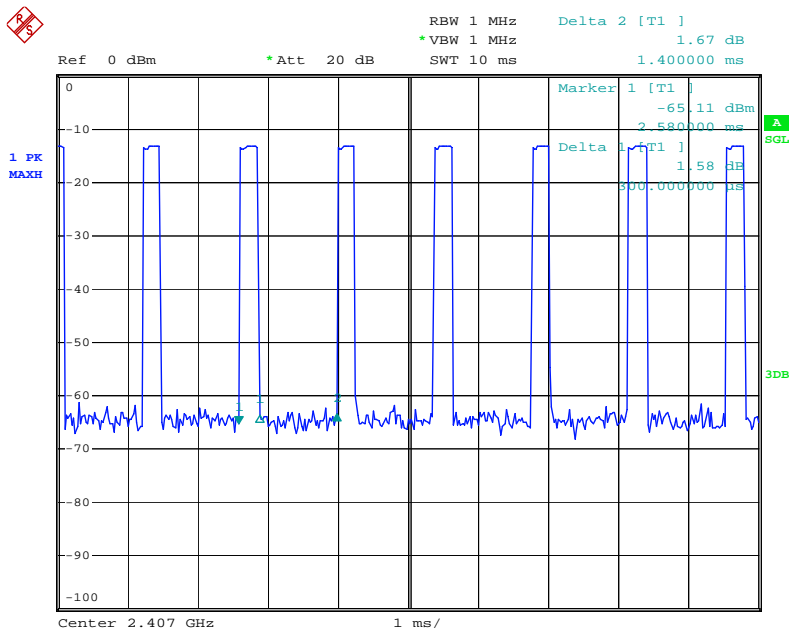
Dwell Time=On/ (On+Off)

On: 0.3ms

On+Off (total time):1.4ms

Dwell Time:0.3/1.4=21.4%

AV=Peak+20 log(Dwell Time)=Peak-13.38



Date: 4.SEP.2011 11:54:40

Operation Mode:	TX 2407MHz	Test Date :	September 04, 2011
Frequency Range:	1-25GHz	Temperature :	28 °C
Measured Distance:	3m	Humidity :	65 %
Test Voltage:	DC 3.7V		

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)		Limit3m (dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2407.000	V	86.89	73.51	114.00	94.00	27.11	20.49
4813.825	V	59.64	46.08	74.00	54.00	14.36	7.92
7220.980	V	53.77	40.39	74.00	54.00	20.23	13.61
--	V	--	--	74.00	54.00	--	--
--	V	--	--	74.00	54.00	--	--
--	V	--	--	74.00	54.00	--	--
2406.750	H	90.21	76.83	114.00	94.00	23.79	17.17
4813.825	H	55.15	41.77	74.00	54.00	18.49	12.23
7220.980	H	50.48	37.10	74.00	54.00	23.52	16.90
--	H	--	--	74.00	54.00	--	--
--	H	--	--	74.00	54.00	--	--
--	H	--	--	74.00	54.00	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level + Probe Factor +Cable Loss
 - (3) 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.
 - (4) The average value of fundamental frequency is:
Average=Peak value+ 20log(Duty Cycle), So Avg=Peak-13.38

Operation Mode: TX 2440MHz Test Date : September 04, 2011
 Frequency Range: 1-25GHz Temperature : 28 °C
 Measured Distance: 3m Humidity : 65 %
 Test Voltage: DC 3.7V

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)		Limit3m (dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2440.000	V	87.00	73.62	114.00	94.00	27.00	20.38
4879.850	V	58.36	44.98	74.00	54.00	15.64	9.02
7319.970	V	53.21	39.83	74.00	54.00	20.79	14.17
--	V	--	--	74.00	54.00	--	--
--	V	--	--	74.00	54.00	--	--
--	V	--	--	74.00	54.00	--	--
2440.000	H	90.82	77.44	114.00	94.00	23.18	16.56
4879.850	H	54.46	41.08	74.00	54.00	19.54	12.92
7319.970	H	49.63	36.25	74.00	54.00	24.37	17.75
--	H	--	--	74.00	54.00	--	--
--	H	--	--	74.00	54.00	--	--
--	H	--	--	74.00	54.00	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level + Probe Factor +Cable Loss
 - (3) 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.
 - (4) The average value of fundamental frequency is:
Average=Peak value+ 20log(Duty Cycle), So Avg=Peak-13.38

Operation Mode: TX 2476MHz Test Date : September 04, 2011
 Frequency Range: 1-25GHz Temperature : 28 °C
 Measured Distance: 3m Humidity : 65 %
 Test Voltage: DC 3.7V

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV)		Limit3m (dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2476.000	V	90.76	77.38	114.00	94.00	23.24	16.62
4951.900	V	58.01	44.63	74.00	54.00	15.99	9.37
7427.980	V	53.45	40.07	74.00	54.00	20.55	13.93
--	V	--	--	74.00	54.00	--	--
--	V	--	--	74.00	54.00	--	--
--	V	--	--	74.00	54.00	--	--
2475.875	H	87.12	73.74	114.00	94.00	26.88	20.26
4951.800	H	51.96	38.58	74.00	54.00	22.04	15.42
7427.980	H	46.87	33.49	74.00	54.00	27.13	20.51
--	H	--	--	74.00	54.00	--	--
--	H	--	--	74.00	54.00	--	--
--	H	--	--	74.00	54.00	--	--

Other harmonics emissions are lower than 20dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level + Probe Factor +Cable Loss
 - (3) 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.
 - (4) The average value of fundamental frequency is:
Average=Peak value+ 20log(Duty Cycle), So Avg=Peak-13.38

5. Restricted Bands Requirement

5.1 Test Standard and Limit

5.1.1 Test Standard

FCC Part 15.209

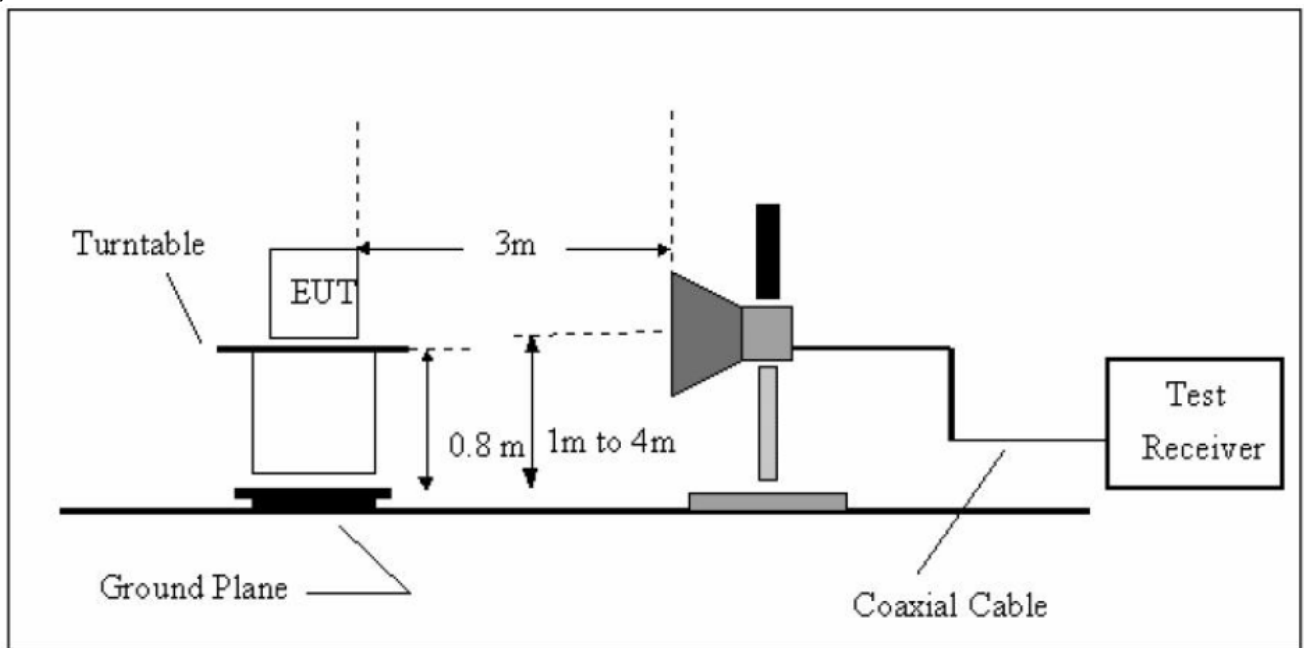
FCC Part 15.205

5.1.2 Test Limit

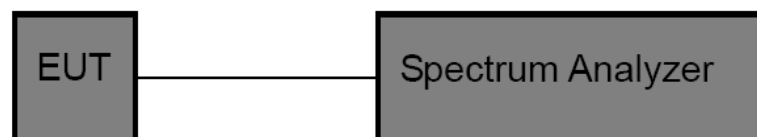
Restricted Frequency Band (MHz)	Class B (dBuV/m)(at 3 M)	
	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

5.2 Test Setup

(1) Radiated Emission



(2) Conducted Emission



5.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) 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.
- (4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (5) For the actual test configuration, please see the test setup photo.

5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

5.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	2011-08-12	2012-08-11
Positioning Controller	C&C	CC-C-1F	N/A	2011-08-12	2012-08-11
Trilog Broadband Antenna	SCHWARZBEC K	VULB9163	9163-333	2011-07-21	2012-07-20
Horn Antenna	SCHWARZBEC K	BBHX 9120	9120-426	2011-07-21	2012-07-20
RF Switch	EM	EMSW18	SW060023	2011-08-12	2012-08-11
Amplifier	Agilent	8447F	3113A06717	2011-08-12	2012-08-11
Coaxial Cable	SCHWARZBEC K	AK9513	9513-10	2011-08-12	2012-08-11
EMI Test Receiver	ROHDE& SCHWARZ	ESPI	25498514	2011-08-12	2012-08-11
EMI Test Receiver	ROHDE& SCHWARZ	ESI26	838786/103	2011-08-12	2012-08-11
Receiver Horn Antenna	ROHDE& SCHWARZ	HF906	100013	2011-08-12	2012-08-11

5.6 Test Data

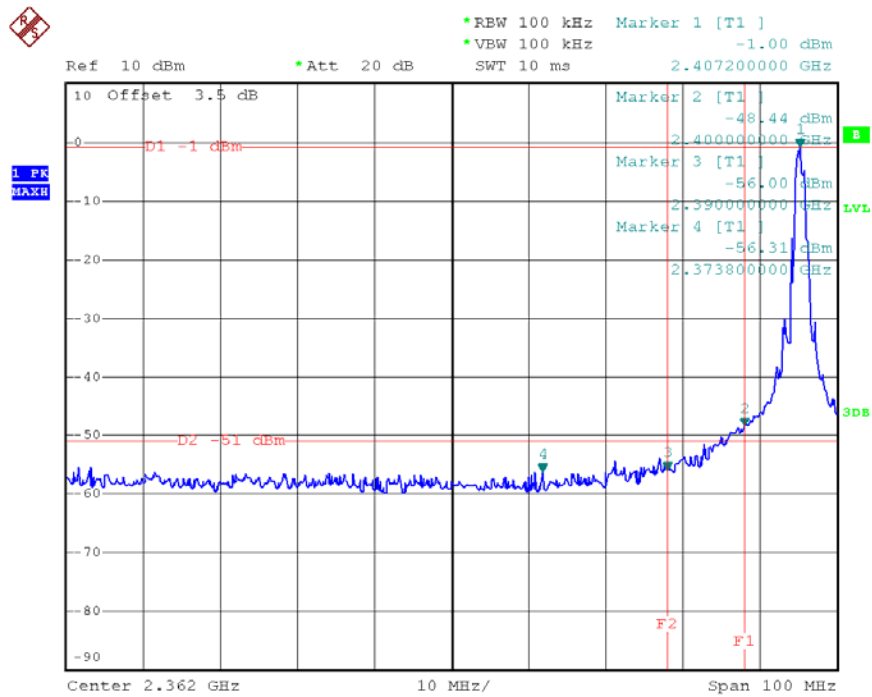
Spectrum Detector: PK Test Date : September 04, 2011
 Temperature : 28 °C Humidity : 65 %

1. Conducted Test

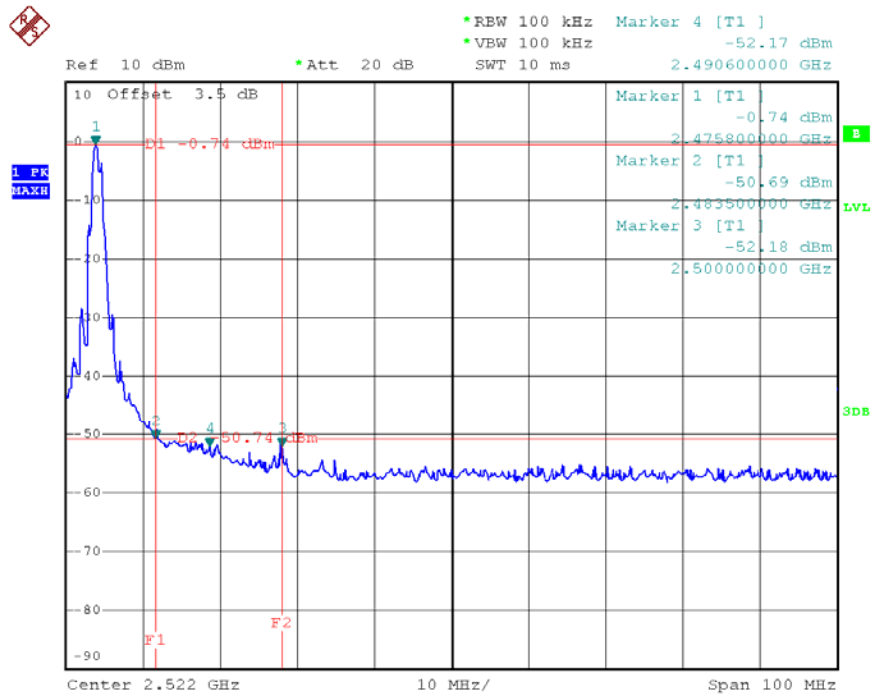
Frequency (MHz)	Peak Power Output(dBm)	Emission Read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
<2400	-1.00	-56.31	55.31	>50dBc
>2483.5	-0.74	-52.17	51.43	>50dBc

2. Radiated emission test

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PEAK	AV	PEAK	AV
2390.0	H	55.52	42.14	74.00	54.00
2390.0	V	54.28	40.90	74.00	54.00
2483.5	H	60.98	47.60	74.00	54.00
2483.5	V	56.86	43.48	74.00	54.00



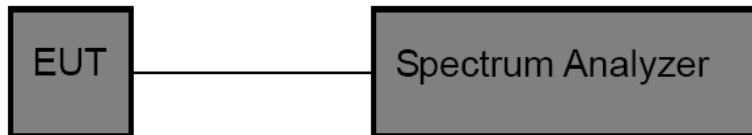
Date: 4.SEP.2011 10:32:04



Date: 4.SEP.2011 10:28:47

6. Bandwidth Test

6.1 Test Setup



6.2 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
Bandwidth: RBW=100 kHz, VBW=100kHz.
- (3) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.

6.3 EUT Operating Condition

The EUT was set to continuously transmitting for the Bandwidth Test.

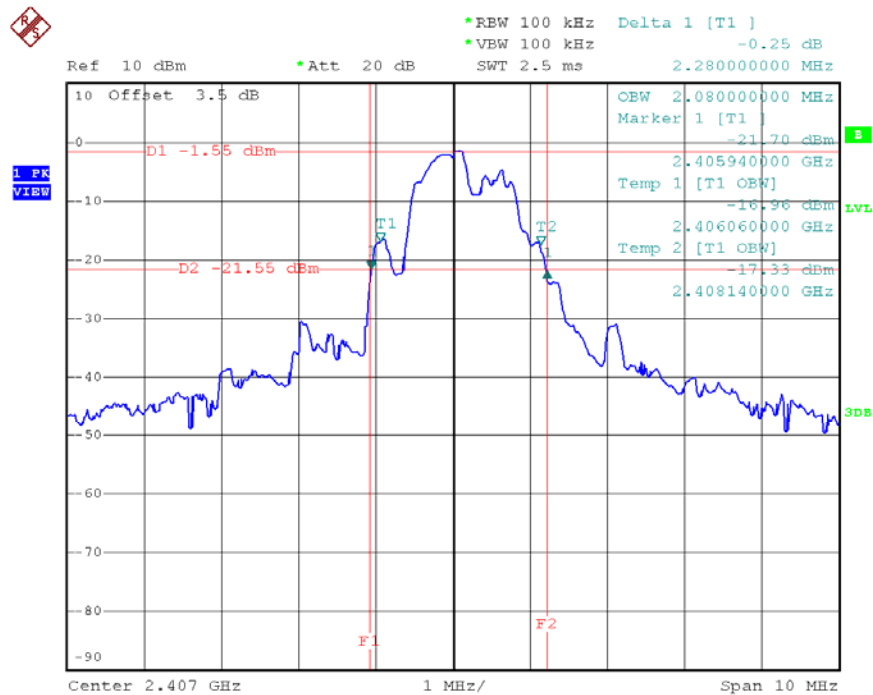
6.4 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	2011-08-12	2012-08-11

6.5 Test Data

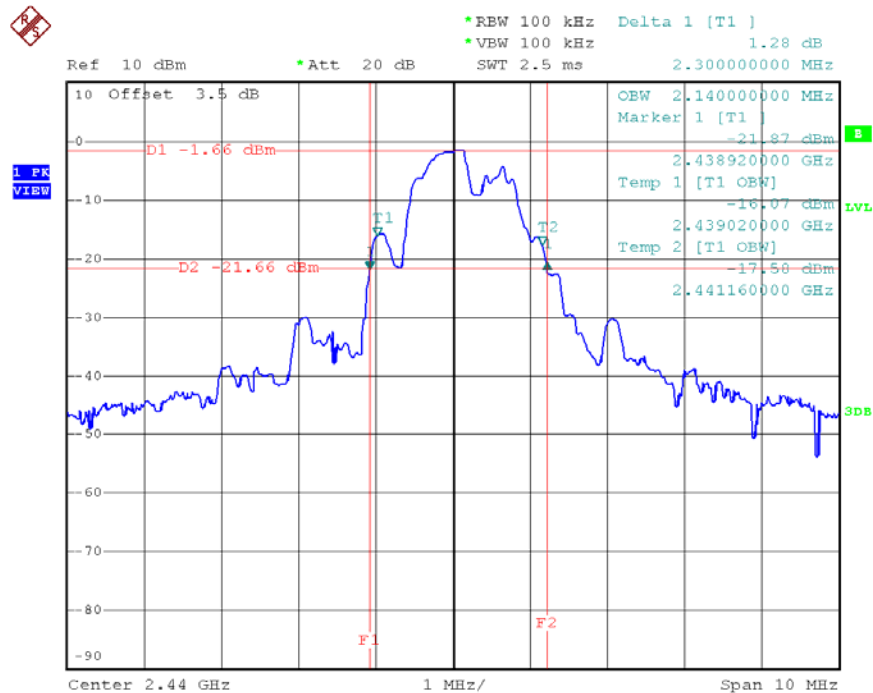
Channel number	Channel frequency (MHz)	20dB Bandwidth (MHz)	99% OBW (MHz)
CH 1	2407	2.280	2.080
CH 2	2440	2.300	2.140
CH 3	2476	2.300	2.180

2407 MHz



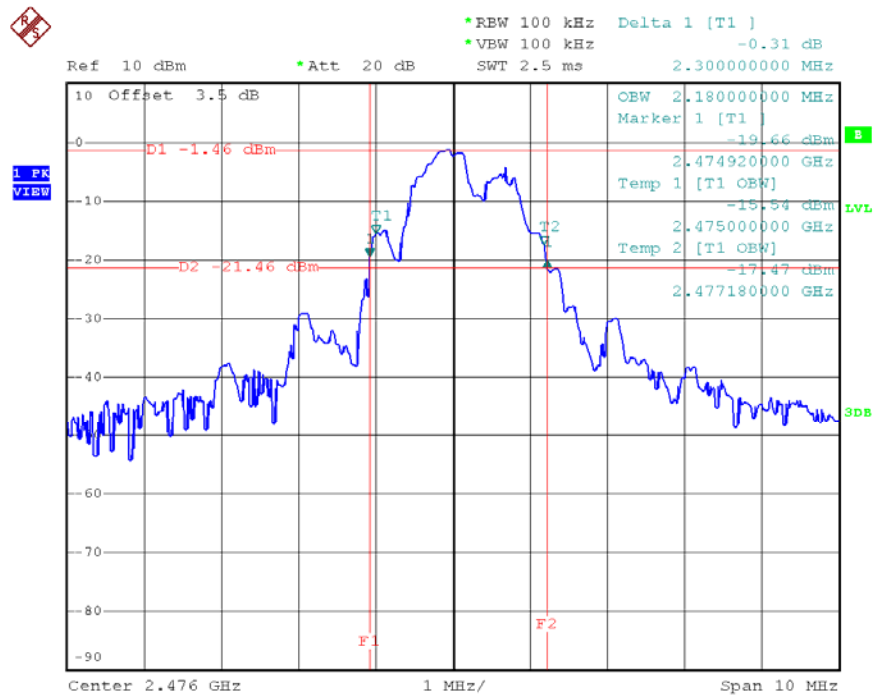
Date: 4.SEP.2011 10:34:18

2440 MHz



Date: 4.SEP.2011 10:37:31

2476 MHz



Date: 4.SEP.2011 10:27:35

7. Antenna Conducted Spurious Emission

7.1 Test Standard and Limit

10.1.1 Test Standard

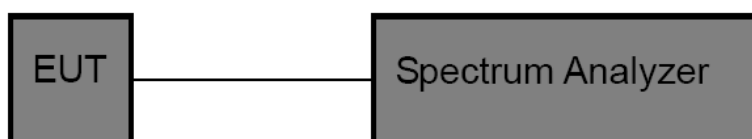
FCC Part 15.249

10.1.2 Test Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. 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 (microvolt/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

7.2 Test Setup



7.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
RBW=100 KHz, VBW=100 KHz.
Frequency range 30MHz to 25 GHz.

7.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

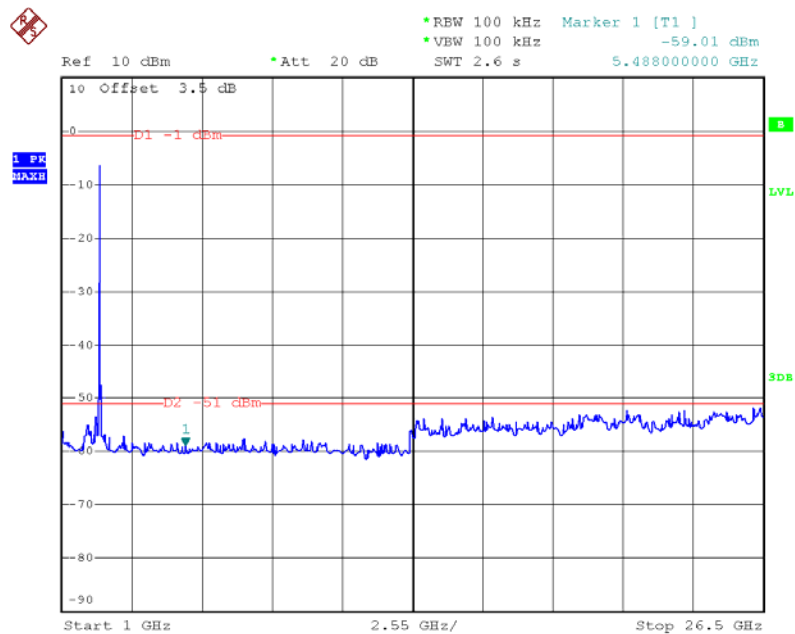
7.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Date
Spectrum Analyzer	ROHDE& SCHWARZ	FSEA20	DE25181	2011-08-12	2012-08-11

7.6 Test Data

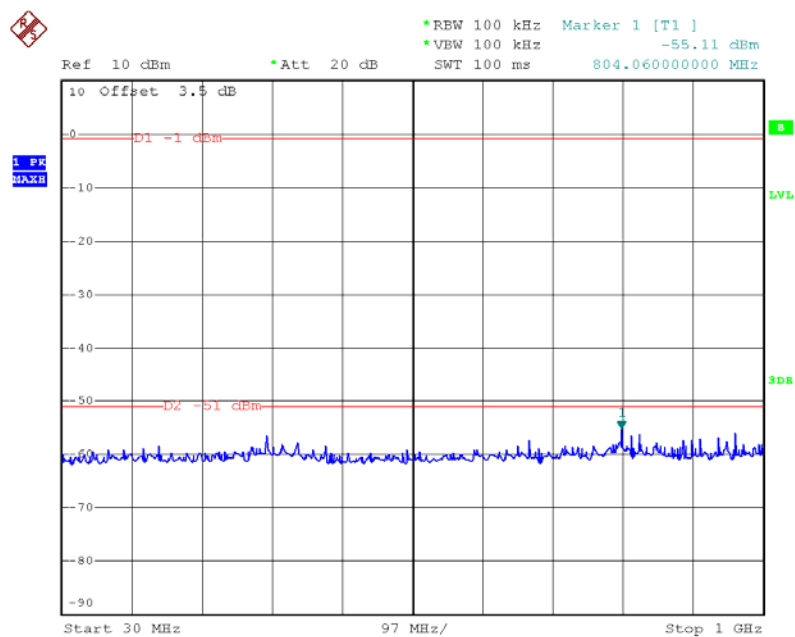
TX CH 01 2407MHz

Above 1 GHz



Date: 4.SEP.2011 10:33:11

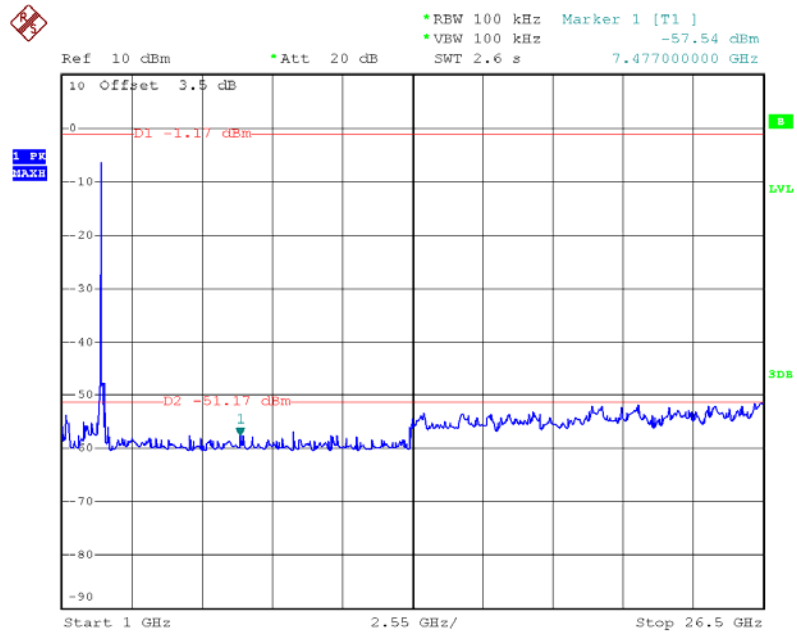
Bellow 1 GHz



Date: 4.SEP.2011 10:32:27

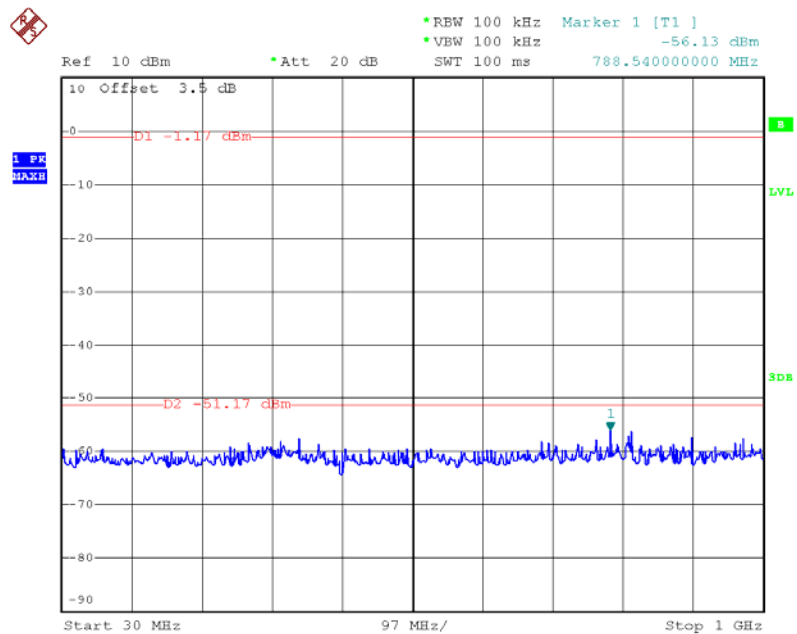
TX CH 02 2440MHz

Above 1 GHz



Date: 4.SEP.2011 10:38:51

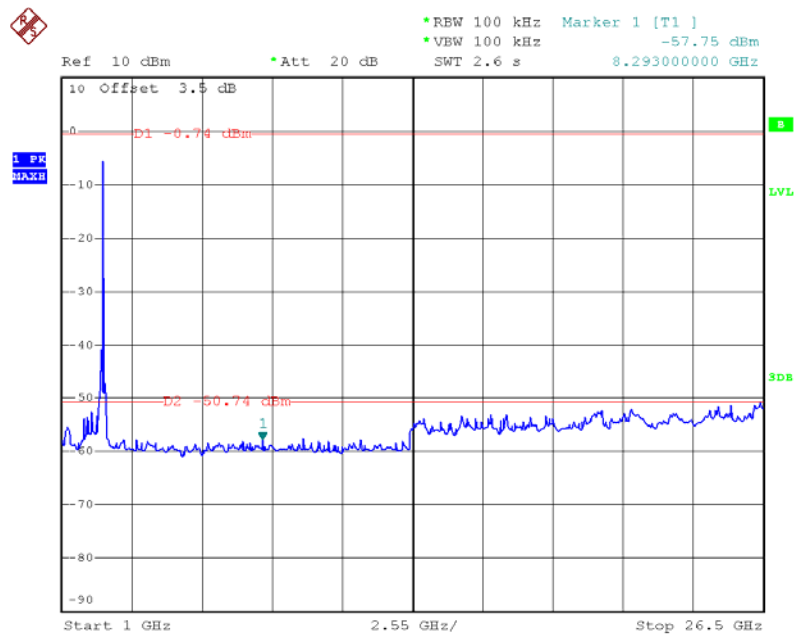
Bellow 1 GHz



Date: 4.SEP.2011 10:38:08

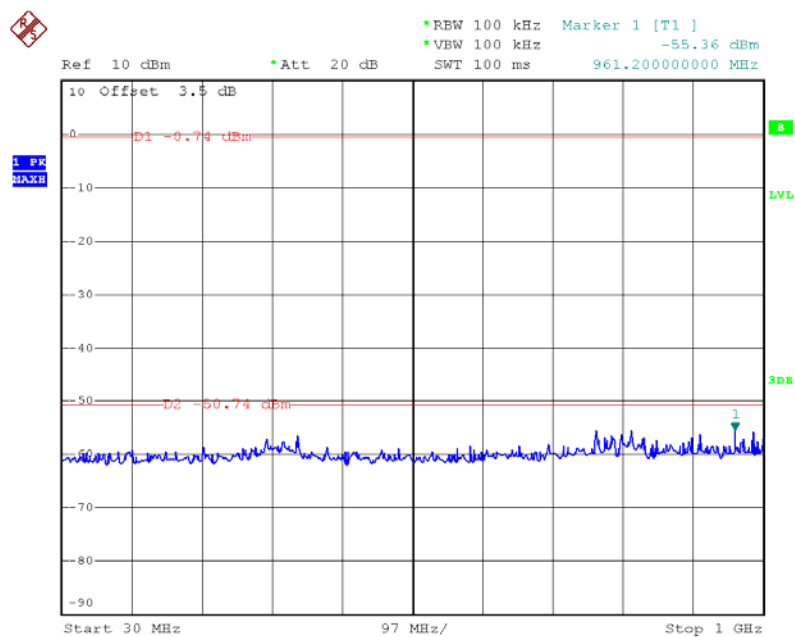
TX CH 03 2476MHz

Above 1 GHz



Date: 4.SEP.2011 10:30:08

Bellow 1 GHz



Date: 4.SEP.2011 10:29:07

8. Antenna Requirement

8.1 Standard Requirement

11.1.1 Standard

FCC Part 15.203

11.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

8.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

8.2 Result

The EUT antenna is a printed Antenna. It complies with the standard requirement.