



# Radio Test Report

**FCC ID: O4GIPDWA**

**IC : 7666A-IPDWA**

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

Issued Date : Jul. 28, 2010  
Project No. : 1007C089  
Equipment : iPhone Dongle WA52500  
Model Name : WA52500  
Applicant : Dayton Industrial Co. Ltd.  
Address : 2 - 12, Kwai Fat Road, 11-A Kwai Chung, Hong Kong.

**Tested by:**

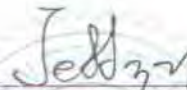
Neutron Engineering Inc. EMC Laboratory

**Date of Receipt:** Jul. 08, 2010

**Date of Test:**

Jul. 08, 2010~ Jul. 18, 2010

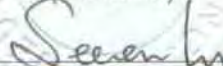
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### **Declaration**

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

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### **Limitation**

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.



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## 1. CERTIFICATION

Equipment: iPhone Dongle WA52500

Trade Name : N/A

Model Name.: WA52500

Applicant: Dayton Industrial Co. Ltd.

Date of Test: Jul. 08, 2010~ Jul. 18, 2010

Test Item: ENGINEERING SAMPLE

Standards: FCC Part15, Subpart C(15.249)/ ANSI C63.4 : 2003; Canada RSS-210:2007

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

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FICP-1-1007C089) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).



## 2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.249)		Canada RSS-210:2007		
Canada	FCC	Test Item	Judgment	Remark
	15.207	Conducted Emission	-	Note(1)
A2.9(a)	15.209	Radiated emission	PASS	
A2.9(a)	15.249	Radiated Spurious Emission	PASS	

**NOTE:**

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



**2.1 TEST FACILITY**

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

Neutron's test firm number for FCC 319330

Neutron's test firm number for IC 4428B-1

**2.2 MEASUREMENT UNCERTAINTY**

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

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**, providing a level of confidence of approximately **95 %**.

**A. Conducted Measurement :**

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

**B. Radiated Measurement :**

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



**3. GENERAL INFORMATION**

**3.1 GENERAL DESCRIPTION OF EUT**

Equipment	iPhone Dongle WA52500	
Trade Name	N/A	
Model Name.	WA52500	
OEM Brand/Model Name	N/A	
Model Difference	N/A	
Product Description	The EUT is a iPhone Dongle WA52500.	
	Product Type	Low Power Communication Device
	Operation Frequency:	2450/2457 MHz
	Modulation Type:	GFSK
	Number Of Channel	2CH
	Antenna Designation:	Ceramic antenna
	Antenna Gain(Peak)	2.0 dBi
	Output Power:	46.15 dBuV/m (AV Max.)
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification please refer to the User's Manual.		
Channel List	Please refer to the Note 2.	
Power Source	DC Voltage supplied from iPhone	
Power Rating	DC 5.0V	
Connecting I/O Port(s)	Please refer to the User's Manual	
Products Covered	N/A	

**Note:**

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

- 2.

Channel	Frequency (MHz)
01	2450
02	2457

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	Johansontechnology	2450AT43A 100	Ceramic Antenna	N/A	2.0





**3.2 DESCRIPTION OF TEST MODES**

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

Pretest Mode	Description
Mode 1	CH 01 - 2450MHz
Mode 2	CH 02 - 2457MHz

For Conducted Test	
Final Test Mode	Description
-	" N/A" denotes test is not applicable in this Test Report

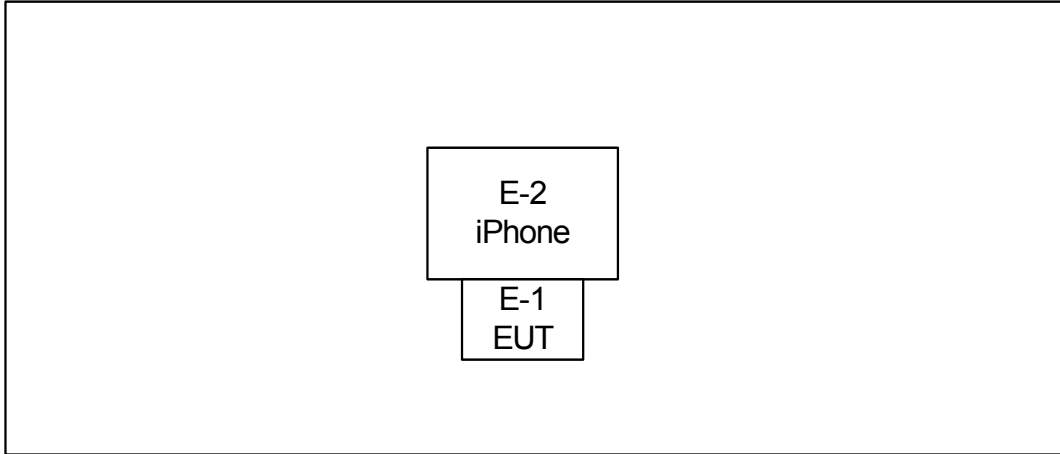
For Radiated Test	
Final Test Mode	Description
Mode 1	CH 01 - 2450MHz
Mode 2	CH 02 - 2457MHz

Note:

- (1) The EUT Voltage supplied from iPhone.
- (2) The EUT function with Transceiver mode.
- (3) The EUT is considered a portable unit(used tihe iphone); it was pre-tested on the positioned of each 3 axis.The worst case was found positioned on X-plane(TX Sample). Therefore only the test data of this X-plane(TX Sample) were used for radiated emission measurement test.



3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





**3.4 DESCRIPTION OF SUPPORT UNITS**

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

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID/IC	Series No.	Note
E-1	iPhone Dongle WA52500	N/A	WA52500	O4GIPDWA 7666A-IPDWA	N/A	EUT
E-2	IPHONE	APPLE	A1241	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note

**Note:**

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



**4. EMC EMISSION TEST**

**4.1 CONDUCTED EMISSION MEASUREMENT**

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

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

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

Note:

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

**4.1.2 MEASUREMENT INSTRUMENTS LIST**

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

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

The following table is the setting of the receiver

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

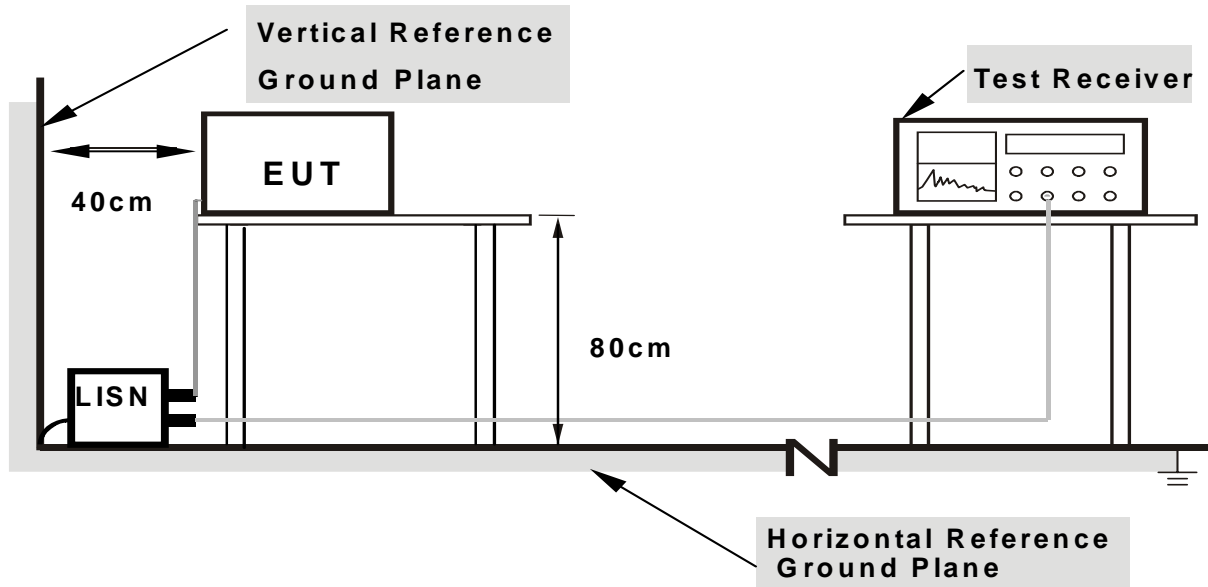
**4.1.3 TEST PROCEDURE**

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

**4.1.4 DEVIATION FROM TEST STANDARD**

No deviation

**4.1.5 TEST SETUP**



- Note: 1.Support units were connected to second LISN.**  
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

**4.1.6 EUT OPERATING CONDITIONS**

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



4.1.7 TEST RESULTS

EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	29 °C	Relative Humidity :	50 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	" N/A" denotes test is not applicable in this Test Report		

Remark

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



**4.2 RADIATED EMISSION MEASUREMENT**

**4.2.1 RADIATED EMISSION LIMITS ( FCC 15.209 )**

<b>Frequencies (MHz)</b>	<b>Field Strength (micorvolts/meter)</b>	<b>Measurement Distance (meters)</b>
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 above has to be followed.

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 (FCC Part 15.249)**

<b>FCC Part15 (15.249) , Subpart C</b>	
<b>Limit</b>	<b>Frequency Range (MHz)</b>
Field strength of fundamental 50000 μV/m (94 dBμV/m) @ 3 m	2400-2483.5
Field strength of harmonics 500 μV/m (54 dBμV/m) @ 3 m	Above 2483.5



4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Triple Loop Antenna	R&S	HFH2-Z2	830749/020	May.27.2011
2	Bi-log Antenna	Schwarzbeck	VULB9160	9160-3232	May.26.2011
3	Amplifier	HP	8447D	2944A09673	May.26.2011
4	Test Receiver	R&S	ESCI	100895	May.26.2011
5	Test Cable	N/A	C-01_CB03	N/A	Jul.05.2011
6	Controller	CT	SC100	N/A	N/A
7	Horn Antenna	ETS	3115	00075789	May.12.2011
8	Amplifier	Agilent	8449B	3008A02274	May.26.2011
9	Spectrum	Agilent	E4408B	US39240143	Nov.16.2010
10	Test Cable	HUBER+SUHNER	CB03 High Fre	N/A	May.03.2011
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	May.12.2011

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

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1MHz / 1MHz for Peak, AV Mode with Dwell time Use 100mS for calculation

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





# Neutron Engineering Inc.

In order to determine possible Maximum Modulation percentage, alternations are made to the EUT. We measured:

pulse= 0.38msec

No. of pulse= 1

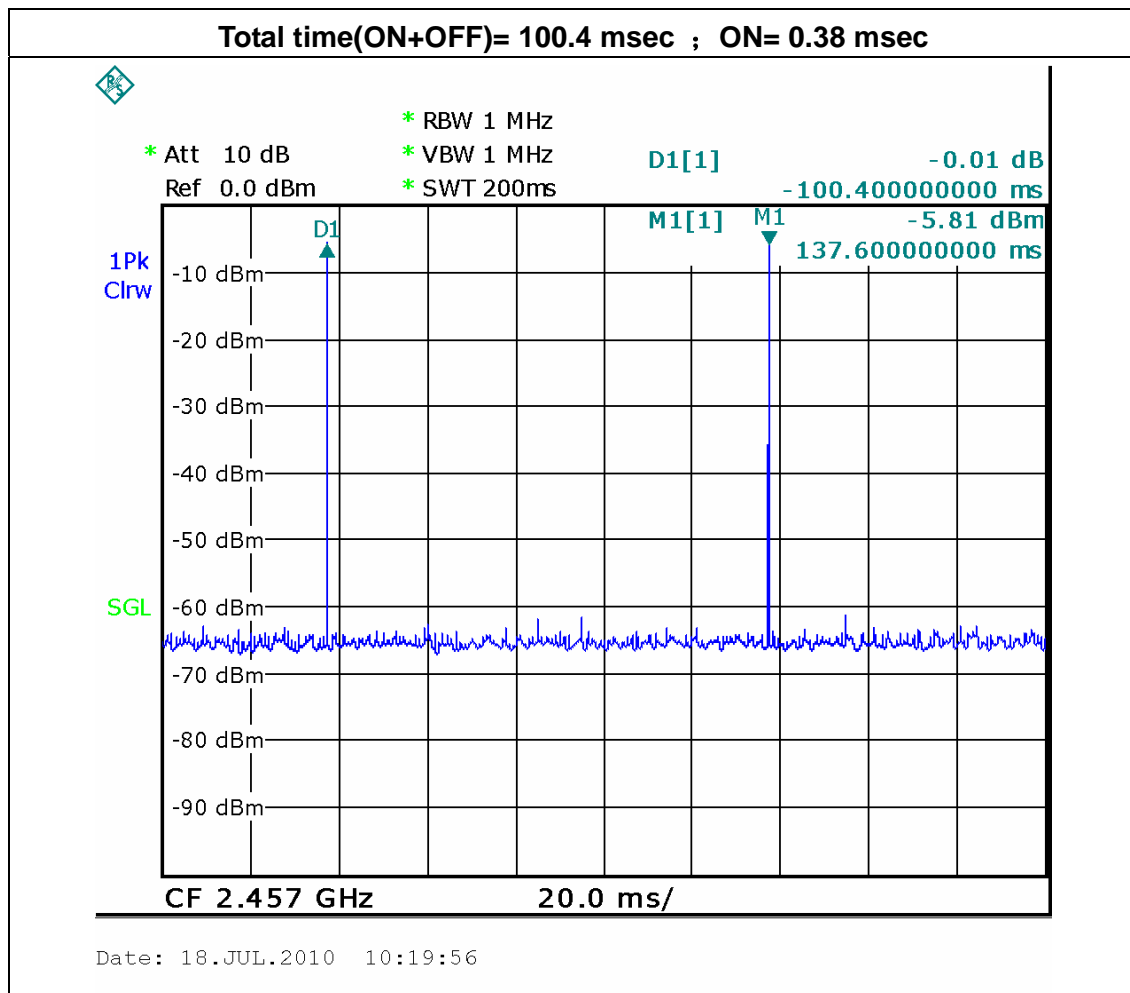
Duty Cycle =  $(N1*L1+N2*L2+...+Nn-1*Ln-1+Nn*Ln)/100$  or T

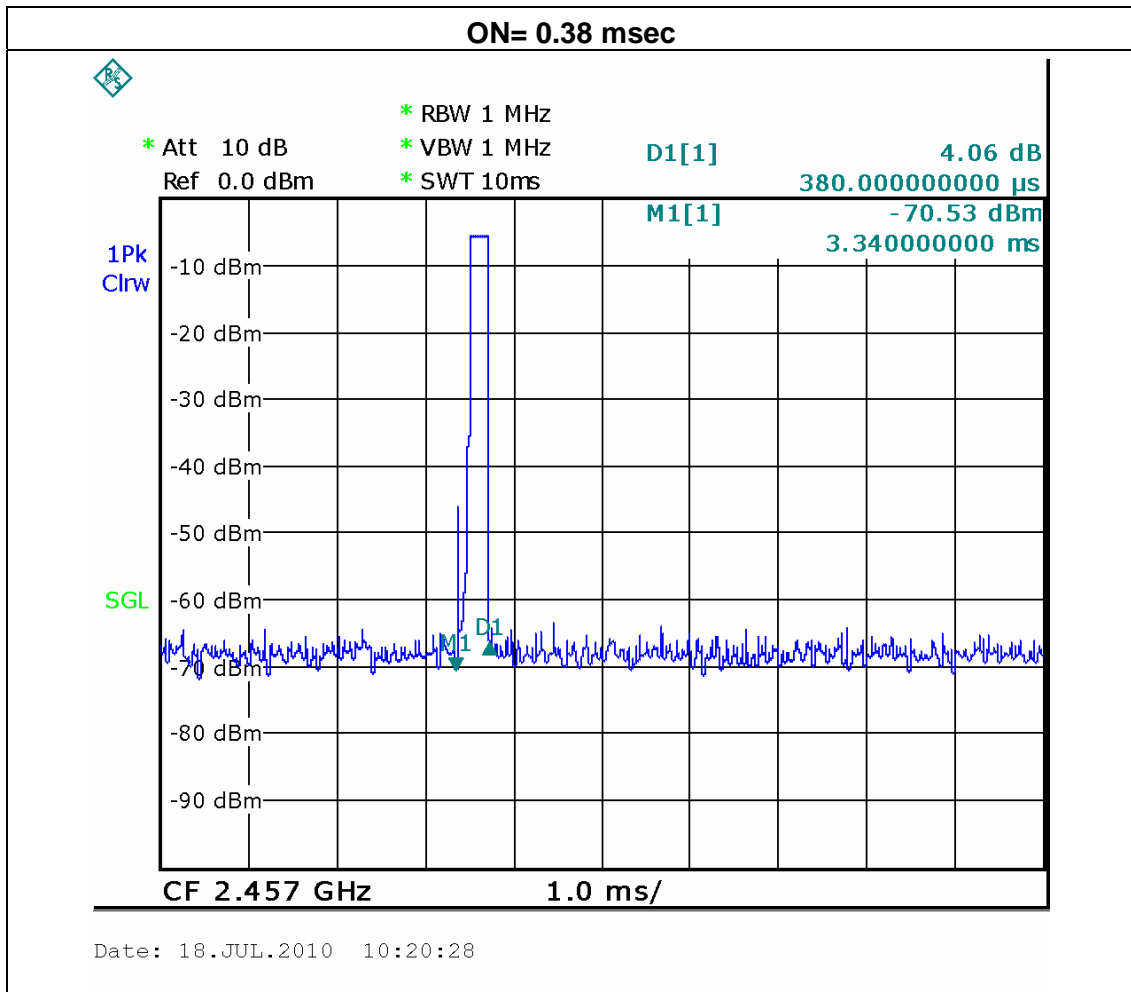
Duty Cycle =  $(0.38ms*1)/100msec=0.378\%$

For duty cycle refer to plot #1

Average Reading =Peak Reading (dBuV/m)+ 20log (Duty cycle)

Average Reading = Peak value + 20log(Duty cycle) , AV=PK-48.439







#### 4.2.3 TEST PROCEDURE

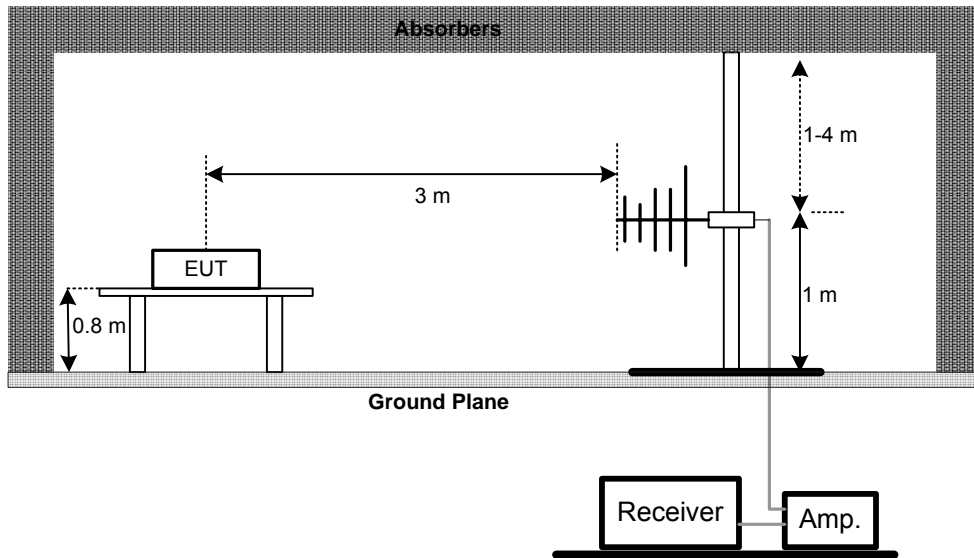
- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter semi-anechoic chamber. The table was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

#### 4.2.4 DEVIATION FROM TEST STANDARD

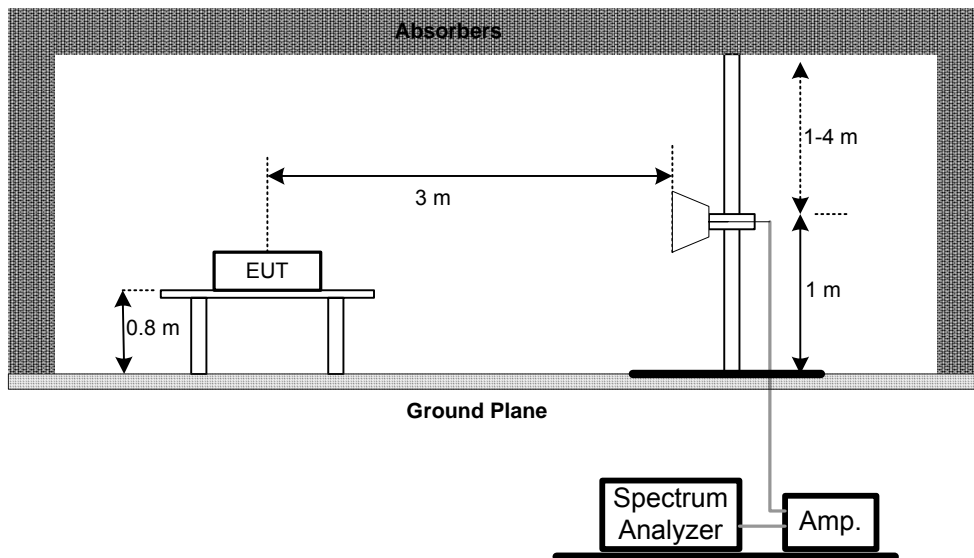
No deviation

4.2.5 TEST SETUP

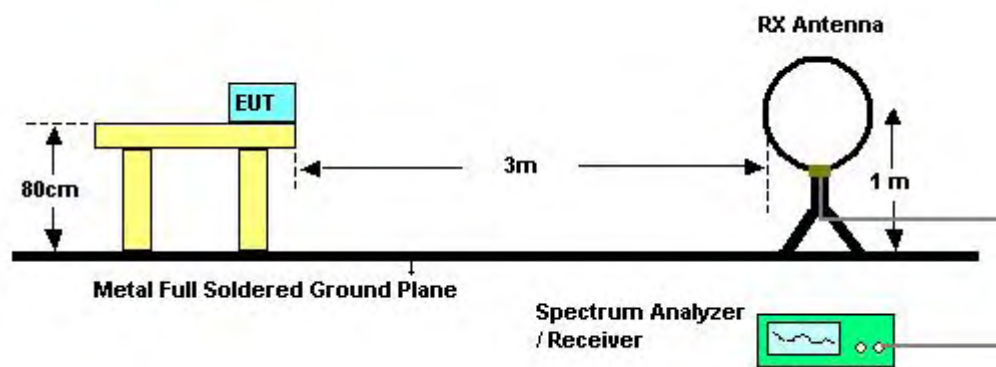
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



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



(C) For radiated emissions below 30MHz



## 4.2.6 EUT OPERATING CONDITIONS

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

## 4.2.7 TEST RESULTS (BELOW 30MHZ)

EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	24 °C	Relative Humidity :	58 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX Mode		

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.37	0°	43.23	20.10	63.33	96.15	-32.82	PK
0.37	0°	40.76	20.10	60.86	96.15	-35.29	AV
0.98	0°	24.43	16.68	41.11	67.78	-26.67	PK
1.65	0°	20.98	19.54	40.52	63.25	-22.73	PK
2.11	0°	23.42	19.43	42.85	69.54	-26.69	PK
10.53	0°	24.11	17.83	41.94	69.54	-27.60	PK
21.53	0°	24.32	17.03	41.35	69.54	-28.19	PK

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.37	90°	52.33	20.11	72.44	96.21	-23.77	PK
0.37	90°	49.82	20.11	69.93	96.21	-26.28	AV
0.93	90°	23.23	19.86	43.09	68.20	-25.11	PK
1.70	90°	20.32	19.53	39.85	63.02	-23.17	PK
5.32	90°	24.00	18.17	42.17	69.54	-27.37	PK
12.32	90°	25.43	17.94	43.37	69.54	-26.17	PK
20.33	90°	28.32	17.32	45.64	69.54	-23.90	PK

Remark :

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported .
- (2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB); .
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor. .



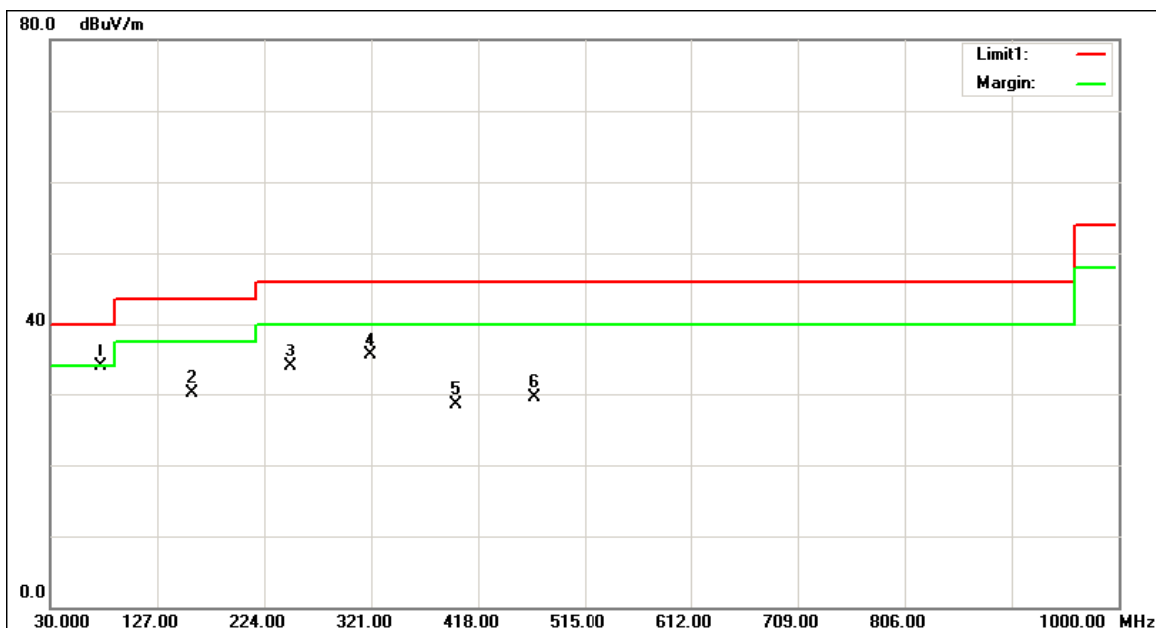
4.2.8 TEST RESULTS (BETWEEN 30 – 1000 MHz)

EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	25 °C	Relative Humidity :	51 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX Mode		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
75.59	V	58.18	-24.23	33.95	40.00	- 6.05	
159.01	V	49.45	-19.27	30.18	43.50	- 13.32	
248.25	V	50.91	-16.91	34.00	46.00	- 12.00	
320.03	V	50.83	-15.23	35.60	46.00	- 10.40	
397.63	V	40.67	-12.25	28.42	46.00	- 17.58	
469.41	V	40.95	-11.45	29.50	46.00	- 16.50	

Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission .
- (4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) All the lower, middle, highest frequencies were tested, and the highest frequency was found to be the worst case during the test. The test result of this worst case was used for the report.
- (6) Measure frequency range 9KHz~30MHz because The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.



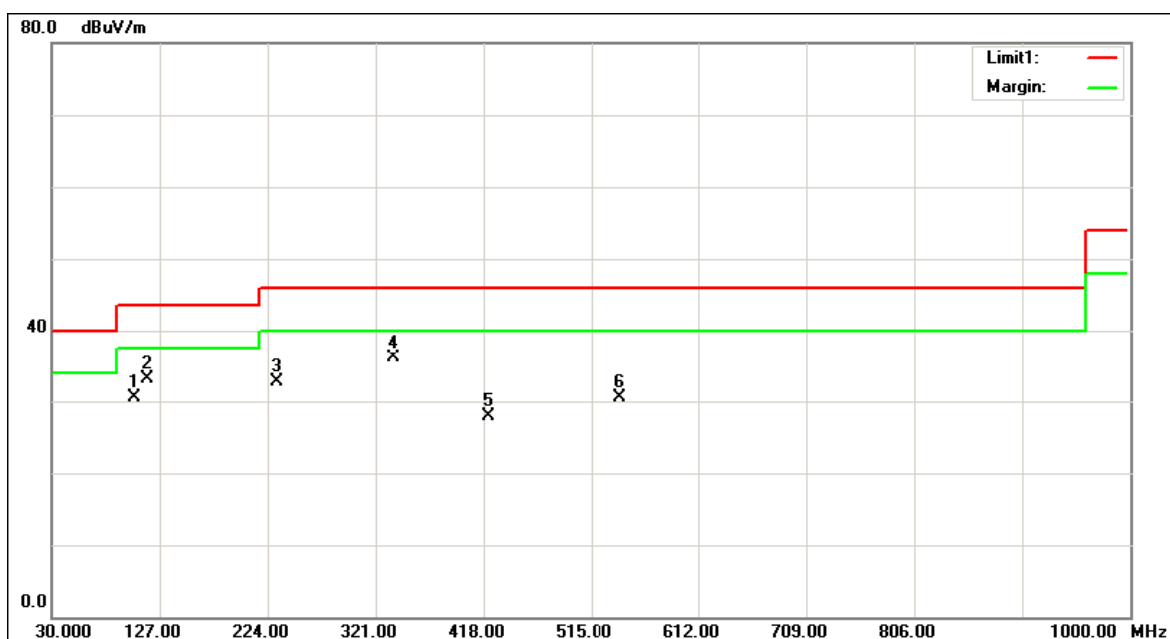


EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	25 °C	Relative Humidity :	51 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX Mode		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
104.69	H	52.31	-21.75	30.56	43.50	- 12.94	
116.33	H	55.68	-22.63	33.05	43.50	- 10.45	
232.73	H	50.69	-18.02	32.67	46.00	- 13.33	
337.49	H	51.41	-15.26	36.15	46.00	- 9.85	
422.85	H	40.01	-12.09	27.92	46.00	- 18.08	
541.19	H	39.69	-9.09	30.60	46.00	- 15.40	

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『 Note 』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission .
- (4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) All the lower, middle, highest frequencies were tested, and the highest frequency was found to be the worst case during the test. The test result of this worst case was used for the report.
- (6) Measure frequency range 9KHz~30MHz because The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.



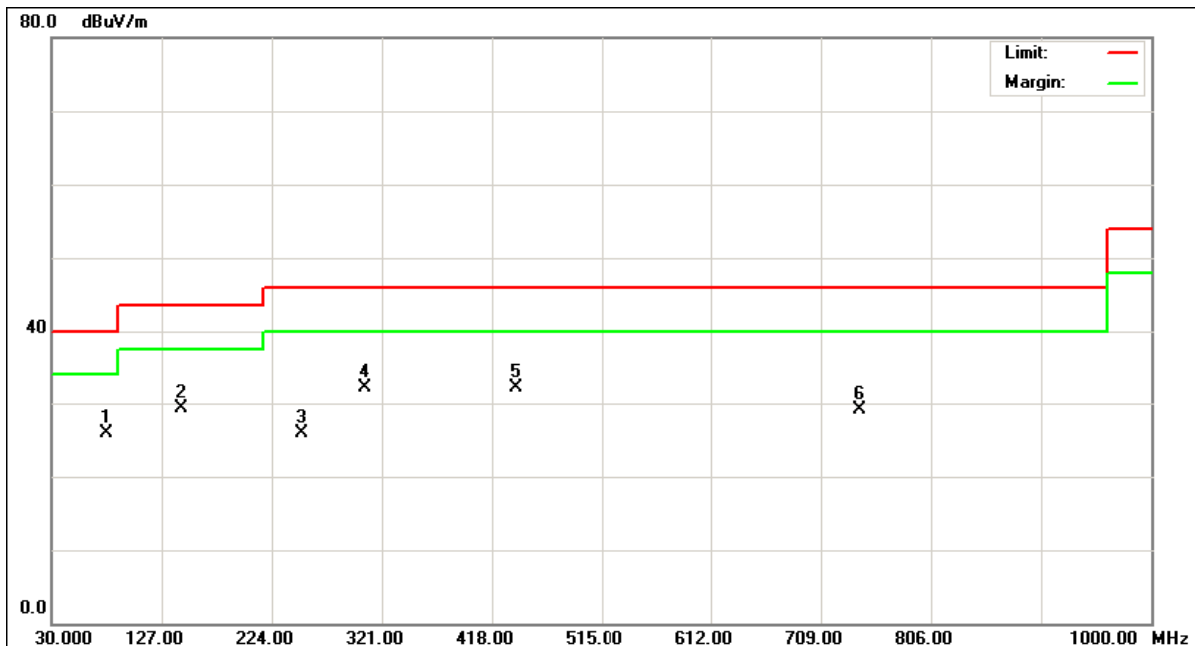


EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	22 °C	Relative Humidity :	56 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	RX Standby mode		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
78.05	V	44.63	-18.68	25.95	40.00	- 14.05	
142.02	V	43.77	-14.56	29.21	43.50	- 14.29	
248.59	V	39.12	-13.20	25.92	46.00	- 20.08	
305.02	V	43.18	-11.09	32.09	46.00	- 13.91	
439.05	V	41.13	-9.01	32.12	46.00	- 13.88	
742.07	V	33.94	-4.88	29.06	46.00	- 16.94	

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency ◦ “F” denotes fundamental frequency; “ H” denotes spurious frequency. “E” denotes band edge frequency.
- (3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission ◦
- (4) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) All the lower, middle, highest frequencies were tested, and the highest frequency was found to be the worst case during the test. The test result of this worst case was used for the report.
- (6) Measure frequency range 9KHz~30MHz because The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.





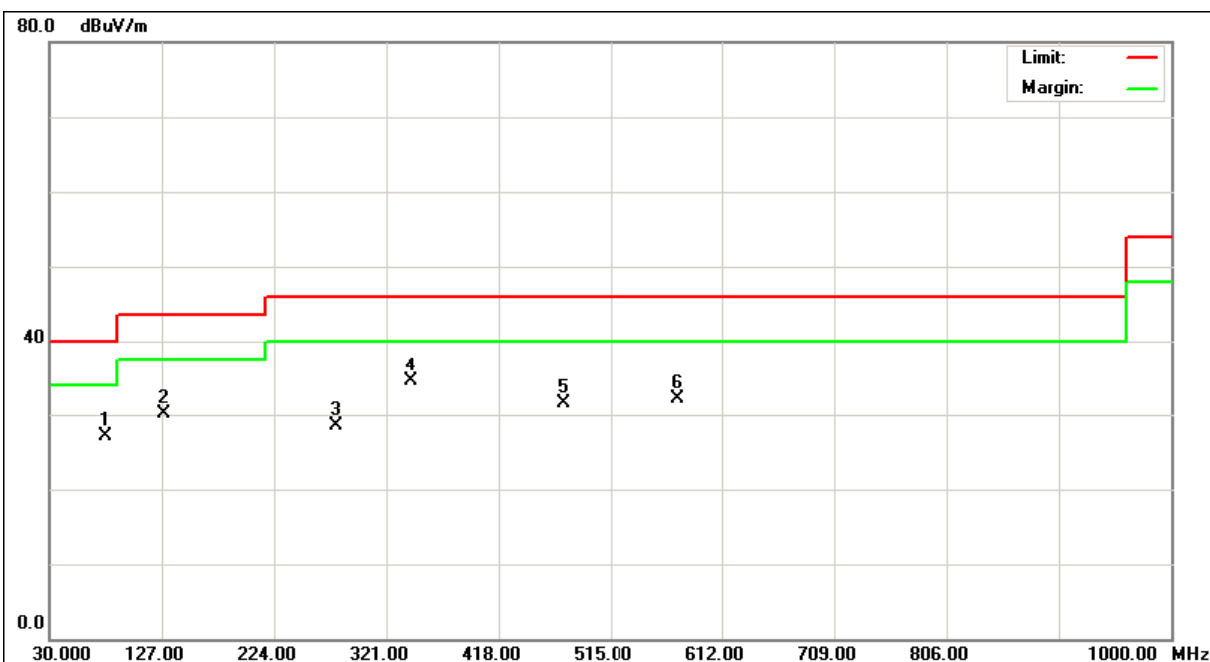


EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	22 °C	Relative Humidity :	56 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	RX Standby mode		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
78.05	H	45.71	-18.68	27.03	40.00	- 12.97	
127.48	H	44.91	-14.78	30.13	43.50	- 13.37	
275.60	H	40.34	-11.80	28.54	46.00	- 17.46	
342.06	H	44.91	-10.48	34.43	46.00	- 11.57	
471.99	H	39.76	-8.22	31.54	46.00	- 14.46	
571.22	H	38.06	-5.89	32.17	46.00	- 13.83	

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; " H" denotes spurious frequency. "E" denotes band edge frequency.
- (3) Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Peak detector mode or QP detector mode of the emission .
- (4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) All the lower, middle, highest frequencies were tested, and the highest frequency was found to be the worst case during the test. The test result of this worst case was used for the report.
- (6) Measure frequency range 9KHz~30MHz because The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.





4.2.9 TEST RESULTS (ABOVE 1000 MHz)

EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	25 °C	Relative Humidity :	51 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX 2450MHz		

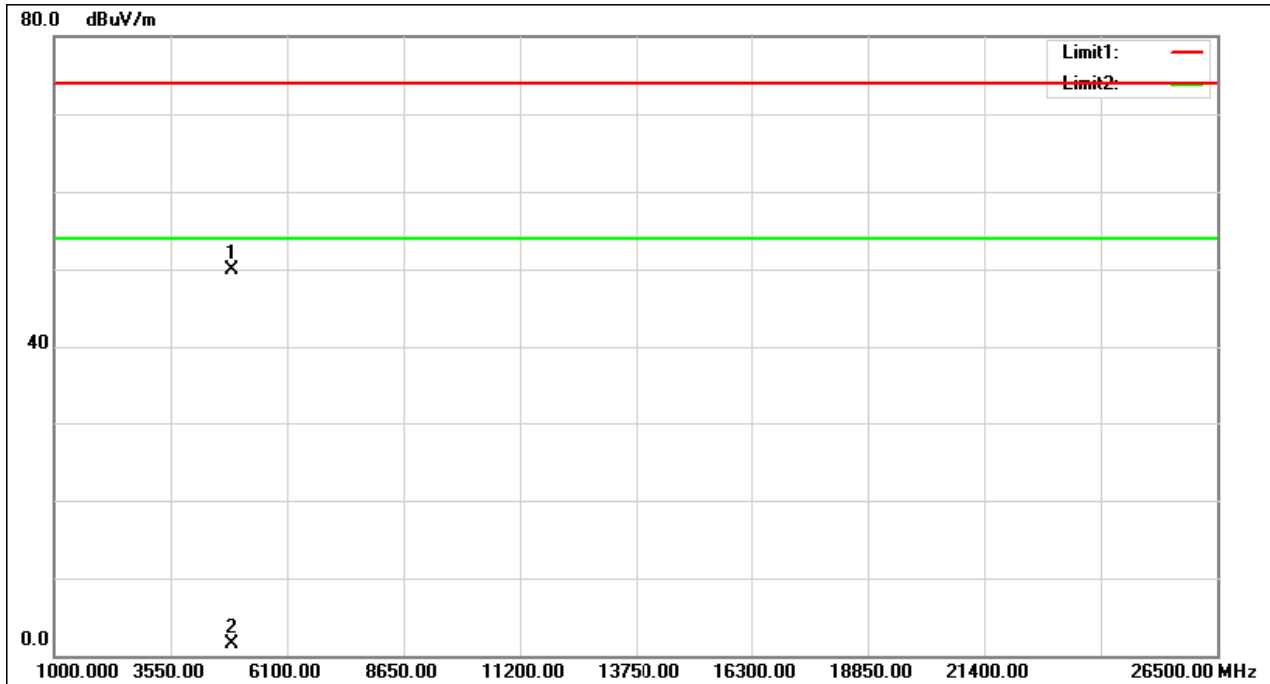
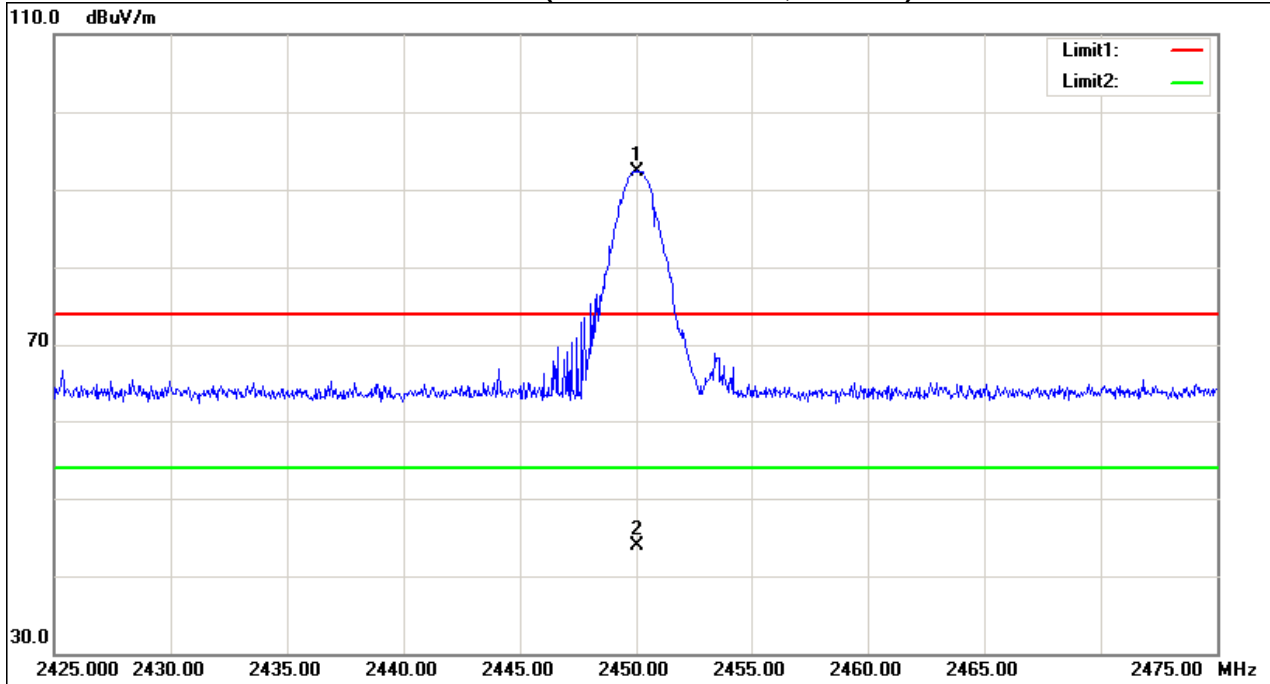
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>2450.00</b>	<b>V</b>	<b>60.55</b>	<b>12.11</b>	<b>31.85</b>	<b>92.40</b>	<b>43.96</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
4900.15	V	43.18	-5.26	6.67	49.85	1.41	74.00	54.00	X/H

Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency ◦ "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ◦
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) ◦ Final AV=PK-48.439



Orthogonal Axis : X  
TX 2450MHz (Above 1000 MHz, Vertical)





EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	25 °C	Relative Humidity :	51 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX 2450MHz		

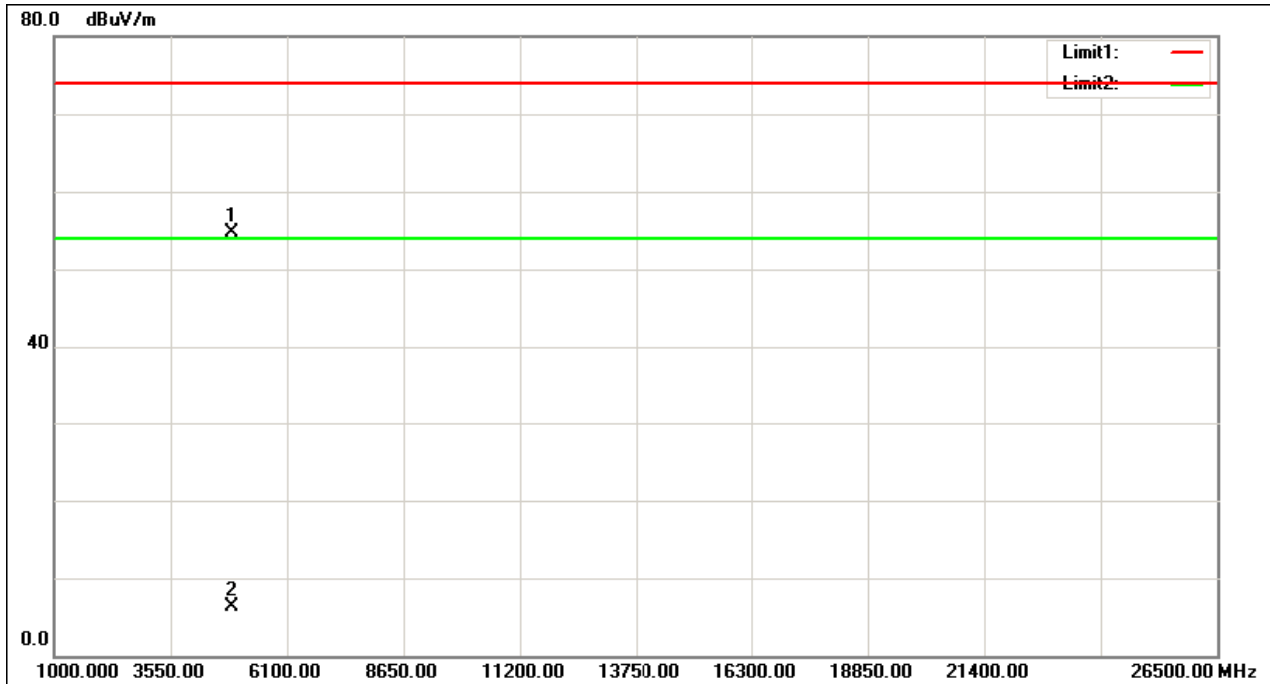
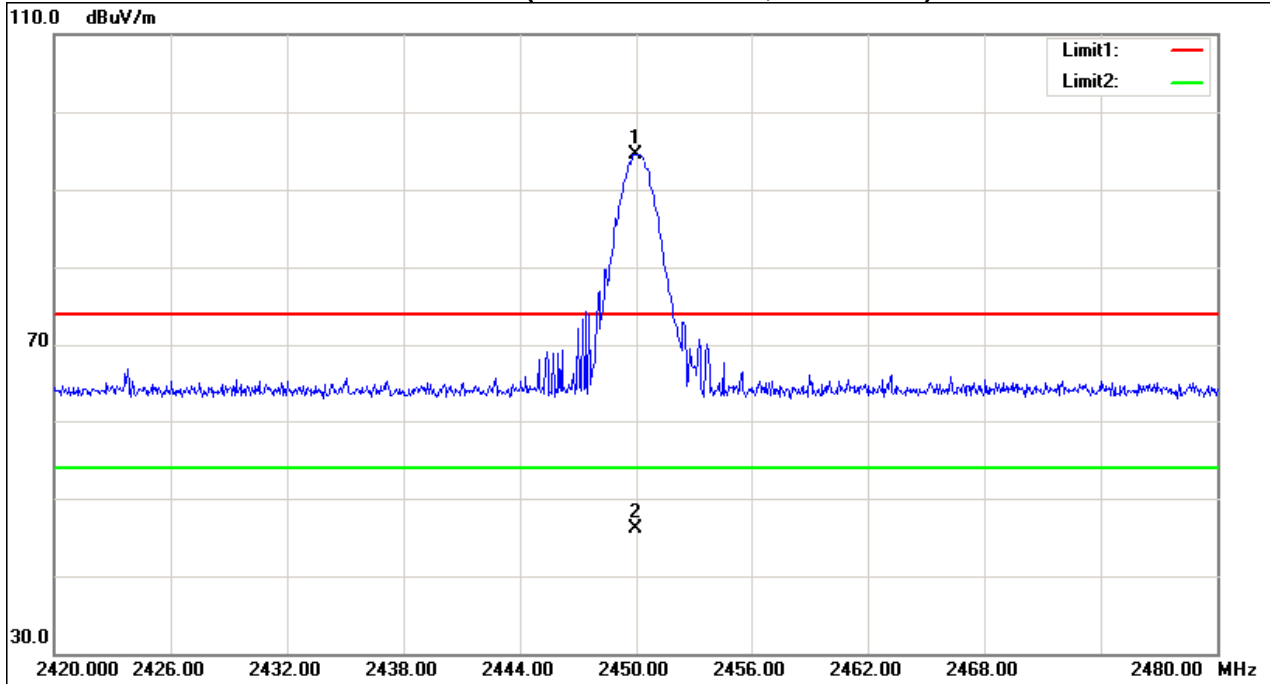
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>2449.94</b>	<b>H</b>	<b>62.74</b>	<b>14.30</b>	<b>31.85</b>	<b>94.59</b>	<b>46.15</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
4900.15	H	48.08	-0.36	6.67	54.75	6.31	74.00	54.00	X/H

Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency .“F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown “ \* ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
“X” - denotes Laid on Table ; “Y” - denotes Vertical Stand ; “Z” - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) · Final AV=PK-48.439



Orthogonal Axis : X  
TX 2450MHz (Above 1000 MHz, Horizontal)





EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	25 °C	Relative Humidity :	51 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX 2457MHz		

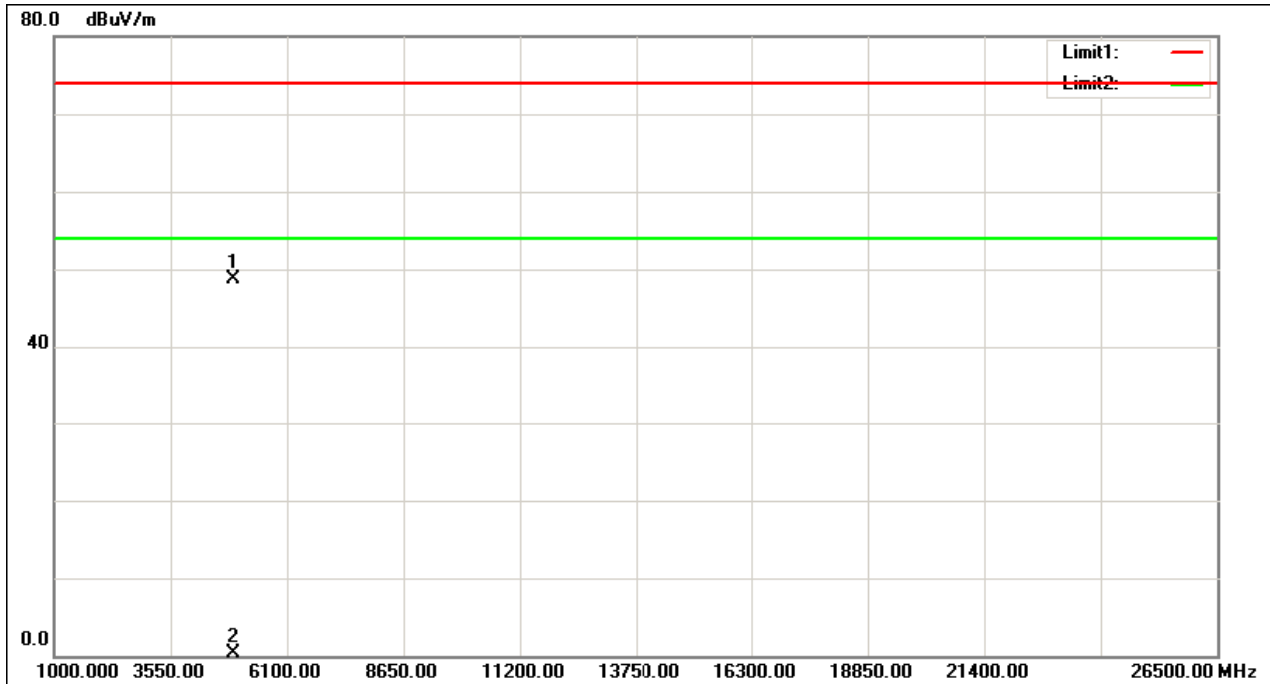
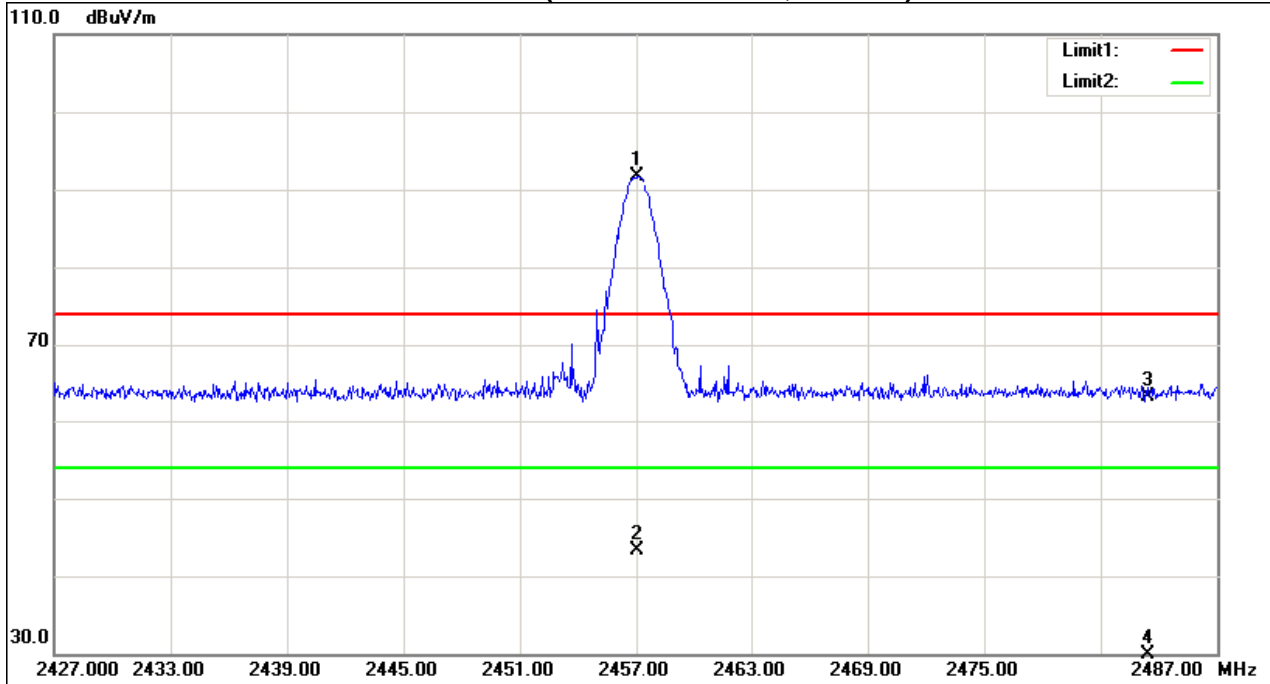
Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>2457.00</b>	<b>V</b>	<b>59.79</b>	<b>11.35</b>	<b>31.85</b>	<b>91.64</b>	<b>43.20</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
2483.50	V	31.33	-17.11	31.87	63.20	14.76	74.00	54.00	X/E
4914.02	V	41.92	-6.52	6.73	48.65	0.21	74.00	54.00	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency ◦ "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ◦
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) ◦ Final AV=PK-48.439



Orthogonal Axis : X  
TX 2457MHz (Above 1000 MHz, Vertical)





EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	25 °C	Relative Humidity :	51 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX 2457MHz		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
<b>2456.94</b>	<b>H</b>	<b>62.35</b>	<b>13.91</b>	<b>31.85</b>	<b>94.20</b>	<b>45.76</b>	<b>114.00</b>	<b>94.00</b>	<b>X/F</b>
2483.50	H	31.73	-16.70	31.87	63.60	15.17	74.00	54.00	X/E
4914.02	H	49.71	1.27	6.73	56.44	8.00	74.00	54.00	X/H

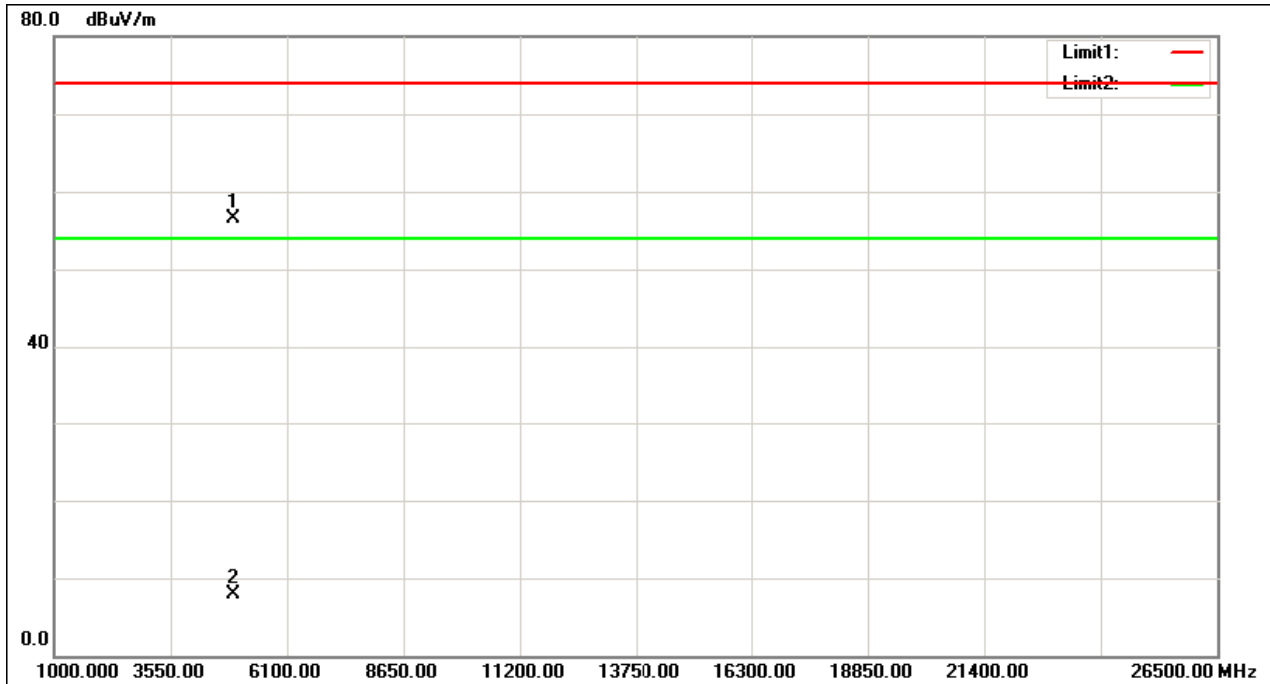
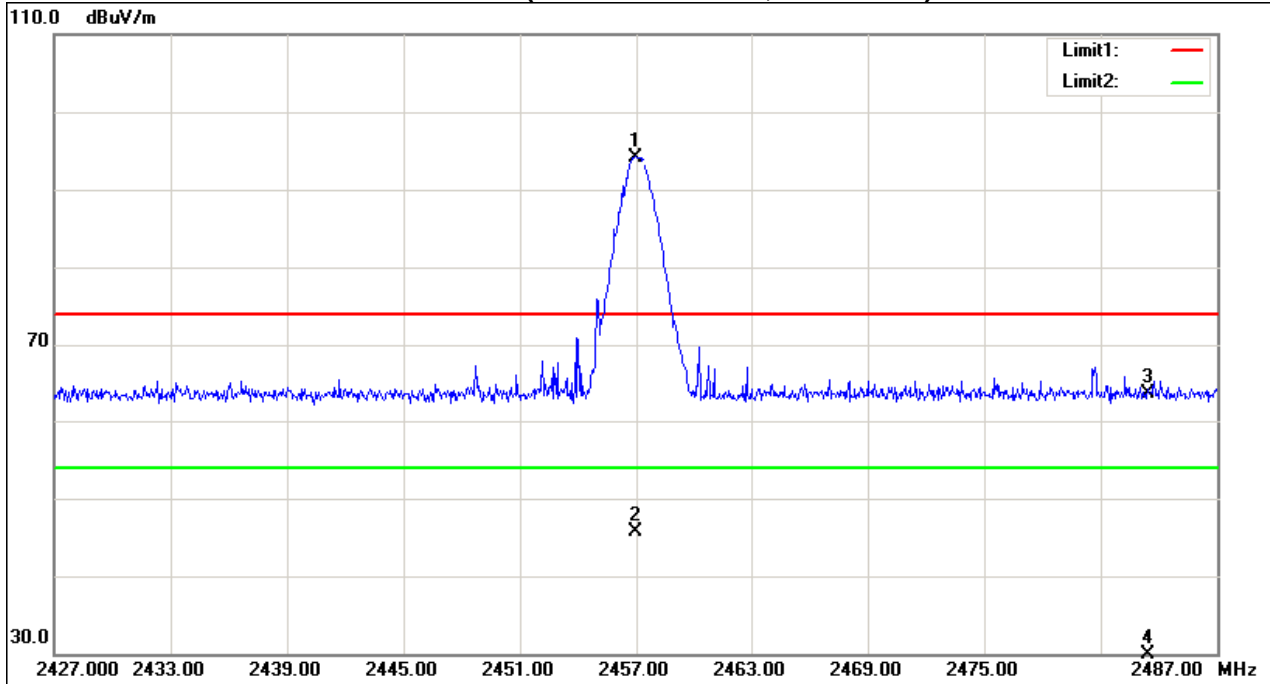
Remark :

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform .
- (2) Measuring frequency range from 30MHz to 1000MHz or the 10th harmonic of highest fundamental frequency . "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand
- (7) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna
- (8) The average value of fundamental frequency is:  
Average = Peak value + 20log(Duty cycle) · Final AV=PK-48.439





Orthogonal Axis : X  
TX 2457MHz (Above 1000 MHz, Horizontal)



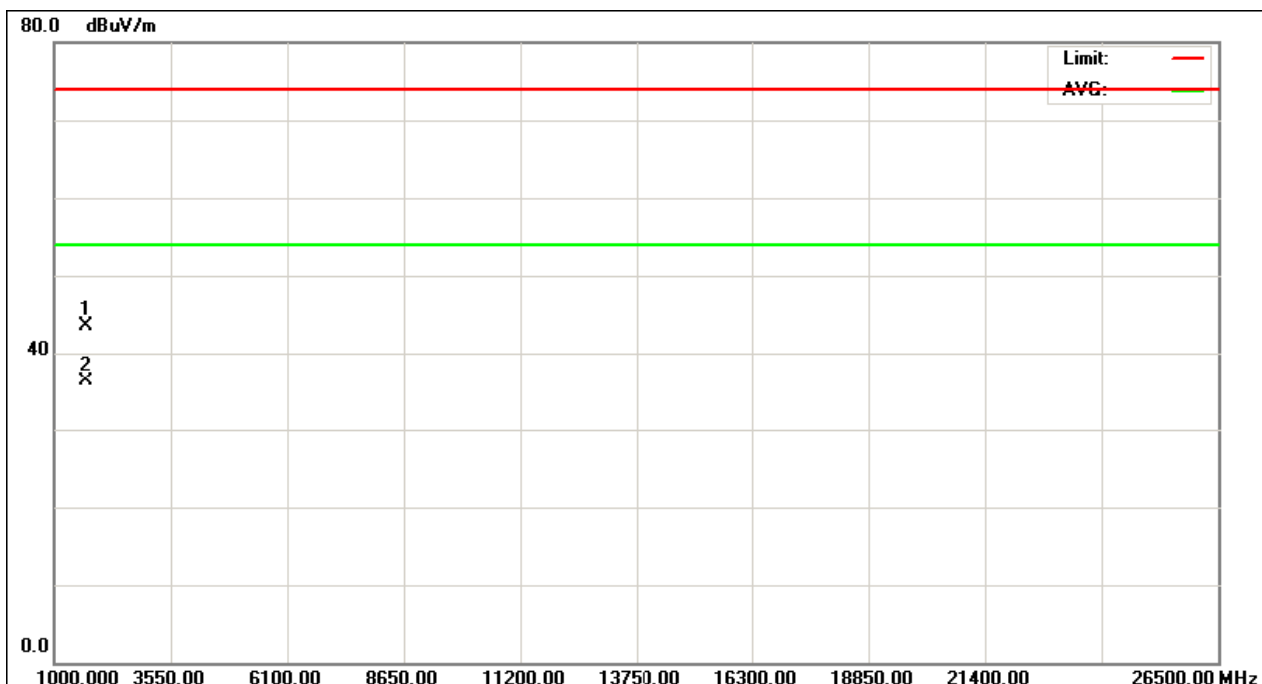


EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	22 °C	Relative Humidity :	56 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	RX Standby mode		

Freq. (MHz)	Ant.Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
1654.44	V	48.26	40.93	-4.72	43.54	36.21	74.00	54.00	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency. "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission.
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand



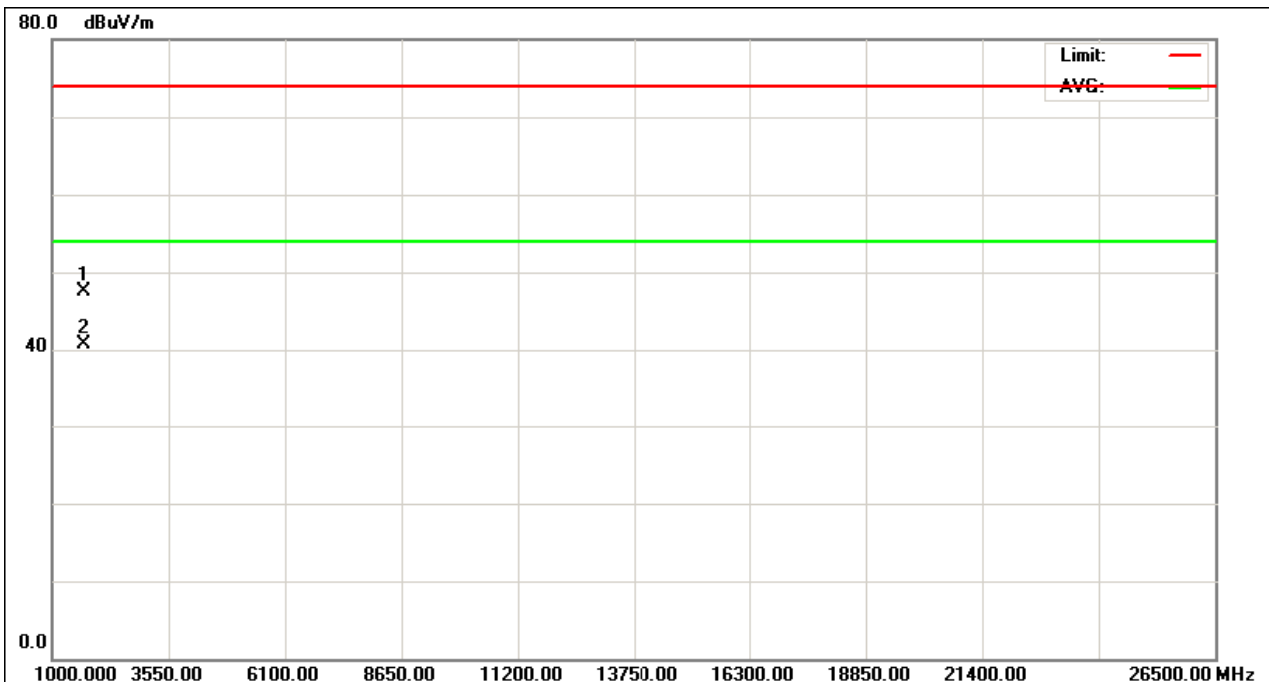


EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	22 °C	Relative Humidity :	56 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	RX Standby mode		

Freq. (MHz)	Ant. Pol. H/V	Reading		Ant./CF CF(dB)	Act.		Limit		Note
		Peak (dBuV)	AV (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	
1654.44	H	52.26	45.44	-4.72	47.54	40.72	74.00	54.00	X/H

**Remark :**

- (1) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (2) Measuring frequency range from 1000MHz to 6000MHz or the 10th harmonic of highest fundamental frequency ◦ "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency. (This judgment method includes the Band Edge Requirement.)
- (3) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ◦
- (4) Data of measurement within this frequency range shown " \* " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.
- (6) EUT Orthogonal Axis :  
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand





## 5. BANDWIDTH TEST

### 5.1 MEASUREMENT INSTRUMENTS LIST

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

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

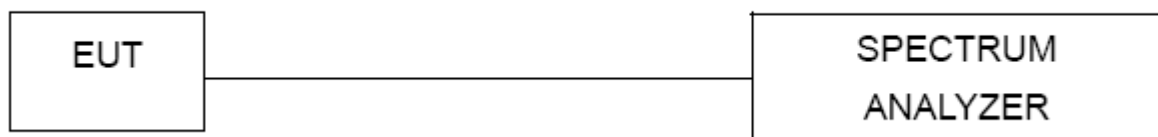
### 5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = 2.5 ms.

### 5.3 DEVIATION FROM STANDARD

No deviation.

### 5.4 TEST SETUP



### 5.5 EUT OPERATION CONDITIONS

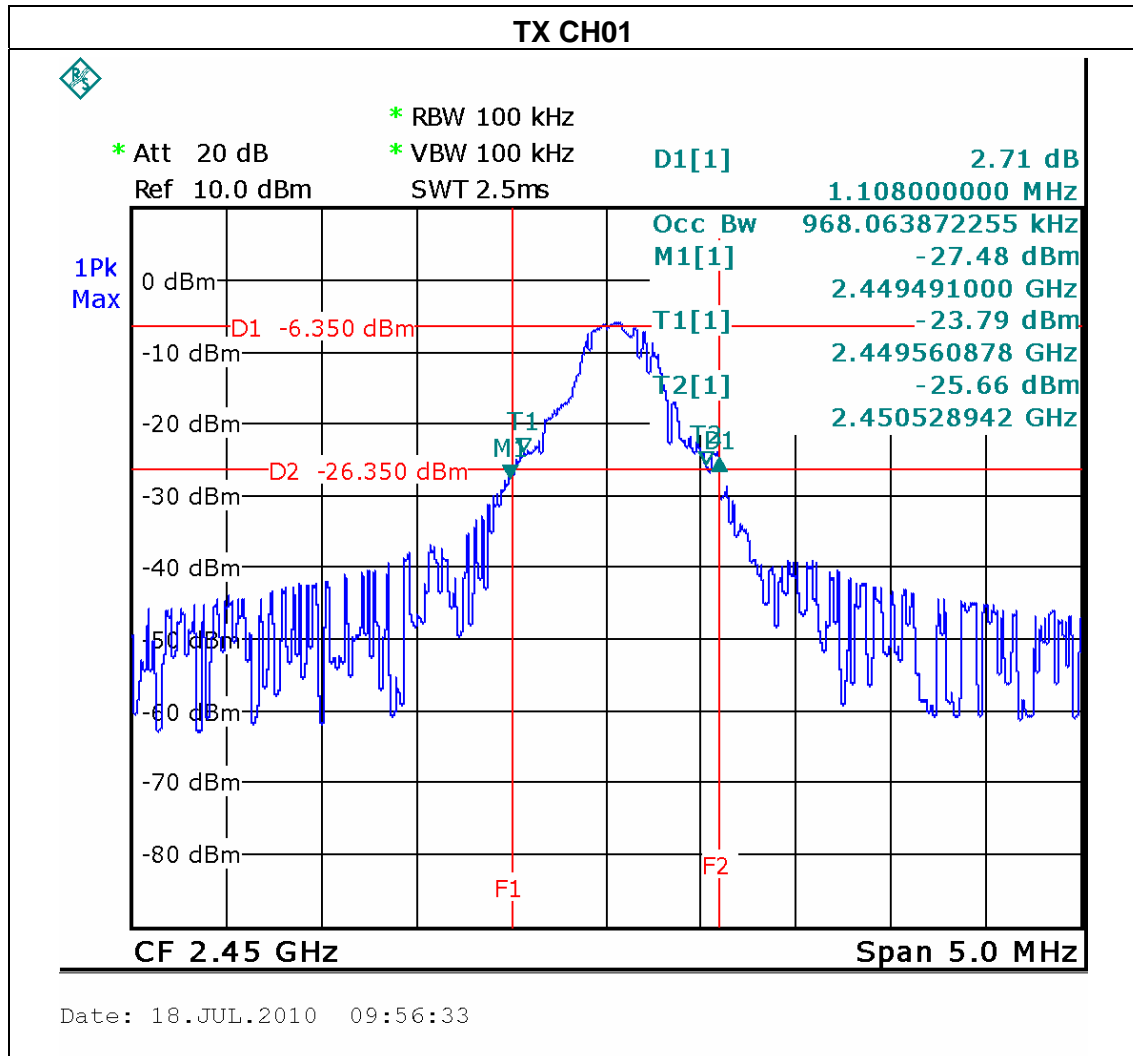
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

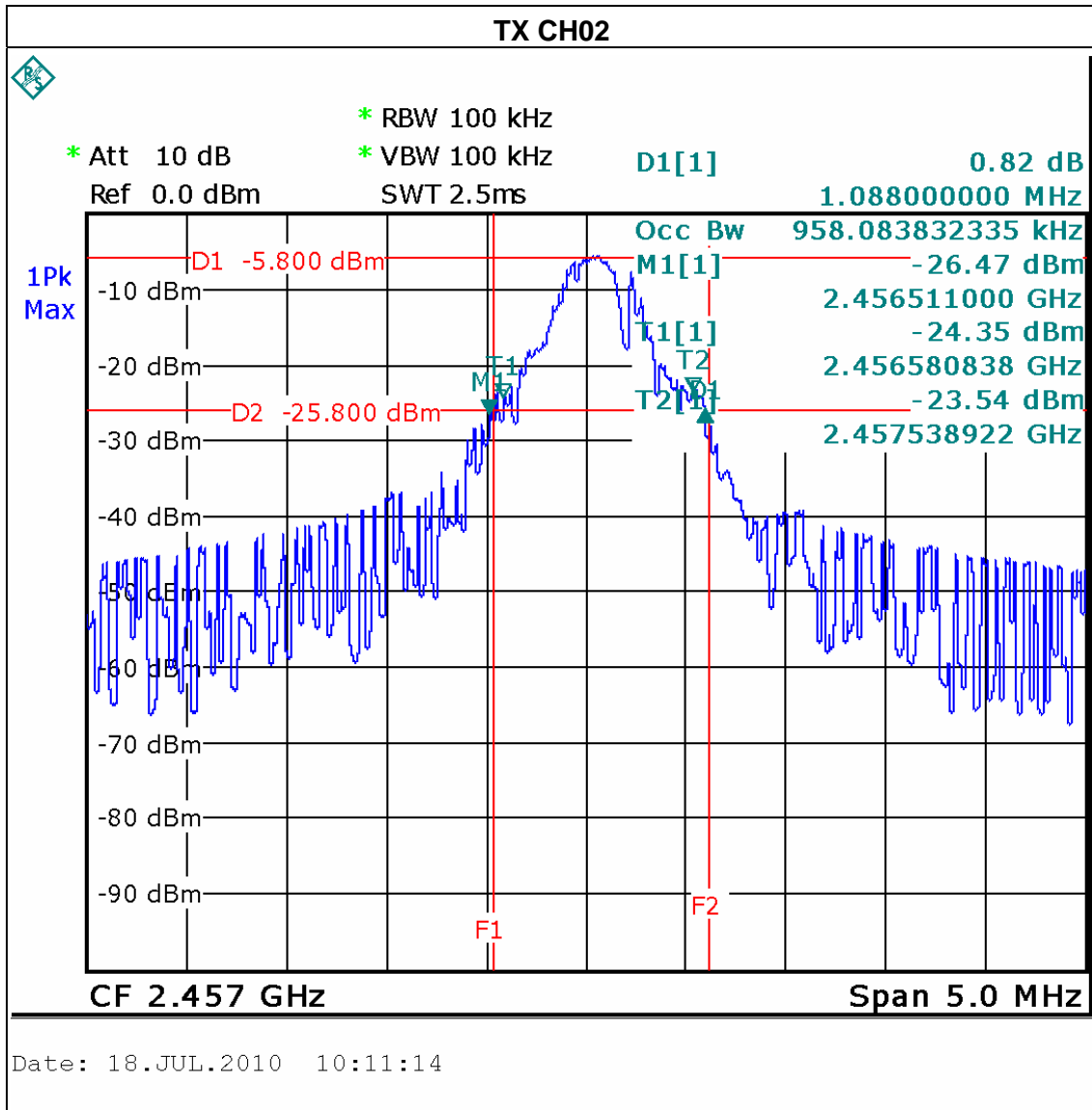


**5.6 TEST RESULTS**

EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	29 °C	Relative Humidity :	50 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX CH 01/02		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)	99% occupied Bandwidth(MHz)
CH01	2450	1.108	0.968
CH02	2457	1.088	0.958







**6. ANTENNA CONDUCTED SPURIOUS EMISSION**

**6.1 APPLIED PROCEDURES / LIMIT**

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

<b>Frequencies (MHz)</b>	<b>Field Strength (micorvolts/meter)</b>	<b>Measurement Distance (meters)</b>
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

**6.1.1 MEASUREMENT INSTRUMENTS LIST**

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

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

The following table is the setting of the spectrum analyzer.

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

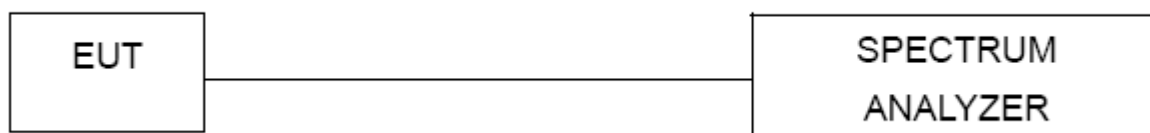
**6.1.2 TEST PROCEDURE**

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

**6.1.3 DEVIATION FROM STANDARD**

No deviation.

**6.1.4 TEST SETUP**





**6.1.5 EUT OPERATION CONDITIONS**

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

**6.1.6 TEST RESULTS**

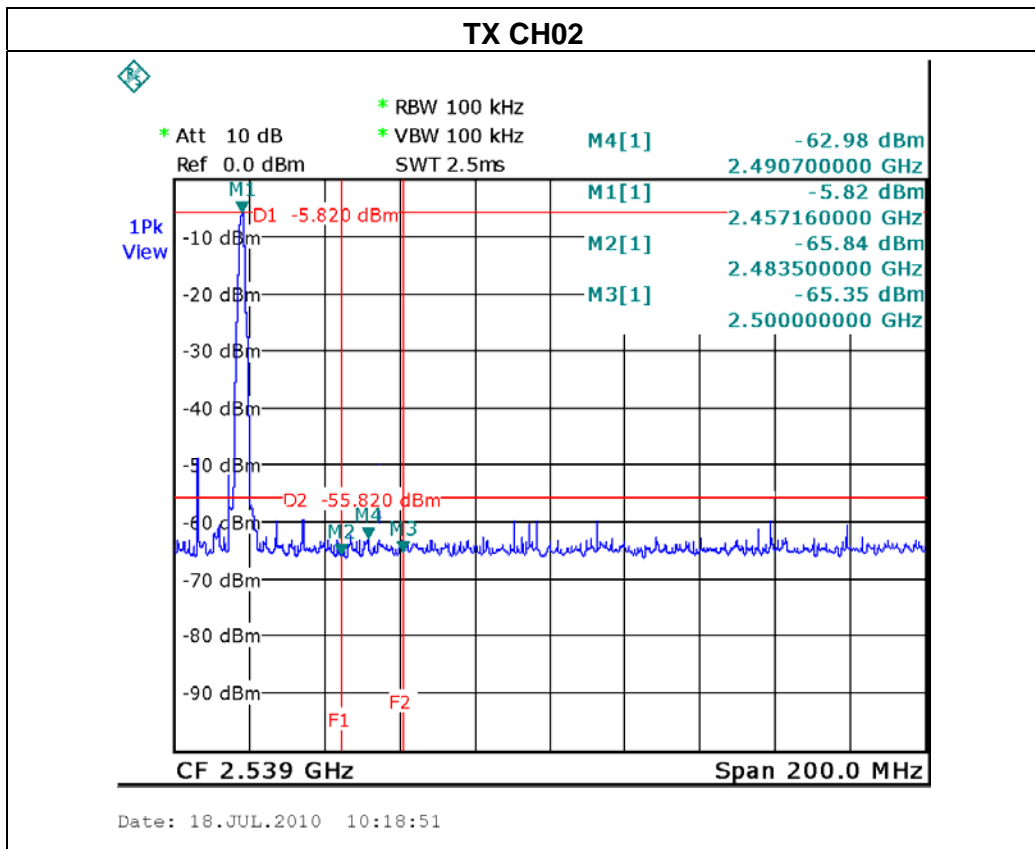
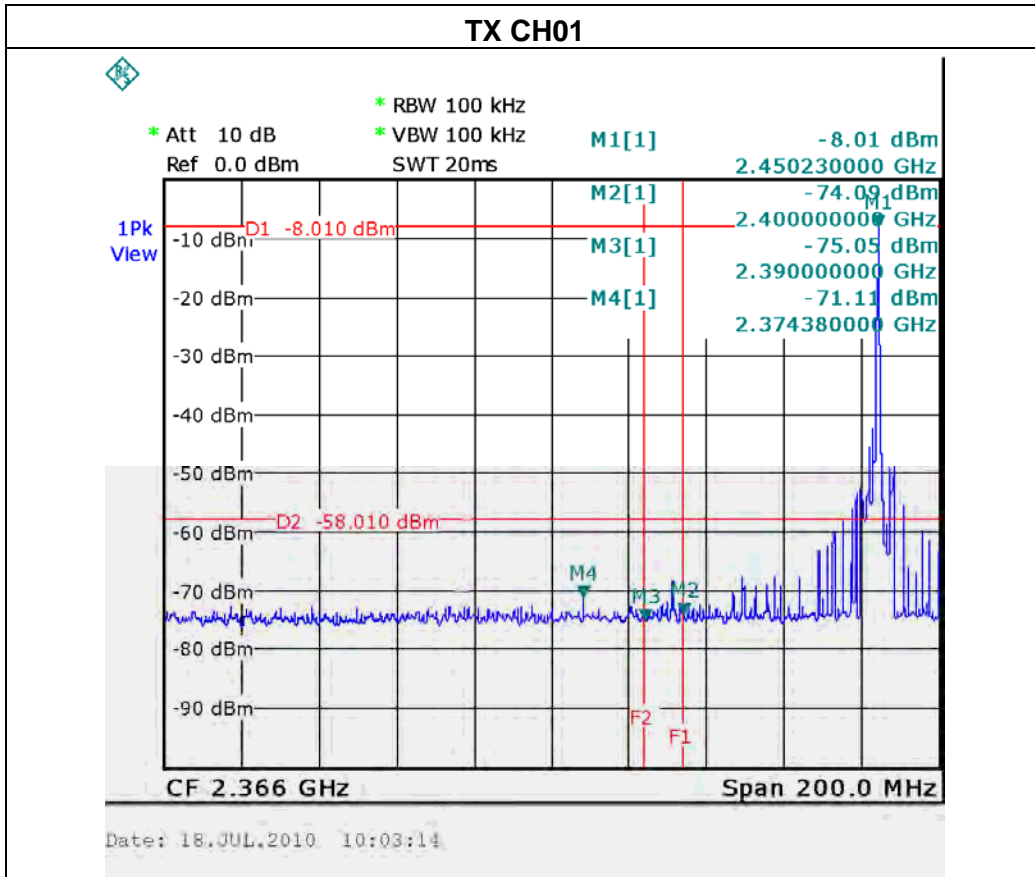
EUT :	iPhone Dongle WA52500	Model Name. :	WA52500
Temperature :	27°C	Relative Humidity :	50 %
Pressure :	1008 hPa	Test Power :	DC 5.0V
Test Mode :	TX CH01/CH02		

Channel of Worst Data: CH02			
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2374.38	-71.11	2490.70	-62.98

**Result**

In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 50dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.







## 7. RF EXPOSURE TEST

### 7.1 RF Exposure Compliance for Exemption from Routine Evaluation Limits

#### **RSS 102-- Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)**

##### **2.5.1 Exemption from Routine Evaluation Limits – SAR Evaluation**

SAR evaluation is required if the separation distance between the user and the radiating element of the device is less than or equal to 20 cm, except when the device operates as follows:

- From 3 kHz up to 1 GHz inclusively, and with output power (i.e. the higher of the conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power) that is less than or equal to 200 mW for general public use and 1000 mW for controlled use;

##### **2.5.2 Exemption from Routine Evaluation Limits – RF Exposure Evaluation**

RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- Below 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 2.5 W;
- At or above 1.5 GHz and the maximum e.i.r.p. of the device is equal to or less than 5 W.

#### E.i.r.p. calculation:

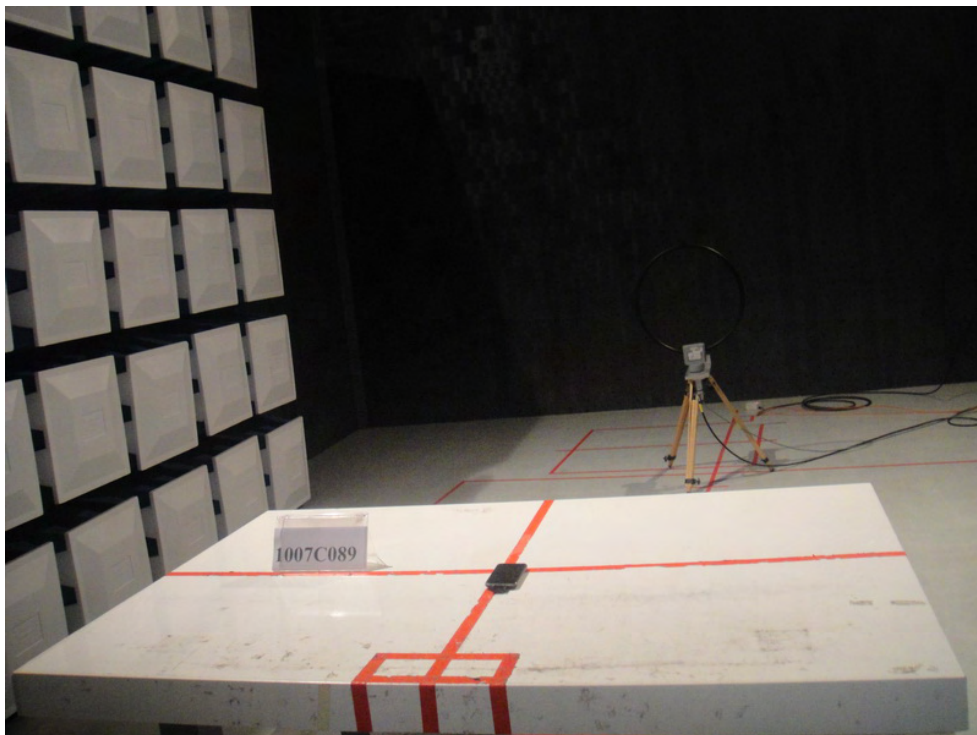
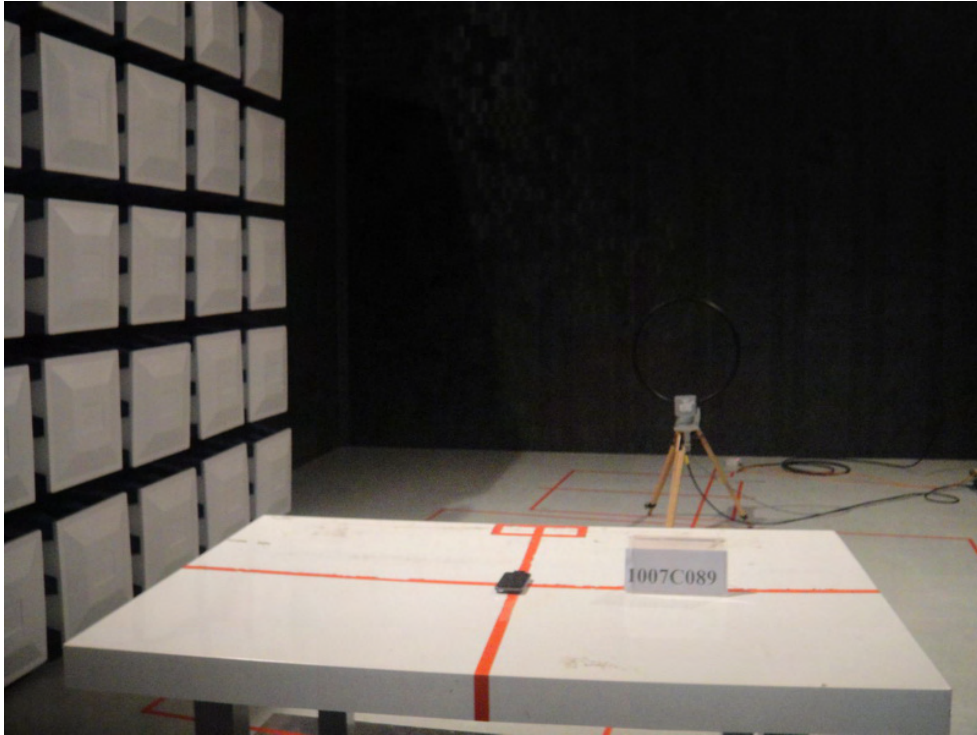
Measured output power is 46.15 dBuV/m

Antenna gain is 2.0 dBi.

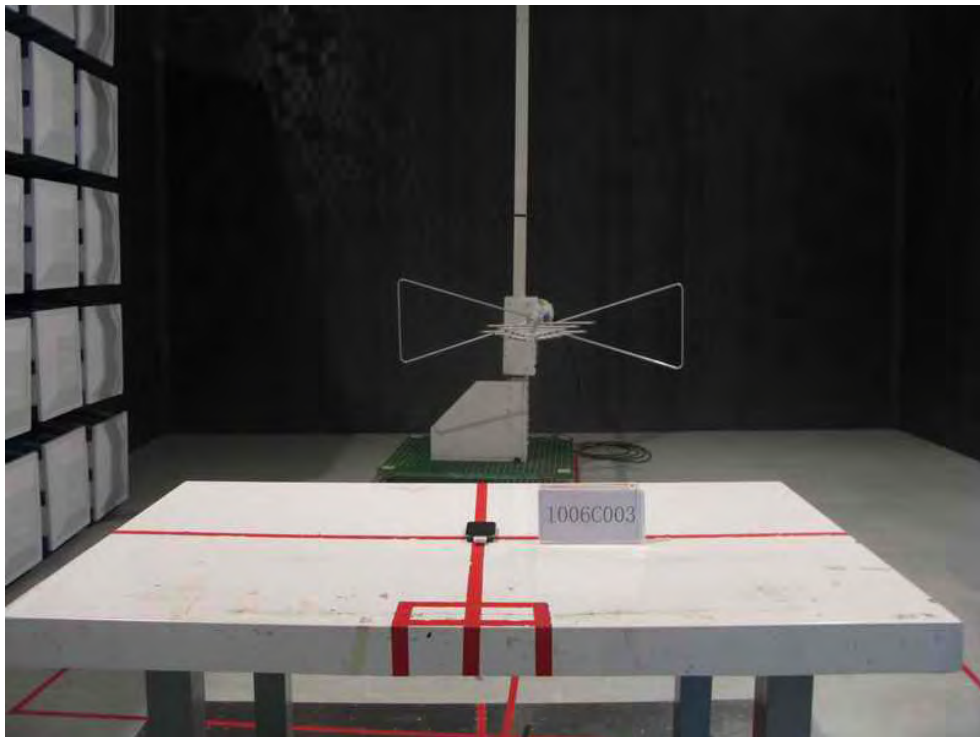
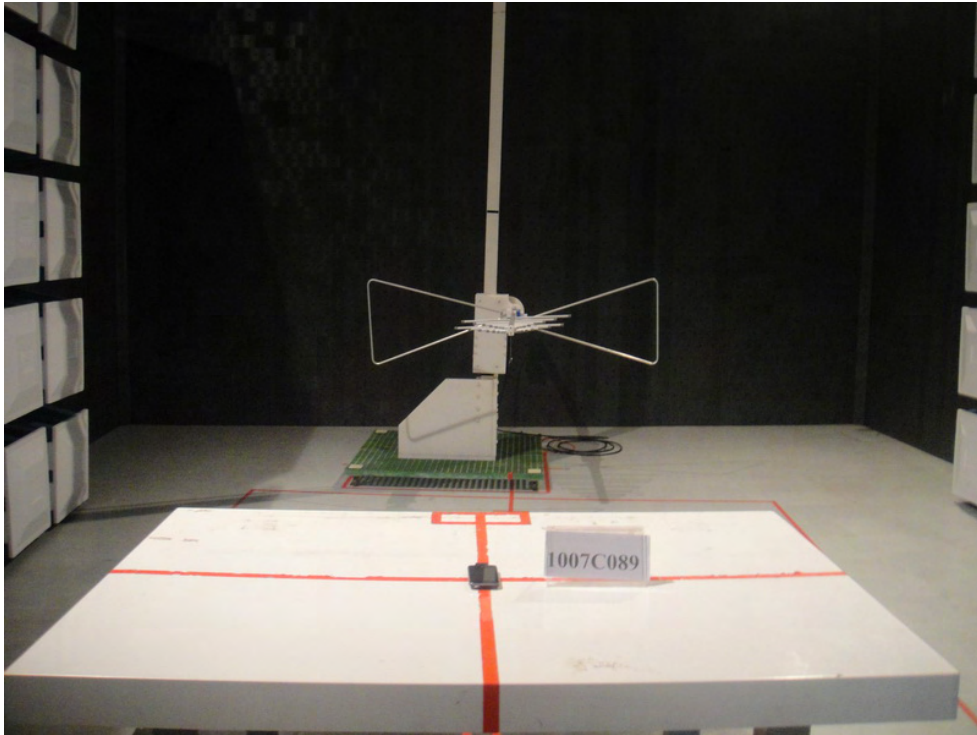
$e.i.r.p.[W] = 46.15 \text{ dBuV/m} = 0.00121 \text{ W} < 5 \text{ W}$  (RF exposure evaluations are not applicable)

**8. EUT TEST PHOTO**

**Radiated Measurement Photos  
9K~30MHz**



**Radiated Measurement Photos  
30M~1000MHz**





**Radiated Measurement Photos  
Above 1000MHz**

