



FCC Radio Test Report

FCC ID: FPW-ERK-10DARX

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

Issued Date : Dec. 14, 2011
Project No. : 1111C253
Equipment : USB Dongle
Model Name : Essentials Wireless Dongle Receiver
Applicant : Jing Mold Electronics Technology (Shen Zhen)CO.,LTD.
Address : Xinqiao, 3rd Industrial Estate, Shajing Baoan, Shenzhen, China
Manufacture : Jing Mold Electronics Technology (Shen Zhen)CO.,LTD.
Address : Xinqiao, 3rd Industrial Estate, Shajing Baoan, Shenzhen, China

Tested by:

Neutron Engineering Inc. EMC Laboratory

Date of Receipt: Dec. 05, 2011

Date of Test:

Dec. 05, 2011 ~ Dec. 13, 2011

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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: USB Dongle

Brand Name: Evoluent

Model Name.: Essentials Wireless Dongle Receiver

Applicant: Jing Mold Electronics Technology (Shen Zhen)CO.,LTD.

Date of Test: Dec. 05, 2011 ~ Dec. 13, 2011

Test Item: ENGINEERING SAMPLE

Standards: FCC Part15, Subpart C(15.249)/ ANSI C63.4 : 2003

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

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-1111C253) 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)

StandardSection	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.209	Radiated Emission	PASS	
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-C02/DG-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

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 expended 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-C02	CISPR	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
DG-CB03	CISPR	30MHz ~ 200MHz	V	2.48	
		30MHz ~ 200MHz	H	2.16	
		200MHz ~ 1,000MHz	V	2.50	
		200MHz ~ 1,000MHz	H	2.66	



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	USB Dongle																
Brand Name	Evoluent																
Model Name.	Essentials Wireless Dongle Receiver																
OEM Brand/Model Name	N/A																
Model Difference	N/A																
Product Description	<p>The EUT is a USB Dongle.</p> <table border="1"><tr><td>Product Type</td><td>Low Power Communication Device</td></tr><tr><td>Operation Frequency:</td><td>2402~2480 MHz</td></tr><tr><td>Modulation Type:</td><td>GFSK</td></tr><tr><td>Date rate:</td><td>1Mbps</td></tr><tr><td>Number of Channel</td><td>79CH .Please see Note 2.</td></tr><tr><td>Antenna Designation:</td><td>Printed antenna</td></tr><tr><td>Antenna Gain(Peak)</td><td>-3.1 dBi</td></tr><tr><td>Output Power:</td><td>65.36 dBuV/m (AV Max.)</td></tr></table> <p>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.</p>	Product Type	Low Power Communication Device	Operation Frequency:	2402~2480 MHz	Modulation Type:	GFSK	Date rate:	1Mbps	Number of Channel	79CH .Please see Note 2.	Antenna Designation:	Printed antenna	Antenna Gain(Peak)	-3.1 dBi	Output Power:	65.36 dBuV/m (AV Max.)
Product Type	Low Power Communication Device																
Operation Frequency:	2402~2480 MHz																
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Date rate:	1Mbps																
Number of Channel	79CH .Please see Note 2.																
Antenna Designation:	Printed antenna																
Antenna Gain(Peak)	-3.1 dBi																
Output Power:	65.36 dBuV/m (AV Max.)																
Channel List	Please refer to the Note 2.																
Power Source	DC Voltage supplied from Host System.																
Power Rating	I/P: 120V/60Hz O/P: DC 5V																
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 List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2402	28	2429	55	2456
2	2403	29	2430	56	2457
3	2404	30	2431	57	2458
4	2405	31	2432	58	2459
5	2406	32	2433	59	2460
6	2407	33	2434	60	2461
7	2408	34	2435	61	2462
8	2409	35	2436	62	2463
9	2410	36	2437	63	2464
10	2411	37	2438	64	2465
11	2412	38	2439	65	2466
12	2413	39	2440	66	2467
13	2414	40	2441	67	2468
14	2415	41	2442	68	2469
45	2416	42	2443	69	2470
46	2417	43	2444	70	2471
17	2418	44	2445	71	2472
18	2419	45	2446	72	2473
19	2420	46	2447	73	2474
20	2421	47	2448	74	2475
21	2422	48	2449	75	2476
22	2423	49	2450	76	2477
23	2424	50	2451	77	2478
24	2425	51	2452	78	2479
25	2426	52	2453	79	2480
26	2427	53	2454		
27	2428	54	2455		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed Antenna	N/A	-3.1



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	Wireless
Mode 2	CH Lower – 2402MHz
Mode 3	CH Middle – 2448MHz
Mode 4	CH Highest -2480MHz

For Conducted Test	
Final Test Mode	Description
Mode 1	Normal Link

For Radiated Test	
Final Test Mode	Description
Mode 2	CH Lower – 2402MHz
Mode 3	CH Middle – 2448MHz
Mode 4	CH Highest -2480MHz

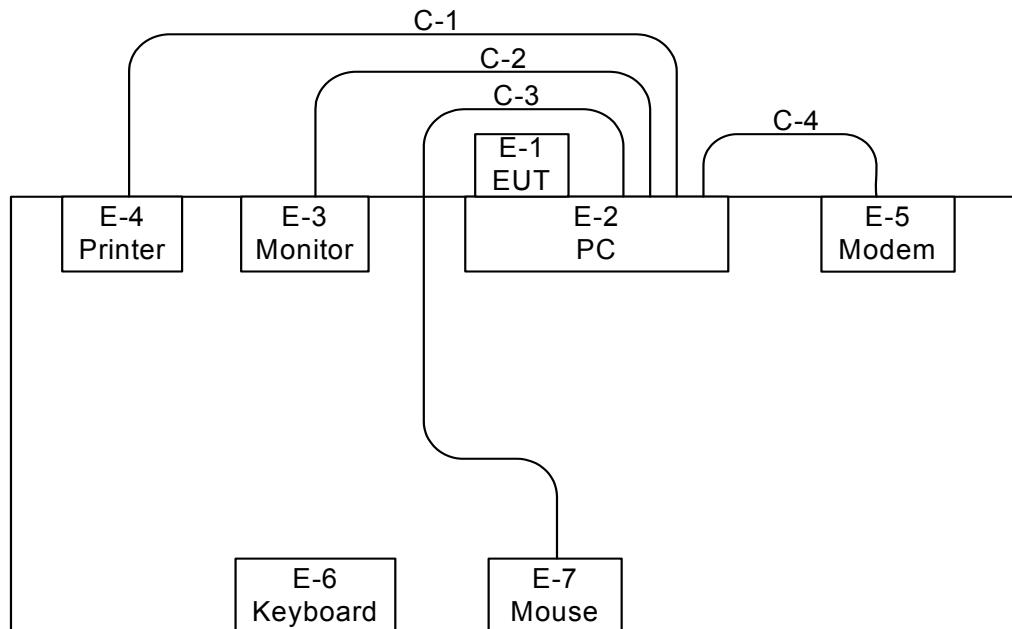
Note:

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



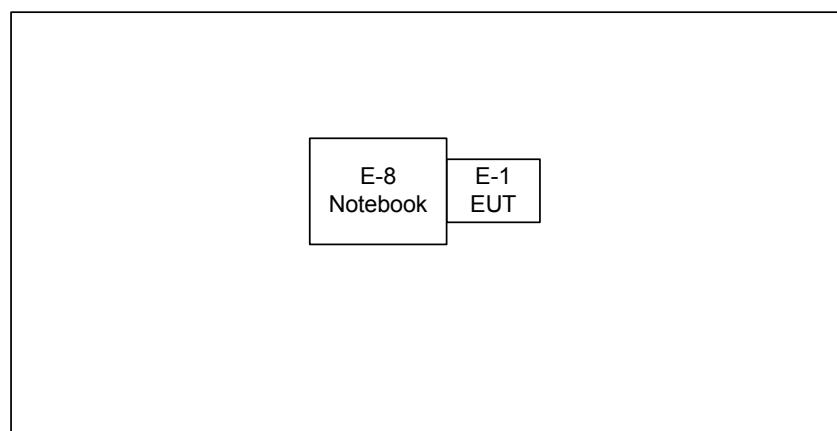
3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted: TX Mode



C-1: Parallel Cable
C-2: D-Sub Cable
C-3: USB Cable
C-4: RS232 Cable

Radiated: TX/RX Mode





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	Series No.	Note
E-1	USB Dongle	Evoluent	Essentials Wireless Dongle Receiver	FPW-ERK-10DARX	N/A	EUT
E-2	PC	Dell 745	DCSM	DOC	G7K832X	
E-3	LCD monitor	Dell	E177FPc	DOC	CNOFJ179-6418 0-6AG-1WNS	
E-4	Printer	SII	DPU-414	DOC	3018507 B	
E-5	Modem	ACEEX	DM-1414V	IFAXDm1414	0603002131	
E-6	Keyboard	Evoluent	Essentials Wireless Full Featured Compact Keyboard	FPW-ERK-10DA	N/A	
E-7	USB Mouse	Dell	MO56UOA	DOC	FQJ000BS	
E-8	Notebook	DELL	INSPIRON 1420	DOC	JX193A01SDC2	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	1.8M	
C-2	YES	YES	1.8M	
C-3	YES	NO	1.8M	
C-4	NO	NO	1.8M	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in m 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.26.2012
2	LISN	R&S	ENV216	100087	May.26.2012
3	Test Cable	N/A	C_17	N/A	Mar.30.2012
4	EMI TEST RECEIVER	R&S	ESCS30	826547/022	May.26.2012
5	50Ω Terminator	SHX	TF2-3G-A	08122902	May.26.2012

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



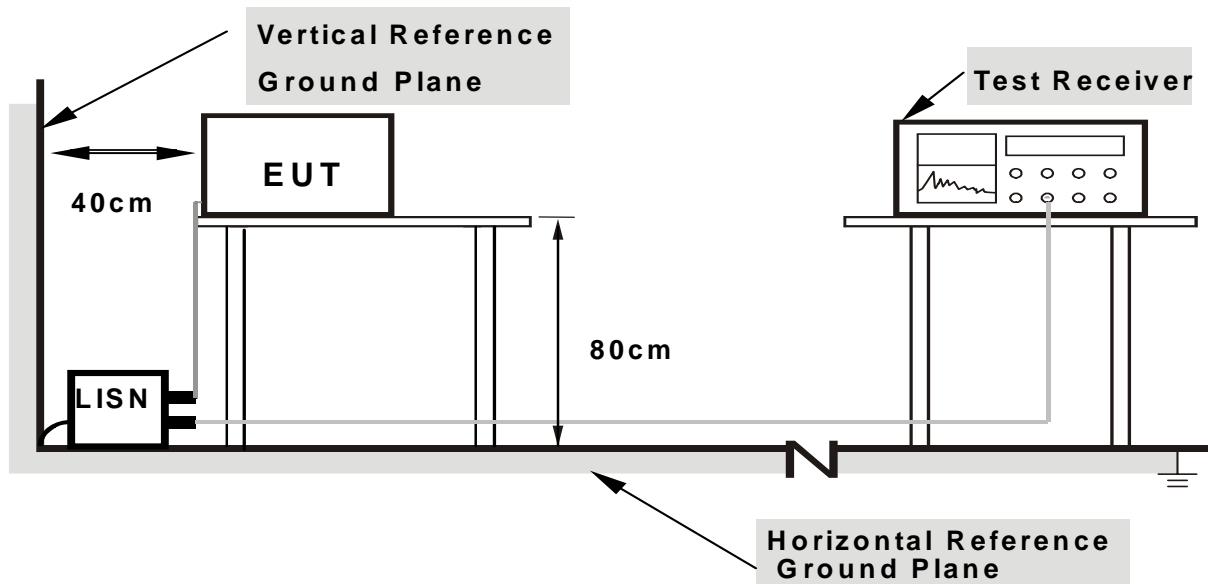
4.1.3 TEST PROCEDURE

- 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 cm 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.

The EUT was programmed to be in continuously transmitting mode.

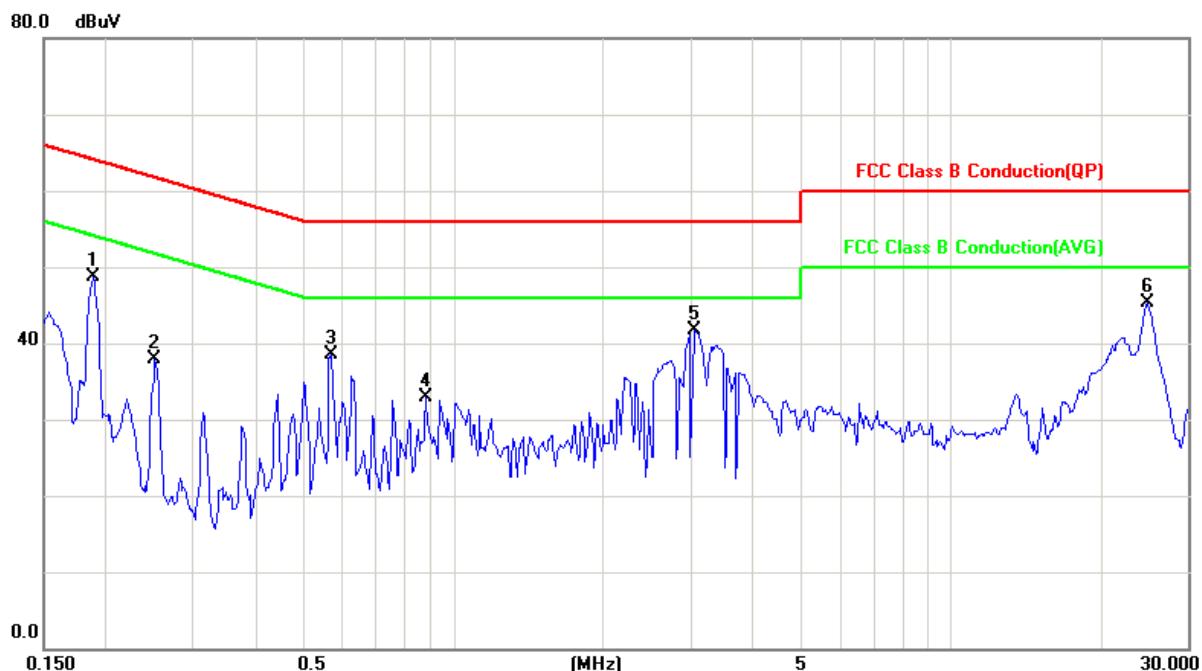
**4.1.7 TEST RESULTS**

EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	21 °C	Relative Humidity :	50 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX Mode		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.19	Line	48.74	*	64.08	54.08	-15.34	(QP)
0.25	Line	37.83	*	61.71	51.71	-23.88	(QP)
0.57	Line	38.59	*	56.00	46.00	-17.41	(QP)
0.88	Line	33.00	*	56.00	46.00	-23.00	(QP)
3.05	Line	41.65	*	56.00	46.00	-14.35	(QP)
24.97	Line	45.38	*	60.00	50.00	-14.62	(QP)

Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. 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.



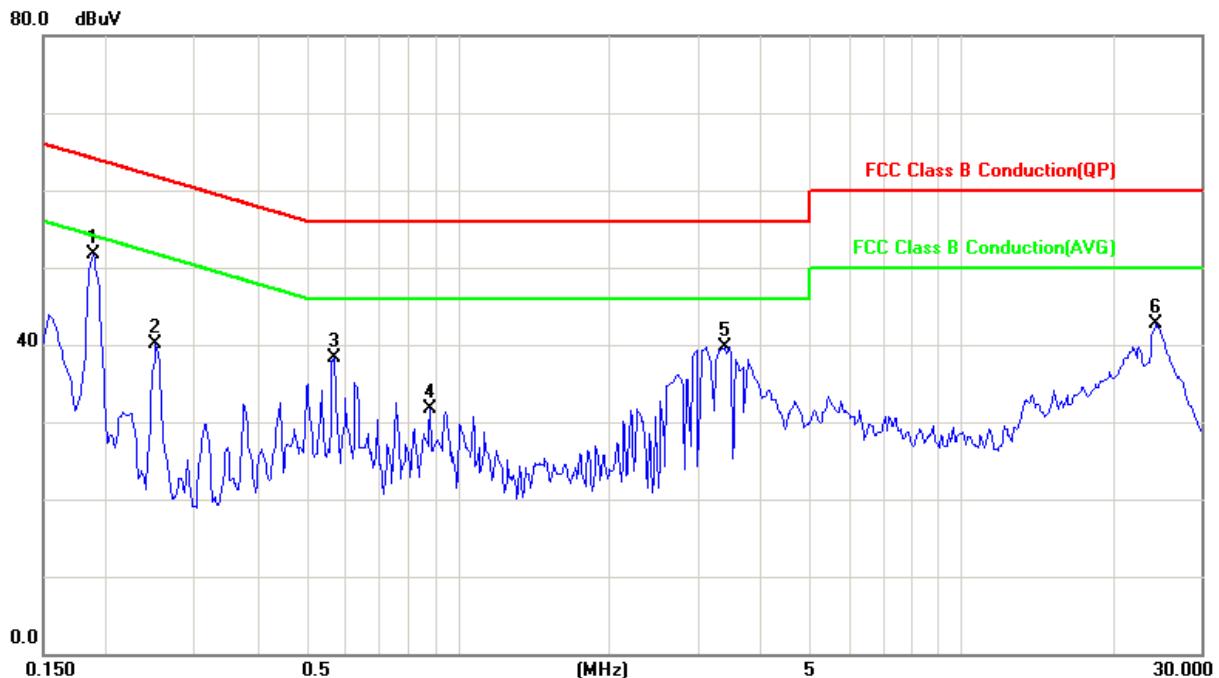


EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	21 °C	Relative Humidity :	50 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX Mode		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.19	Neutral	51.72	*	64.08	54.08	-12.36	(QP)
0.25	Neutral	40.15	*	61.71	51.71	-21.56	(QP)
0.57	Neutral	38.37	*	56.00	46.00	-17.63	(QP)
0.88	Neutral	31.68	*	56.00	46.00	-24.32	(QP)
3.40	Neutral	39.76	*	56.00	46.00	-16.24	(QP)
24.50	Neutral	42.65	*	60.00	50.00	-17.35	(QP)

Remark

- (1) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. 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)

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

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.

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 15.209)

FREQUENCY (MHz)	(dBuV/m) (at 3m)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

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

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC Part 15.249)

FCC Part15 (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 harmonics 500 μ V/m (54 dB μ V/m) @ 3 m	Above 2483.5

**4.2.2 MEASUREMENT INSTRUMENTS LIST**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Jun.04.2012
2	Amplifier	HP	8447D	2944A09673	May.26.2012
3	Test Receiver	R&S	ESCI	100382	May.26.2012
4	Test Cable	N/A	C-01_CB03	N/A	Jul.01.2012
5	Antenna	ETS	3115	00075789	May.26.2012
6	Amplifier	Agilent	8449B	3008A02274	May.26.2012
7	Spectrum	Agilent	E4408B	US39240143	Nov.25.2012
8	Test Cable	HUBER+SUHNER	C-45	N/A	May.04.2012
9	Controller	CT	SC100	N/A	N/A
10	Active Loop Antenna	R&S	HFH2-Z2	830749/020	May.26.2012
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct.13.2012

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)	1 MHz / 1 MHz for Peak, Average=PK-dycty cycle

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



DUTY CYCLE: TX 2404MHz (1Mbps)

Dwell time=ON/ON+OFF

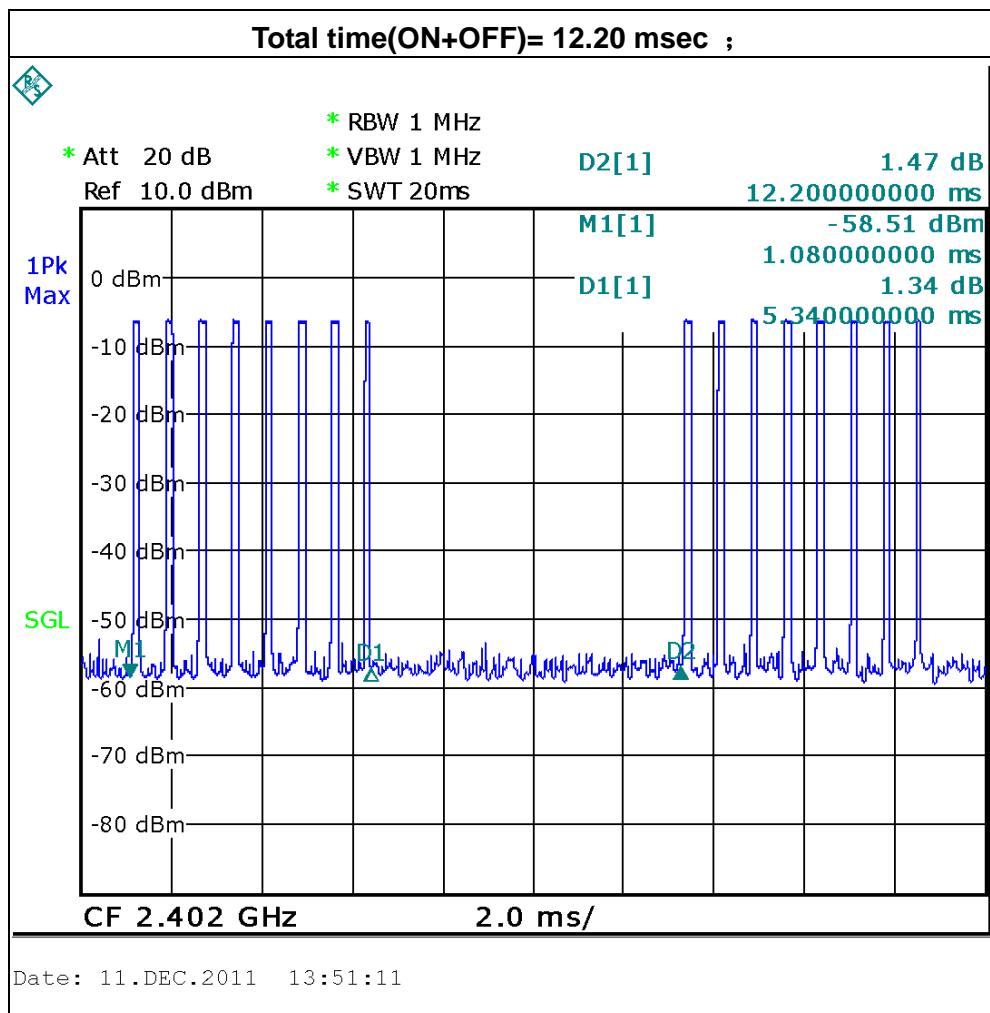
ON: 1.76msec

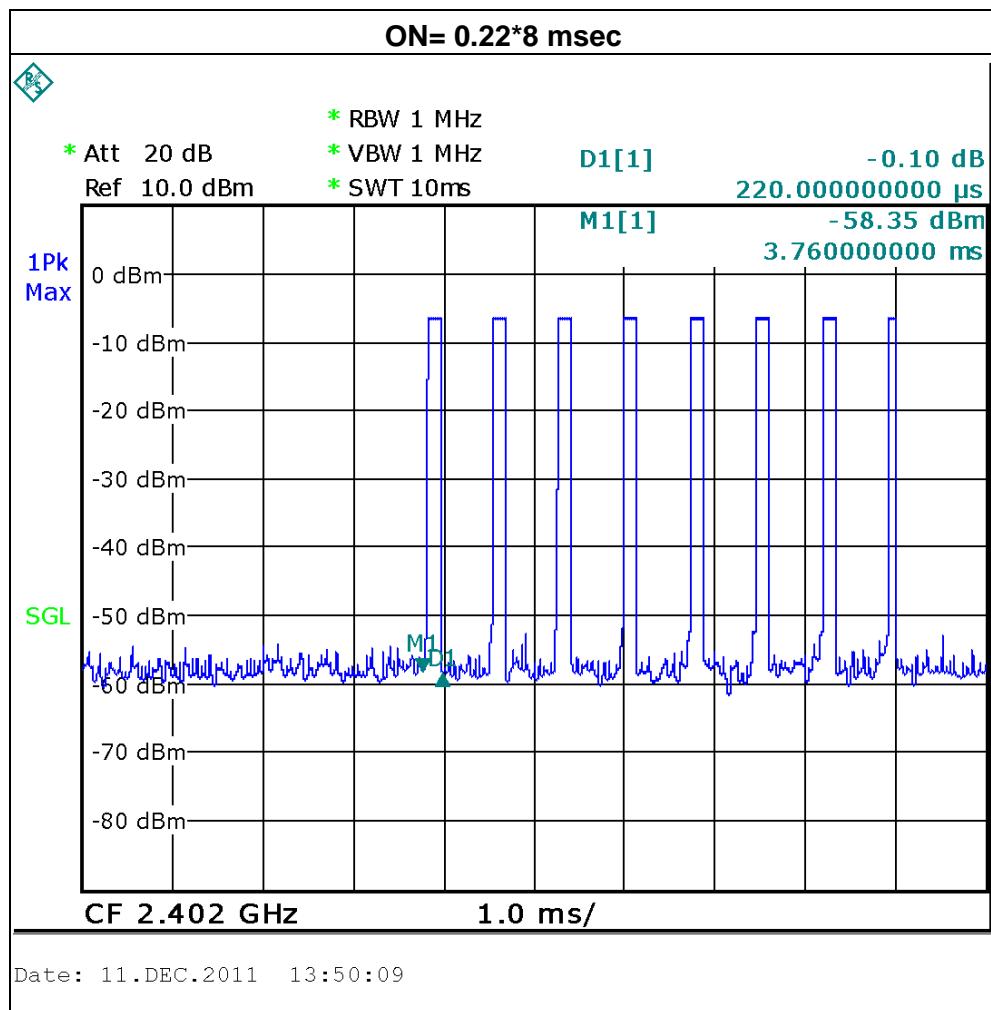
ON+OFF: (total time):12.20msec

Dwell time: 14.43%

AV=PK+20 log(Dwell time)

AV=PK-16.82







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.

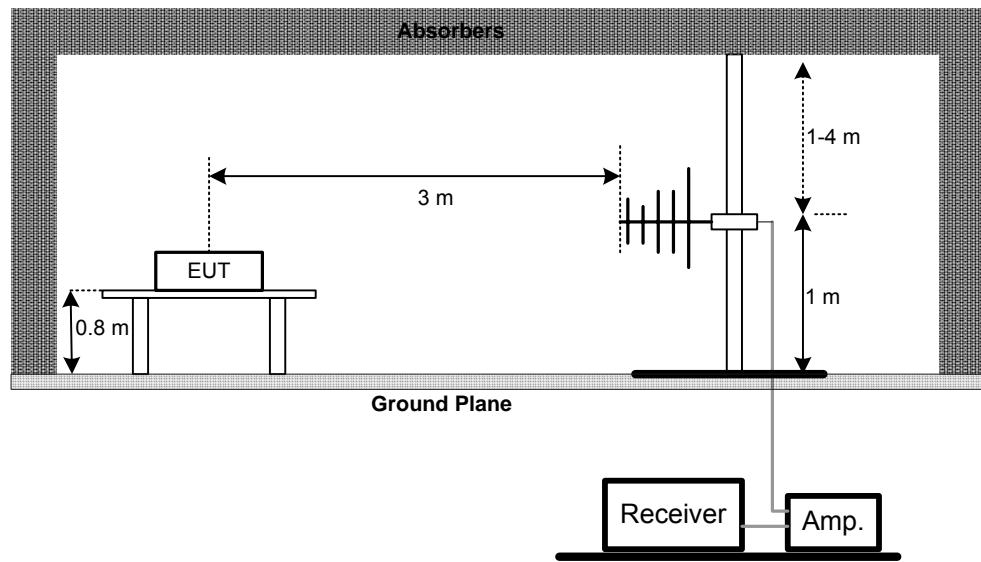
4.2.4 DEVIATION FROM TEST STANDARD

No deviation

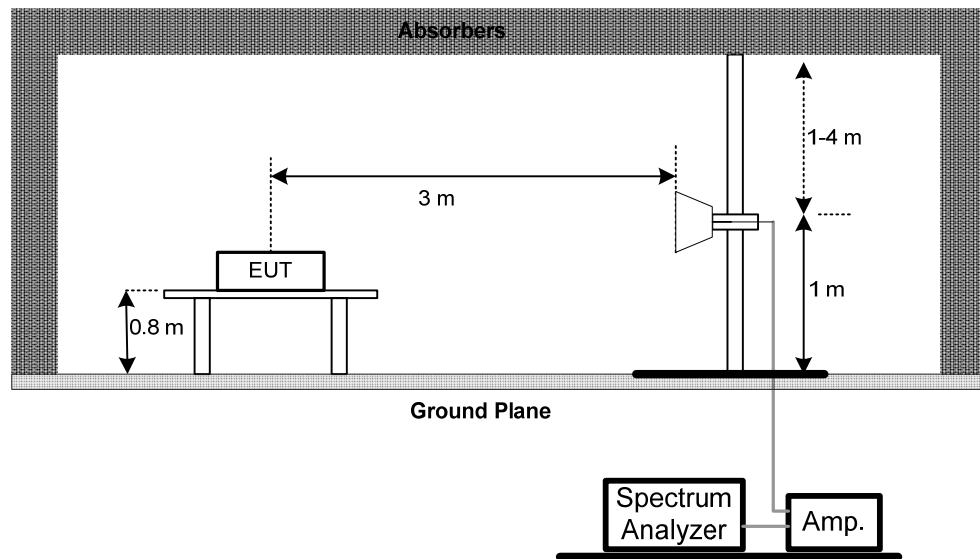


4.2.5 TEST SETUP

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

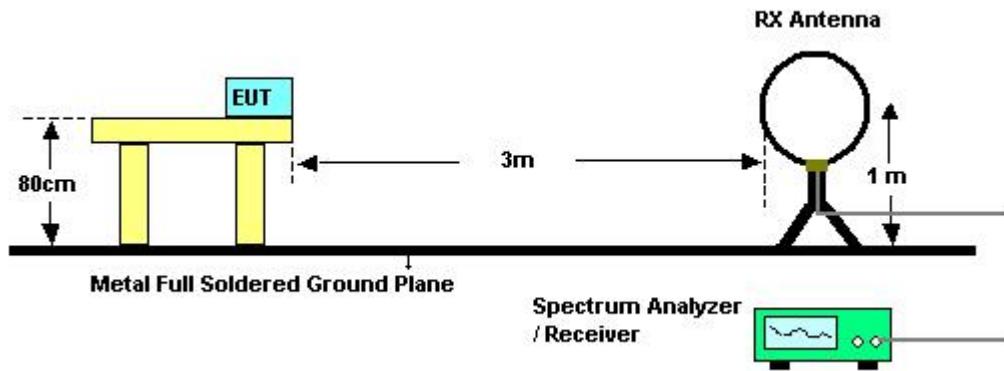


(B) Radiated Emission Test Set-Up Frequency Above 1 GHz





(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 :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	53 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
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
0.05	0°	53.17	22.71	75.88	114.52	-38.64	PK
0.60	0°	27.55	20.11	47.66	72.07	-24.41	PK
1.70	0°	27.08	19.53	46.61	63.00	-16.39	PK
5.48	0°	20.81	18.16	38.97	69.54	-30.57	PK
10.73	0°	34.48	17.84	52.32	69.54	-17.22	PK
25.25	0°	40.20	16.17	56.37	69.54	-13.17	PK

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.13	90°	53.84	20.97	74.81	105.53	-30.72	PK
0.68	90°	36.97	20.38	57.35	70.95	-13.61	PK
1.34	90°	25.13	19.57	44.70	65.06	-20.37	PK
6.58	90°	26.08	18.07	44.15	69.54	-25.39	PK
10.45	90°	32.11	17.83	49.94	69.54	-19.60	PK
22.25	90°	39.06	16.86	55.92	69.54	-13.62	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 = $40 \log (\text{specific distance} / \text{test distance})$ (dB); ◦
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor. ◦

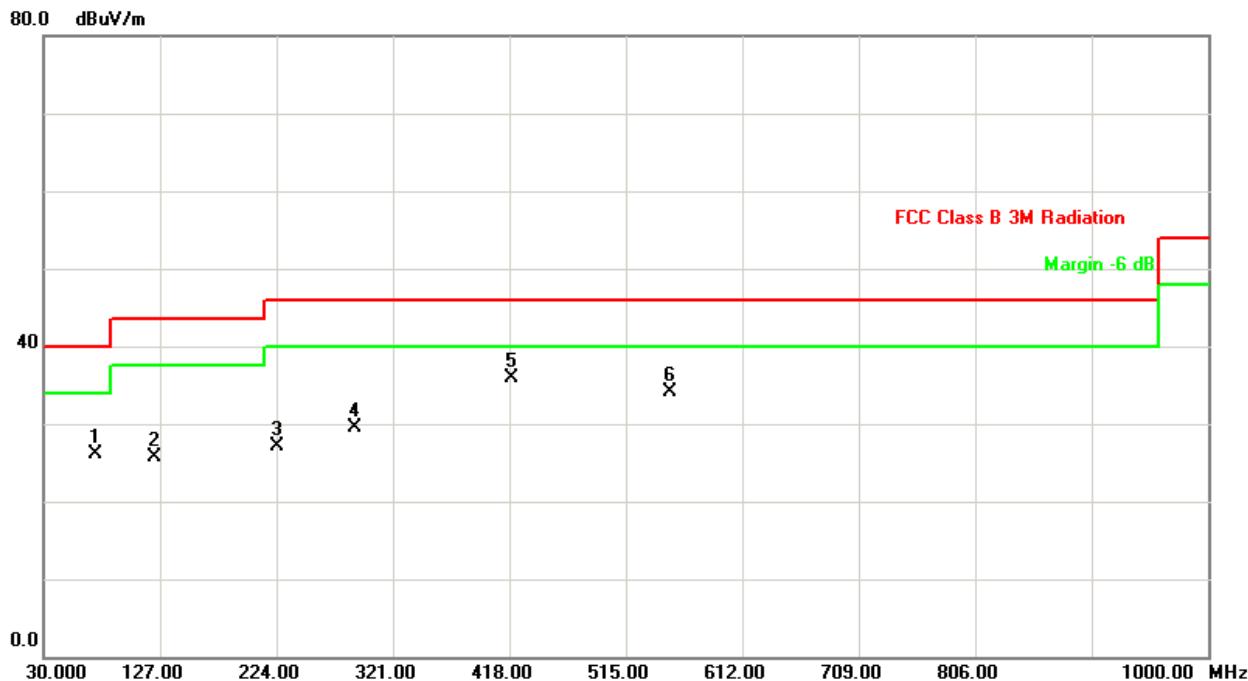
**4.2.8 TEST RESULTS (BETWEEN 30 – 1000 MHZ)**

EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX Mode 2402MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
73.65	V	44.87	-18.69	26.18	40.00	- 13.82	
122.15	V	43.96	-18.25	25.71	43.50	- 17.79	
224.00	V	42.89	-15.76	27.13	46.00	- 18.87	
289.48	V	41.57	-12.08	29.49	46.00	- 16.51	
420.43	V	44.50	-8.65	35.85	46.00	- 10.15	
551.38	V	39.59	-5.45	34.14	46.00	- 11.86	

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.



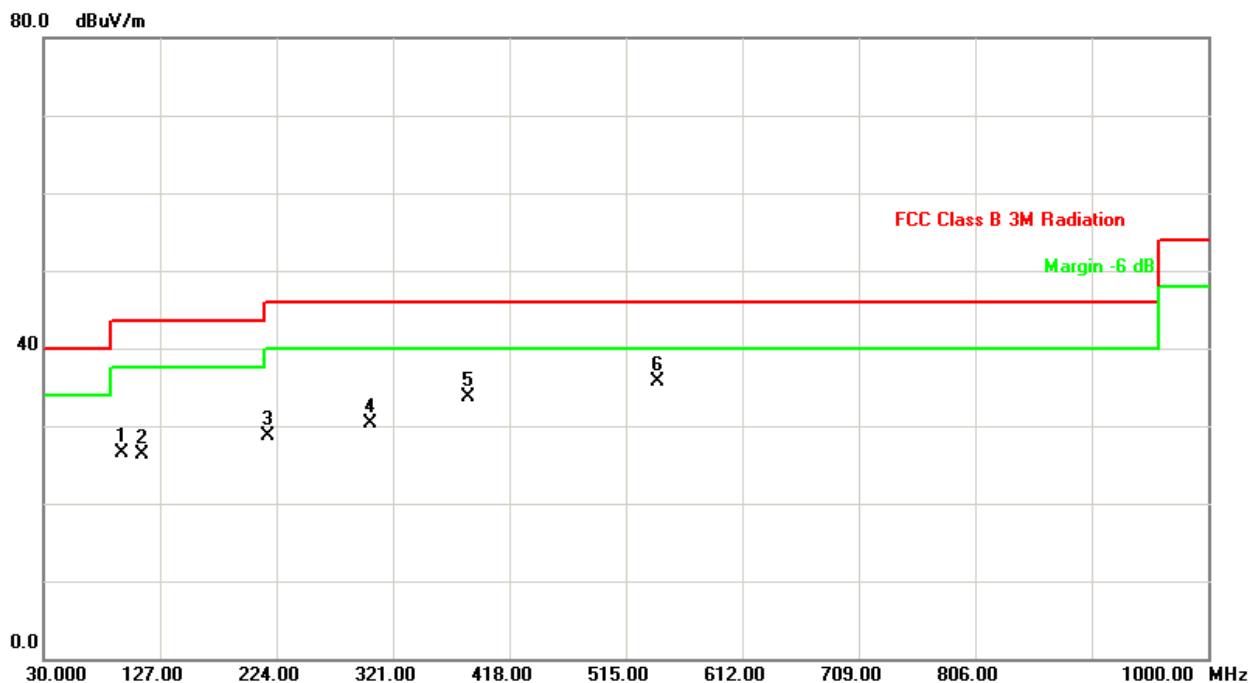


EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX Mode 2402MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
95.48	H	45.06	-18.48	26.58	43.50	- 16.92	
112.45	H	44.61	-18.34	26.27	43.50	- 17.23	
216.73	H	44.78	-16.00	28.78	46.00	- 17.22	
301.60	H	42.36	-12.03	30.33	46.00	- 15.67	
384.05	H	43.27	-9.60	33.67	46.00	- 12.33	
541.68	H	41.60	-5.80	35.80	46.00	- 10.20	

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.



**4.2.9 TEST RESULTS (ABOVE 1000 MHZ)**

EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX 2402MHz		

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)	
2390.00	V	23.47	6.65	31.61	55.08	38.26	74.00	54.00	X/E
2401.88	V	50.42	33.60	31.60	82.02	65.20	114.00	94.00	X/F
4804.00	V	51.66	34.84	5.17	56.83	40.01	74.00	54.00	X/H

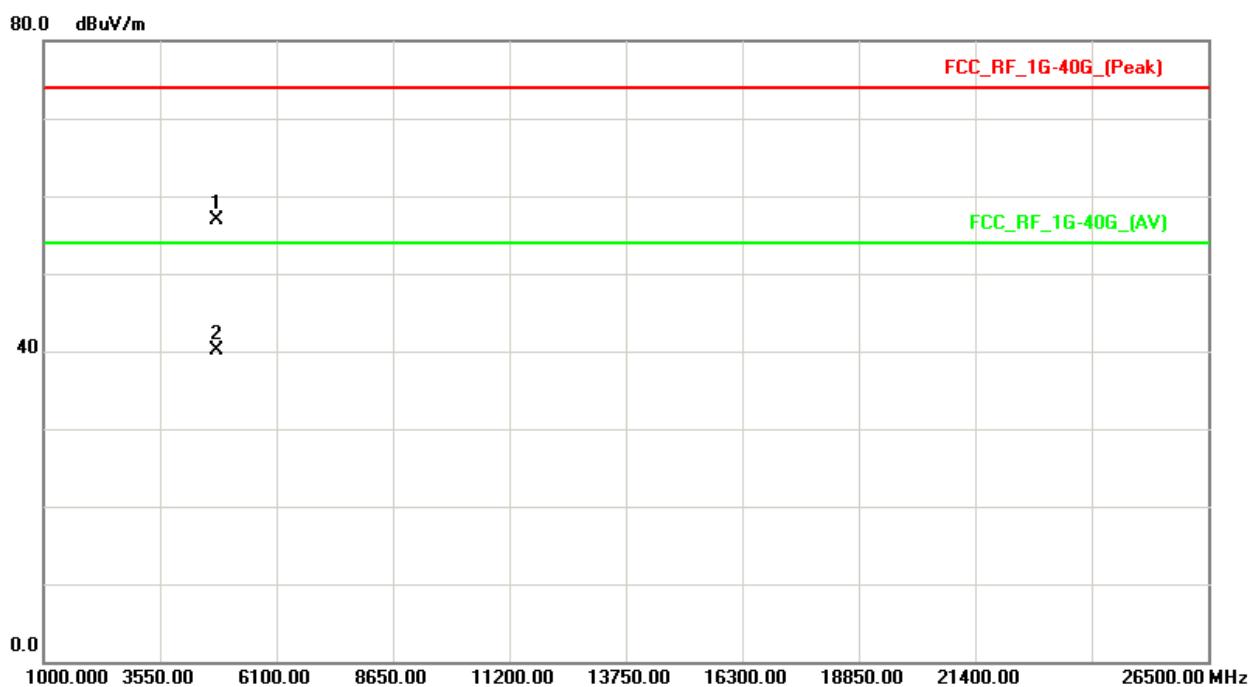
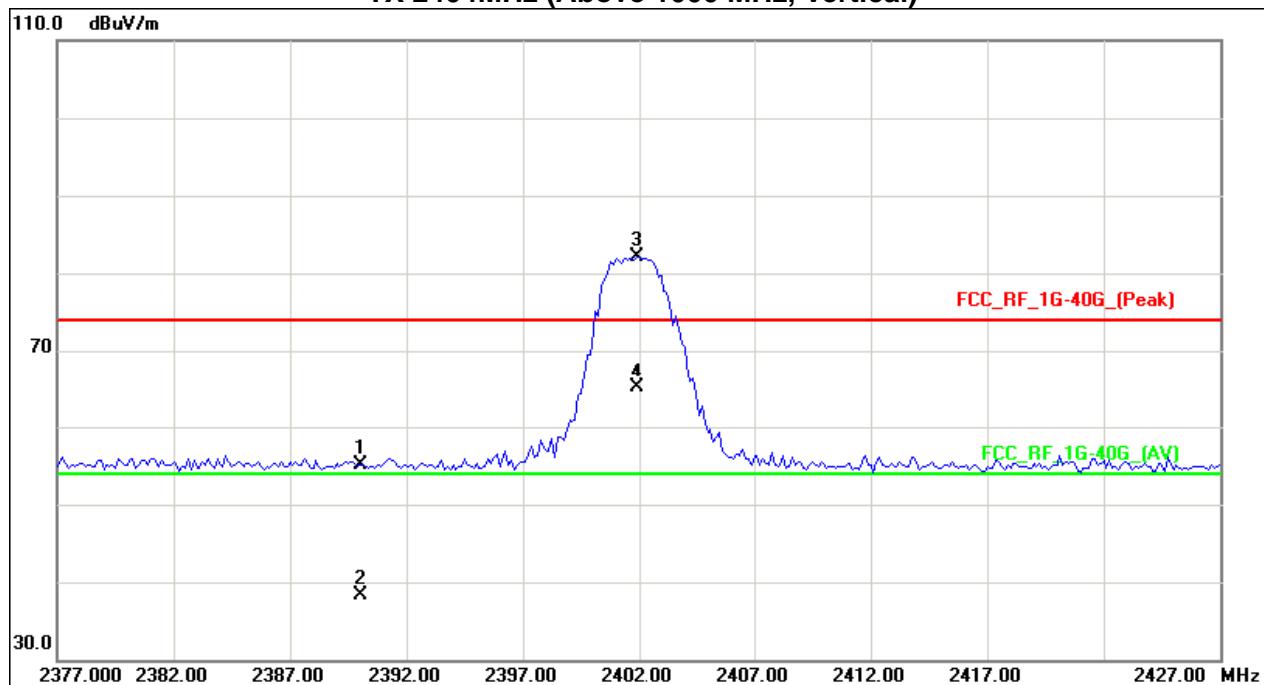
Remark :

- (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-16.82



Orthogonal Axis : X

TX 2404MHz (Above 1000 MHz, Vertical)





EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX 2402MHz		

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)	
2390.00	H	22.94	6.12	31.61	54.55	37.73	74.00	54.00	X/E
2402.38	H	47.04	30.22	31.60	78.64	61.82	114.00	94.00	X/F
4804.00	H	47.03	30.21	5.17	52.20	35.38	74.00	54.00	X/H

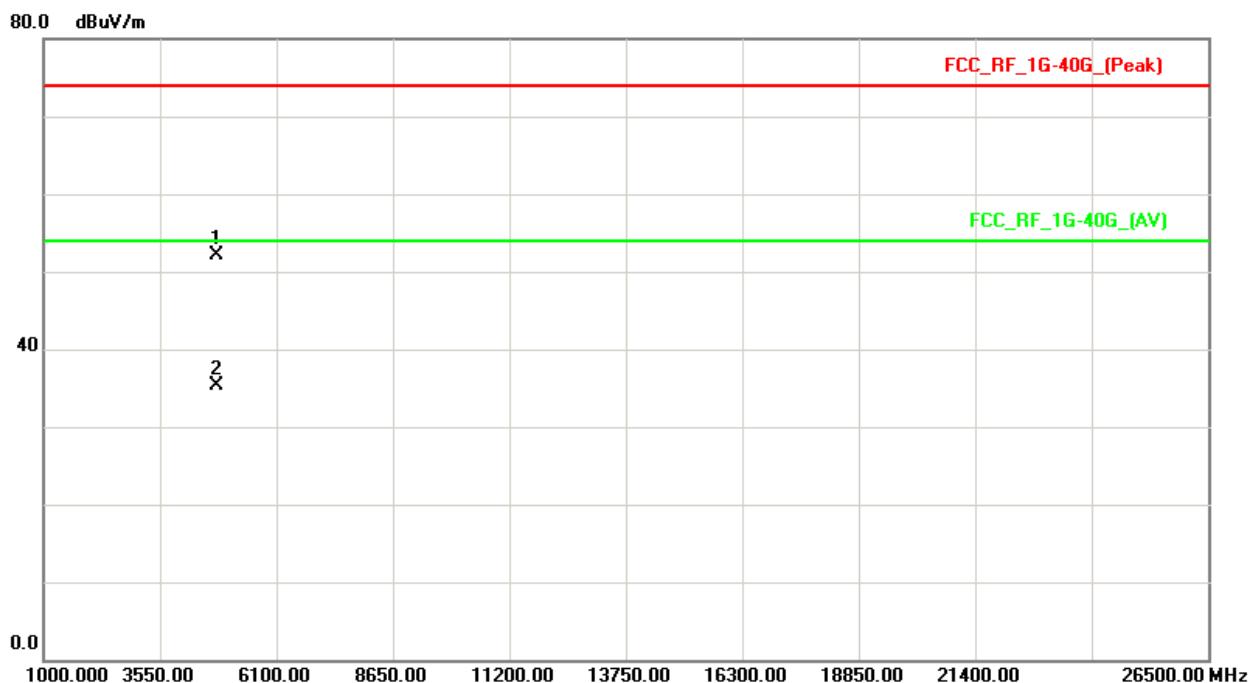
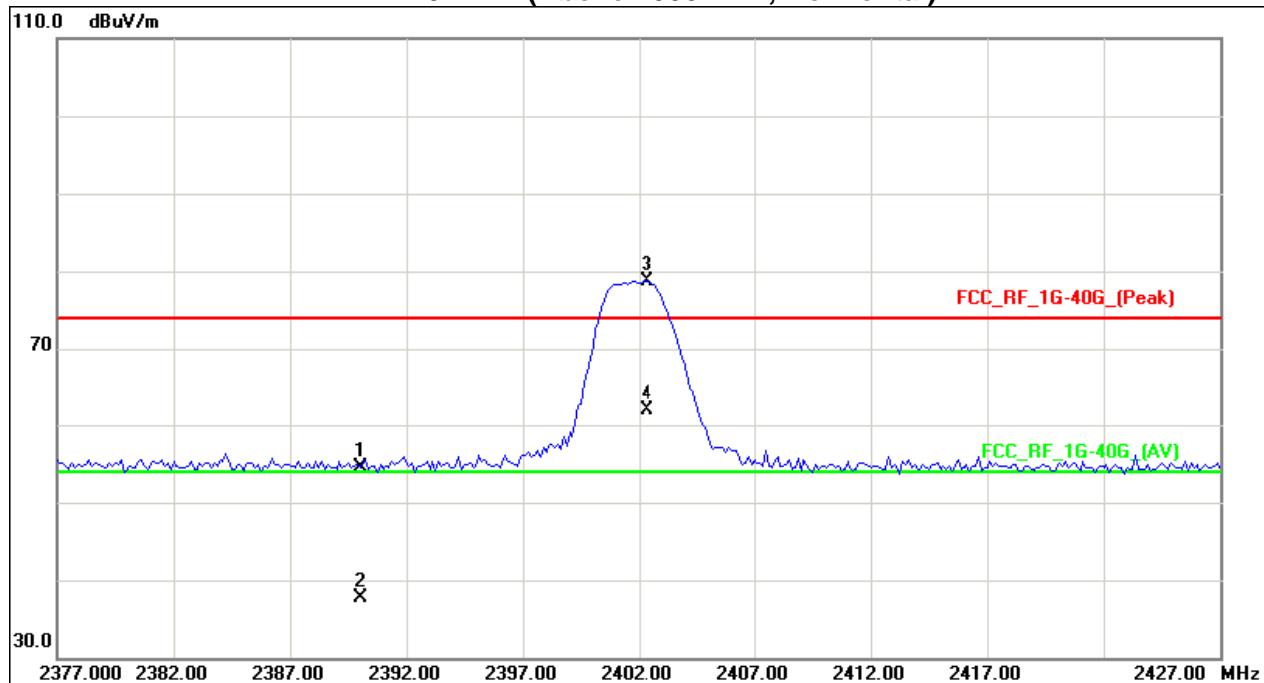
Remark :

- (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-16.82



Orthogonal Axis : X

TX 2404MHz (Above 1000 MHz, Horizontal)





EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX 2448MHz		

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)	
2448.13	V	50.64	33.82	31.54	82.18	65.36	114.00	94.00	X/F
4895.75	V	52.03	35.21	5.62	57.65	40.83	74.00	54.00	X/H

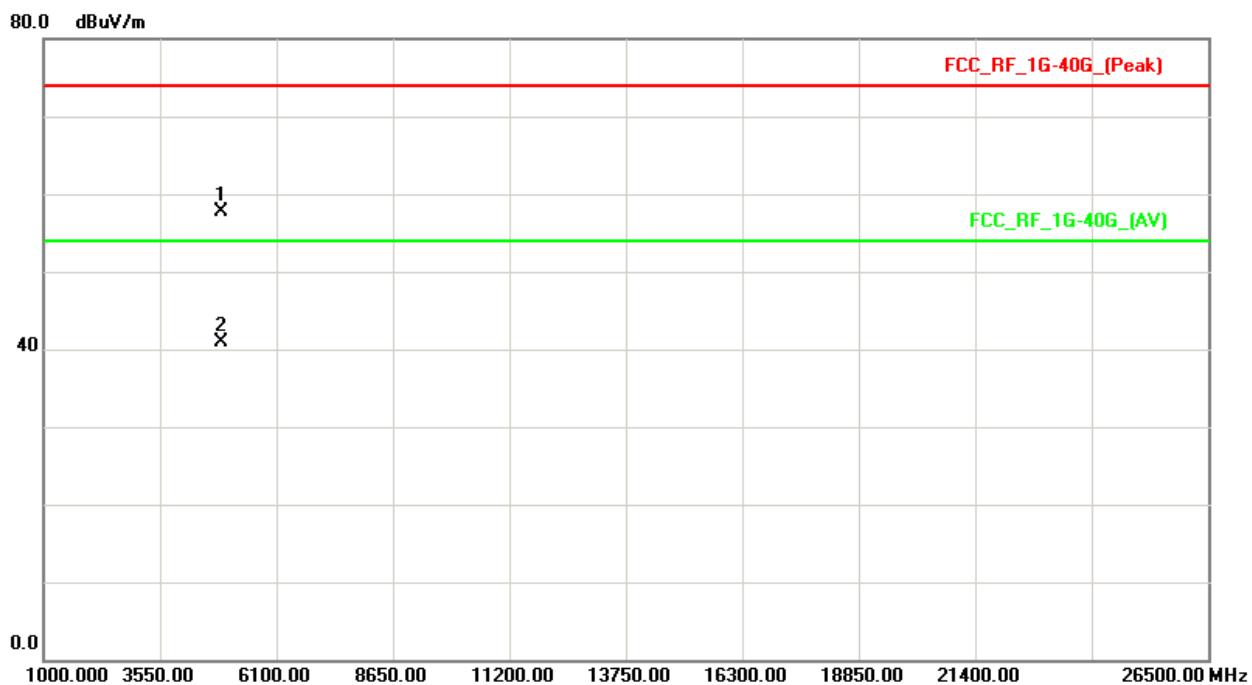
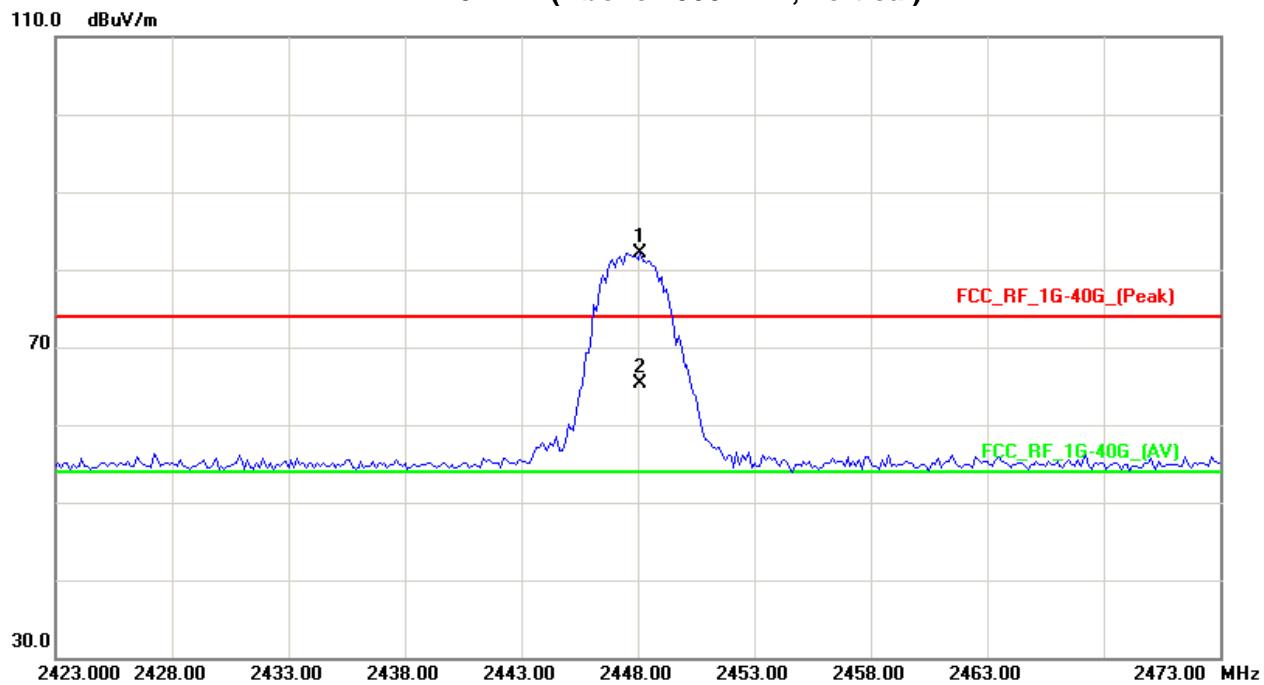
Remark :

- (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-16.82



Orthogonal Axis : X

TX 2440 MHz (Above 1000 MHz, Vertical)





EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX 2448MHz		

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)	
2447.88	H	49.29	32.47	31.54	80.83	64.01	114.00	94.00	X/F
4896.13	H	47.72	30.90	5.64	53.36	36.54	74.00	54.00	X/H

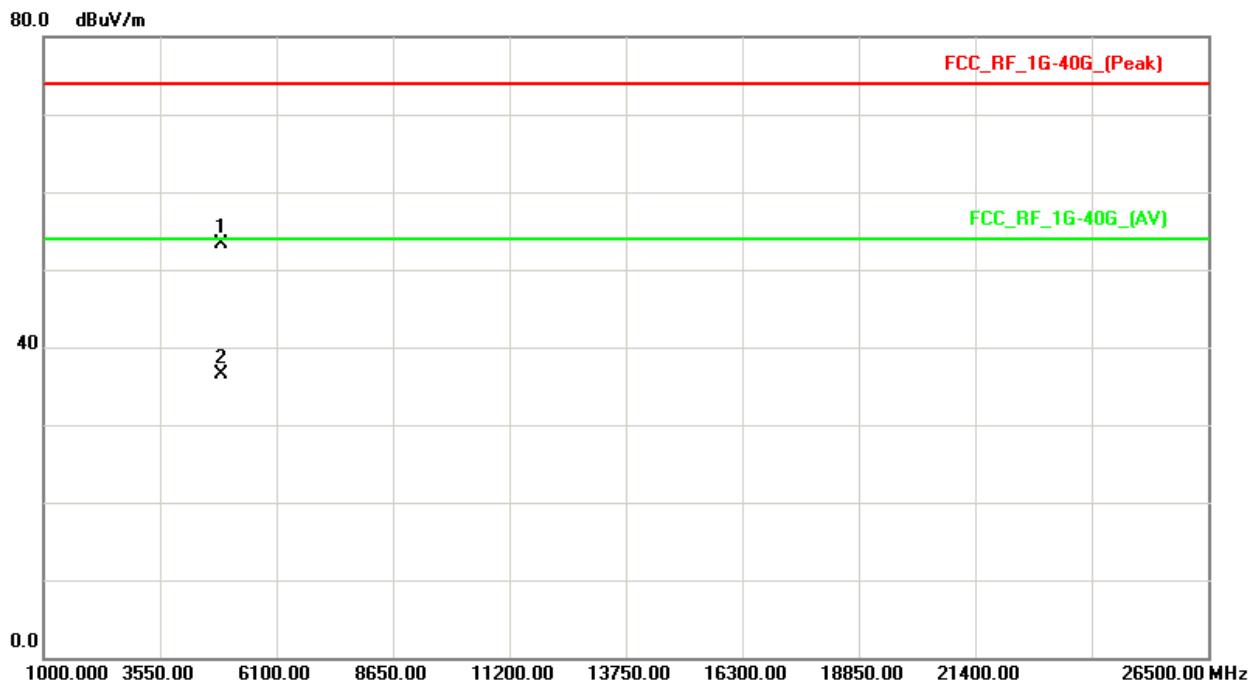
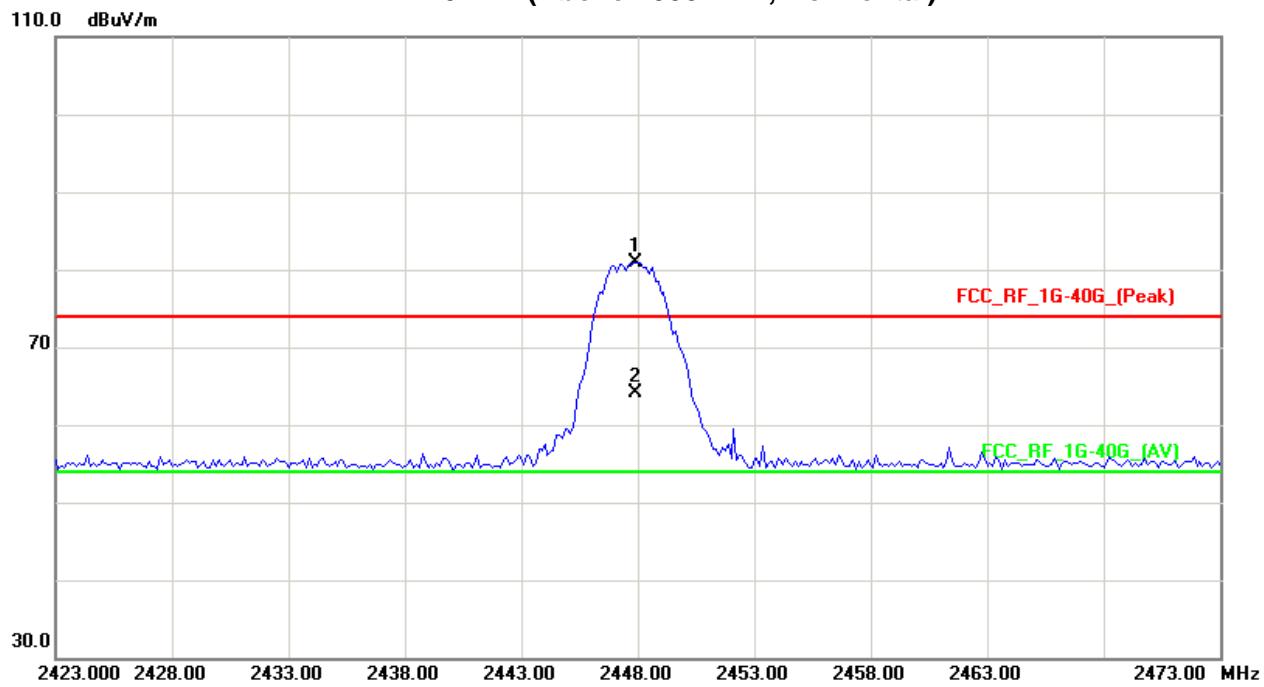
Remark :

- (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-16.82



Orthogonal Axis : X

TX 2440MHz (Above 1000 MHz, Horizontal)





EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX 2480MHz		

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)	
2479.88	V	49.07	32.25	31.50	80.57	63.75	114.00	94.00	X/F
2483.50	V	26.36	9.54	31.50	57.86	41.04	74.00	54.00	X/E
4959.88	V	50.93	34.11	5.94	56.87	40.05	74.00	54.00	X/H

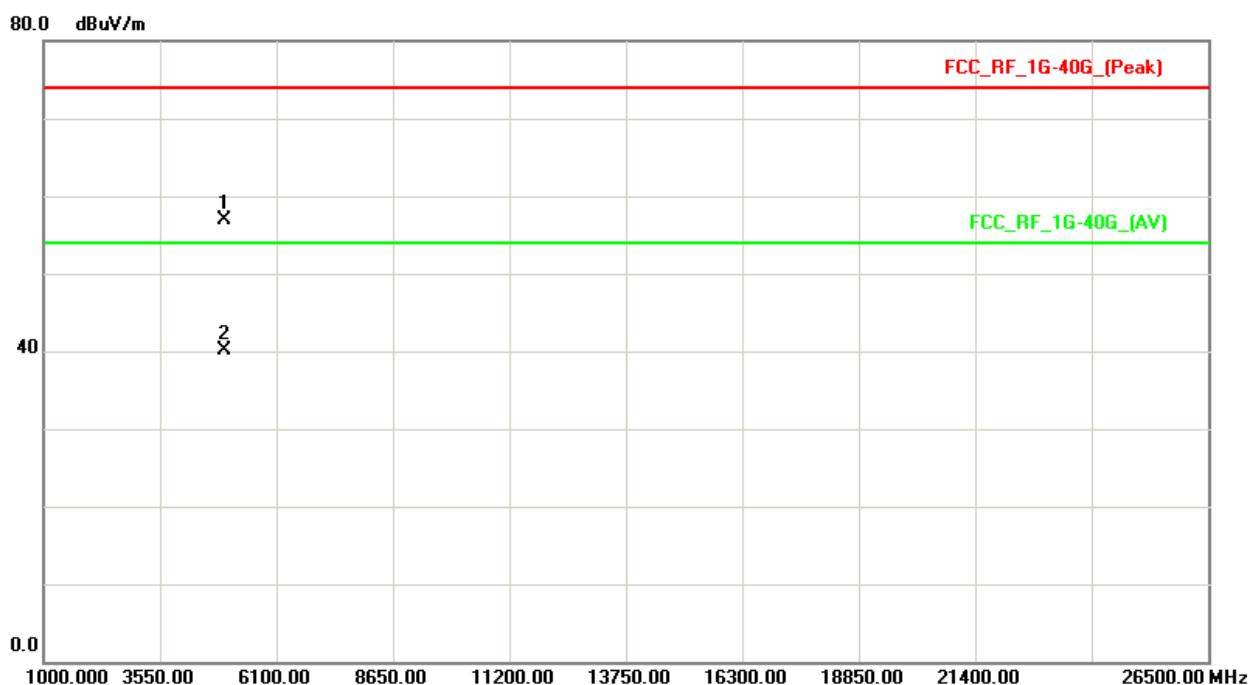
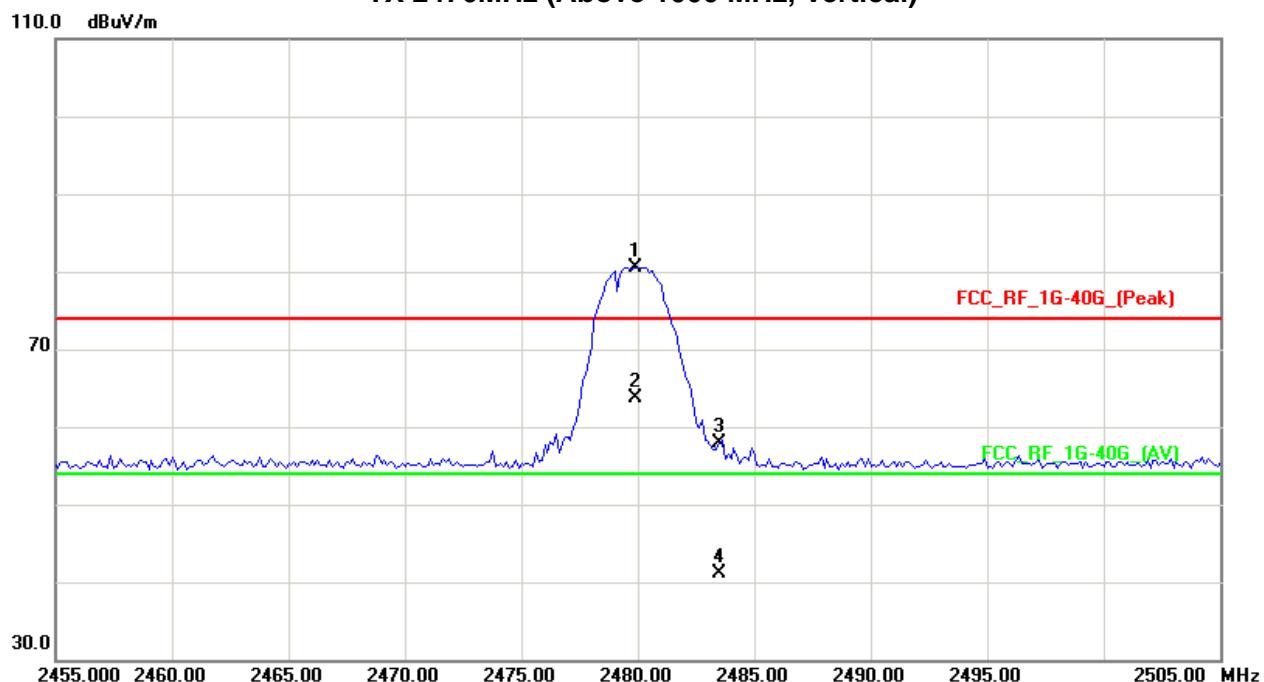
Remark :

- (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-16.82



Orthogonal Axis : X

TX 2476MHz (Above 1000 MHz, Vertical)





EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	25°C	Relative Humidity :	58 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX 2480MHz		

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)	
2479.38	H	50.45	33.63	31.50	81.95	65.13	114.00	94.00	X/F
2483.50	H	26.71	9.89	31.50	58.21	41.39	74.00	54.00	X/E
4960.50	H	46.33	29.51	5.94	52.27	35.45	74.00	54.00	X/H

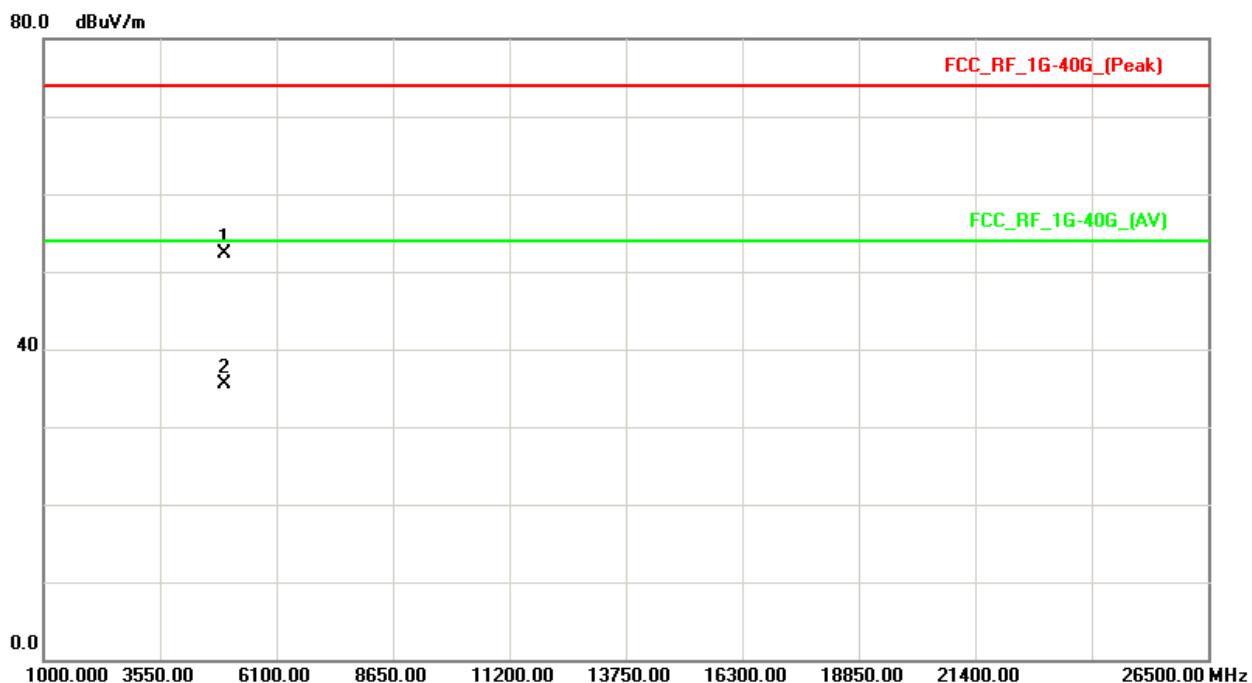
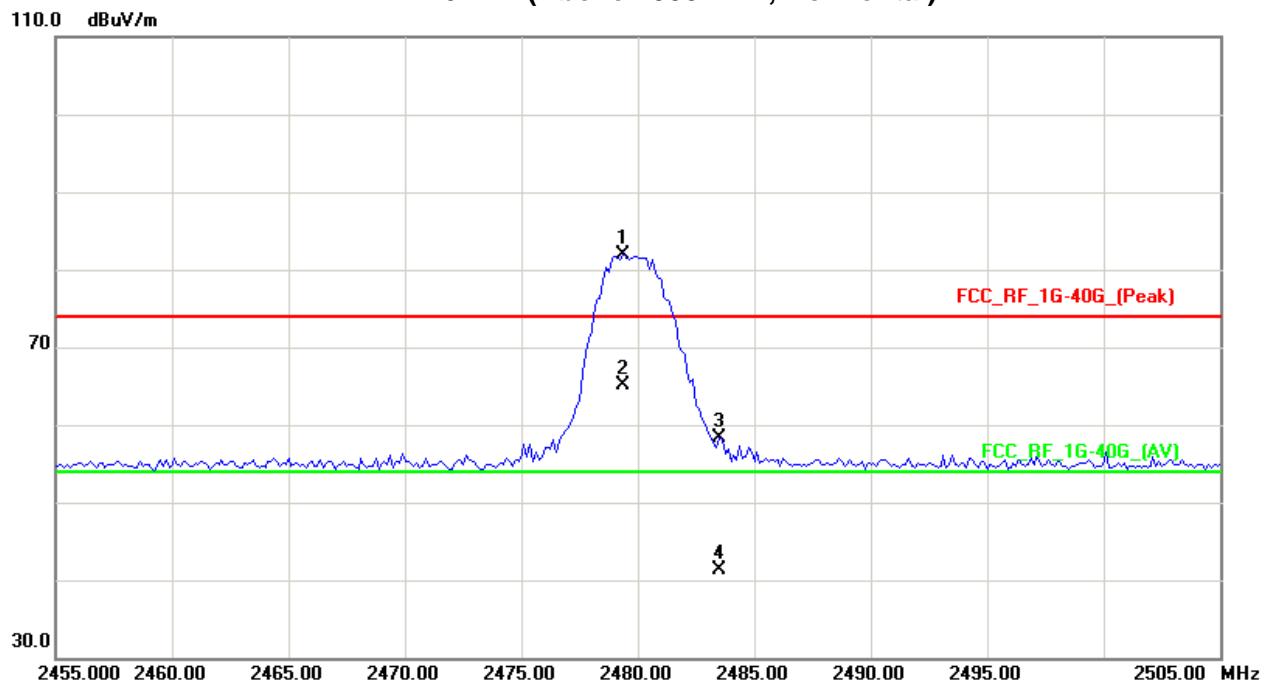
Remark :

- (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-16.82



Orthogonal Axis : X

TX 2476MHz (Above 1000 MHz, Horizontal)





4.2.10 TEST RESULTS (2400 – 2483.5 MHz)

EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	20°C	Relative Humidity :	55 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX CH 2402MHz/2448MHz/2480MHz		

Freq. (MHz)	Ant.Pol. (H/V)	Peak	AV	Ant./CL/ CF(dB)	Peak	AV	Peak	AV	Limit3m (dBuV/m)	NOTE
		Reading (dBuV)	(dBuV)		(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)		
2401.88	V	50.42	33.60	31.60	82.02	65.20	114.00	94.00	CH01	
2402.38	H	47.04	30.22	31.60	78.64	61.82	114.00	94.00	CH01	
2448.13	V	50.64	33.82	31.54	82.18	65.36	114.00	94.00	CH47	
2447.88	H	49.29	32.47	31.54	80.83	64.01	114.00	94.00	CH47	
2479.88	V	49.07	32.25	31.50	80.57	63.75	114.00	94.00	CH79	
2479.38	H	50.45	33.63	31.50	81.95	65.13	114.00	94.00	CH79	

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) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission .
- (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) EUT Orthogonal Axis :
“X” - denotes Laid on Table ; “Y” - denotes Vertical Stand ; “Z” - denotes Side Stand
- (5) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) , Final AV=PK-16.82



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.25.2012

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

5.2 TEST PROCEDURE

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

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

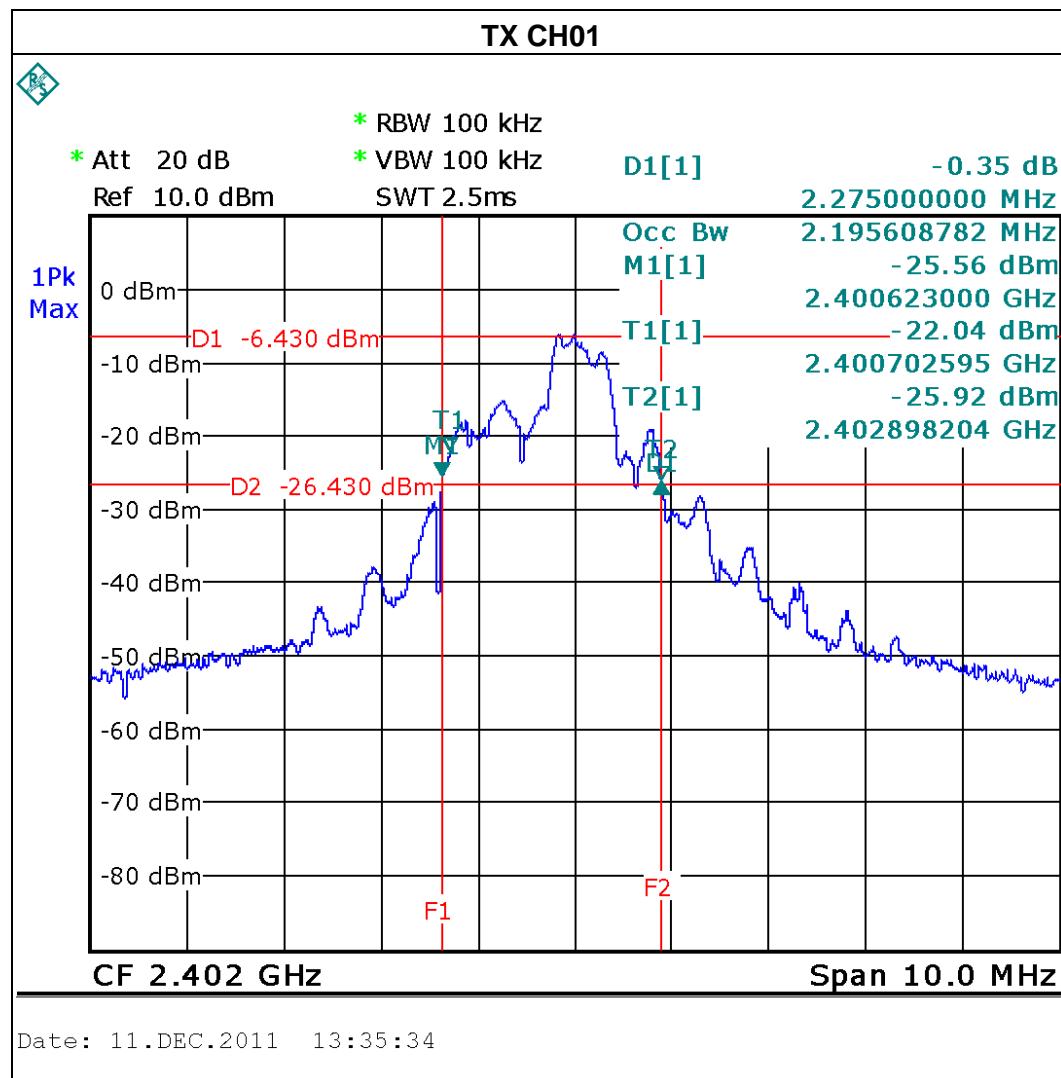
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

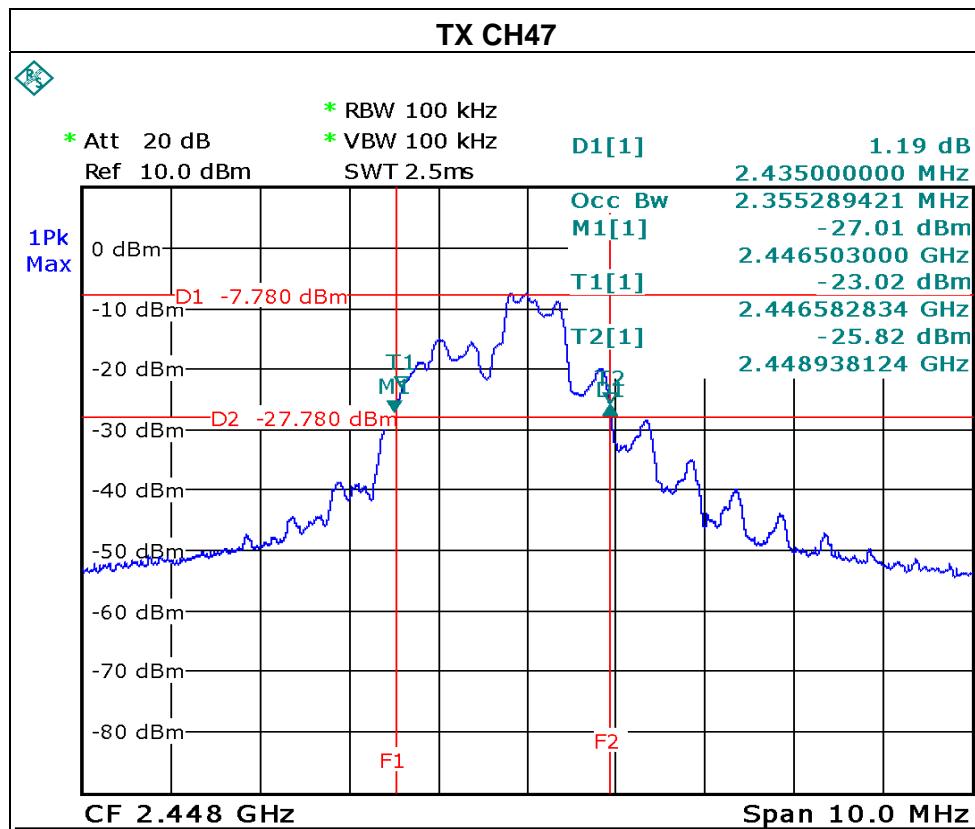


5.6 TEST RESULTS

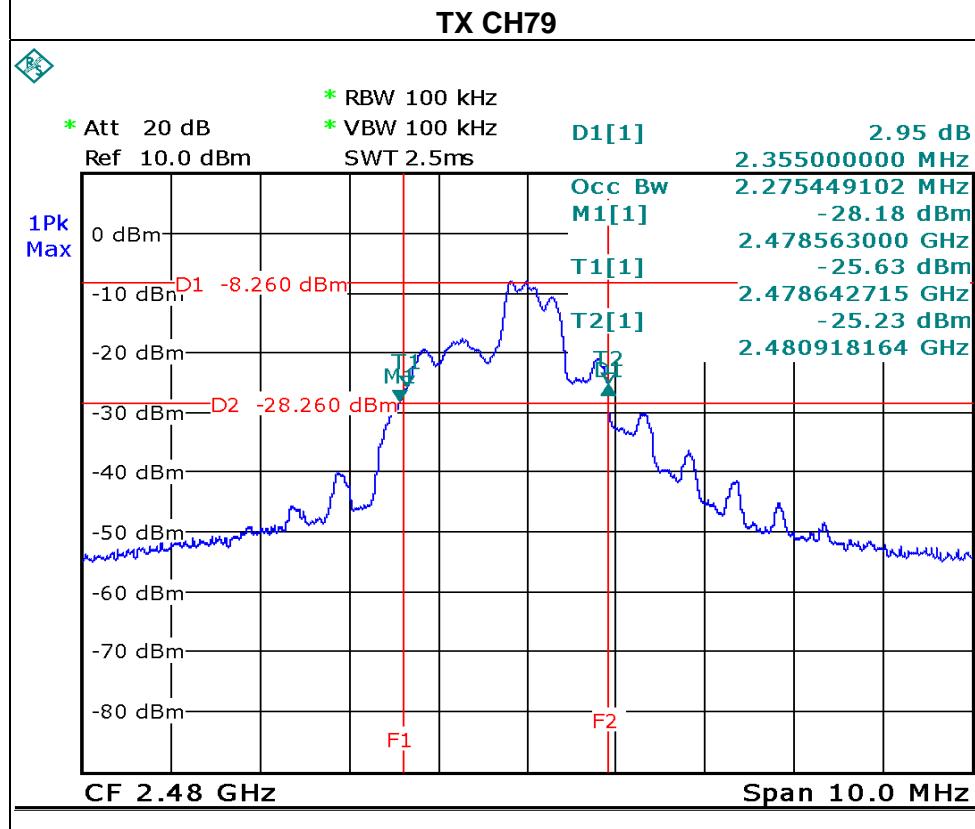
EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	20°C	Relative Humidity :	55 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX CH 01/47/79		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)
CH01	2402	2.275
CH47	2448	2.435
CH79	2480	2.355





Date: 11.DEC.2011 13:37:21



Date: 11.DEC.2011 13:38:47



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.

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

6.1.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP 40	100185	Nov.25.2012

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

6.1.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.

6.1.3 DEVIATION FROM STANDARD

No deviation.

6.1.4 TEST SETUP



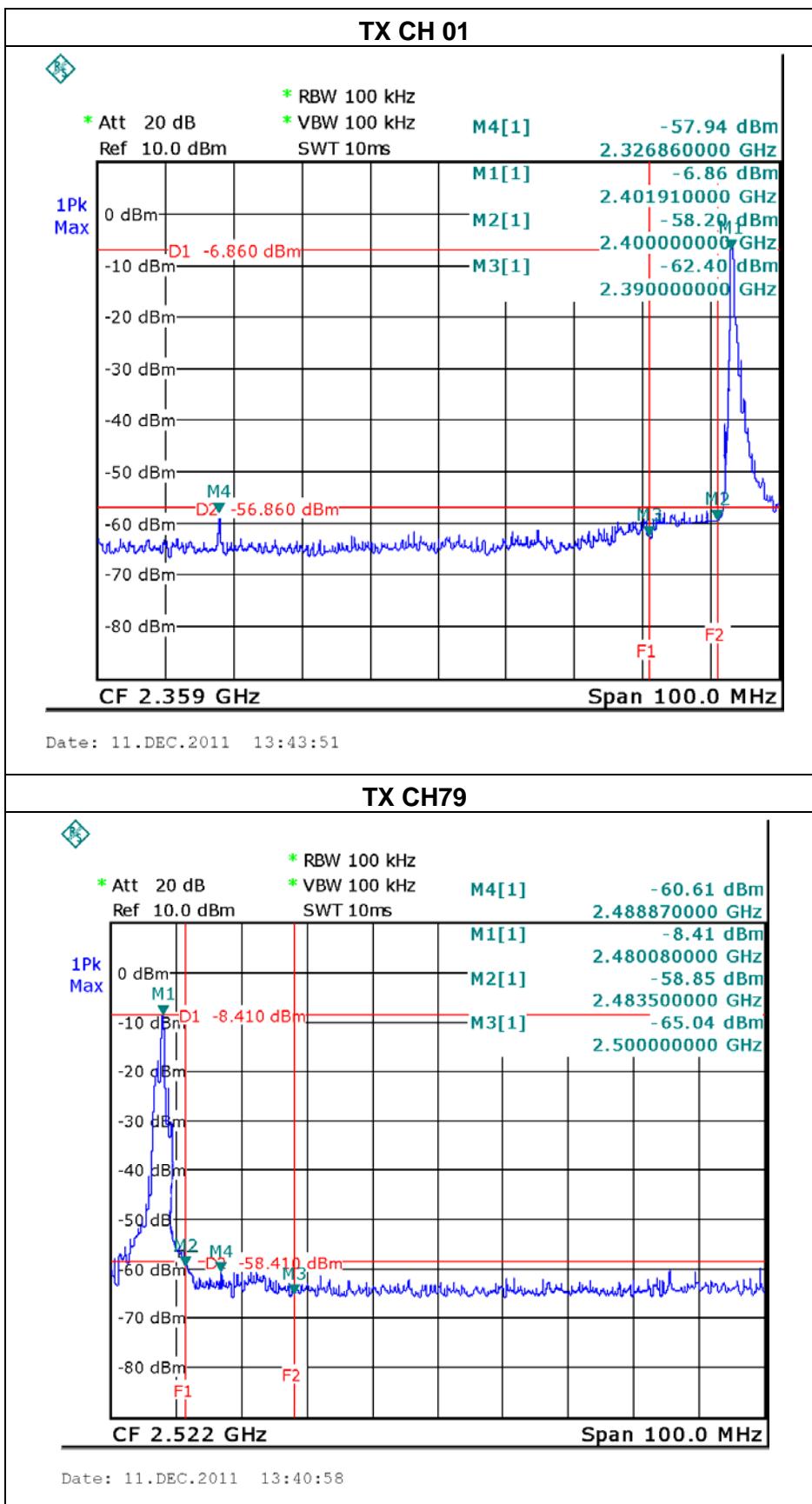
6.1.5 EUT OPERATION CONDITIONS

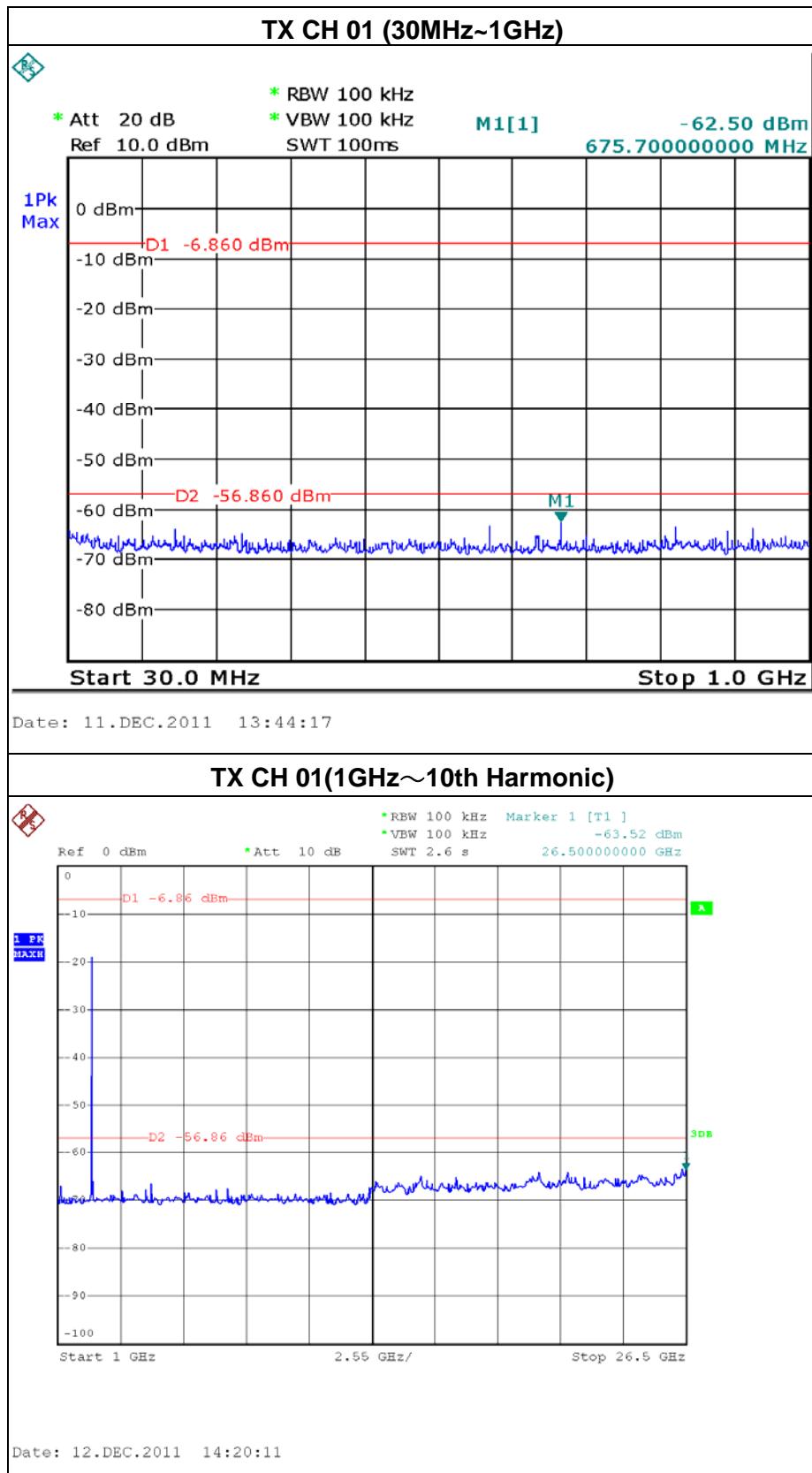
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

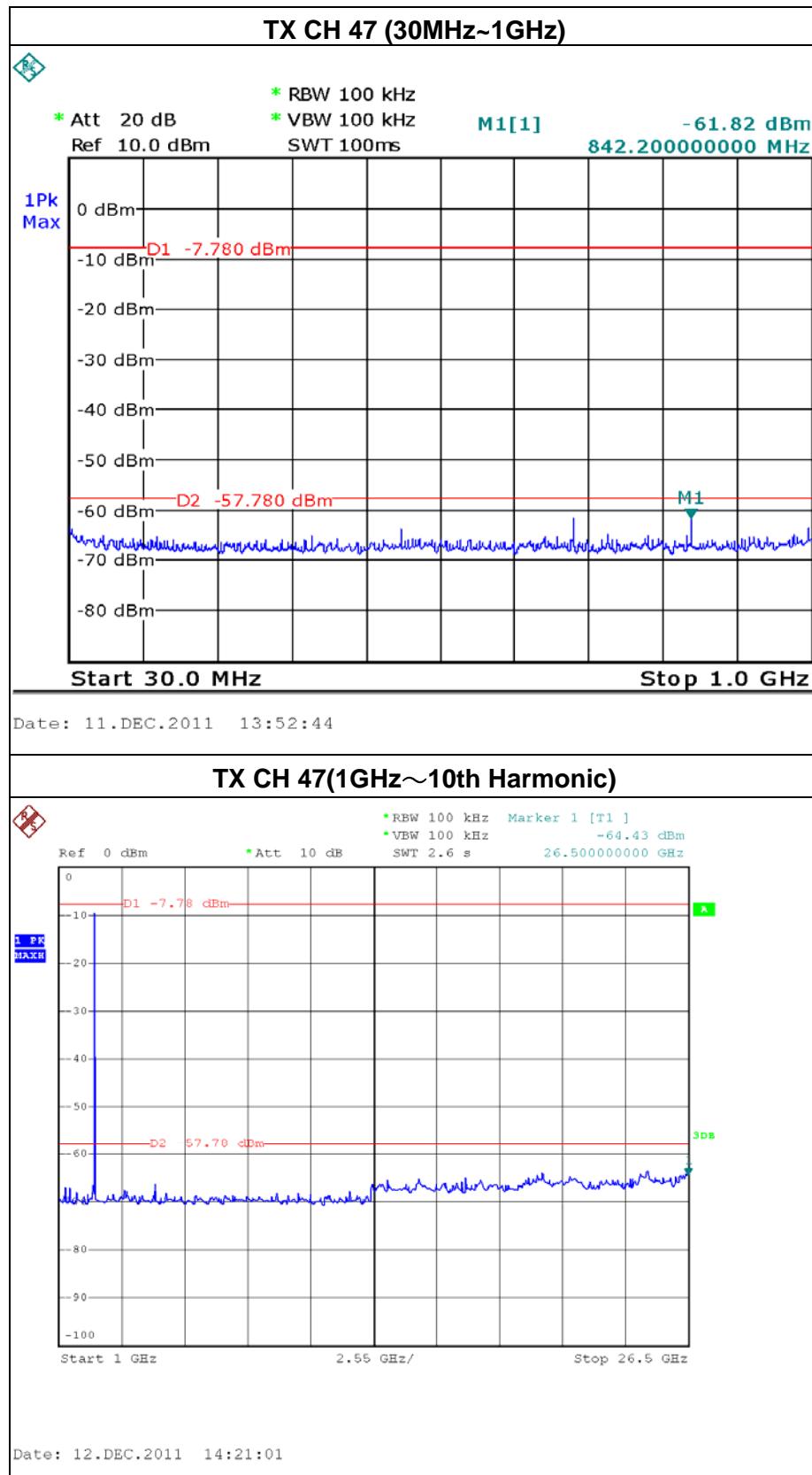
**6.1.6 TEST RESULTS**

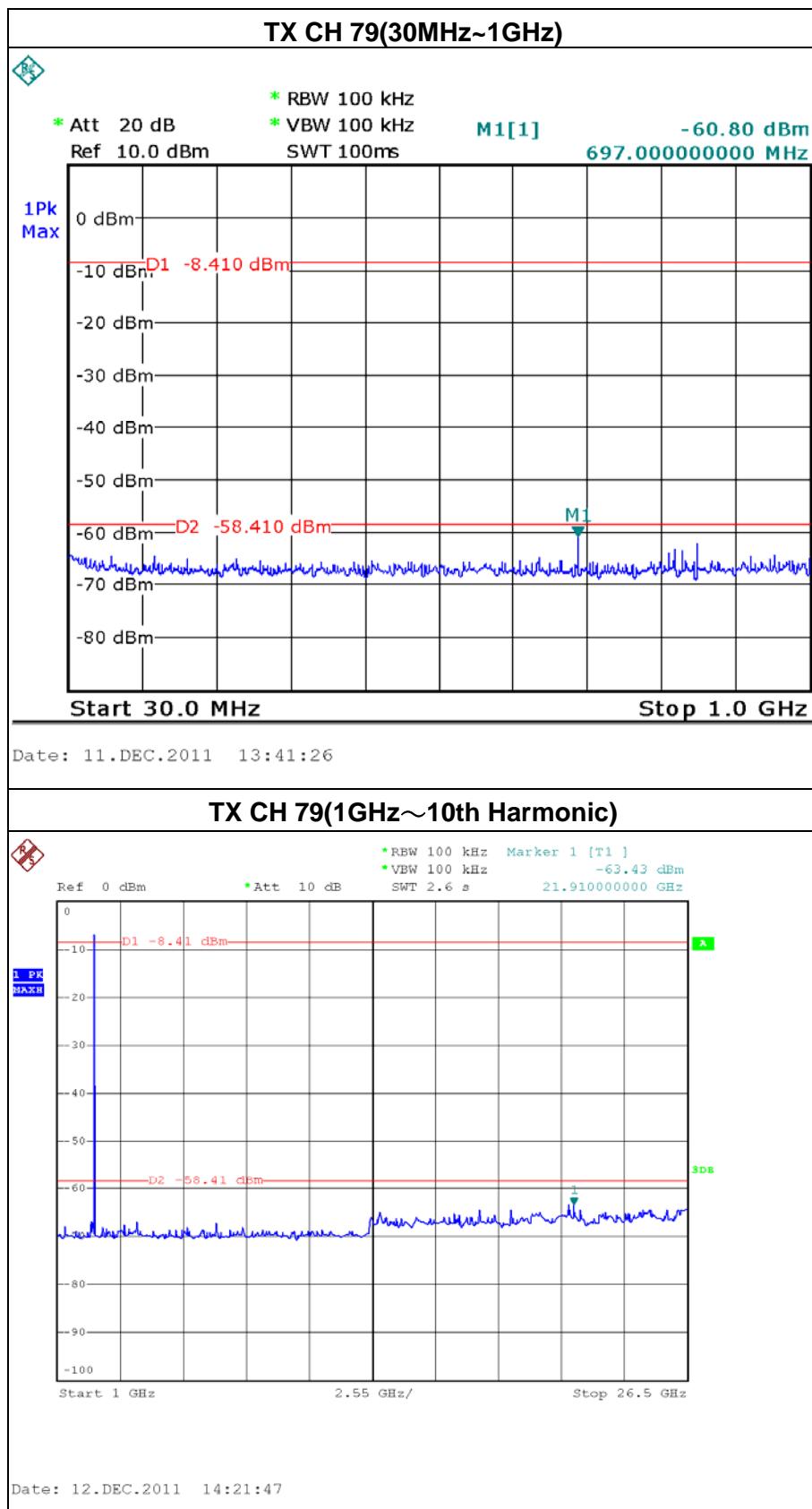
EUT :	USB Dongle	Model Name. :	Essentials Wireless Dongle Receiver
Temperature :	20°C	Relative Humidity :	55 %
Pressure :	1009 hPa	Test Power :	AC 120V/60Hz
Test Mode :	TX CH01, CH47, CH79		

Channel of Worst Data: CH01			
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)
2326.86	-57.94	2483.50	-58.85
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.			











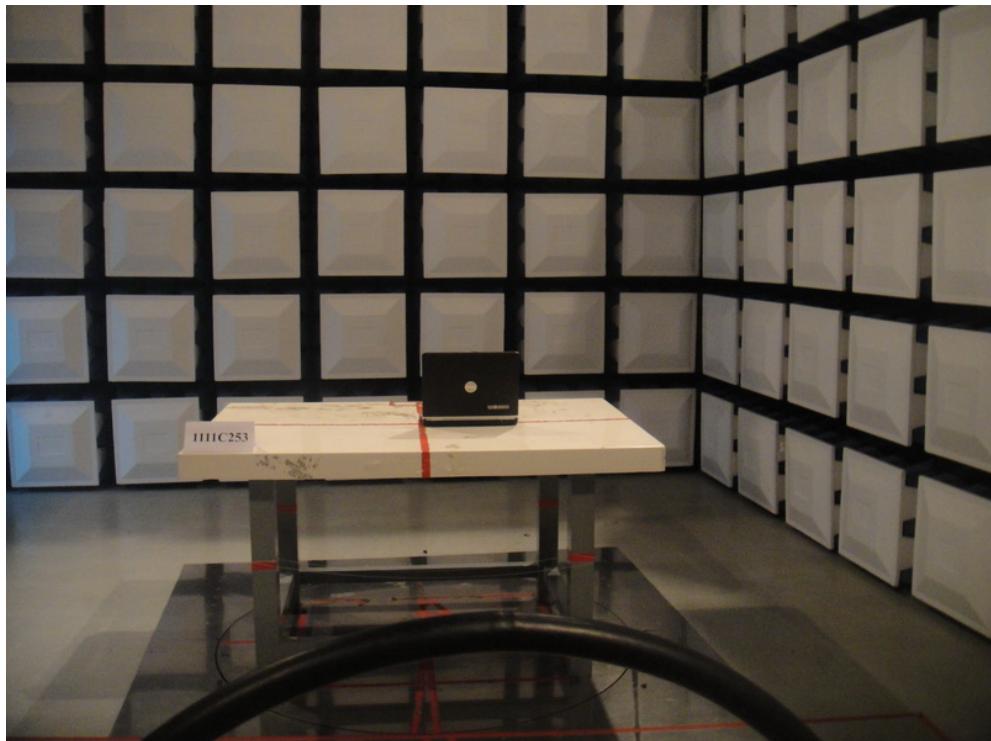
7. EUT TEST PHOTO

Conducted Measurement Photos



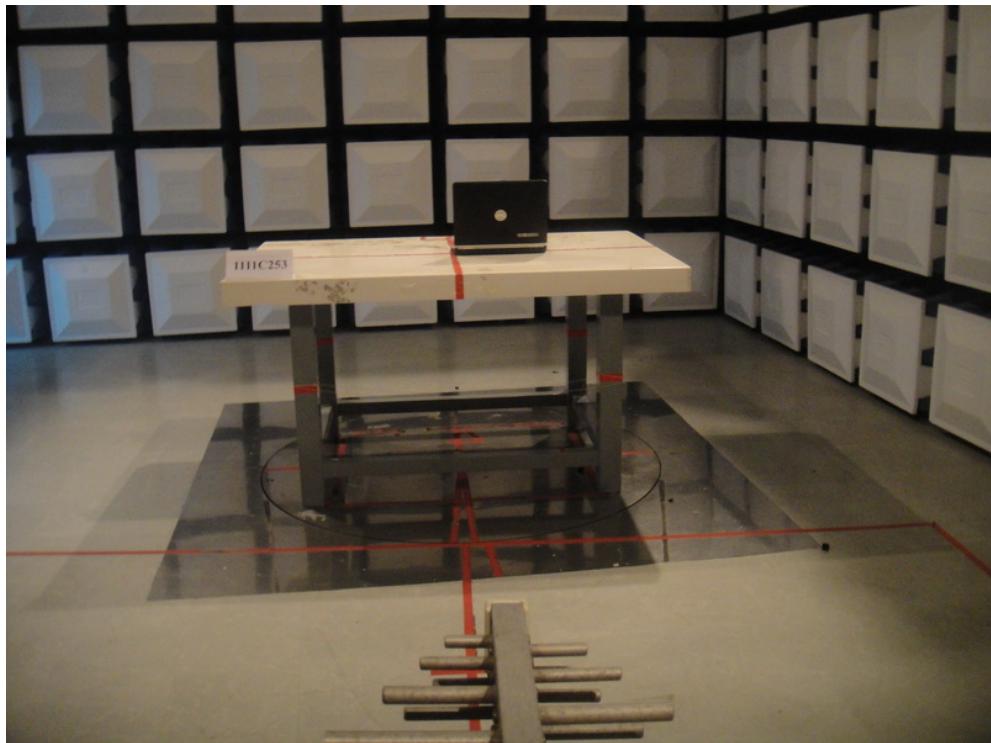
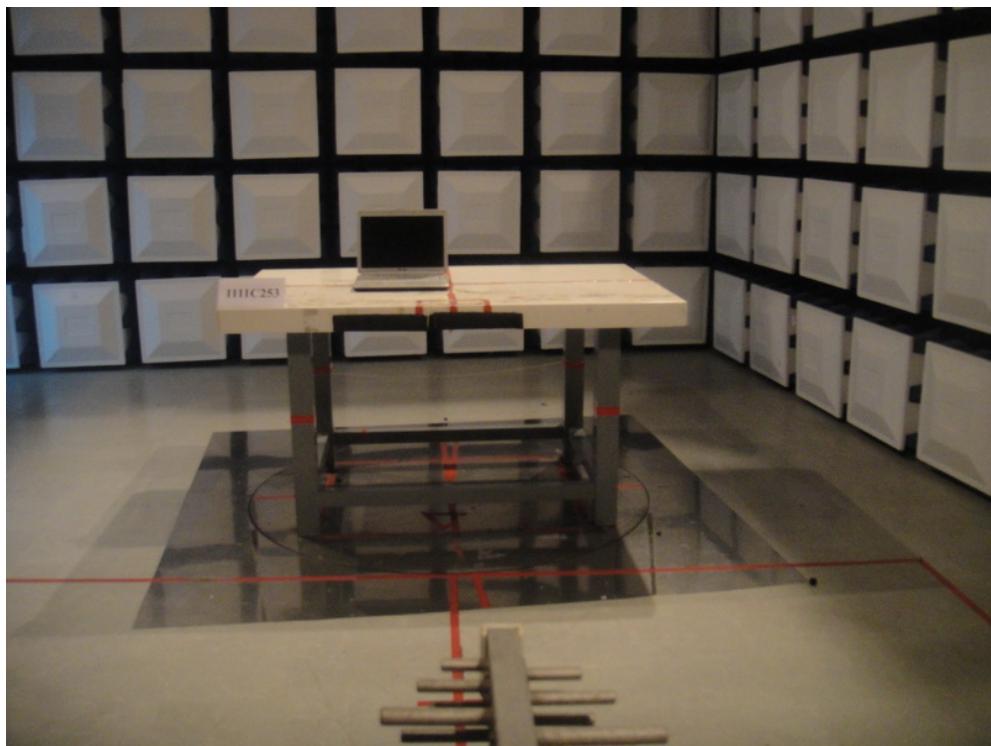


**Radiated Measurement Photos
9K~30MHz**





Radiated Measurement Photos
30M~1000MHz





**Radiated Measurement Photos
Above 1000MHz**

