FCC Radio TEST Report

FCC ID: V4P-MX168SOC

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

Issued Date	:	Jun. 26, 2009
Project No.	:	0906C066
Equipment	:	Dongle
Model Name	:	MX-168SOC
Applicant	:	Shenzhen Fuyeda Industry Development Corp.,Ltd.
Address	:	NO.1,NEWMEN ROAD,TONGSHENG VILLAGE, DALANG STREET,BAO'AN,SHENZHEN,CHINA
Manufacturer	:	Shenzhen Fuyeda Industry Development Corp.,Ltd.
Address	:	NO.1,NEWMEN ROAD,TONGSHENG VILLAGE, DALANG STREET,BAO'AN,SHENZHEN,CHINA

Tested by:
Neutron Engineering Inc. EMC Laboratory
Date of Test:
Jun. 15, 2009 ~ Jun. 22, 2009

Testing Engineer : (Jeff Yang)

Technical Manager : (Vic Chiu)

Authorized Signatory : (Steven Lu)

NEUTRON ENGINEERING INC.

No. 132-1, Lane 329, Sec. 2, Palain Rd.,
Shijr City, Taipei, Taiwan
TEL : (02) 2646-5426 FAX : (02) 2646-6815

NVLAP Lab Code: 200145-0 ilac-MRA TAF Testing Laboratory 0659

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:	Dongle
Brand Name :	NEWMEN
Model Name. :	MX-168SOC
Applicant:	Shenzhen Fuyeda Industry Development Corp.,Ltd.
Factory:	Shenzhen Fuyeda Industry Development Corp.,Ltd.
Address:	NO.1,NEWMEN ROAD,TONGSHENG VILLAGE,DALANG STREET, BAO'AN,SHENZHEN,CHINA
Date of Test:	Jun. 15, 2009 ~ Jun. 22, 2009
Test Item:	ENGINEERING SAMPLE
Standards:	FCC Part15, Subpart C(15.247) / 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-1-0906C066) 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 (15.247) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (c)	Antenna conducted Spurious Emission	PASS	
15.247 (a)(1)	Hopping Channel Separation	PASS	
15.247 (b)(1)	Peak Output Power	PASS	
15.247 (c)	Radiated Spurious Emission	PASS	
15.247 (b)(1)	Number of Hopping Frequency	PASS	
15.247 (a)(1)	Dwell Time	PASS	
15.205	Restricted Bands	PASS	
15.203	Antenna Requirement	PASS	
1.1307 1.1310 2.1091 2.1093	RF Exposure Compliance	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 **C01/OS02** at the location of No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan.
Neutron's test firm number is 95335

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **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
C01	ANSI	150 KHz ~ 30MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U，(dB)	NOTE
OS-01	ANSI	30MHz ~ 200MHz	V	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
OS-02	ANSI	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	Dongle
Brand Name	NEWMEN
Model Name.	MX-168SOC
OEM Brand/Model Name	N/A
Model Difference	N/A
Product Description	The EUT is a Dongle . Product Type: Low Power Communication Device Operation Frequency: 2405~2476 MHz Modulation Type: GFSK Number Of Channel: 64CH Antenna Designation: Printed antenna Antenna Gain(Peak): 1.86 dBi Output Power: -2.68 dBm 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 Host system
Power Rating	I/P 120V/60Hz O/P DC 5V
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

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

2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2405	28	2435	55	2467
02	2406	29	2436	56	2468
03	2407	30	2437	57	2469
04	2408	31	2438	58	2470
05	2409	32	2439	59	2471
06	2410	33	2442	60	2472
07	2411	34	2443	61	2473
08	2412	35	2444	62	2474
09	2413	36	2446	63	2475
10	2414	37	2447	64	2476
11	2415	38	2448		
12	2416	39	2449		
13	2417	40	2451		
14	2418	41	2452		
15	2419	42	2453		
16	2420	43	2455		
17	2421	44	2456		
18	2422	45	2457		
19	2423	46	2458		
20	2425	47	2459		
21	2427	48	2460		
22	2428	49	2461		
23	2429	50	2462		
24	2430	51	2463		
25	2431	52	2464		
26	2432	53	2465		
27	2434	54	2466		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed Antenna	N/A	1.86

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 Lower - 2405MHz
Mode 2	CH Middle - 2439MHz
Mode 3	CH Highest -2476MHz
Mode 4	Normal Link with Mouse; but Mouse Sample is not requested by application

For Conducted Test	
Final Test Mode	Description
Mode 4	Normal Link with Mouse; but Mouse Sample is not requested by application

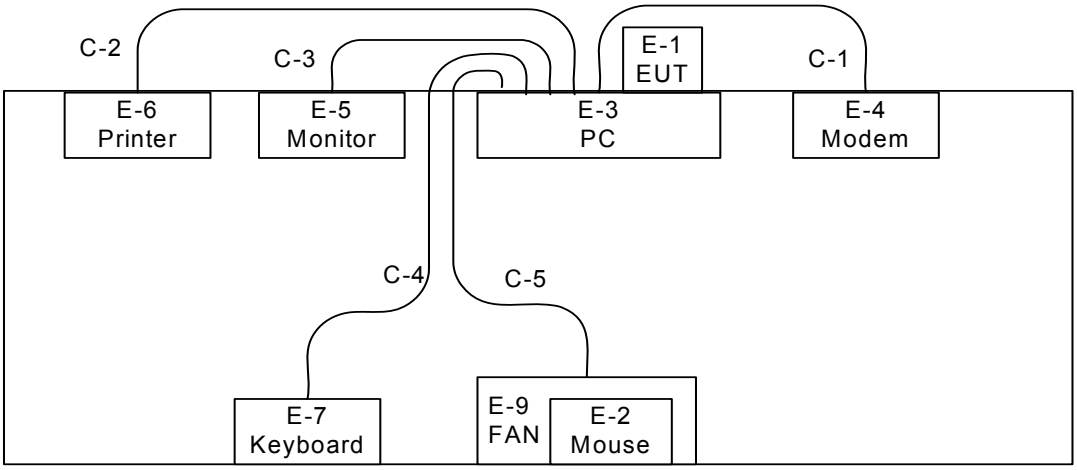
For Radiated Test	
Final Test Mode	Description
Mode 1	CH Lower - 2405MHz
Mode 2	CH Middle - 2439MHz
Mode 3	CH Highest -2476MHz

NOTE

(1) Dongle sample function have transceiver mode.

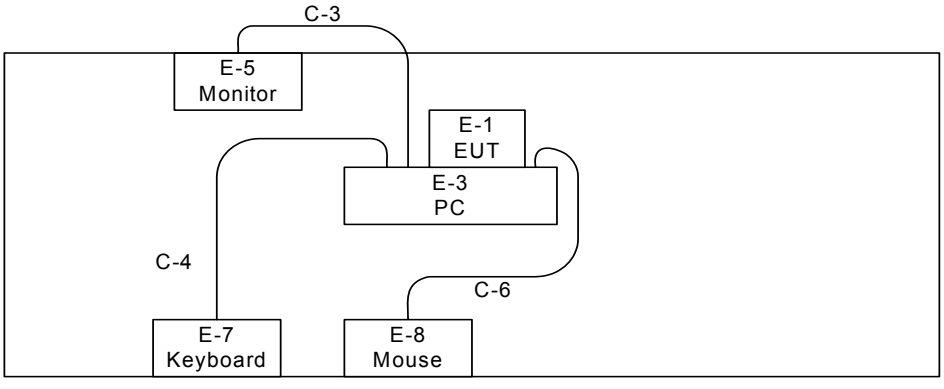
3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted :



C-1 RS232 Cable
C-2 VGA Cable
C-3 Parallel Cable
C-4 USB Cable
C-5 USB Cable

Radiated:



C-3 VGA Cable
C-4 USB Cable
C-6 USB Cable

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	Dongle	NEWMEN	MX-168SOC	V4P-MX168SOC	N/A	EUT
E-2	Mouse	NEWMEN	MS-152OR	V4P-MS152OR	N/A	
E-3	PC	lenovo	H2510	DOC	11S300017810010784F1PV	
E-4	Modem	ACEEX	DM-1414V	DOC	8041708	
E-5	Printer	SII	DPU-414	DOC	1045105A	
E-6	USB keyboard	Dell	L100	DOC	CNORH6596589071T08NE	
E-7	Monitor	DELL	E177FPc	DOC	CN-0FJ179-64180-6AG-1PKS	
E-8	USB mouse	Dell	MO56UOA	DOC	FQJ000BS	
E-9	FAN	N/A	N/A	N/A	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	YES	NO	1.5M	
C-2	YES	NO	1.5M	
C-3	YES	YES	1.8M	
C-4	YES	YES	1.8M	
C-5	YES	NO	1.8M	
C-6	YES	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 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	00042991	Jan. 23, 2010
2	LISN	EMCO	3816/2	00042990	Jan. 23, 2010
3	Pulse Limiter	Electro-Metrics	EM-7600	112644	Nov. 26, 2009
4	50Ω Terminator	N/A	N/A	N/A	May.11, 2010
5	Test Cable	N/A	C01	N/A	Nov. 26, 2009
6	EMI Test Receiver	R&S	ESCI	100082	Mar. 06, 2010

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

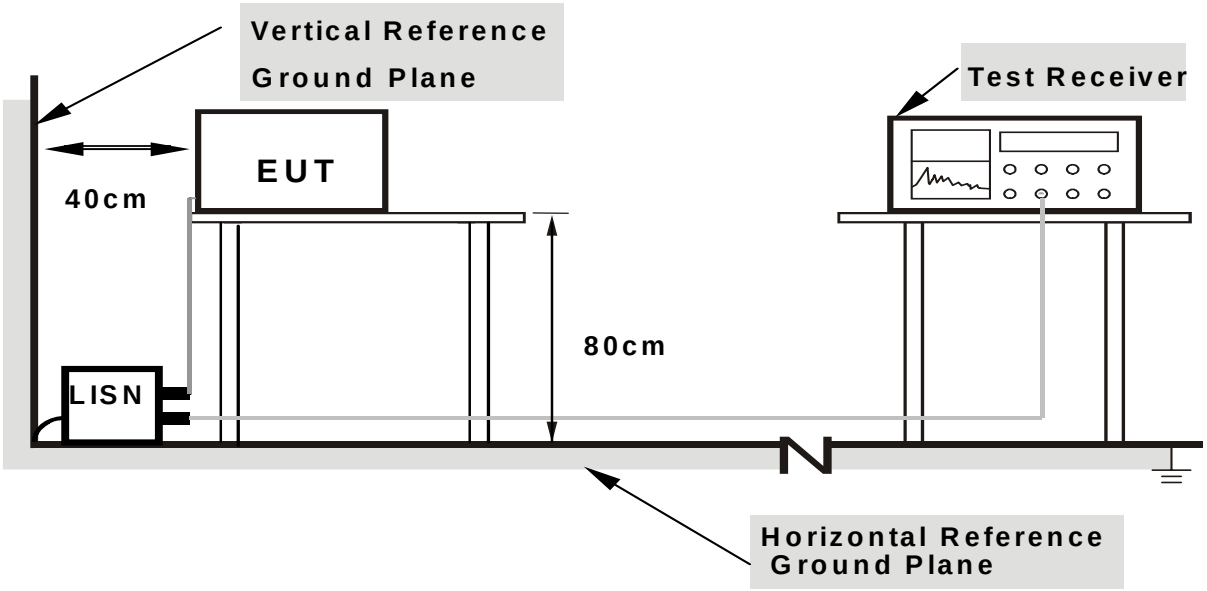
4.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 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

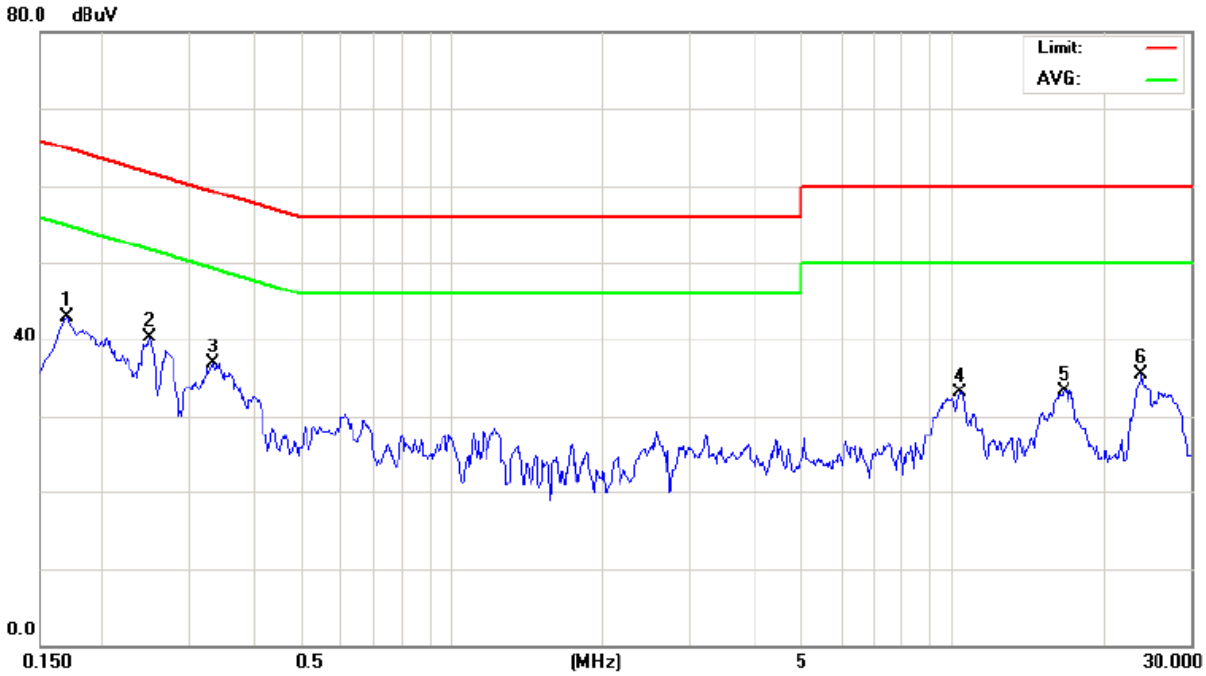
EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	29 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	Normal Link		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.17	Line	42.92	*	64.99	54.99	-22.07	(QP)
0.25	Line	40.40	*	61.79	51.79	-21.39	(QP)
0.33	Line	36.91	*	59.40	49.40	-22.49	(QP)
10.39	Line	33.18	*	60.00	50.00	-26.82	(QP)
16.84	Line	33.40	*	60.00	50.00	-26.60	(QP)
23.90	Line	35.43	*	60.00	50.00	-24.57	(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.



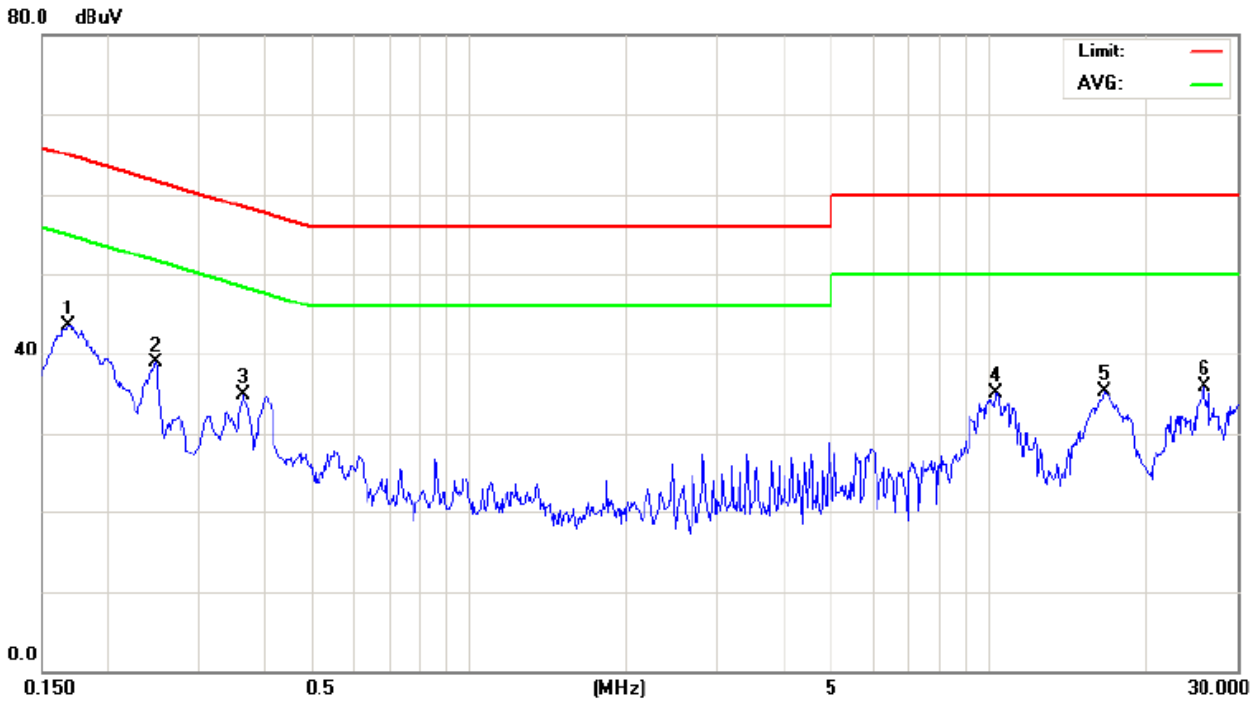
EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	29 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	Normal Link		

Freq. (MHz)	Terminal L/N	Measured(dBuV)		Limits(dBuV)		Margin (dB)	Note
		QP-Mode	AV-Mode	QP-Mode	AV-Mode		
0.17	Neutral	43.54	*	65.03	55.03	-21.49	(QP)
0.25	Neutral	38.94	*	61.79	51.79	-22.85	(QP)
0.37	Neutral	34.81	*	58.59	48.59	-23.78	(QP)
10.32	Neutral	35.18	*	60.00	50.00	-24.82	(QP)
16.60	Neutral	35.30	*	60.00	50.00	-24.70	(QP)
25.86	Neutral	35.84	*	60.00	50.00	-24.16	(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.



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 Radiated Emission Limits **(Frequency Range 9kHz-1000MHz)**

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 (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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	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).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Log-Bicon Antenna	Schwarzbeck	VULB 9160	3058	Nov. 26, 2009
2	Test Cable	N/A	10M_OS02	N/A	Nov. 26, 2009
3	Test Cable	N/A	OS02-1/-2/-3	N/A	Nov. 26, 2009
4	Pre-Amplifier	Anritsu	MH648A	M09961	Nov. 26, 2009
5	EMI Test Receiver	R&S	ESCI	100082	Jan. 29, 2010
6	Antenna Mast	Chance Most	CMTB-1.5	N/A	N/A
7	Turn Table	Chance Most	CMTB-1.5	N/A	N/A
8	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 06, 2010
9	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-325	Oct. 23, 2009
10	Horn Antenna	Schwarzbeck	BBHA9170	9170187	Oct. 23, 2009
11	Microwave Pre_amplifier	Agilent	8449B	3008A01714	Mar. 08, 2010
12	Microflex Cable	United Microwave	57793	1m	Mar. 08, 2010
13	Microflex Cable	United Microwave	A30A30-5006	10M	Jul. 06, 2009

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 2405MHz (1Mbps)

Dwell time=ON/ON+OFF

ON:0.40msec

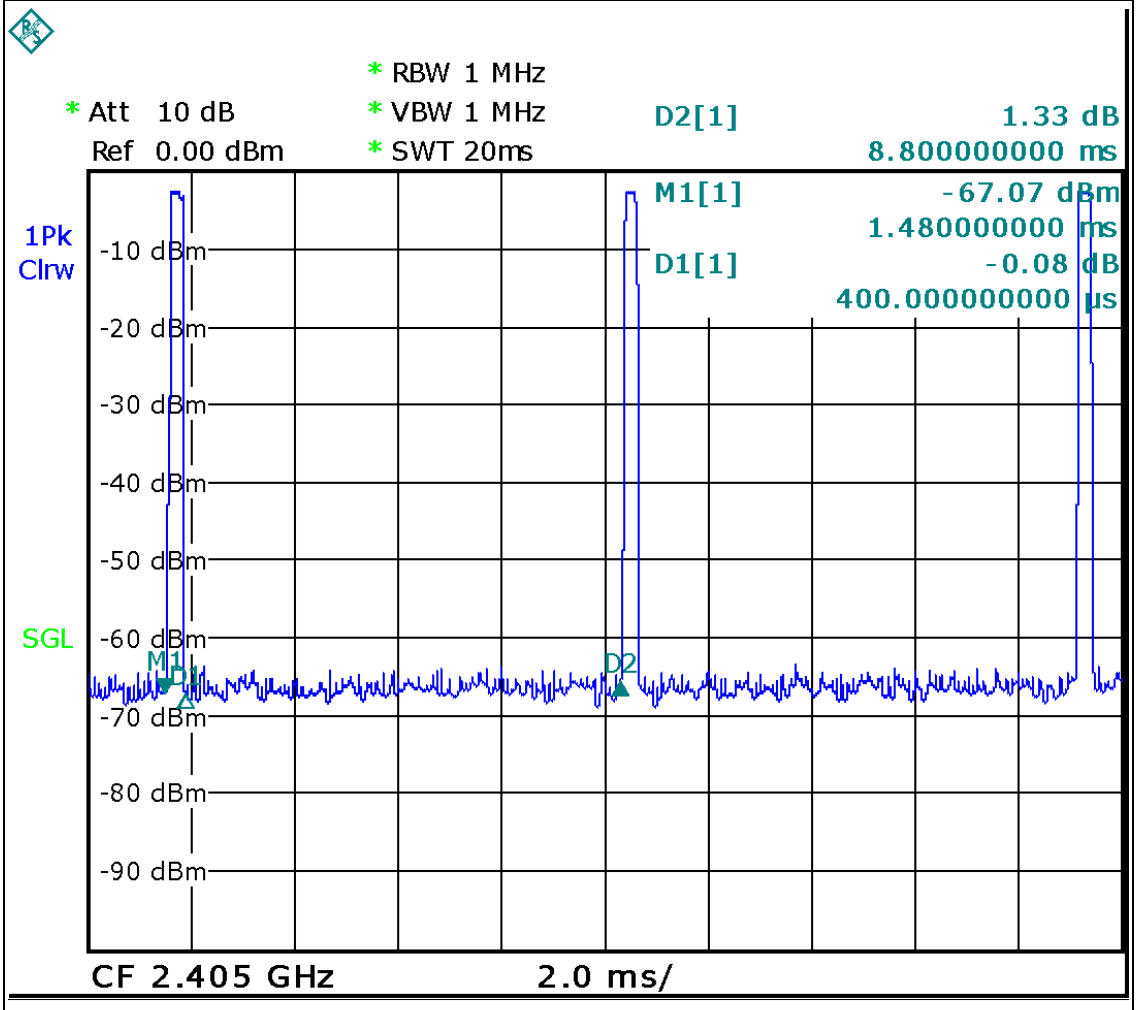
ON+OFF:(total time):8.80msec

Dwell time:4.5%

AV=PK+20 log(Dwell time)

AV=PK-26.85

Total time(ON+OFF)= 8.80 msec ； ON= 0.40 msec



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4.2.3 TEST PROCEDURE

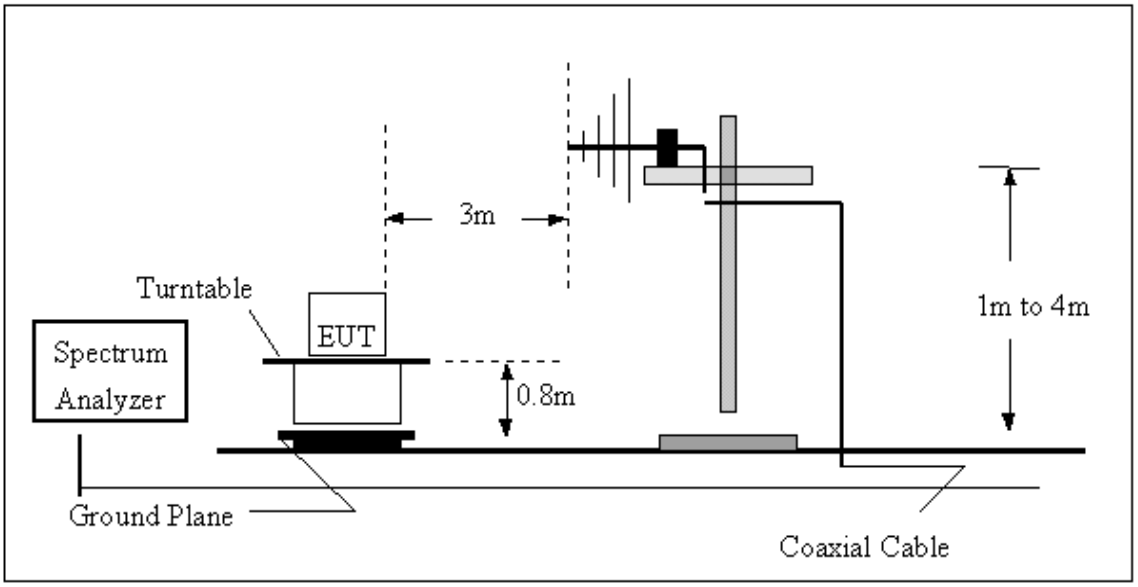
a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter open area test site. The table was rotated 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

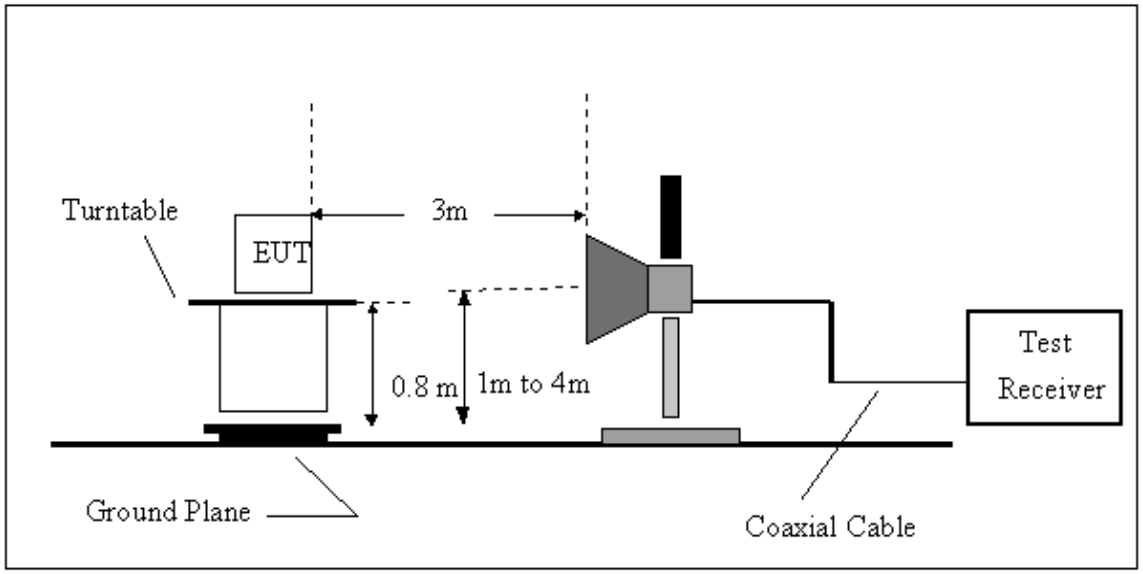
No deviation

4.2.5 TEST SETUP

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



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



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 (BETWEEN 30 – 1000 MHz)

EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX Mode 2439MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
114.90	V	38.87	-20.24	18.63	43.50	- 24.87	
190.10	V	39.70	-18.20	21.50	43.50	- 22.00	
296.80	V	39.91	-13.86	26.05	46.00	- 19.95	
408.30	V	31.22	-10.60	20.62	46.00	- 25.38	
490.80	V	31.06	-8.93	22.13	46.00	- 23.87	
590.20	V	31.19	-6.43	24.76	46.00	- 21.24	

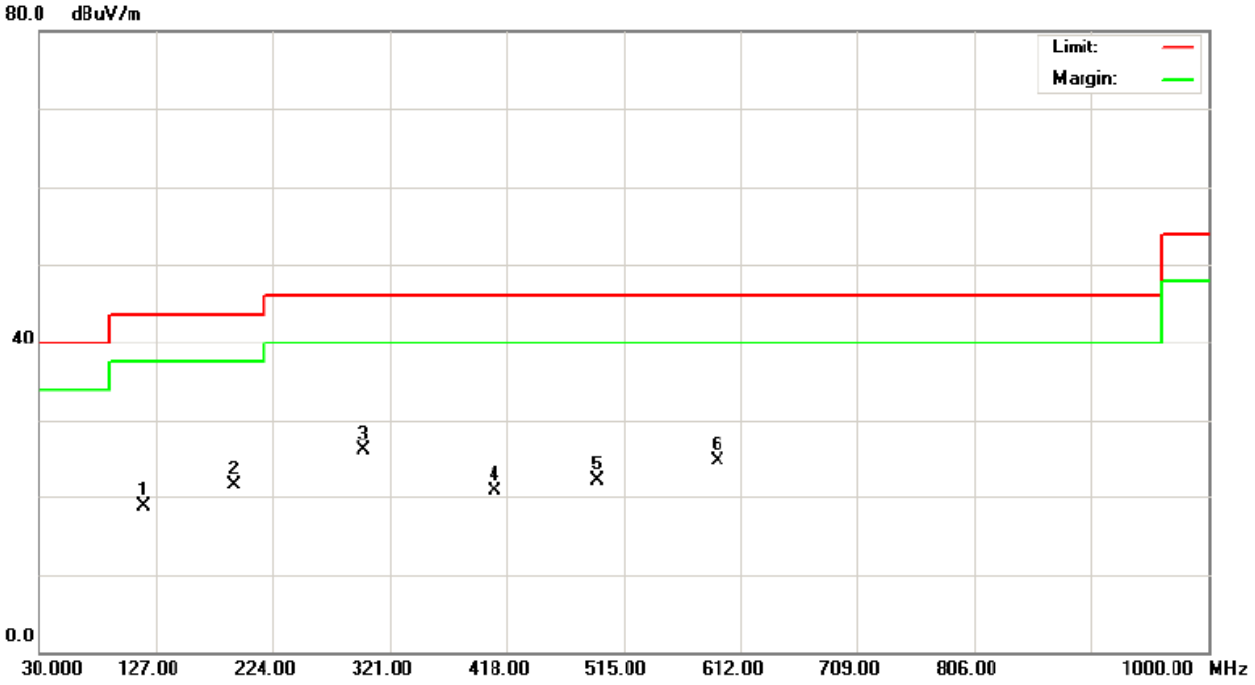
Remark：

(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：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX Mode 2439MHz		

Freq. (MHz)	Ant. H/V	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
119.70	H	31.21	-20.53	10.68	43.50	- 32.82	
216.70	H	39.52	-17.01	22.51	46.00	- 23.49	
328.30	H	30.33	-12.55	17.78	46.00	- 28.22	
442.30	H	30.29	-10.14	20.15	46.00	- 25.85	
524.70	H	30.80	-7.93	22.87	46.00	- 23.13	
626.60	H	27.27	-4.95	22.32	46.00	- 23.68	

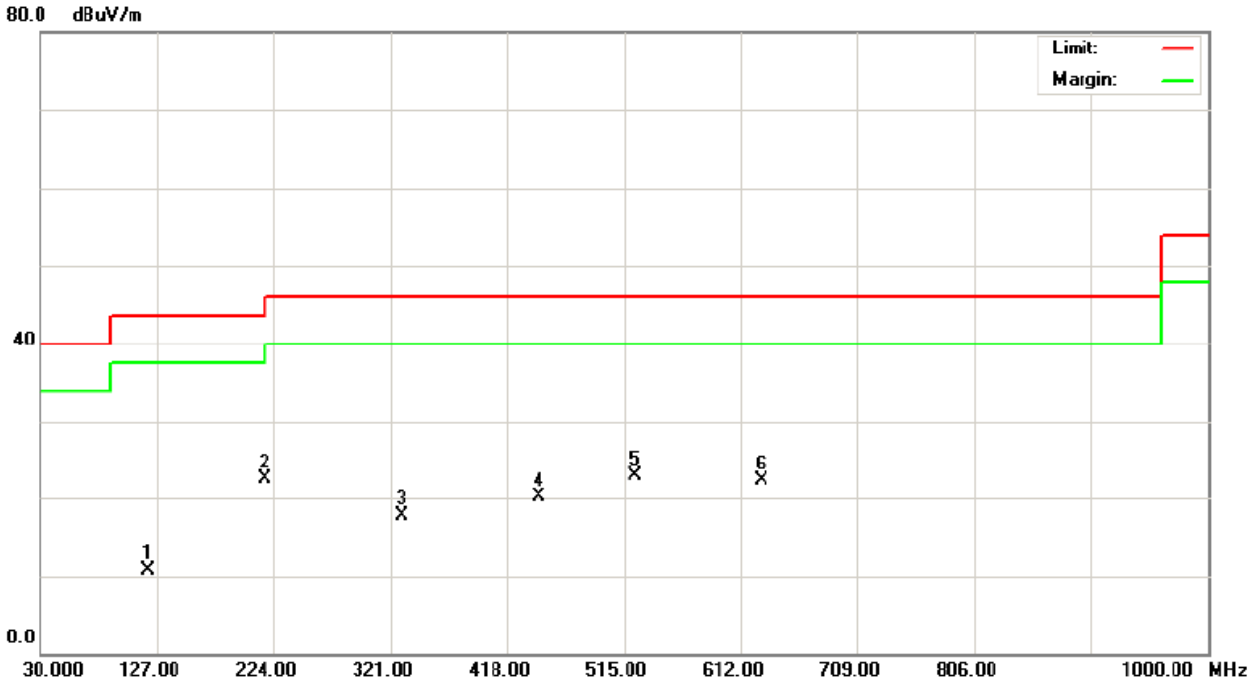
Remark：

(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.



4.2.8 TEST RESULTS (ABOVE 1000 MHz)

EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX 2405MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	V	16.25	-10.60	32.32	48.57	21.72	74.00	54.00	X/E
2405.00	**V**	**53.89**	**27.04**	**32.36**	**86.25**	**59.40**	**114.00**	**94.00**	**X/F**
4811.03	V	49.32	22.47	4.47	53.79	26.84	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.

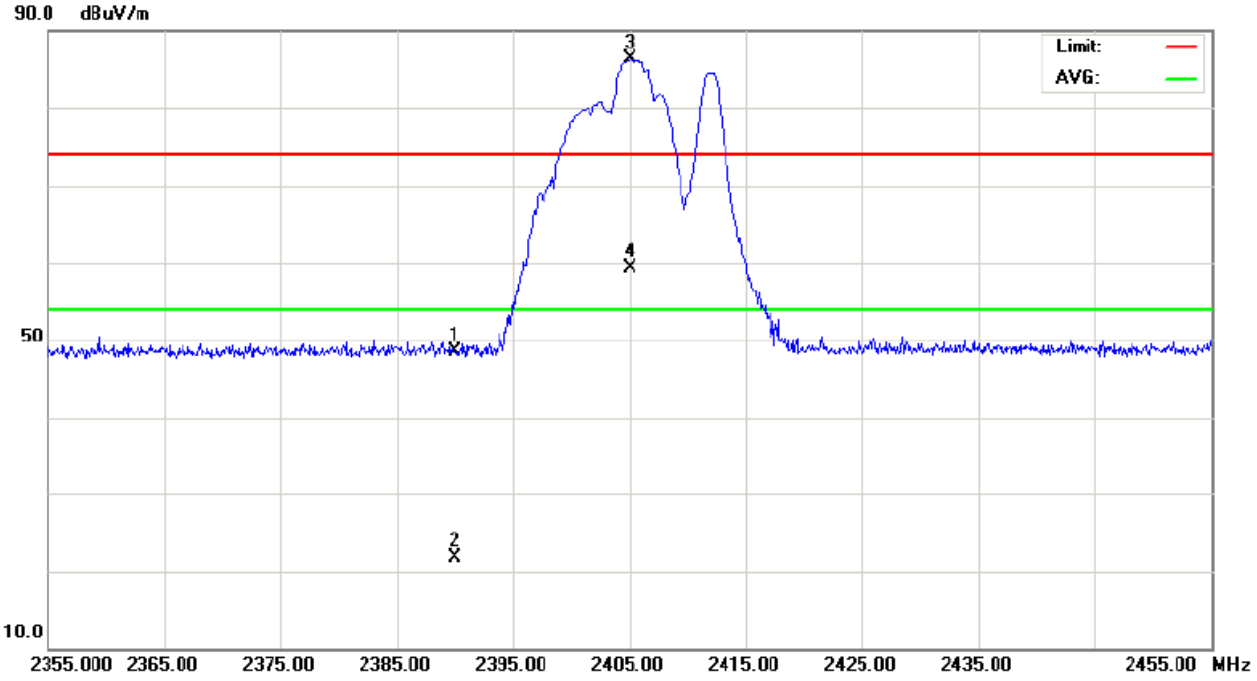
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

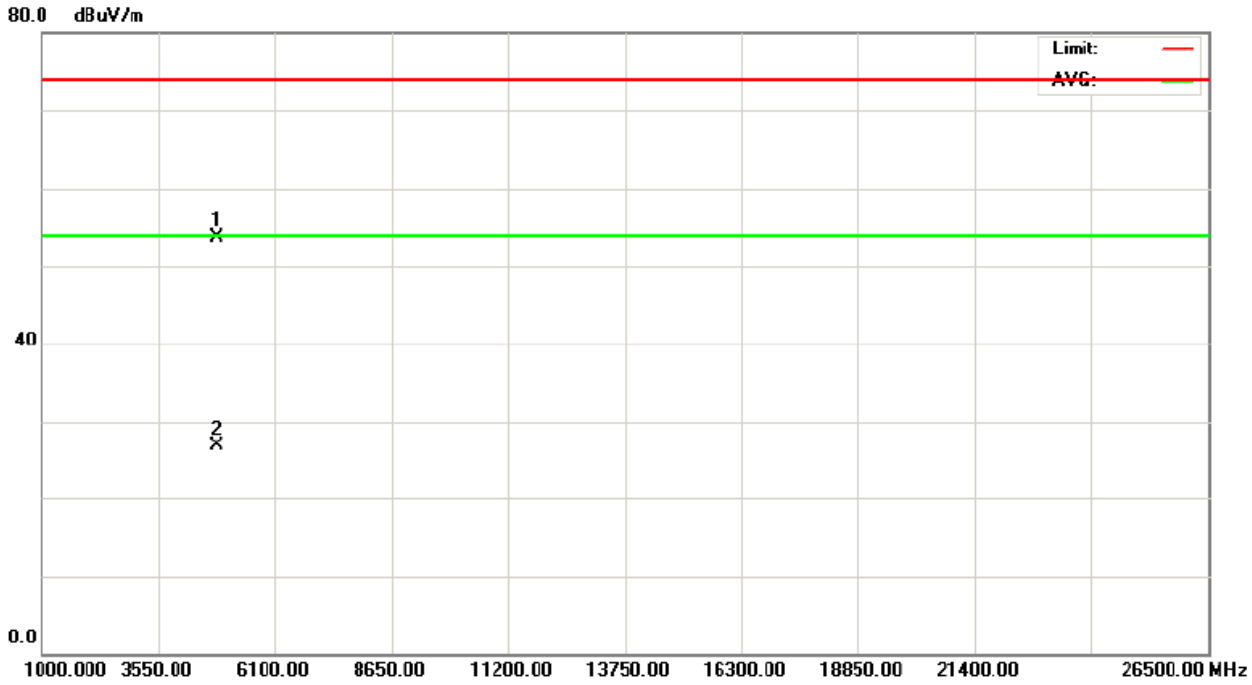
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(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-26.85

Orthogonal Axis：X
TX 2405MHz (Above 1000 MHz, Vertical)





EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX 2405MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	H	16.75	-10.10	32.32	49.07	22.22	74.00	54.00	X/E
2405.30	**H**	**55.55**	**28.70**	**32.36**	**87.91**	**61.06**	**114.00**	**94.00**	**X/F**
4810.58	H	50.81	23.96	4.46	55.27	28.42	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.

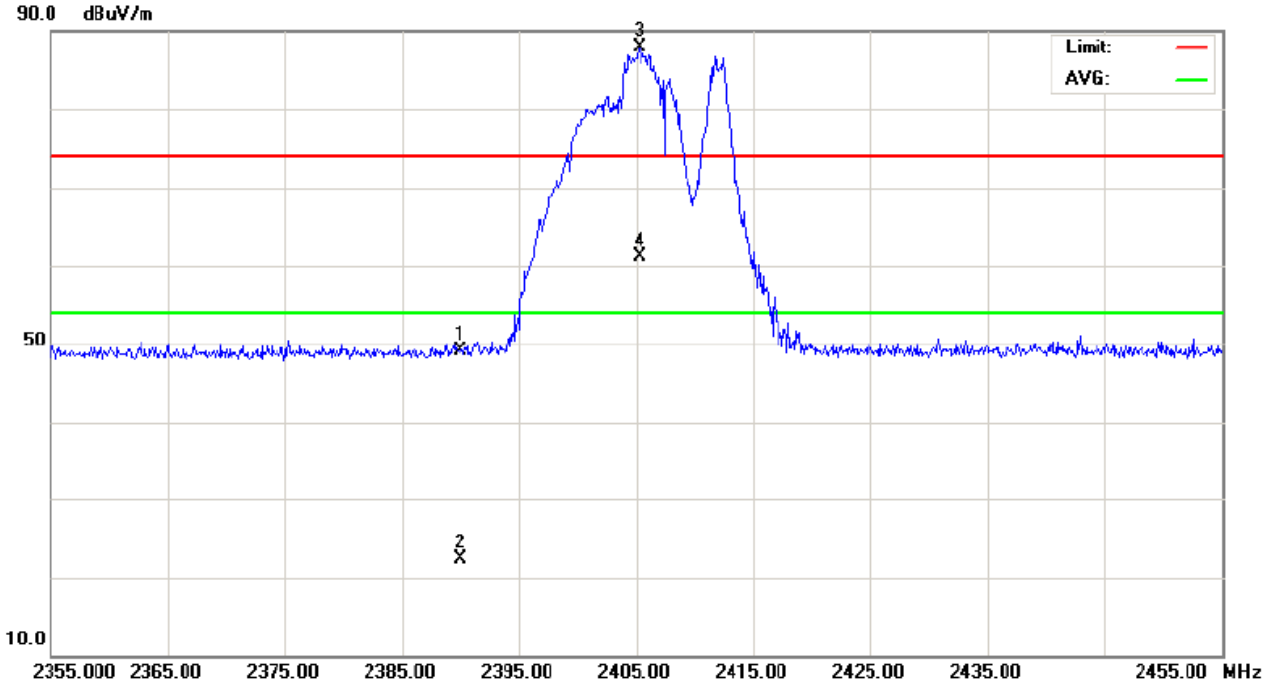
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

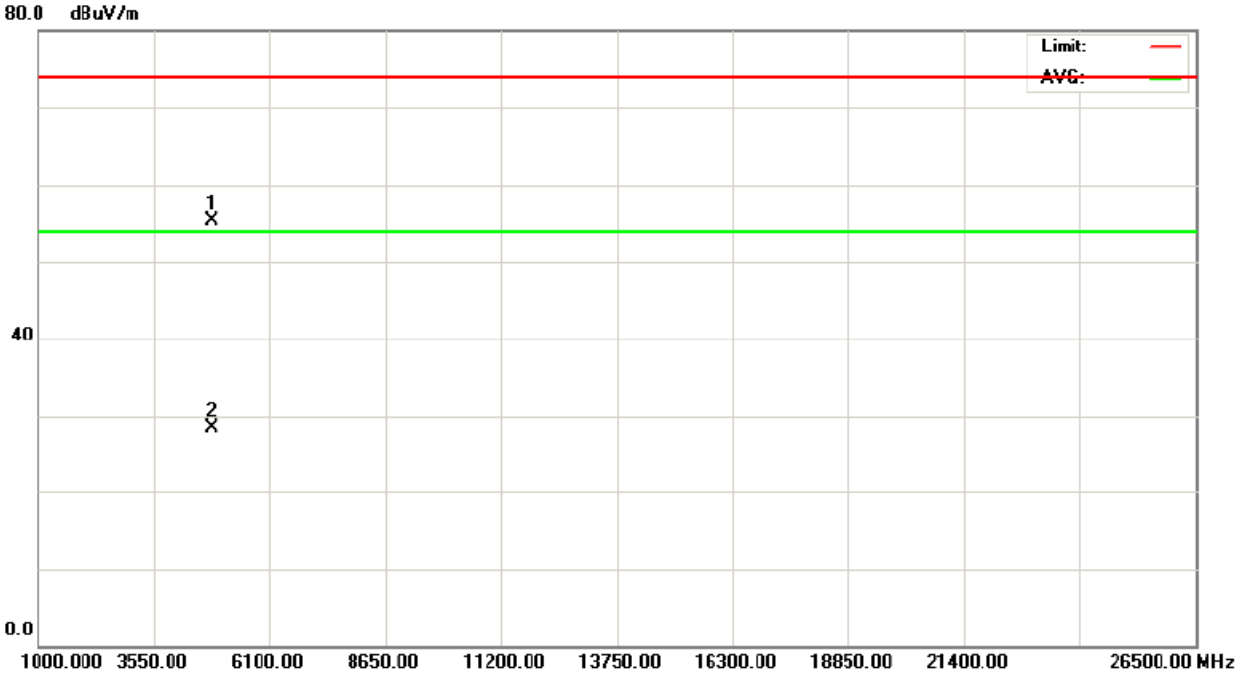
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(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-26.85

Orthogonal Axis：X
TX 2405MHz (Above 1000 MHz, Horizontal)





EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX 2439MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2439.40	**V**	**52.00**	**25.15**	**32.49**	**84.49**	**57.64**	**114.00**	**94.00**	**X/F**
4879.52	V	51.38	24.53	4.69	56.07	29.22	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.

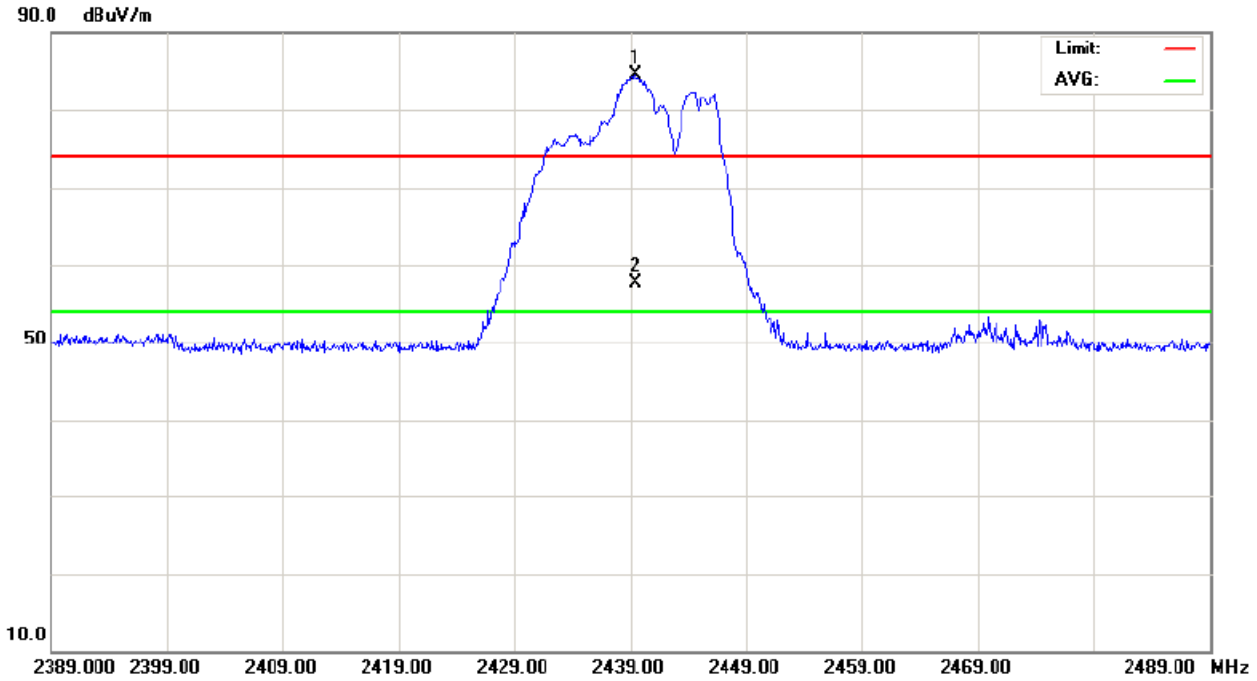
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

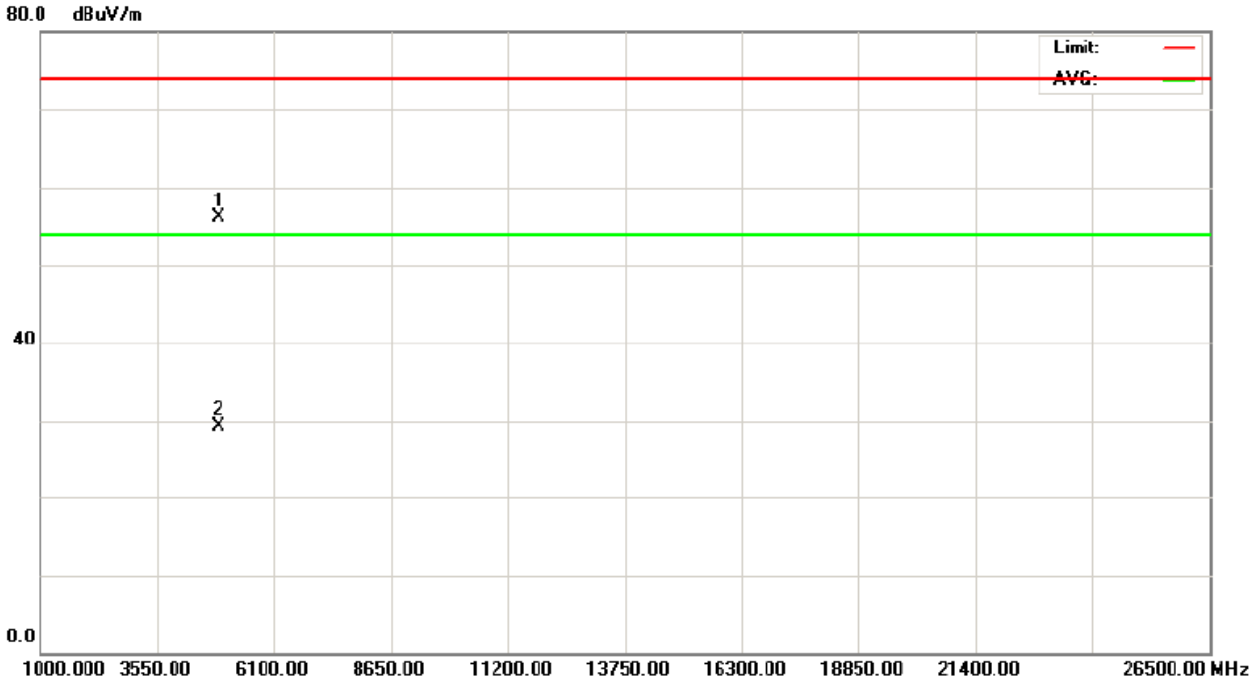
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(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-26.85

Orthogonal Axis：X
TX 2439 MHz (Above 1000 MHz, Vertical)





EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX 2439MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2439.40	**H**	**52.46**	**25.61**	**32.49**	**84.95**	**58.10**	**114.00**	**94.00**	**X/F**
4879.36	H	51.04	24.19	4.69	55.73	28.88	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.

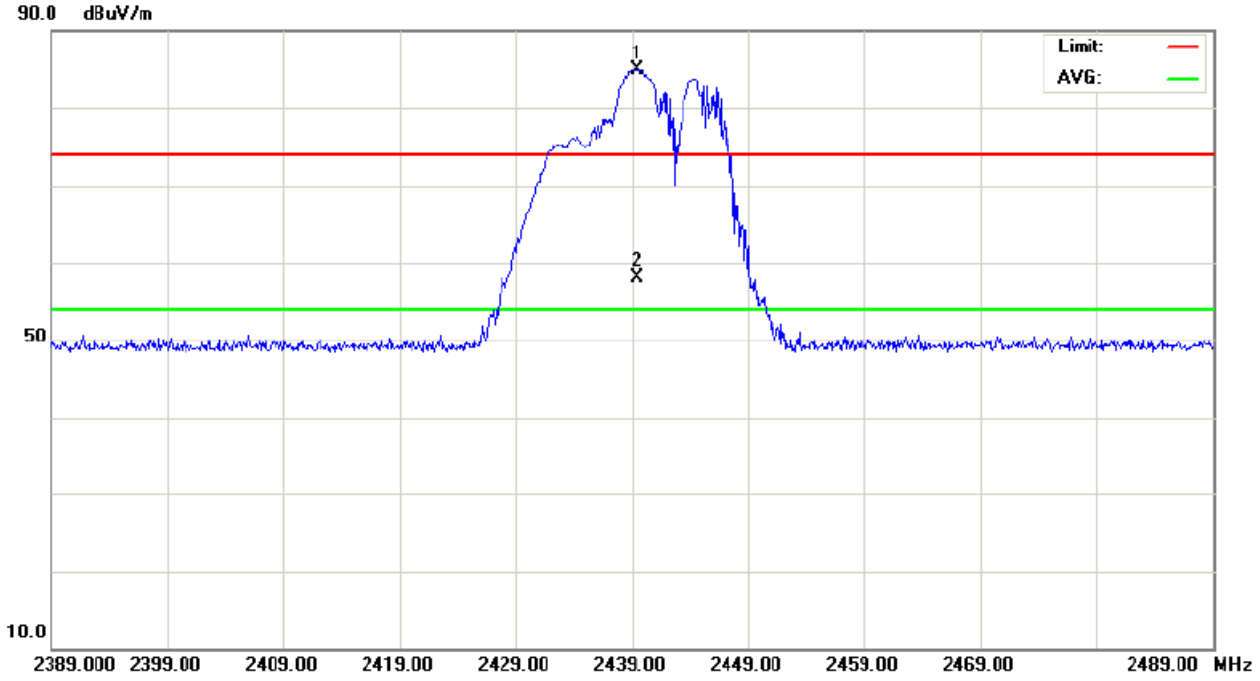
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

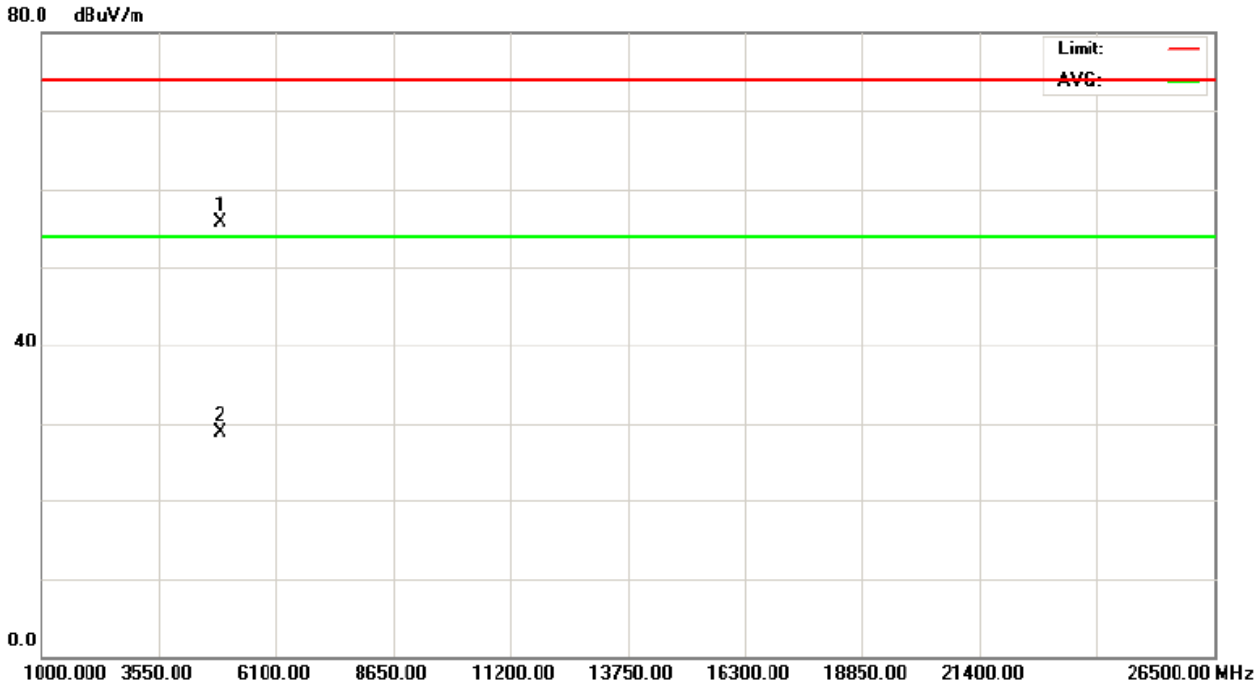
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(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-26.85

Orthogonal Axis：X
TX 2439MHz (Above 1000 MHz, Horizontal)





EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX 2476MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2476.40	**V**	**52.71**	**25.86**	**32.61**	**85.32**	**58.47**	**114.00**	**94.00**	**X/F**
2483.50	V	34.38	7.53	32.63	67.01	40.16	74.00	54.00	X/E
4953.51	V	53.37	26.52	4.93	58.30	31.45	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.

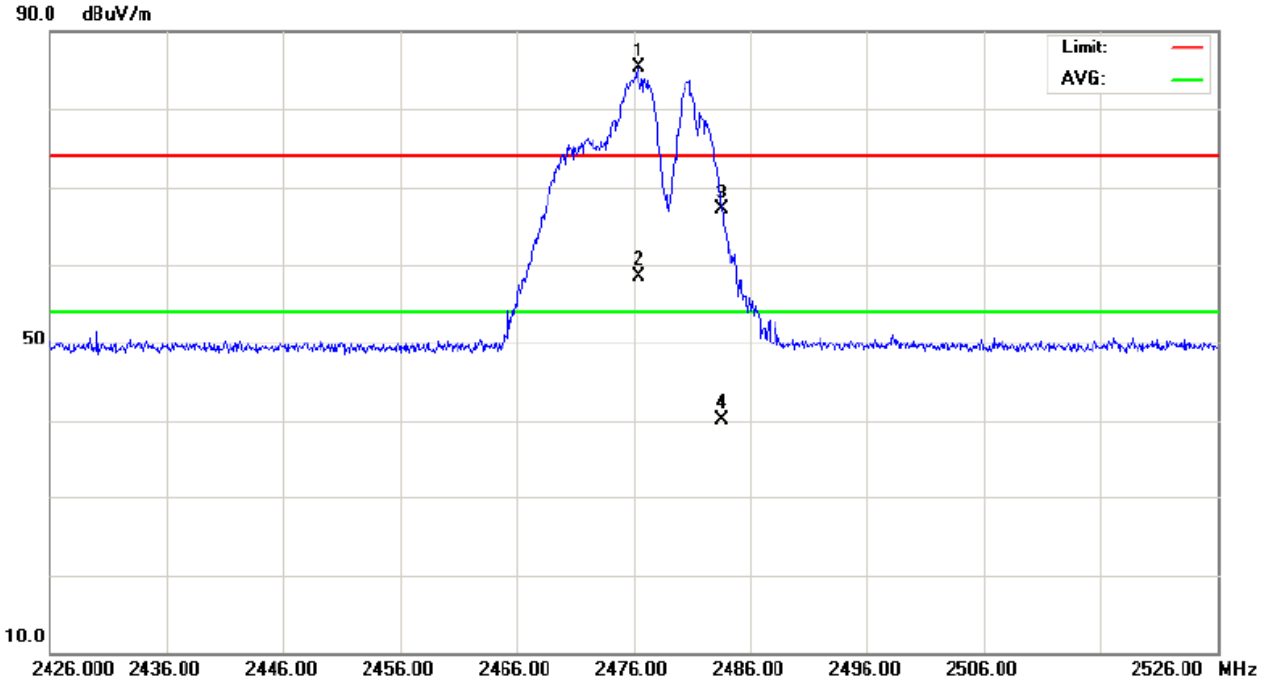
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

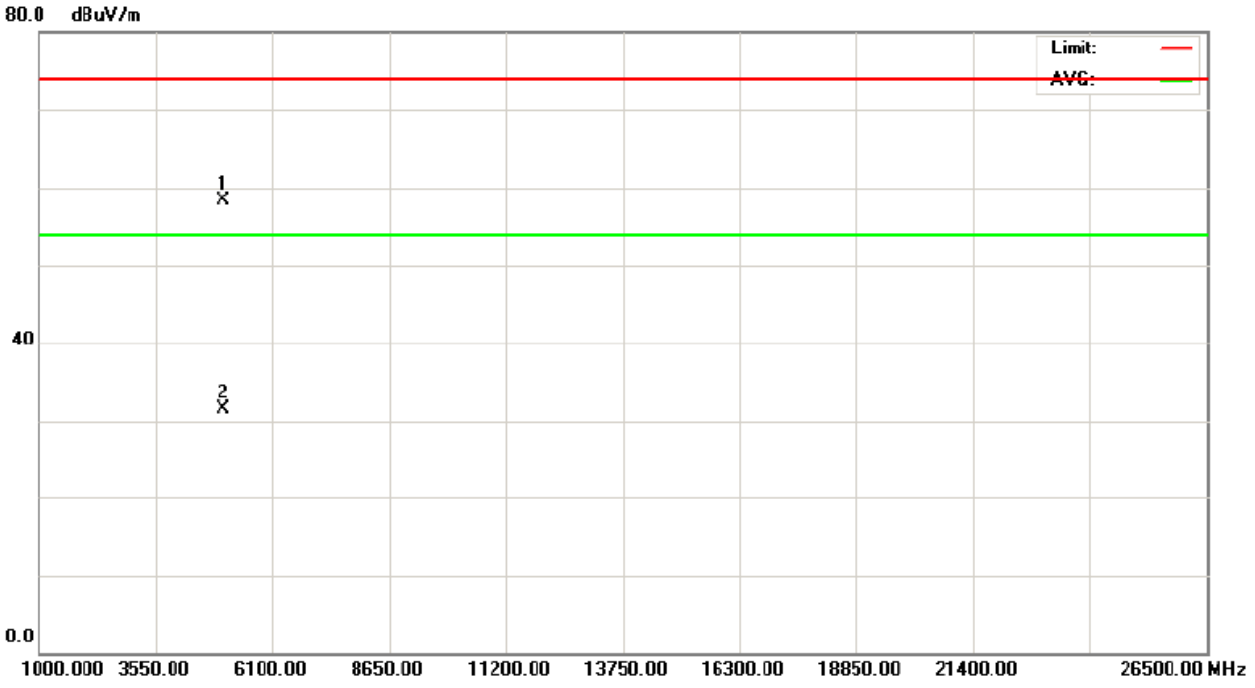
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(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-26.85

Orthogonal Axis：X
TX 2476MHz (Above 1000 MHz, Vertical)





EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX 2476MHz		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2476.00	**H**	**54.91**	**28.06**	**32.61**	**87.52**	**60.67**	**114.00**	**94.00**	**X/F**
2483.50	H	38.18	11.33	32.63	70.81	43.96	74.00	54.00	X/E
4953.79	H	50.41	23.56	4.93	55.34	28.49	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.

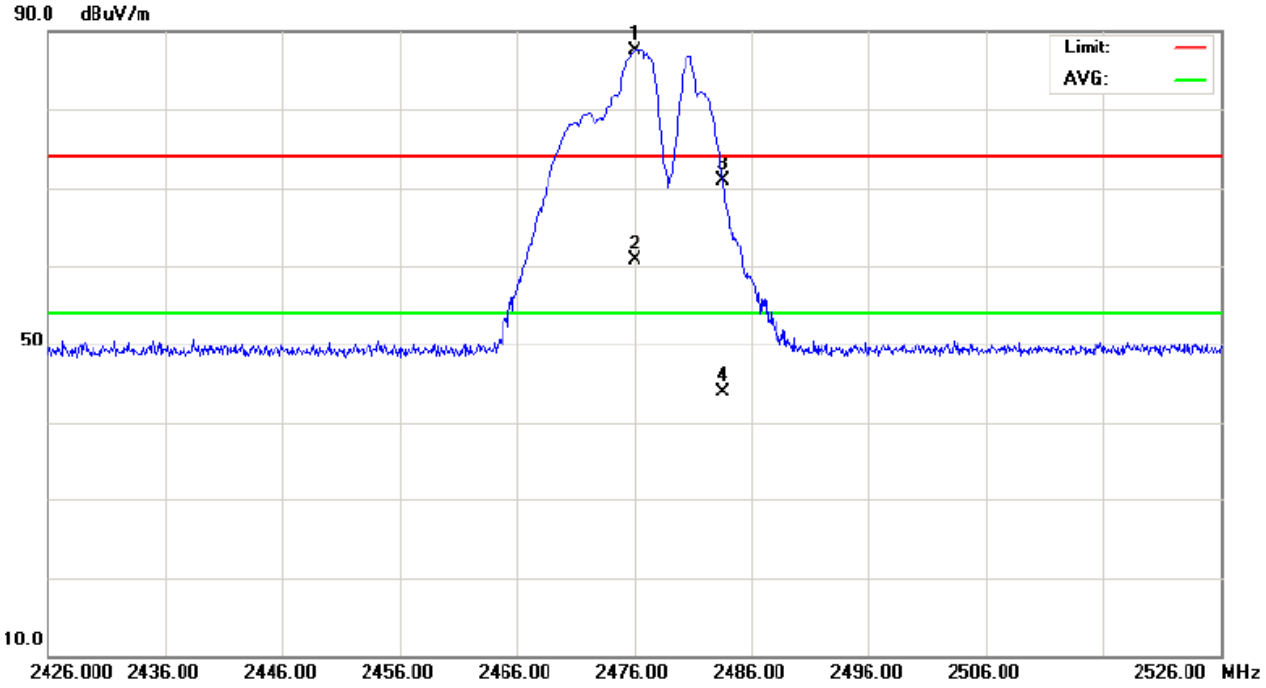
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

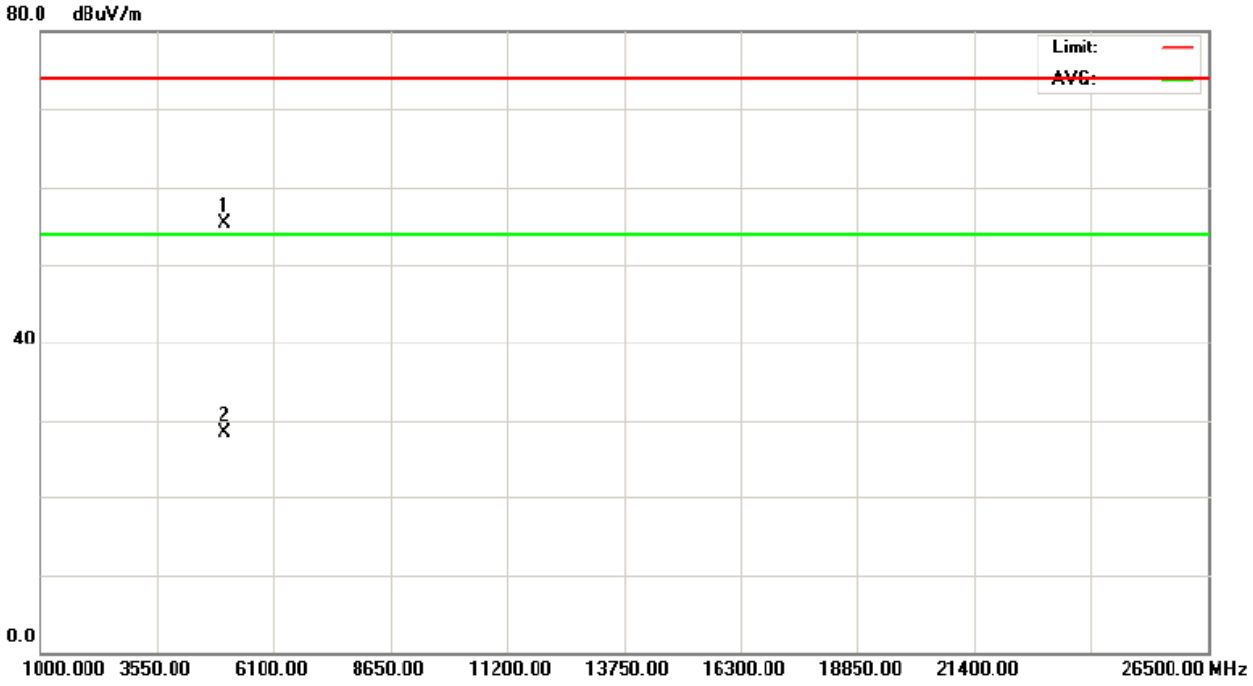
(6) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

(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-26.85

Orthogonal Axis：X
TX 2476MHz (Above 1000 MHz, Horizontal)





4.2.9 TEST RESULTS (2400 – 2483.5 MHz)

EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX CH 2405MHz/2439MHz/2476MHz		

		Peak	AV		Peak	AV	Peak	AV	
Freq.	Ant.Pol.	Reading		Ant./CL/	Actual FS		Limit3m		
(MHz)	(H/V)	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	NOTE
2405.00	V	53.89	27.04	32.36	86.25	59.40	114.00	94.00	CH01
2405.30	H	55.55	28.70	32.36	87.91	61.06	114.00	94.00	CH01
2439.40	V	52.00	25.15	32.49	84.49	57.64	114.00	94.00	CH32
2439.40	H	52.46	25.61	32.49	84.95	58.10	114.00	94.00	CH32
2476.40	V	52.71	25.86	32.61	85.32	58.47	114.00	94.00	CH64
2476.00	H	54.91	28.06	32.61	87.52	60.67	114.00	94.00	CH64

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) 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

4.2.10 TEST RESULTS (Restricted Bands Requirements)

EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX CH 2405MHz/2476MHz(Vertical)		
Note：	The emission of the carrier radiated field strength is measured for (Peak and AV) as following: 1. The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel (CH01). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was configured with the worst case antenna and setup to transmit at the highest channel (CH16). Then the field strength was measured at 2483.5-2500 MHz.		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	V	16.25	-10.60	32.32	48.57	21.72	74.00	54.00	CH01
2483.50	V	34.38	7.53	32.63	67.01	40.16	74.00	54.00	CH64

Remark：

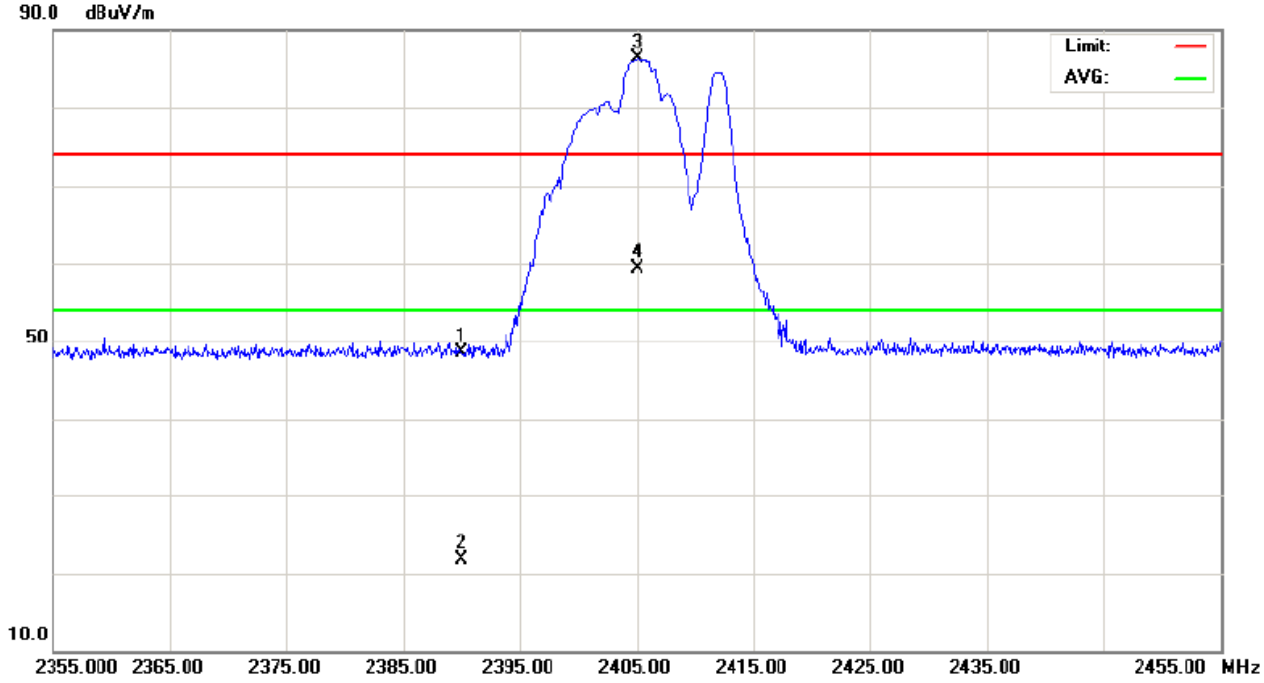
(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ◦

(2) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

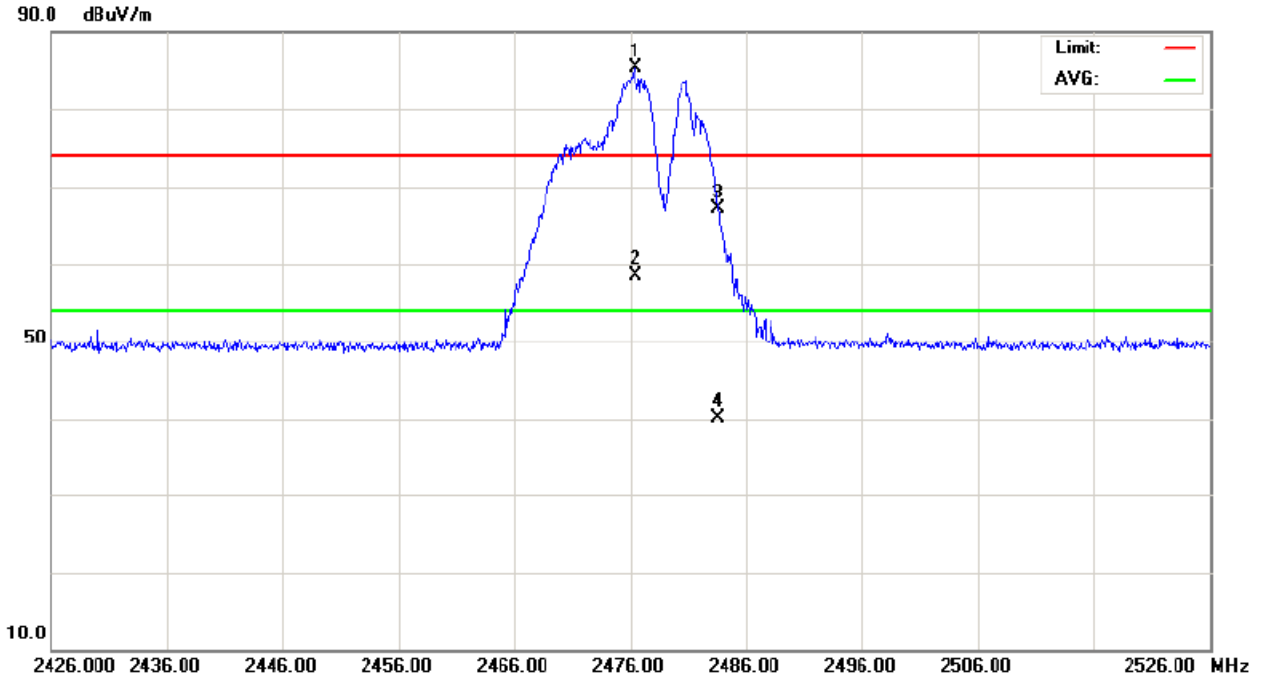
(3) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(4) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) ，Final AV=PK-26.85

TX CH 01 (Restricted Bands Requirements, Vertical)



TX CH 64 (Restricted Bands Requirements, Vertical)



EUT：	Dongle	Model Name. ：	MX-168SOC
Temperature：	24 ℃	Relative Humidity：	56 %
Pressure：	1010 hPa	Test Power ：	AC 120V/60Hz
Test Mode ：	TX CH 2405MHz/2476MHz (Horizontal)		
Note：	The emission of the carrier radiated field strength is measured for (Peak and AV) as following: 1. The transmitter was then configured with the worst case antenna and setup to transmit at the lowest channel (CH01). Then the field strength was measured at 2310-2390 MHz. 2. The transmitter was configured with the worst case antenna and setup to transmit at the highest channel (CH16). Then the field strength was measured at 2483.5-2500 MHz.		

Freq.	Ant.Pol.	Reading		Ant./CF	Act.		Limit		Note
		Peak	AV		Peak	AV	Peak	AV	
(MHz)	H/V	(dBuV)	(dBuV)	CF(dB)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	
2390.00	H	16.75	-10.10	32.32	49.07	22.22	74.00	54.00	CH01
2483.50	H	38.18	11.33	32.63	70.81	43.96	74.00	54.00	CH64

Remark：

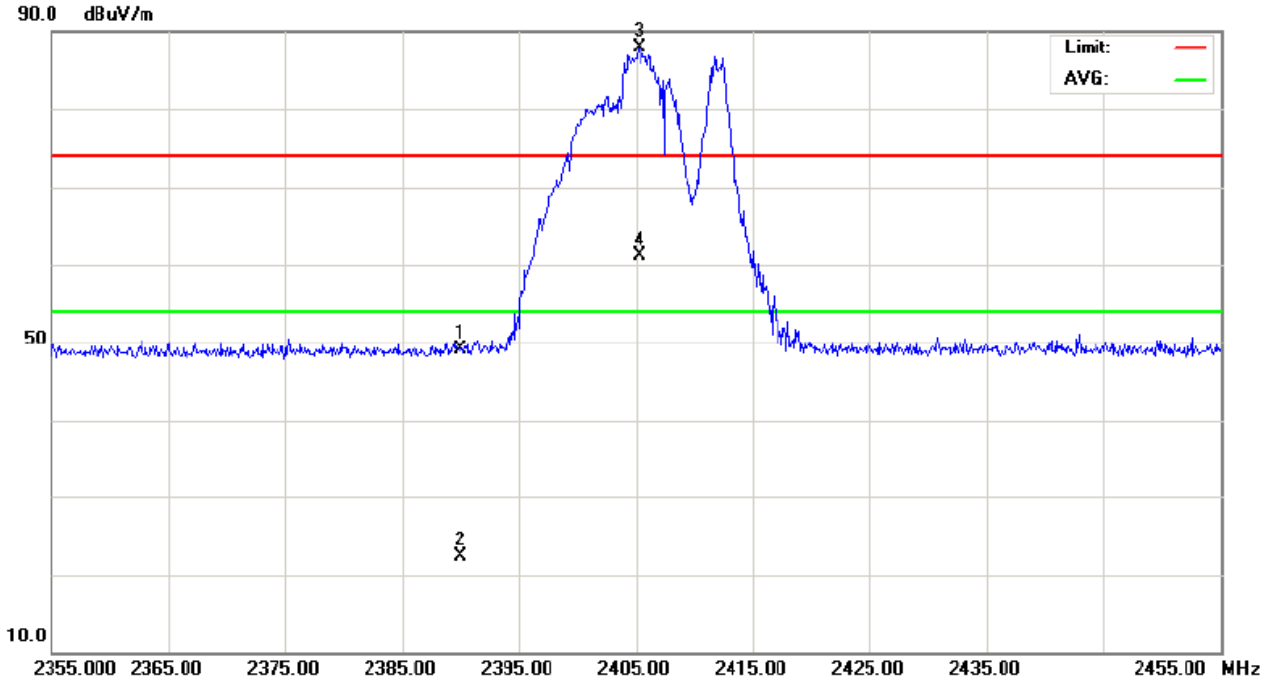
(1) Radiated emissions measured in frequency range above 1000MHz were made with an instrument using Peak detector mode and AV detector mode of the emission ◦

(2) EUT Orthogonal Axis：
"X" - denotes Laid on Table；"Y" - denotes Vertical Stand；"Z" - denotes Side Stand

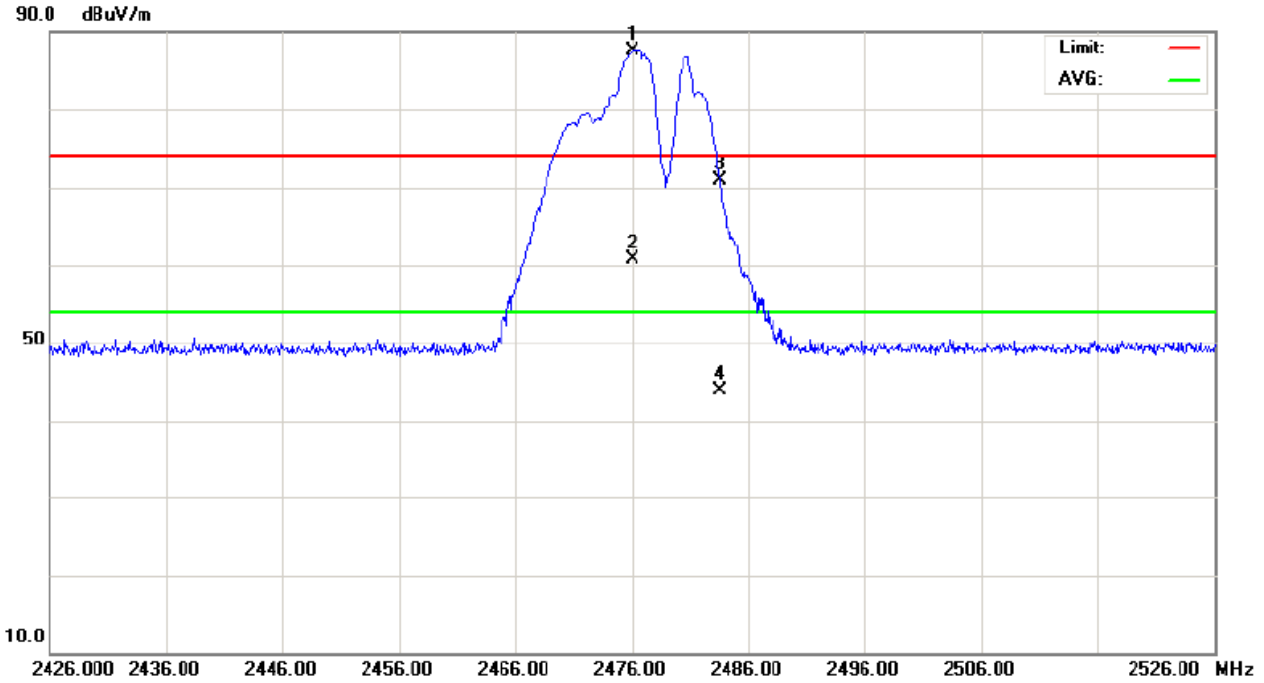
(3) During the measurements above 1 GHz it is taken care of that the EUT is always within the 3 dB cone of radiation BW of the used antenna

(4) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle) ，Final AV=PK-26.85

TX CH 01 (Restricted Bands Requirements, Horizontal)



TX CH 64 (Restricted Bands Requirements, Horizontal)



5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Frequency Range (MHz)	Result
15.247 (a)(1)(ii)	Number of Hopping Channel	2400-2483.5	PASS

5.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 06, 2010

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

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

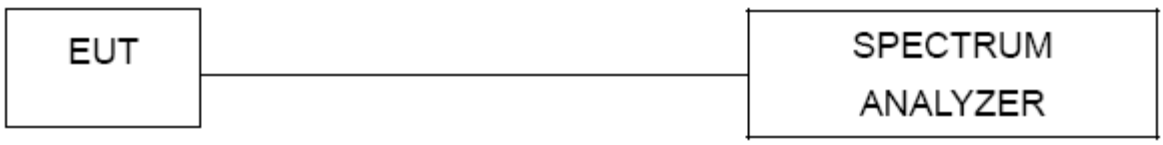
5.1.2 TEST PROCEDURE

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 = Auto.

5.1.3 DEVIATION FROM STANDARD

No deviation.

5.1.4 TEST SETUP



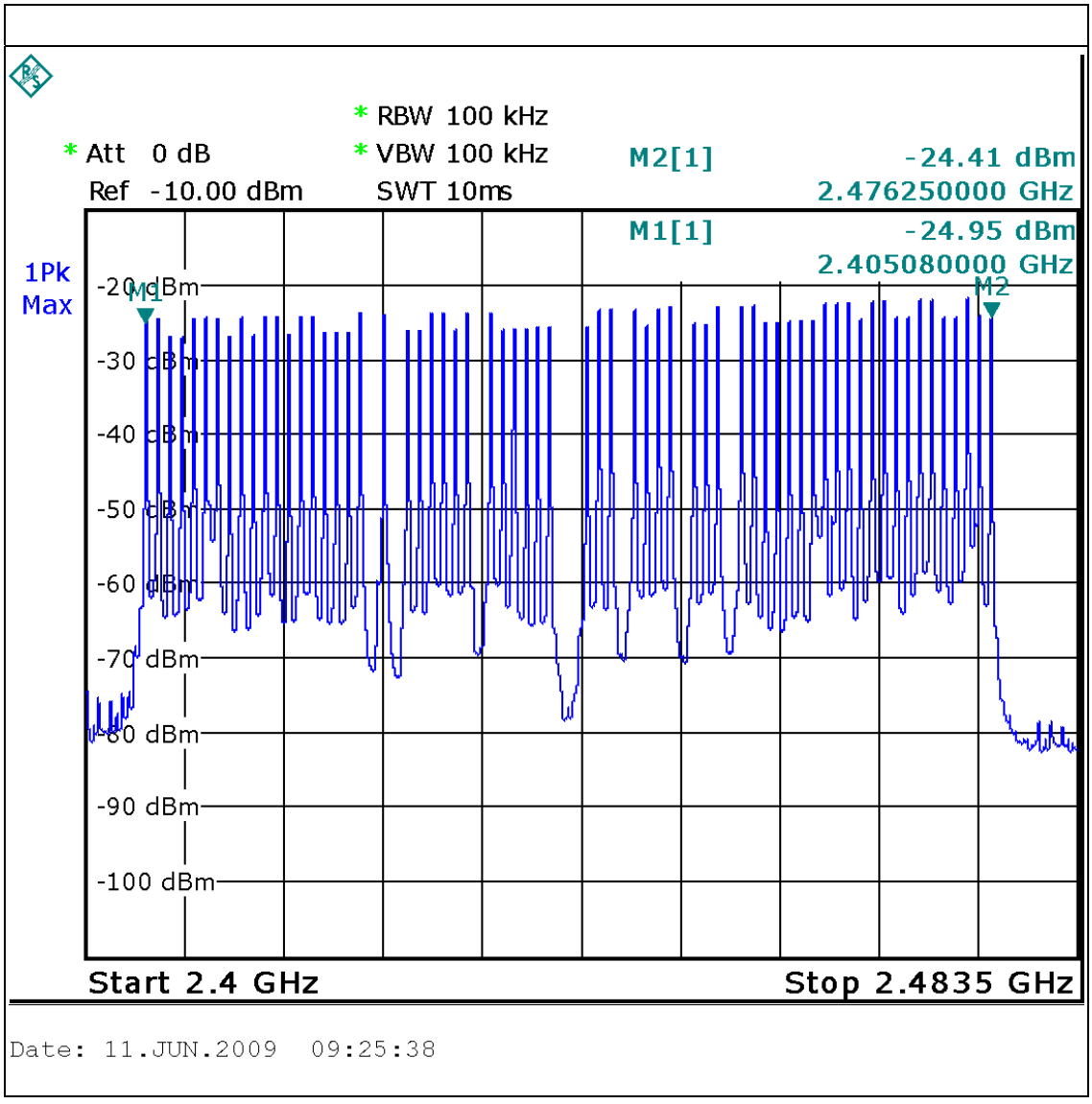
5.1.5 EUT OPERATION CONDITIONS

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.

5.1.6 TEST RESULTS

EUT :	Dongle	Model Name :	MX-168SOC
Temperature :	25 ℃	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.0V
Test Mode :	Hopping Mode		

Number of Hopping Channel	64



6. AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(ii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.1.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 06, 2010

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

6.1.2. Test Procedures

a. The transmitter output (antenna port) was connected to the spectrum analyzer
b. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
d. Sweep Time is more than once pulse time.
e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
f. Measure the maximum time duration of one single pulse.
g. Set the EUT for packet transmitting.
h. Measure the maximum time duration of one single pulse.
i. Dwell time = [spreading rate/32] x duty-cycle x 0.4 seconds

6.1.3. Test Setup Layout

6.1.4. Test Deviation

There is no deviation with the original standard.

6.1.5. EUT Operation during Test

The EUT was programmed to be in continuously transmitting/Hopping mode.

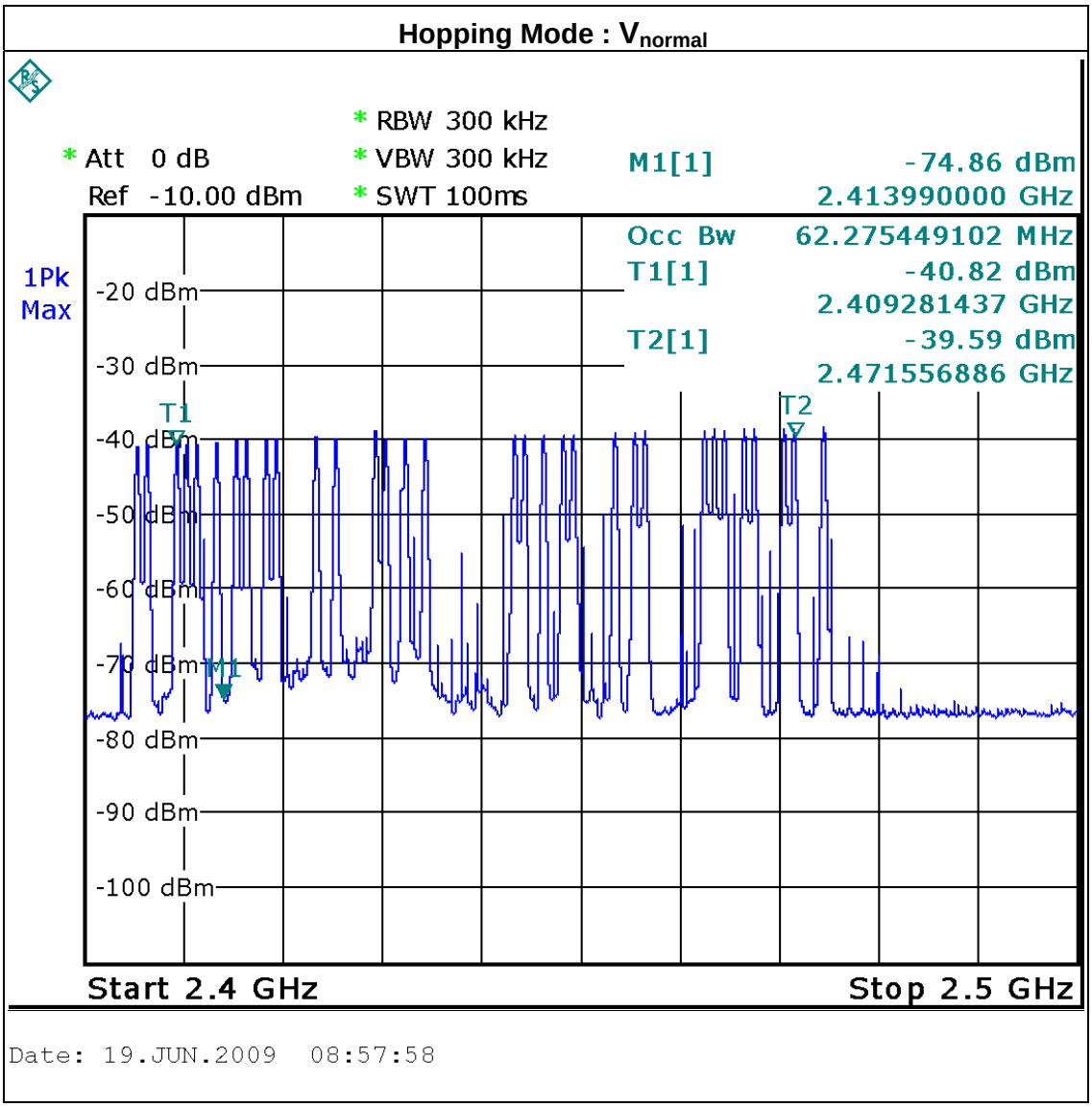
6.1.6. Results of Occupied Bandwidth and Spread-spectrum Bandwidth

EUT：	Dongle	Model Name ：	MX-168SOC
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1015 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	Hopping Mode		

Data Packet	90% OBW (MHz)	Duty cycle (%)	Dwell Time (s)	Limits (s)
Hooping	62.275	0.528	0.04	0.4000

NOTE: For the test plots please refer to the below pages.

Hopping Mode : V_{normal}



7. Hopping Channel Separation Measurement

7.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

7.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 06, 2010

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

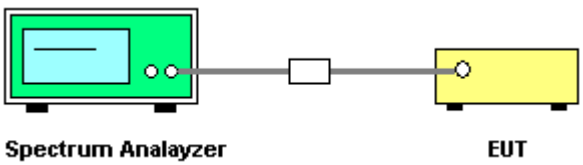
7.1.2 TEST PROCEDURE

a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
c. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were utilised for channel separation measurement.

7.1.3 DEVIATION FROM STANDARD

No deviation.

7.1.4 TEST SETUP



7.1.5 EUT OPERATION CONDITIONS

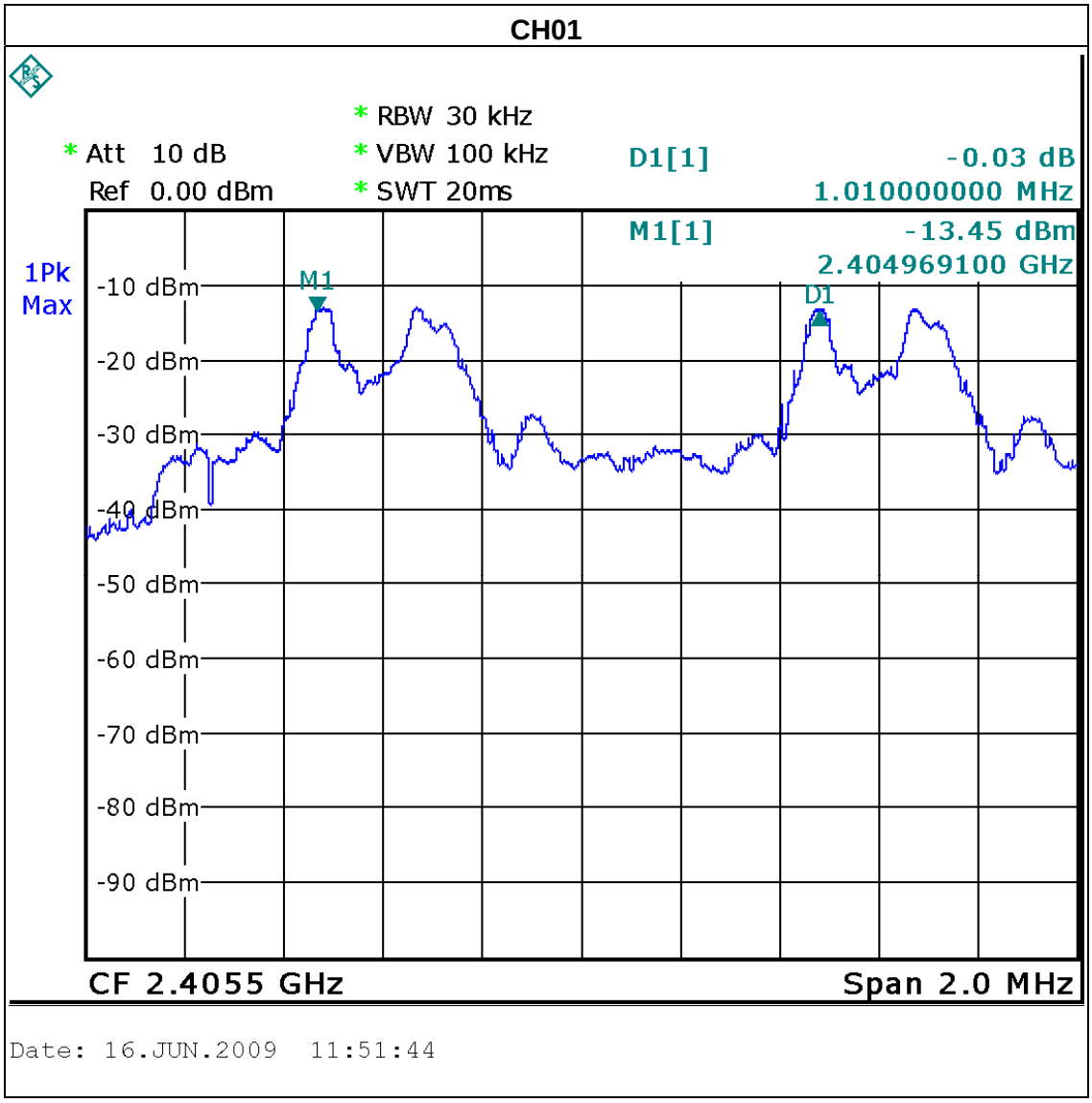
The EUT was programmed to be in continuously transmitting mode.

7.1.6 TEST RESULTS

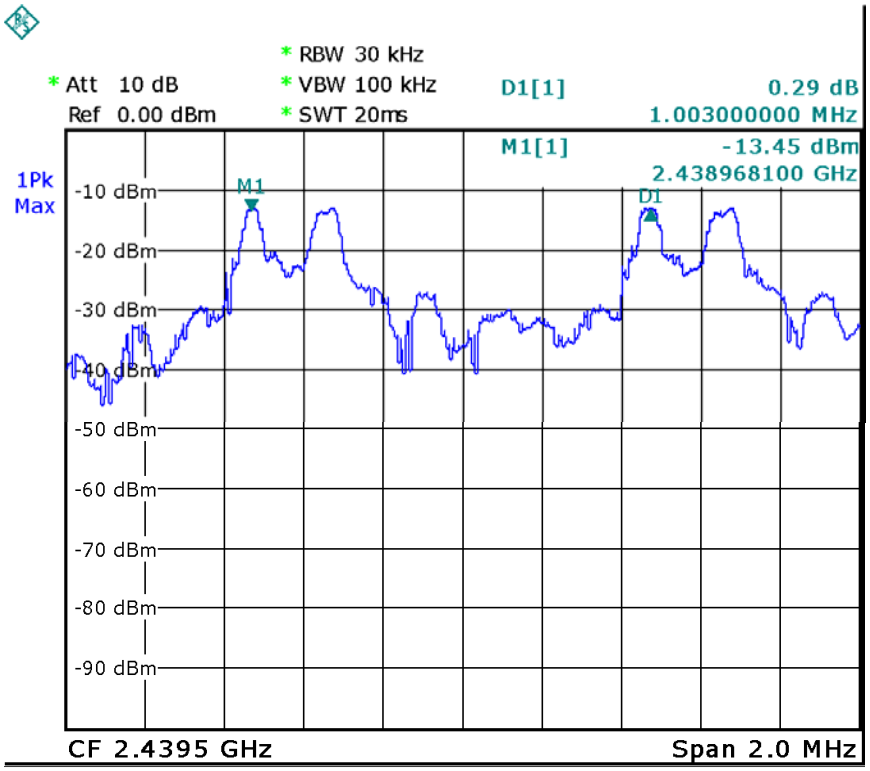
EUT：	Dongle	Model Name ：	MX-168SOC
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	CH01 / CH32 /CH64		

Frequency	Ch. Separation (MHz)	20d Bandwidth B (MHz)	99% Occupied Bandwidth (MHz)	Result
2405 MHz	1	4.351	2.994	**Complies**
2439 MHz	1	4.232	3.113	**Complies**
2476 MHz	1	4.451	6.646	**Complies**

Ch. Separation Limits: >20dB bandwidth or >2/3 of 20dB bandwidth

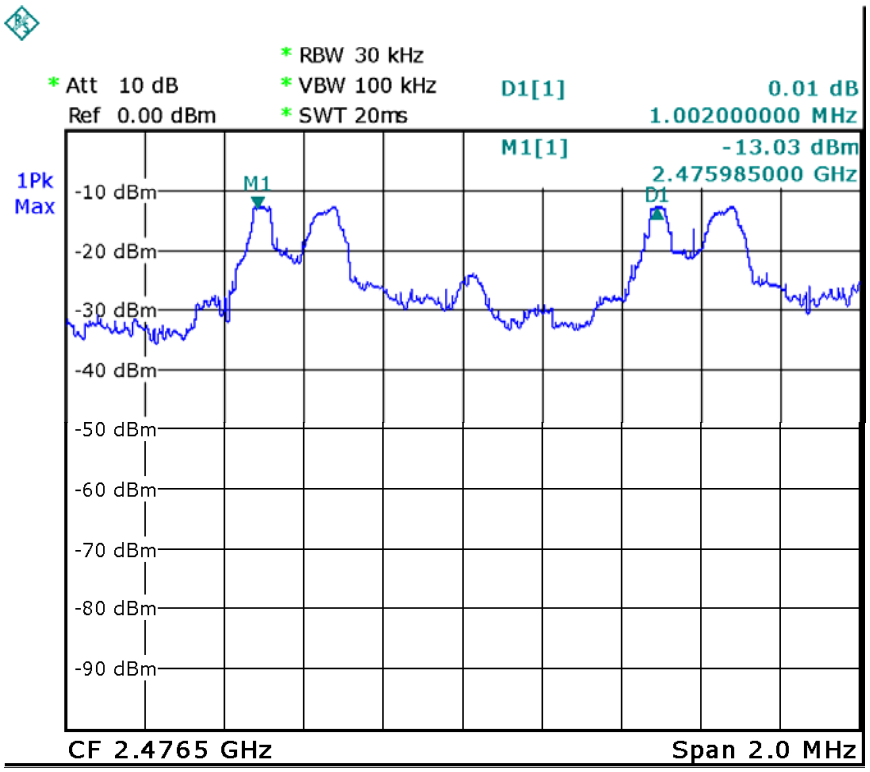


CH32



Date: 16.JUN.2009 11:50:20

CH64



Date: 16.JUN.2009 11:53:48

8. BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(2)	Bandwidth	<= 1 MHz (20dB bandwidth)	2400-2483.5	PASS

8.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 06, 2010

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 300 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.1.2 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 = Auto.

8.1.3 DEVIATION FROM STANDARD

No deviation.

8.1.4 TEST SETUP

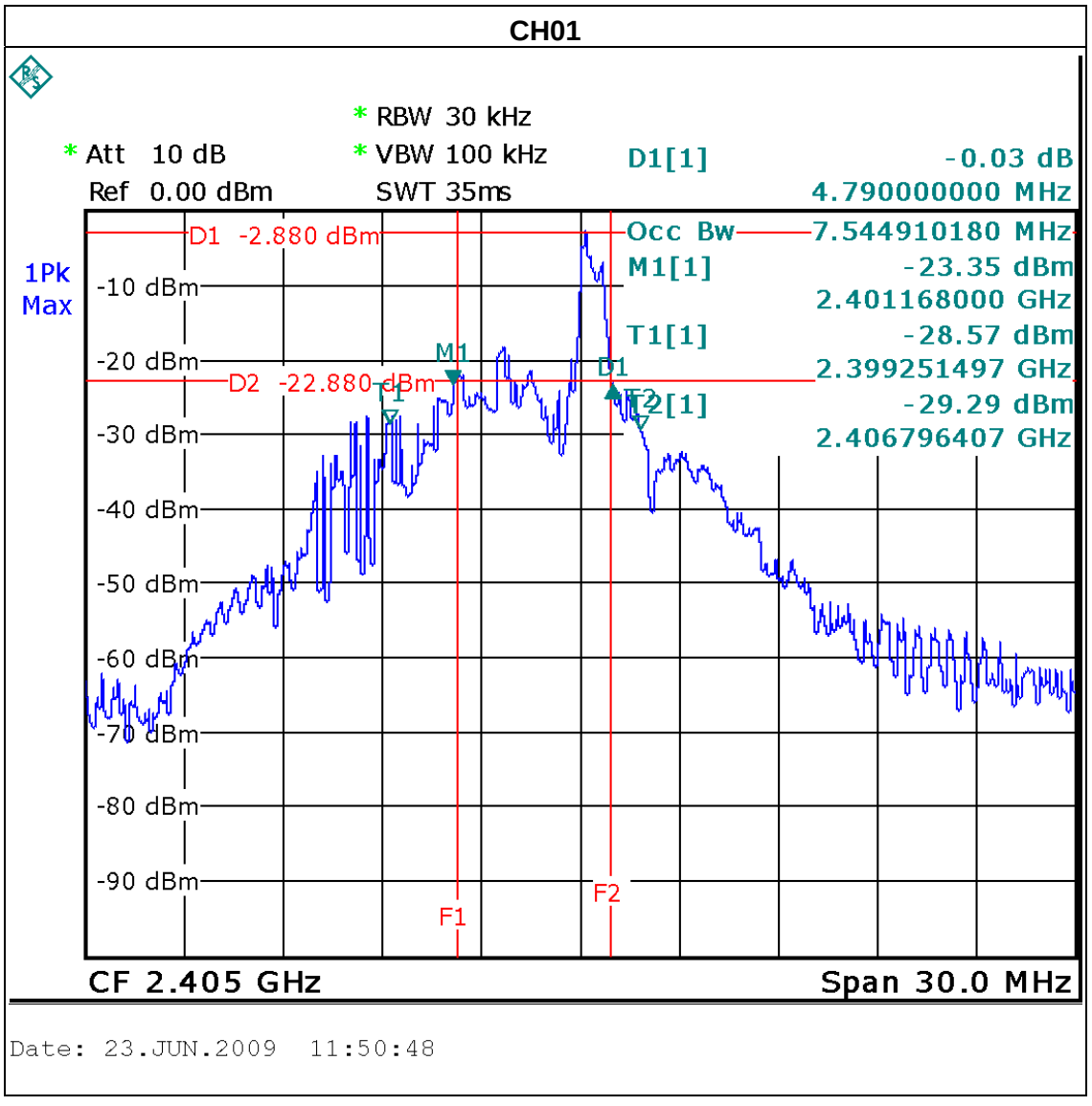
8.1.5 EUT OPERATION CONDITIONS

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.

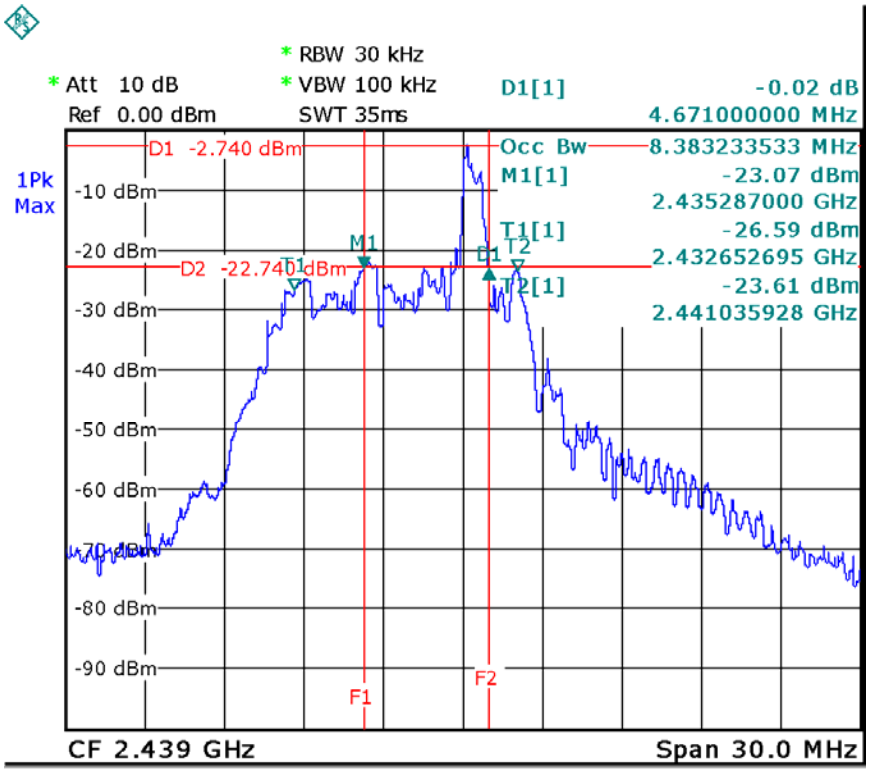
8.1.6 TEST RESULTS

EUT：	Dongle	Model Name ：	MX-168SOC
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	CH01 / CH32 /CH64		

Frequency	20dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2405 MHz	4.790	<= 1MHz	**PASS**
2439 MHz	4.671	<= 1MHz	**PASS**
2476 MHz	5.090	<= 1MHz	**PASS**

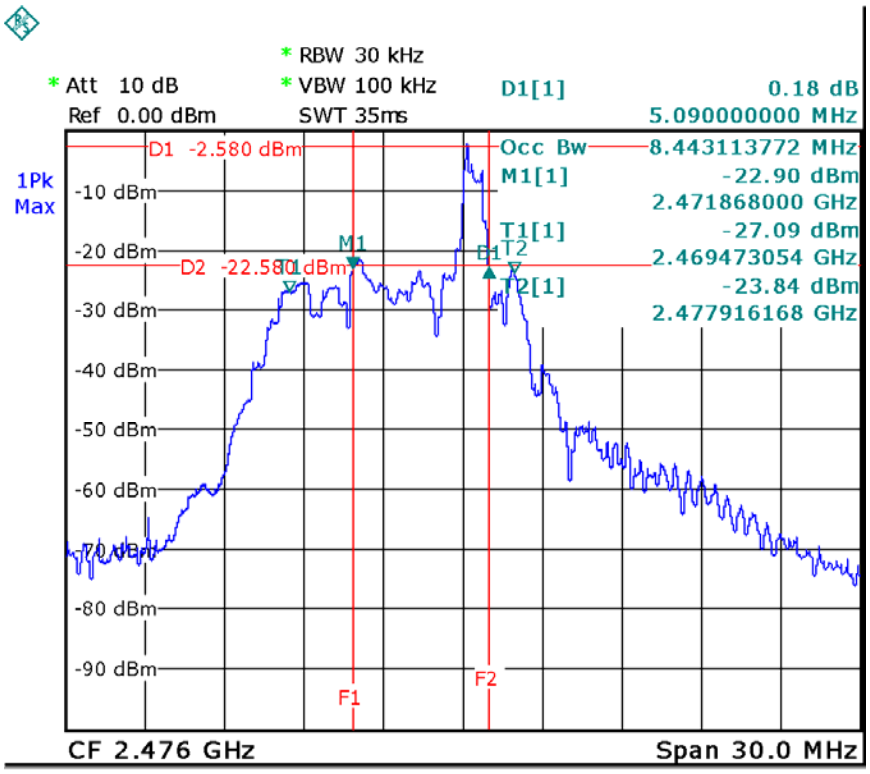


CH32



Date: 23.JUN.2009 11:55:33

CH64



Date: 23.JUN.2009 11:59:17

9. PEAK OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (b)(1)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

9.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 06, 2010

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

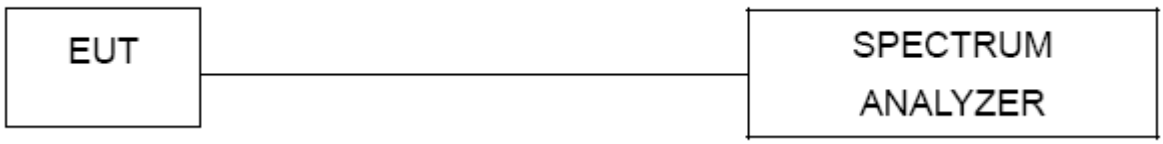
9.1.2 TEST PROCEDURE

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= 1MHz, VBW= 1MHz, Sweep time = Auto.

9.1.3 DEVIATION FROM STANDARD

No deviation.

9.1.4 TEST SETUP



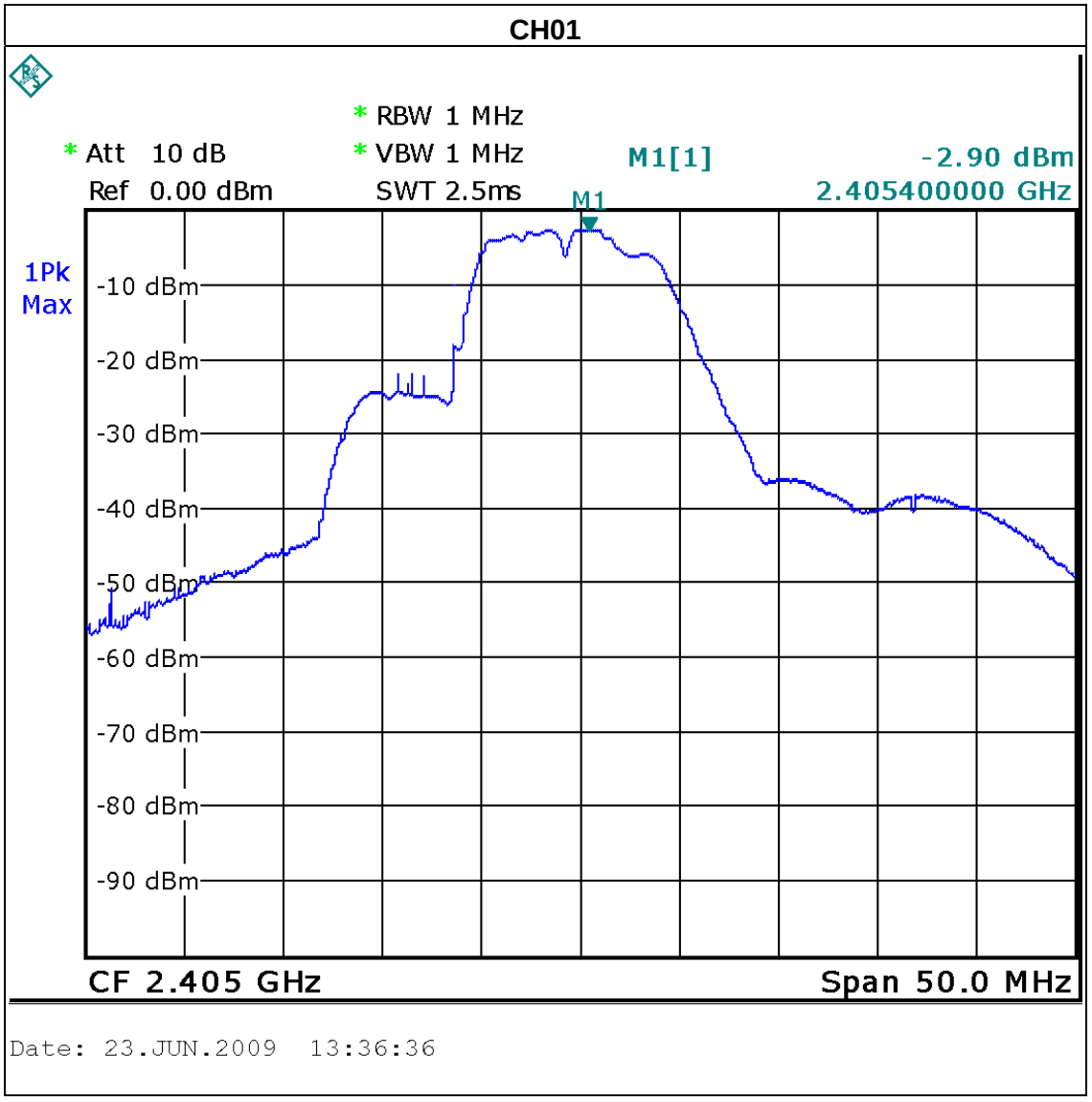
9.1.5 EUT OPERATION CONDITIONS

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.

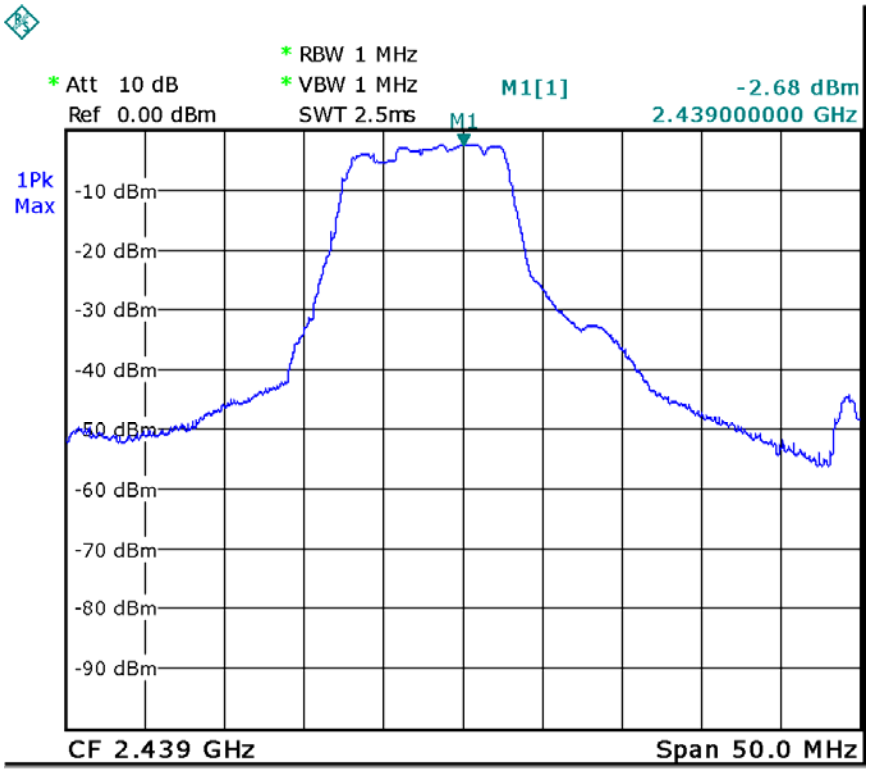
9.1.6 TEST RESULTS

EUT：	Dongle	Model Name ：	MX-168SOC
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	CH01/ CH32 /CH64		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)	LIMIT (W)
CH01	2405	-2.90	30	1
CH32	2439	-2.68	30	1
CH64	2476	-2.90	30	1

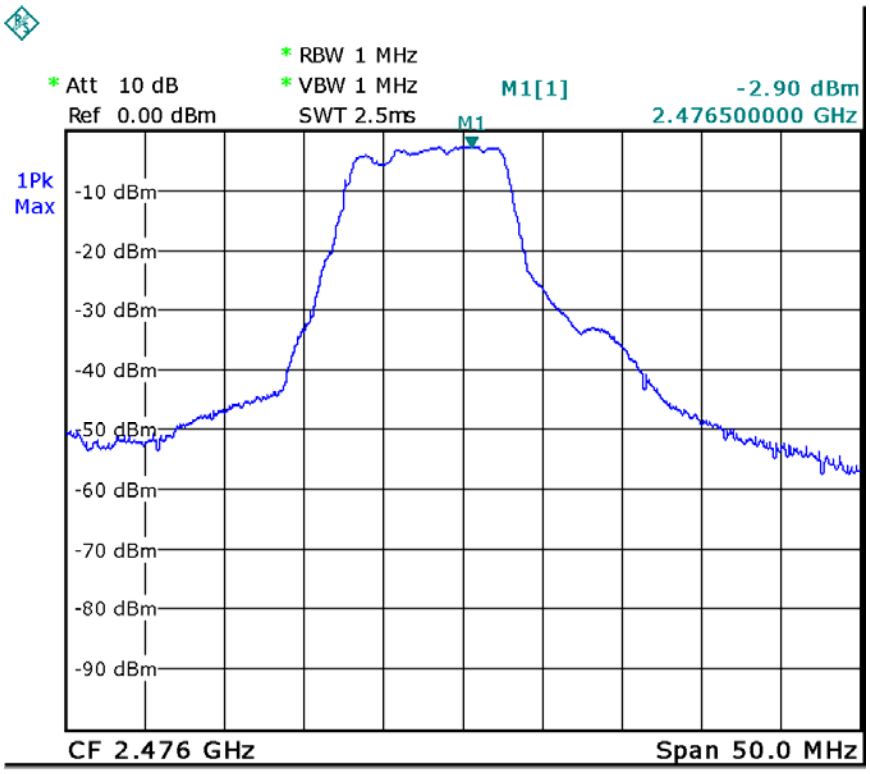


CH32



Date: 23.JUN.2009 13:38:02

CH64



Date: 23.JUN.2009 13:39:36

10. ANTENNA CONDUCTED SPURIOUS EMISSION

10.1 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 (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

10.1.1 MEASUREMENT INSTRUMENTS LIST AND SETTING

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 06, 2010

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

The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
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

10.1.2 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 = Auto.

10.1.3 DEVIATION FROM STANDARD

No deviation.

10.1.4 TEST SETUP

10.1.5 EUT OPERATION CONDITIONS

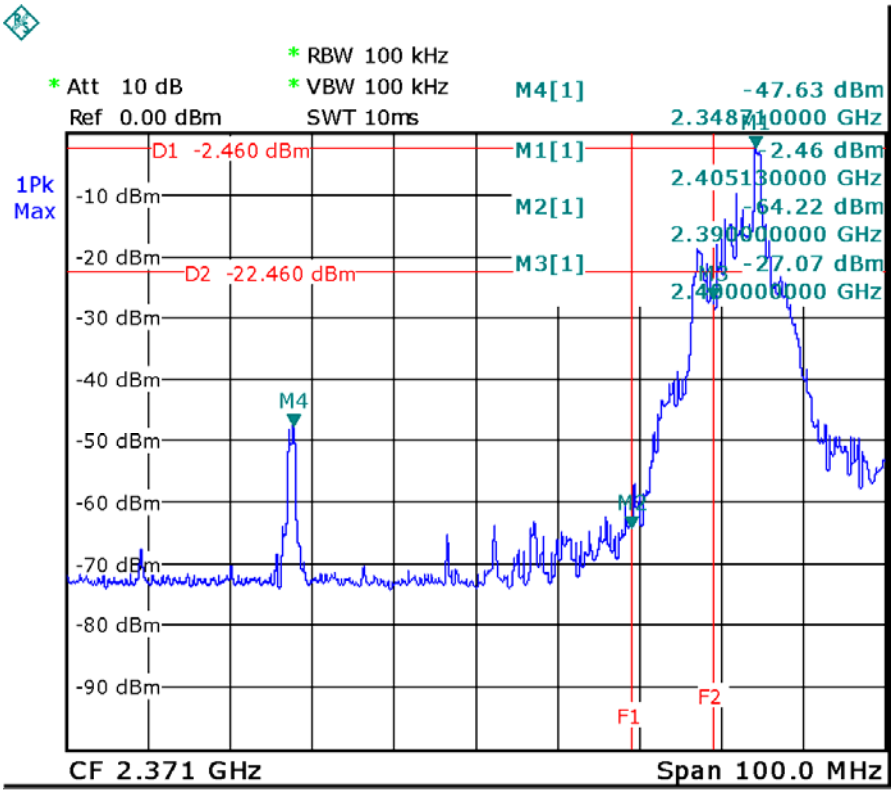
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

10.1.6 TEST RESULTS

EUT：	Dongle	Model Name ：	MX-168SOC
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	CH01 / CH64		

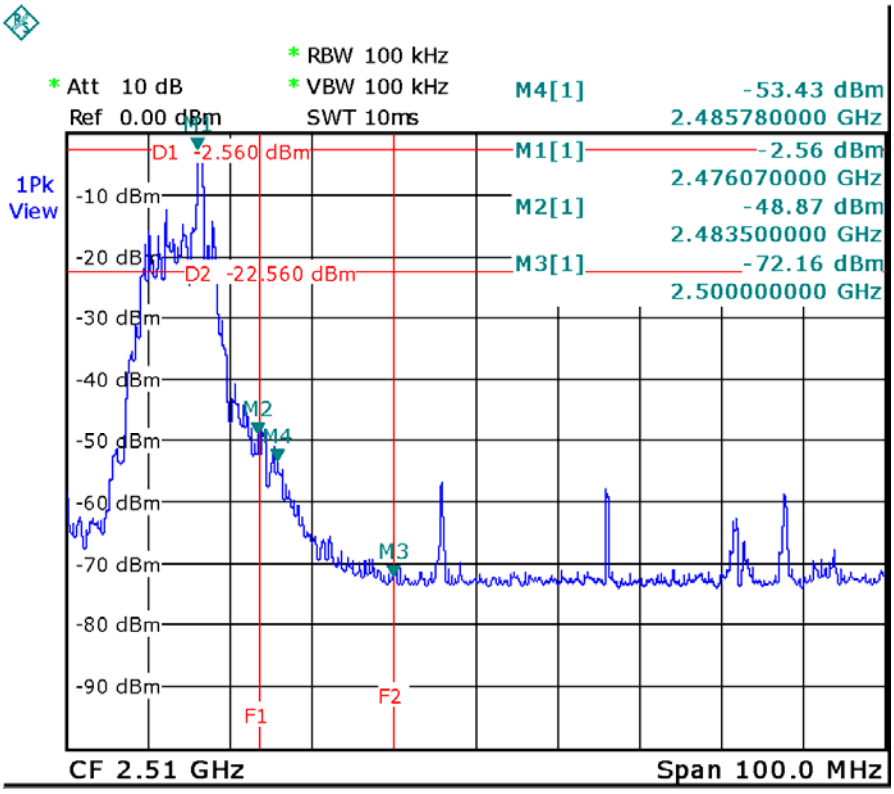
The max. radio frequency power in any 100kHz bandwidth outside the frequency band		The max. radio frequency power in any 100 kHz bandwidth within the frequency band.	
FREQUENCY(MHz)	POWER(dBm)	FREQUENCY(MHz)	POWER(dBm)
2348.71	-47.63	2483.50	-48.87
Result			
In any 100kHz bandwidth outside the frequency band, the radio frequency power is at least 20dB below that in the 100kHz bandwidth within the band that contains the highest lever of the desired power.			

CH01 (Lower)



Date: 23.JUN.2009 13:33:57

CH 78 (Upper)



Date: 23.JUN.2009 13:29:08

11. RF EXPOSURE TEST

11.1 APPLIED PROCEDURES / LIMIT

These devices are not exempted from compliance does not exceed the Commission's RF exposure guidelines.Unless a device operates at substantially low power levels,with a low gain antenna(s),supporting information is generally needed to establish the various potential operating configurations and exposure conditions of a transmitter and its antenna(s) in order to determine compliance with the RF exposure guidelines.

In order to demonstrate compliance with MPE requirement(see Section 2.1091),the following information is typically needed:

Calculation that estimates the minimum separation distance(20 cm or more)between an antenna and persons required to satisfy power density limits defined for free space.

Antenna installation and device operating instructions for installers(professional/unskilled users), and the parties responsible for ensuring compliance with the RF exposure requirement Any caution statements and/or warming labels that are necessary in order to comply with the exposure limits Any other RF exposure related issues that may affect MPE compliance.

FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency(RF) radiation as specified in 1.1307(b).

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

11.1.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP_40	100129	Jan. 06, 2010

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

11.1.2 MPE CALCULATION METHOD

Calculation Method of RF Safety Distance:

$$S = \frac{PG}{4\pi r^2} = \frac{EIRP}{4\pi r^2}$$

P :power input to the antenna in Mw
EIRP :Equivalent(effective) isotropic radiated power.
S :power density mW/ cm^2
G ;numeric gain of antenna relative to isotropic radiator
R :distance to centre of radiation in cm

FCC radio frequency exposure limits may be exceeded at distances closer than r cm from the antenna of this device

$$r = \sqrt{\frac{PG}{4\pi S}} = \sqrt{\frac{EIRP}{4\pi S}}$$

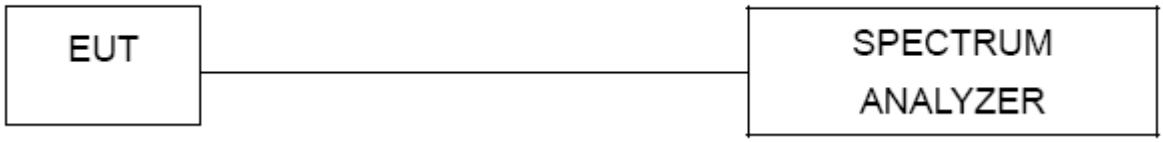
Note:
1. s=1.0 mW /cm^2 for limits for General Population/Uncontrolled Exposures.
2. The time averaged power over 30 minutes will be equaled Output Power.
3. Minimum calculated separation distance betweet antenna and persons required:0.53 cm
4. The Power Density at a distance of 20cm calculated from the formula is far below the limit of 1MW/ cm^2
5. For portable device,the power limit is 60/f(in GHz) mW
6. For limit 60/f is equal:
   60/2.405=24.95mW
   60/2.439=24.60mW
   60/2.476=24.23mW
7. The max.output power E.I.R.P is 0.090507 mW

So it is complied with the limit,SAR report is not requied.

11.1.3 DEVIATION FROM STANDARD

No deviation.

11.1.4 TEST SETUP



11.1.5 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.

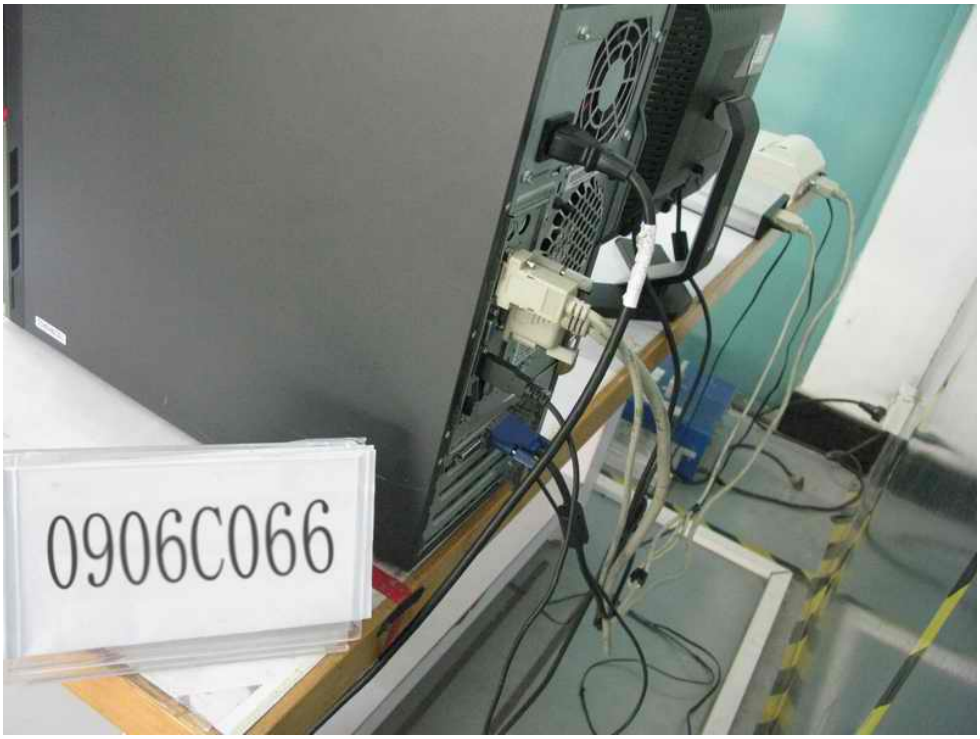
11.1.6 TEST RESULTS

EUT：	Dongle	Model Name ：	MX-168SOC
Temperature：	25 ℃	Relative Humidity：	60%
Pressure：	1012 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	CH01 (2405 MHz), CH32(2439 MHz), **CH64 (2476 MHz)**		

Frequency (MHz)	Antenna Gain (dBi)	Peak Output Power (dBm)	Calculated EIRP (mW)	Power Density (S) (mW/cm²)	FCC Threshold (mW)	Test Result
2405	1.86	-2.90	0.5129	0.000157	24.95	Complies
2439	**1.86**	**-2.68**	**0.5395**	**0.000165**	**24.60**	**Complies**
2476	1.86	-2.90	0.5129	0.000157	24.23	Complies

12. EUT TEST PHOTO

Conducted Measurement Photos



Radiated Measurement Photos
TX Mode