FCC Radio Test Report

FCC ID: HQXAPT-I5C

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

Issued Date	:	Jul. 25, 2013
Project No.	:	1307C202
Equipment	:	2.4G Wireless Presenter
Model Name	:	I5; H8B; PJ087-B; N1B; PSR01; AMP17-A; AMP025
Applicant	:	SYSGRATION LTD.
Address	:	10FL, NO.868-3, Chung Rd, Chung Ho, Taipei, Taiwan, R.O.C.

Tested by: Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Jul. 16, 2013
Date of Test: Jul. 16, 2013 ~ Jul. 24, 2013

Testing Engineer : David Mao
(David Mao)

Technical Manager : Leo Hung
(Leo Hung)

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(Steven Lu)

NEUTRON ENGINEERING INC.

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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	:	2.4G Wireless Presenter		
Brand Name	:	Sysgration	BenQ	Targus
Model Name	:	I5; H8B; PJ087-B; N1B	PSR01	AMP17-A; AMP025
Applicant	:	SYSGRATION LTD.		
Manufacturer	:	Sysgration (Shenzhen) Ltd.		
Address	:	Egongling Village, Pinghu Town, Longgang Dist, Shenzhen City, China.		
Factory	:	Sysgration (Shenzhen) Ltd.		
Address	:	Egongling Village, Pinghu Town, Longgang Dist, Shenzhen City, China.		
Date of Test	:	Jul. 16, 2013 ~ Jul. 24, 2013		
Test Sample	:	Engineering Sample		
Standard(s)	:	FCC Part15, Subpart C(15.249)/ ANSI C63.4 : 2009		

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-1-1307C202) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standard(s):

FCC Part15, Subpart C (15.249)			
Standard(s) Section FCC	Test Item	Judgment	Remark
15.207	Conducted Emission	-	N/A
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-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 ± 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	3.82	
		30MHz ~ 200MHz	H	3.60	
		200MHz ~ 1,000MHz	V	3.86	
		200MHz ~ 1,000MHz	H	3.94	
		1GHz~18GHz	V	3.12	
		1GHz~18GHz	H	3.68	
		18GHz ~ 40GHz	V	4.04	
		18GHz ~ 40GHz	H	4.01	

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td colspan="3">2.4G Wireless Presenter</td></tr>
<tr><td>Brand Name</td><td>Sysgration</td><td>BenQ</td><td>Targus</td></tr>
<tr><td>Model Name.</td><td>I5; H8B; PJ087-B; N1B</td><td>PSR01</td><td>AMP17-A; AMP025</td></tr>
<tr><td>Model Difference</td><td colspan="3">Different model for different brand and appearance, more details please refer to note 4. (Page 9)</td></tr>
<tr><td>Product Description</td><td colspan="3"><table><tr><td>Operation Frequency</td><td>2412~2472 MHz</td></tr><tr><td>Modulation Technology</td><td>GFSK</td></tr><tr><td>Data rate</td><td>2Mbps</td></tr><tr><td>Number of Channel</td><td>5CH .Please see note 2.(Page 9)</td></tr><tr><td>Antenna Gain(Peak)</td><td>Please see note 3.(Page 9)</td></tr><tr><td>Field Strength</td><td>91.73 dBuV/m (AV Max.)</td></tr></table>
More details of EUT technical specification. Please refer to the User's Manual.</td></tr>
<tr><td>Power Source</td><td colspan="3">Supplied from 1*AAA size battery.</td></tr>
<tr><td>Power Rating</td><td colspan="3">DC 1.5V</td></tr>
<tr><td>Connecting I/O Port(s)</td><td colspan="3">Please refer to the User's Manual</td></tr>
</table>

Note:

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

2.

Frequency Channel	
Channel	Frequency (MHz)
01	**2412**
02	2427
03	**2442**
04	2457
05	**2472**

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Printed	N/A	3.53

4.

Brand / Model	Sysgration	BenQ	Targus
	I5	PSR01	-
	H8B	-	AMP17-A
	PJ087-B	-	AMP025
	N1B	-	-

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	Low – 2412MHz
Mode 2	Middle – 2442MHz
Mode 3	High -2472MHz

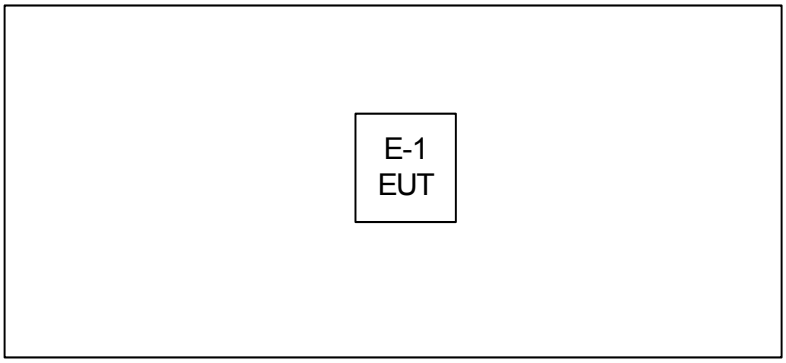
For Conducted Test	
Final Test Mode	Description
N/A	”N/A” denotes test is not applicable in this test report.

For Radiated Test	
Final Test Mode	Description
Mode 1	Low – 2412MHz
Mode 2	Middle – 2442MHz
Mode 3	High -2472MHz

Note:
(1) The measurements are performed at the high, middle, low available channels.

3.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated:



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	2.4G Wireless Presenter	Sysgration	I5	HQXAPT-I5C	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
N/A	-	-	-	

Note:

(1) 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	Apr. 25, 2014
2	LISN	R&S	ENV216	100087	Nov. 16, 2013
3	Test Cable	N/A	C_17	N/A	Mar. 15, 2014
4	EMI TEST RECEIVER	R&S	ESCS30	826547/022	Apr. 25, 2014
5	50Ω Terminator	SHX	TF2-3G-A	08122902	Apr. 25, 2014

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

The following table is the setting of the receiver

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

4.1.3 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

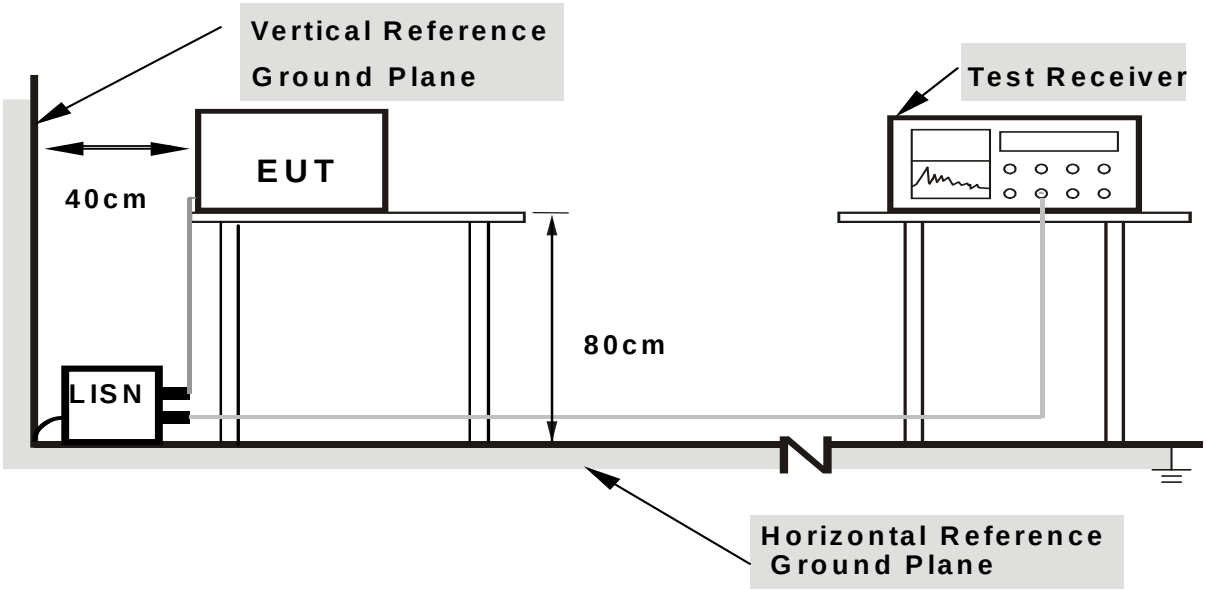
d. LISN at least 80 cm from nearest part of EUT chassis.

e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

4.1.6 EUT OPERATING CONDITIONS

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

The EUT was programmed to be in continuously transmitting mode.

4.1.7 TEST RESULTS

EUT:	2.4G Wireless Presenter	Model Name:	I5
Temperature:	-	Relative Humidity:	-
Test Voltage:	-	Polarization:	-
Test Mode :	N/A		

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
960~1000	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 μV/m (94 dBμV/m) @ 3 m	2400-2483.5
Field strength of harmonics 500 μV/m (54 dBμV/m) @ 3 m	Above 2483.5

4.2.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarbeck	VULB9160	9160-3232	Apr. 25, 2014
2	Amplifier	HP	8447D	2944A09673	Apr. 25, 2014
3	Test Receiver	R&S	ESCI	100382	Apr. 25, 2014
4	Test Cable	N/A	C-01_CB03	N/A	Jul. 02, 2014
5	Antenna	ETS	3115	00075789	Apr. 25, 2014
6	Amplifier	Agilent	8449B	3008A02274	Apr. 25, 2014
7	Spectrum	Agilent	E4408B	US39240143	Nov. 16, 2013
8	Test Cable	HUBER+SUHNER	C-45	N/A	Apr. 30, 2014
9	Controller	CT	SC100	N/A	N/A
10	Active Loop Antenna	R&S	HFH2-Z2	830749/020	Apr. 25, 2014
11	Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170319	Oct. 23, 2013
12	Horn Antenna	EMCO	3115	9605-4803	Apr. 25, 2014

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (emission in restricted band)	1 MHz / 1 MHz for Peak, Average=PK-duty cycle

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz for PK/AVG detector
Start ~ Stop Frequency	90kHz~110kHz for QP detector
Start ~ Stop Frequency	110kHz~490kHz for PK/AVG detector
Start ~ Stop Frequency	490kHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

4.2.3 TEST PROCEDURE

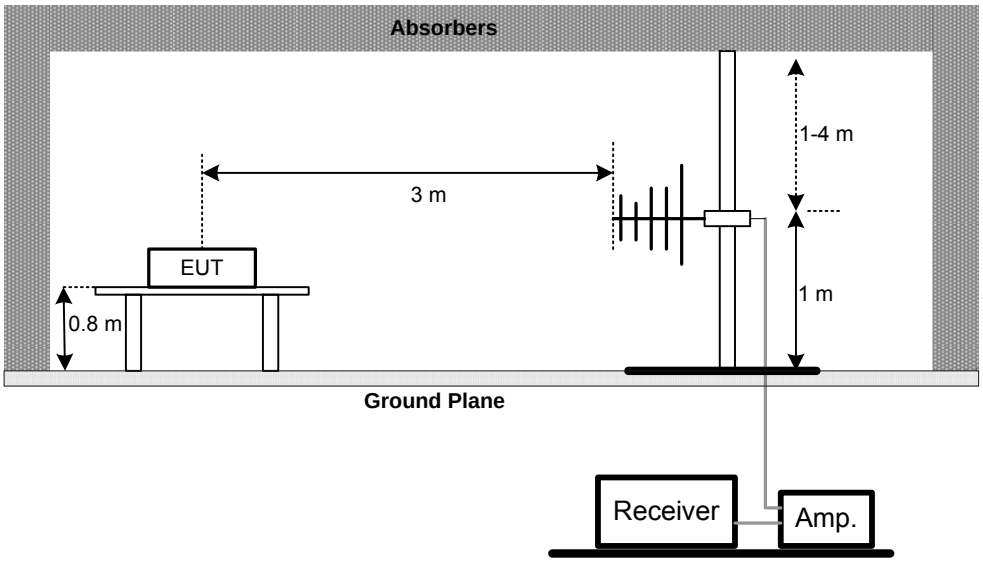
a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
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 AV 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

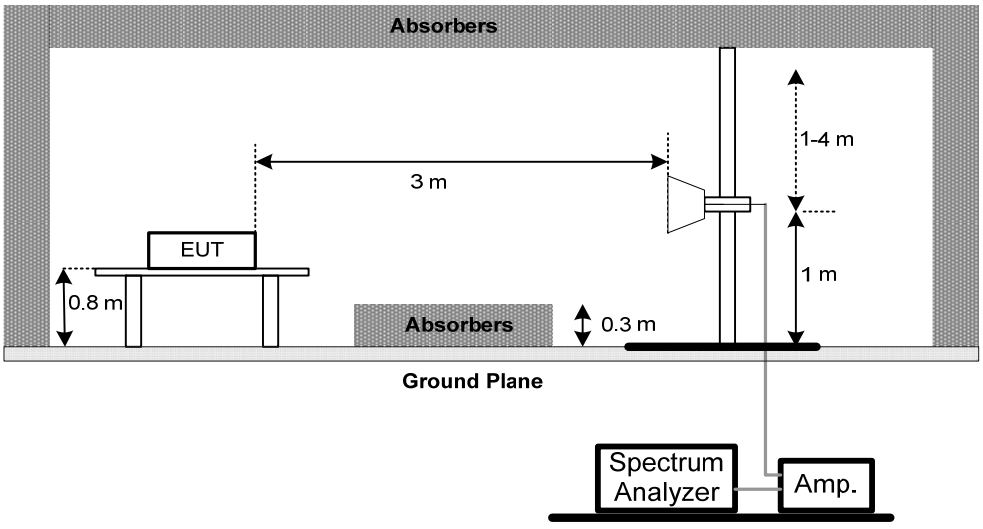
No deviation

4.2.5 TEST SETUP

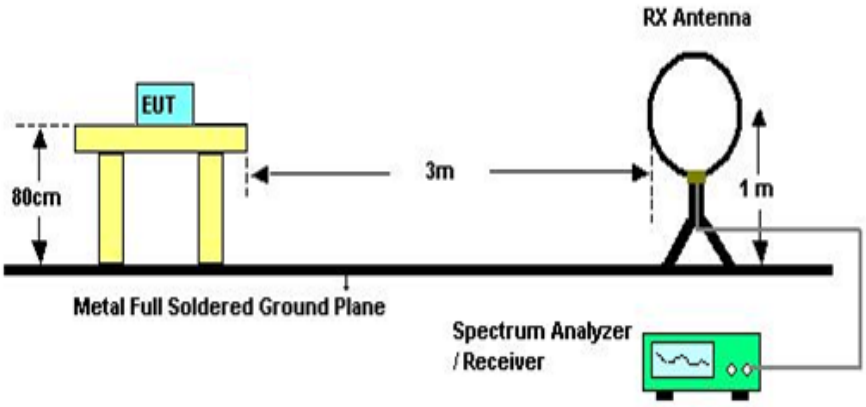
(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(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 (9K~ 30MHz)

EUT:	2.4G Wireless Presenter	Model Name:	I5
Temperature:	25 ℃	Relative Humidity:	58 %
Test Voltage:	DC 1.5V		
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
0.0098	0°	27.15	24.30	51.45	127.78	-76.33	AVG
0.0098	0°	30.65	24.30	54.95	147.78	-92.83	PK
0.0256	0°	23.78	23.95	47.73	119.44	-71.71	AVG
0.0256	0°	26.42	23.95	50.37	139.44	-89.07	PK
0.0402	0°	20.04	23.02	43.06	115.53	-72.46	AVG
0.0402	0°	22.71	23.02	45.73	135.53	-89.79	PK
0.0623	0°	23.56	22.15	45.71	111.71	-66.00	AVG
0.0623	0°	25.82	22.15	47.97	131.71	-83.74	PK
0.3528	0°	20.34	20.15	40.49	96.65	-56.16	AVG
0.3528	0°	23.02	20.15	43.17	116.65	-73.48	PK
1.7430	0°	27.35	19.53	46.88	69.54	-22.66	QP

Freq. (MHz)	Ant. 0°/90°	Reading(RA) (dBuV)	Corr.Factor(CF) (dB)	Measured(FS) (dBuV/m)	Limits(QP) (dBuV/m)	Margin (dB)	Note
0.0096	90°	19.54	24.30	43.84	127.96	-84.12	AVG
0.0096	90°	22.31	24.30	46.61	147.96	-101.35	PK
0.0225	90°	18.59	24.14	42.73	120.56	-77.83	AVG
0.0225	90°	21.04	24.14	45.18	140.56	-95.38	PK
0.0465	90°	20.14	22.62	42.76	114.26	-71.49	AVG
0.0465	90°	23.58	22.62	46.20	134.26	-88.05	PK
0.0705	90°	21.44	21.99	43.43	110.64	-67.21	AVG
0.0705	90°	24.66	21.99	46.65	130.64	-83.99	PK
0.3680	90°	21.07	20.12	41.19	96.29	-55.10	AVG
0.3680	90°	24.96	20.12	45.08	116.29	-71.21	PK
1.5240	90°	23.74	19.55	43.29	63.94	-20.66	QP

Remark：

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

4.2.8 TEST RESULTS (BETWEEN 30 – 1000 MHz)

Remark：

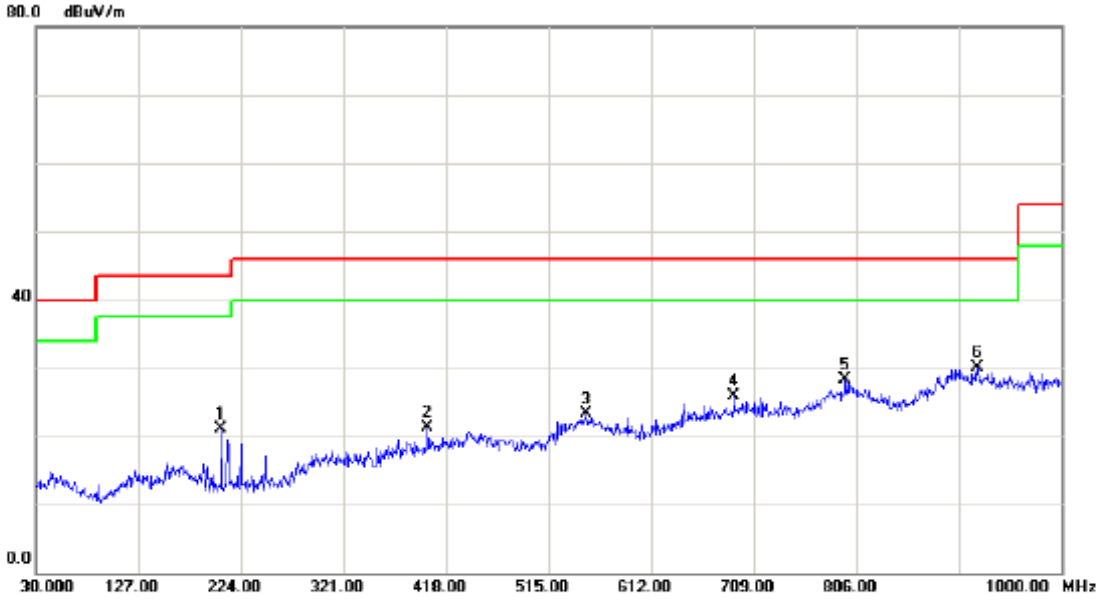
(1) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

(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 .

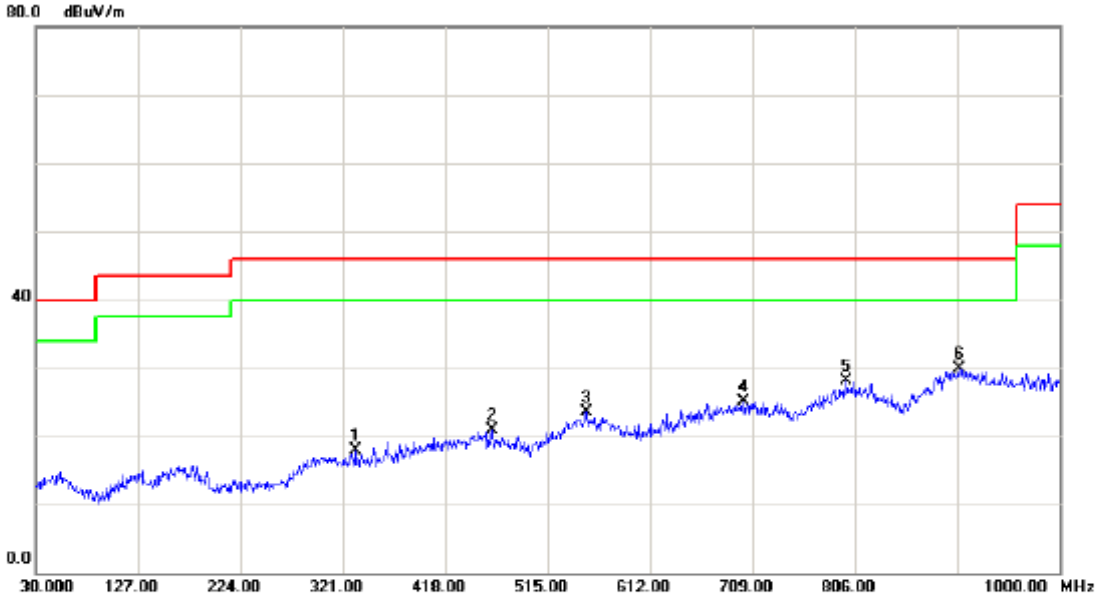
(4) Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

EUT:	2.4G Wireless Presenter	Model Name:	I5
Temperature:	25 ℃	Relative Humidity:	58 %
Test Voltage:	DC 1.5V	Polarization:	Vertical
Test Mode :	TX Mode 2412MHz		



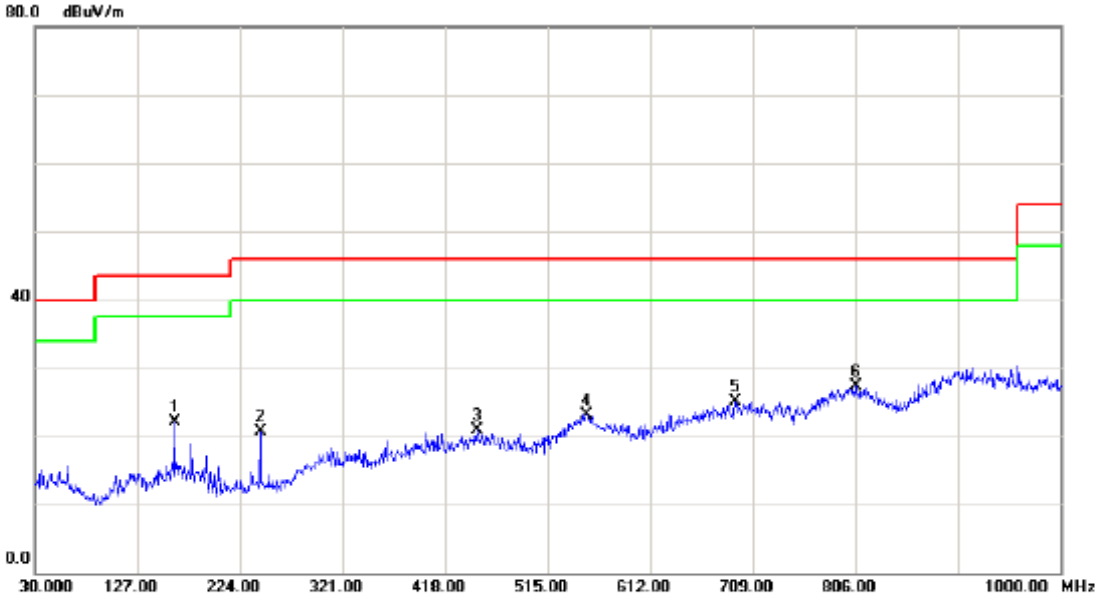
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		205.5700	36.33	-15.29	21.04	43.50	-22.46	peak	
2		400.5400	31.04	-9.77	21.27	46.00	-24.73	peak	
3		550.8900	29.13	-5.89	23.24	46.00	-22.76	peak	
4		690.5700	30.65	-4.68	25.97	46.00	-20.03	peak	
5		795.3300	30.20	-1.96	28.24	46.00	-17.76	peak	
6	*	920.4600	29.92	0.16	30.08	46.00	-15.92	peak	

EUT:	2.4G Wireless Presenter	Model Name:	I5
Temperature:	25 ℃	Relative Humidity:	58 %
Test Voltage:	DC 1.5V	Polarization:	Horizontal
Test Mode :	TX Mode 2412MHz		



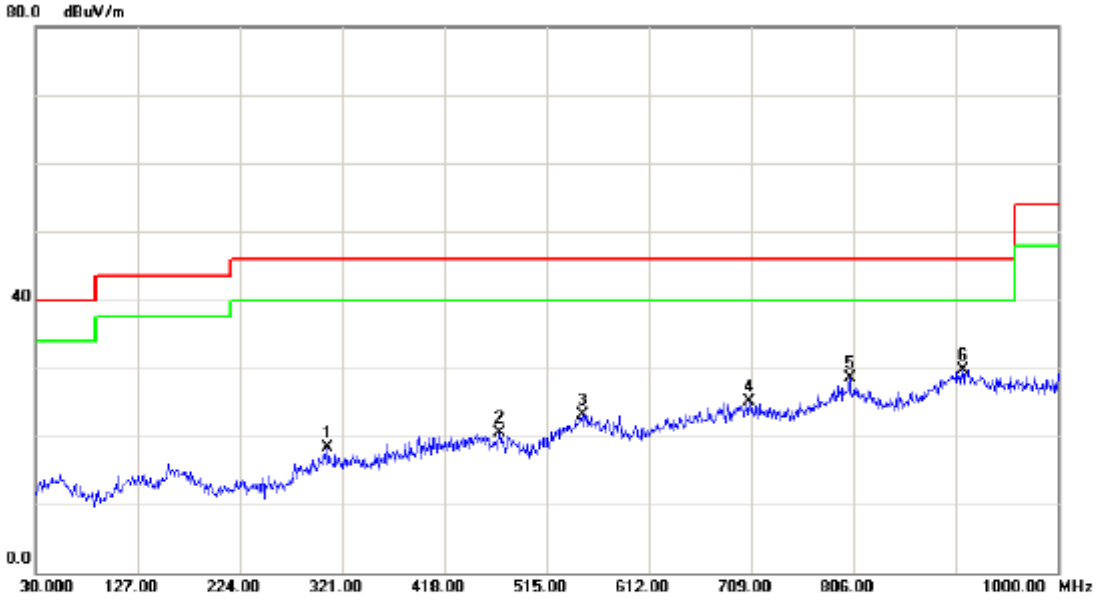
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		332.6400	29.13	-11.22	17.91	46.00	-28.09	peak	
2		462.6200	30.11	-9.17	20.94	46.00	-25.06	peak	
3		551.8600	29.37	-5.94	23.43	46.00	-22.57	peak	
4		700.2700	29.53	-4.42	25.11	46.00	-20.89	peak	
5		797.2700	29.89	-1.81	28.08	46.00	-17.92	peak	
6	*	904.9400	29.33	0.51	29.84	46.00	-16.16	peak	

EUT:	2.4G Wireless Presenter	Model Name:	I5
Temperature:	25 ℃	Relative Humidity:	58 %
Test Voltage:	DC 1.5V	Polarization:	Vertical
Test Mode :	TX Mode 2442MHz		



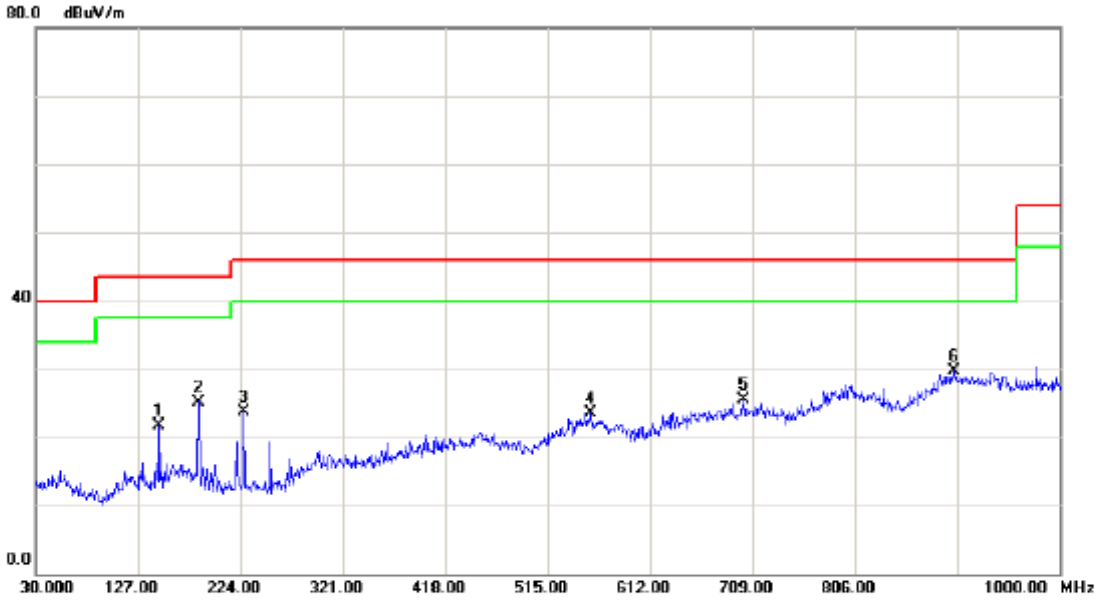
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		161.9200	34.79	-12.77	22.02	43.50	-21.48	peak	
2		243.4000	35.35	-14.70	20.65	46.00	-25.35	peak	
3		448.0700	29.67	-8.75	20.92	46.00	-25.08	peak	
4		551.8600	29.10	-5.94	23.16	46.00	-22.84	peak	
5		692.5100	29.81	-4.63	25.18	46.00	-20.82	peak	
6	*	806.0000	29.21	-1.92	27.29	46.00	-18.71	peak	

EUT:	2.4G Wireless Presenter	Model Name:	I5
Temperature:	25 ℃	Relative Humidity:	58 %
Test Voltage:	DC 1.5V	Polarization:	Horizontal
Test Mode :	TX Mode 2442MHz		



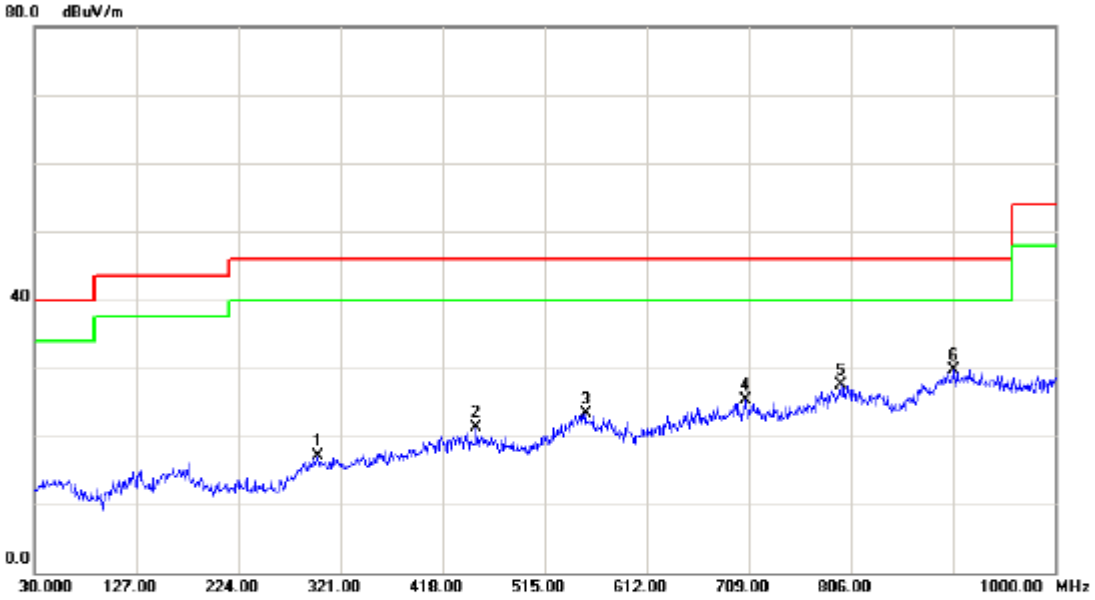
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		307.4200	29.31	-11.01	18.30	46.00	-27.70	peak	
2		470.3800	29.90	-9.45	20.45	46.00	-25.55	peak	
3		548.9500	29.04	-5.94	23.10	46.00	-22.90	peak	
4		707.0600	29.59	-4.54	25.05	46.00	-20.95	peak	
5		802.1200	30.13	-1.72	28.41	46.00	-17.59	peak	
6	*	909.7900	29.33	0.40	29.73	46.00	-16.27	peak	

EUT:	2.4G Wireless Presenter	Model Name:	I5
Temperature:	25 ℃	Relative Humidity:	58 %
Test Voltage:	DC 1.5V	Polarization:	Vertical
Test Mode :	TX Mode 2472MHz		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		147.3700	35.51	-13.81	21.70	43.50	-21.80	peak	
2		184.2300	39.08	-13.88	25.20	43.50	-18.30	peak	
3		226.9100	38.54	-14.75	23.79	46.00	-22.21	peak	
4		555.7400	29.57	-6.12	23.45	46.00	-22.55	peak	
5		700.2700	29.89	-4.42	25.47	46.00	-20.53	peak	
6	*	900.0900	29.00	0.63	29.63	46.00	-16.37	peak	

EUT:	2.4G Wireless Presenter	Model Name:	I5
Temperature:	25 ℃	Relative Humidity:	58 %
Test Voltage:	DC 1.5V	Polarization:	Horizontal
Test Mode :	TX Mode 2472MHz		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		299.6600	28.02	-10.97	17.05	46.00	-28.95	peak	
2		450.0100	30.02	-8.71	21.31	46.00	-24.69	peak	
3		553.8000	29.33	-6.03	23.30	46.00	-22.70	peak	
4		705.1200	29.78	-4.50	25.28	46.00	-20.72	peak	
5		796.3000	29.33	-1.89	27.44	46.00	-18.56	peak	
6	*	903.9700	29.20	0.54	29.74	46.00	-16.26	peak	

4.2.9 TEST RESULTS (ABOVE 1000 MHz)

EUT	2.4G Wireless Presenter	Model Name	I5
Temperature	25℃	Relative Humidity	60 %
Pressure	1009 hPa	Test Voltage	DC 1.5V
Test Mode	TX 2412MHz		

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	24.51	13.42	34.09	58.60	47.51	74.00	54.00	X/E
2411.80	**V**	**58.65**	**57.57**	**34.16**	**92.81**	**91.73**	**114.00**	**94.00**	**X/F**
4824.07	V	46.06	37.74	6.43	52.49	44.17	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 .

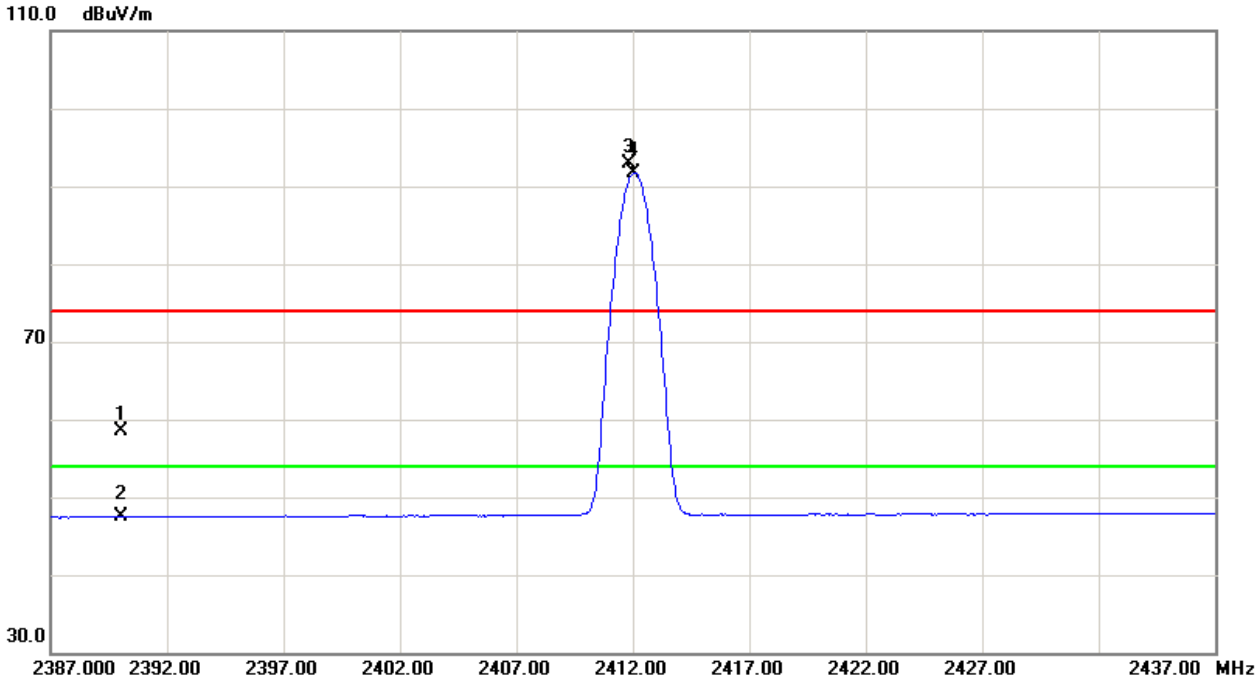
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

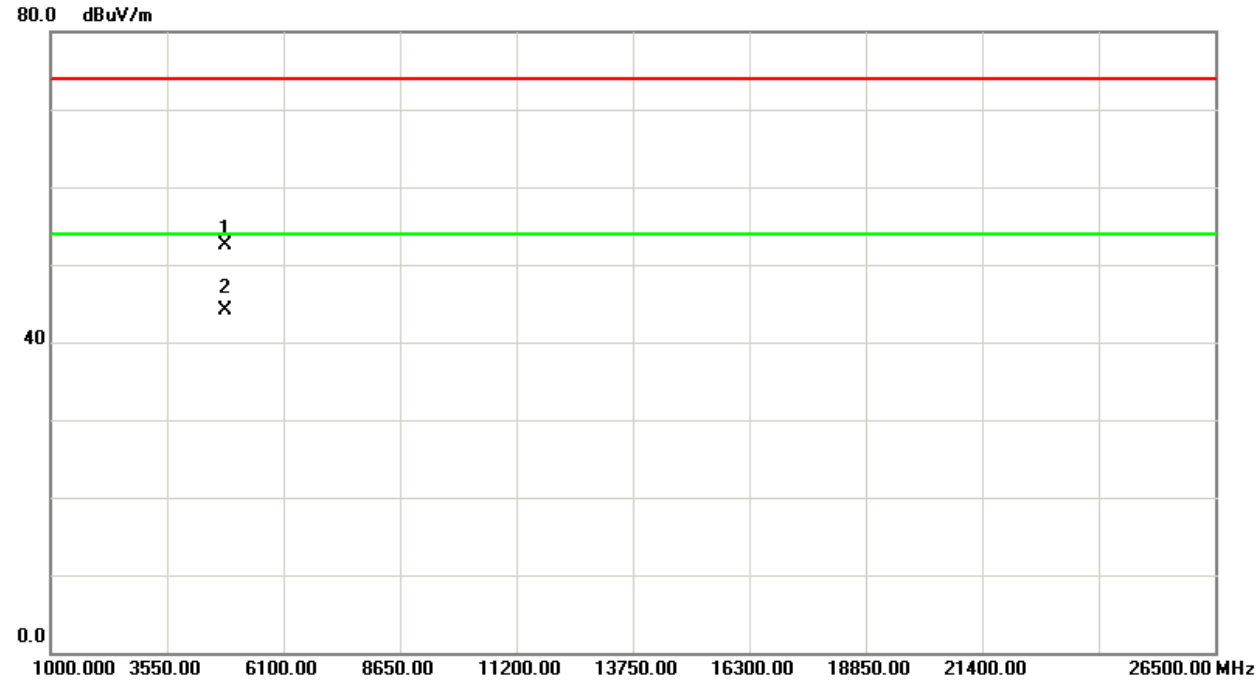
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2412MHz (Above 1000 MHz, Vertical)





EUT	2.4G Wireless Presenter	Model Name	I5
Temperature	25℃	Relative Humidity	60 %
Pressure	1009 hPa	Test Voltage	DC 1.5V
Test Mode	TX 2412MHz		

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	24.78	13.38	34.09	58.87	47.47	74.00	54.00	X/E
2411.75	**H**	**58.66**	**57.55**	**34.16**	**92.82**	**91.71**	**114.00**	**94.00**	**X/F**
4824.18	H	44.17	34.18	6.43	50.60	40.61	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.

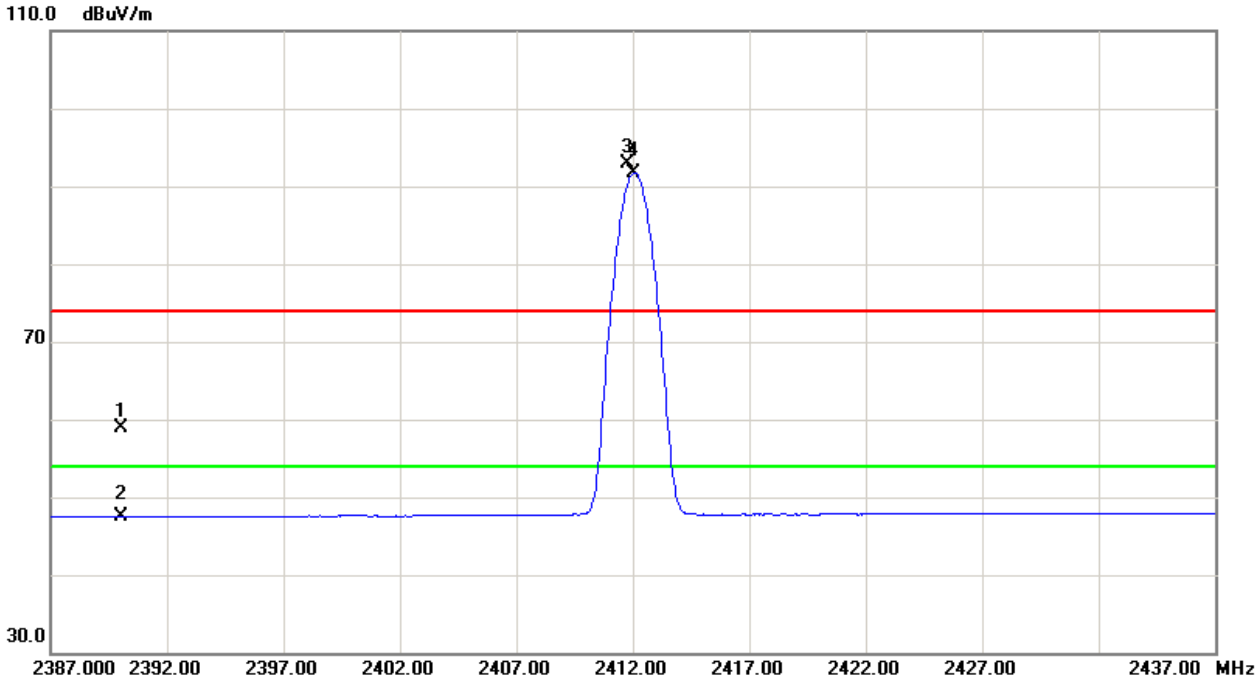
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

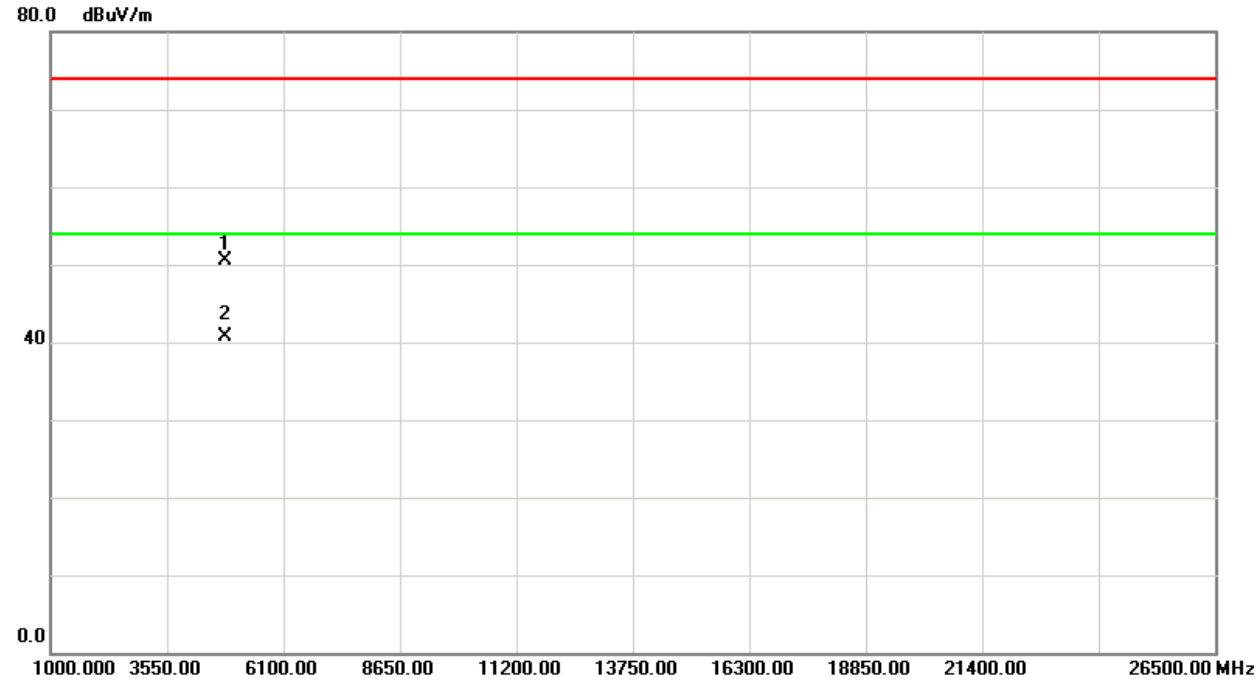
(6) EUT Orthogonal Axis：

"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

Orthogonal Axis：X
TX 2412MHz (Above 1000 MHz, Horizontal)





EUT	2.4G Wireless Presenter	Model Name	I5
Temperature	25℃	Relative Humidity	60 %
Pressure	1009 hPa	Test Voltage	DC 1.5V
Test Mode	TX 2442MHz		

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)	
2411.80	**V**	**57.89**	**56.86**	**34.25**	**92.14**	**91.11**	**114.00**	**94.00**	**X/F**
4884.12	V	44.28	36.01	6.62	50.90	42.63	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 .

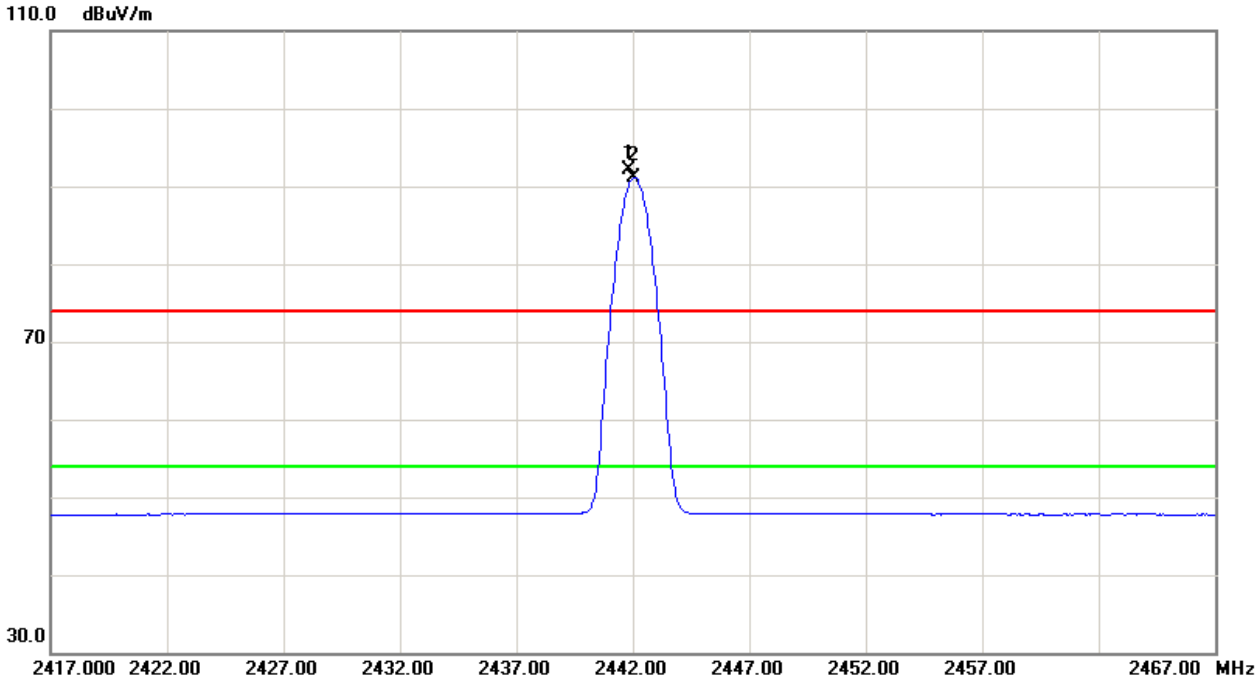
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

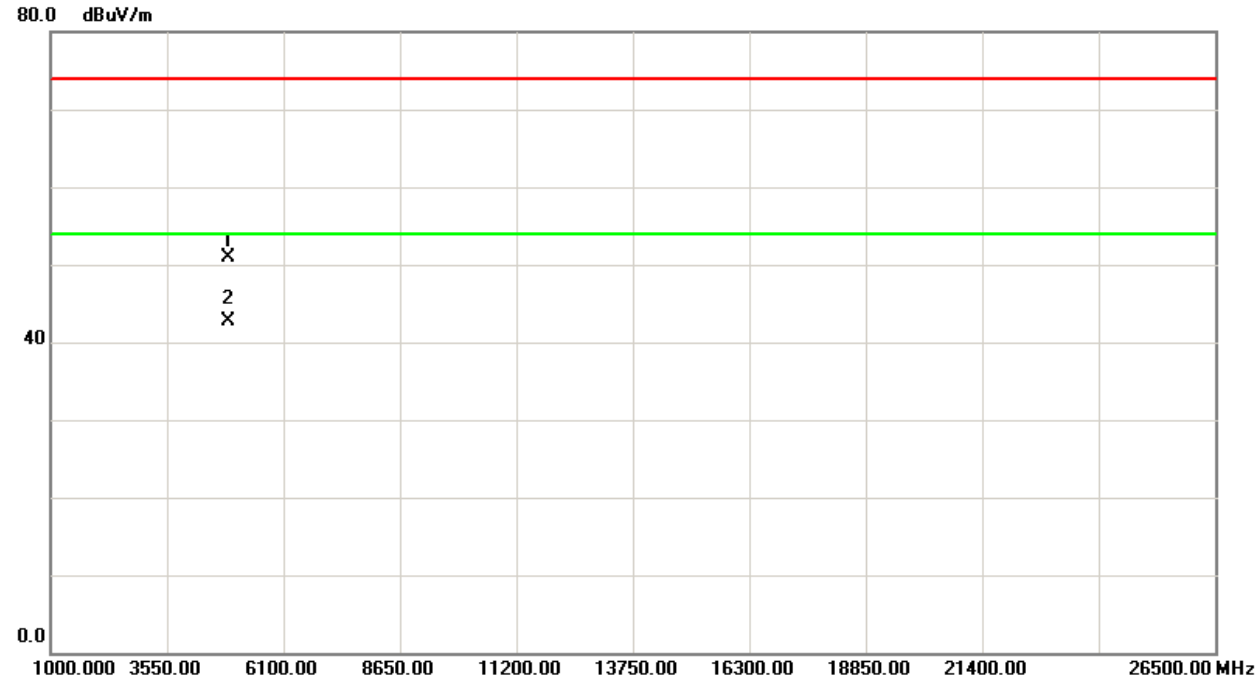
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2440 MHz (Above 1000 MHz, Vertical)





EUT	2.4G Wireless Presenter	Model Name	I5
Temperature	25℃	Relative Humidity	60 %
Pressure	1009 hPa	Test Voltage	DC 1.5V
Test Mode	TX 2442MHz		

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)	
2441.80	**H**	**58.00**	**56.95**	**34.25**	**92.25**	**91.20**	**114.00**	**94.00**	**X/F**
4884.14	H	43.05	33.46	6.62	49.67	40.08	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 .

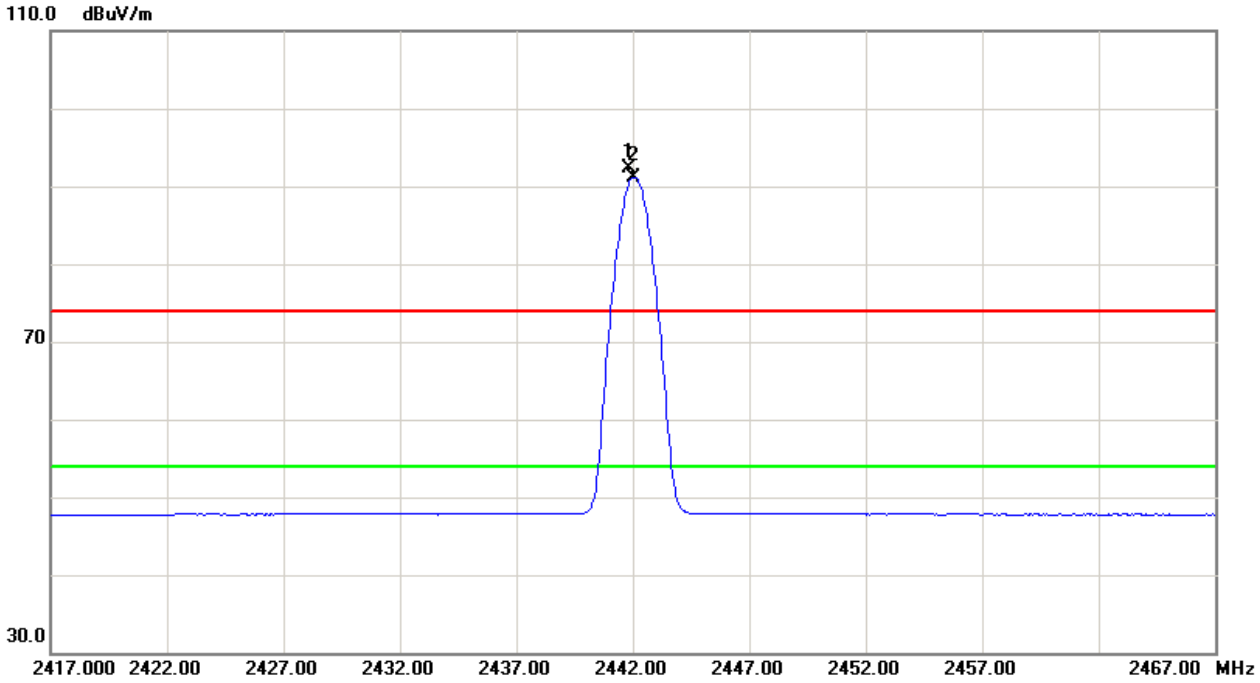
(4) Data of measurement within this frequency range shown " * " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

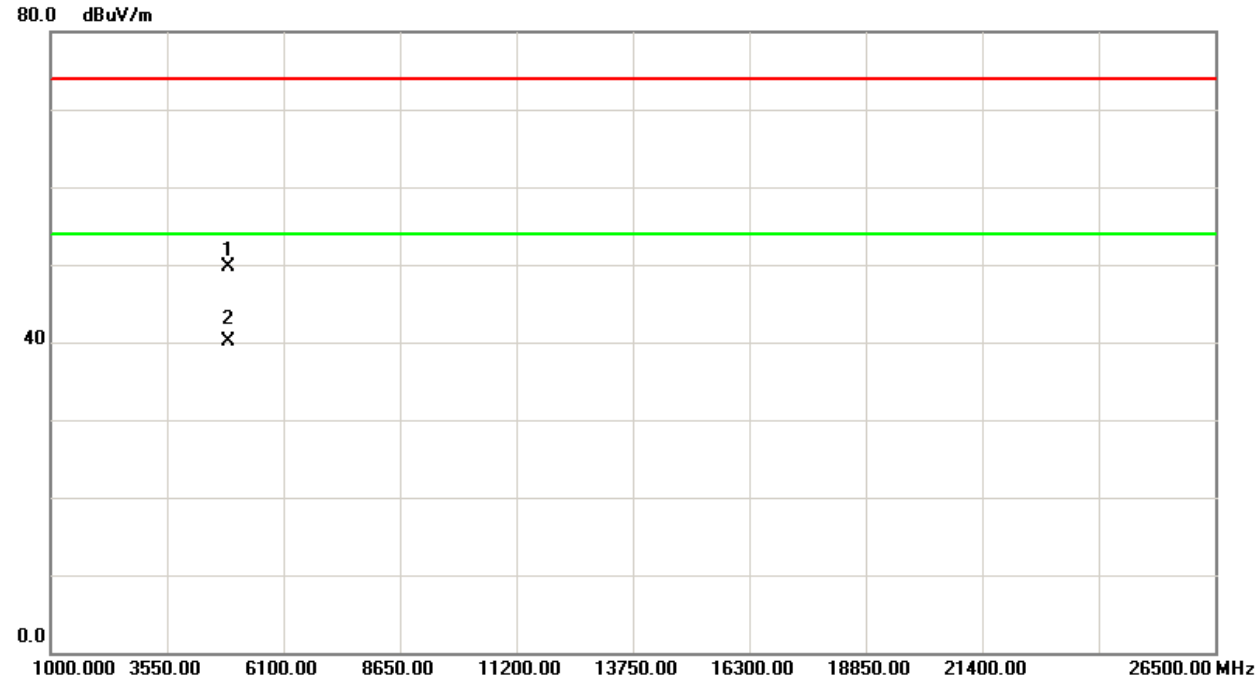
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

(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

Orthogonal Axis：X
TX 2442MHz (Above 1000 MHz, Horizontal)





EUT	2.4G Wireless Presenter	Model Name	I5
Temperature	25℃	Relative Humidity	60 %
Pressure	1009 hPa	Test Voltage	DC 1.5V
Test Mode	TX 2472MHz		

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)	
2471.75	**V**	**55.98**	**54.83**	**34.33**	**90.31**	**89.16**	**114.00**	**94.00**	**X/F**
2483.50	V	23.54	13.40	34.37	57.91	47.77	74.00	54.00	X/E
4944.10	V	43.25	35.69	6.79	50.04	42.48	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.

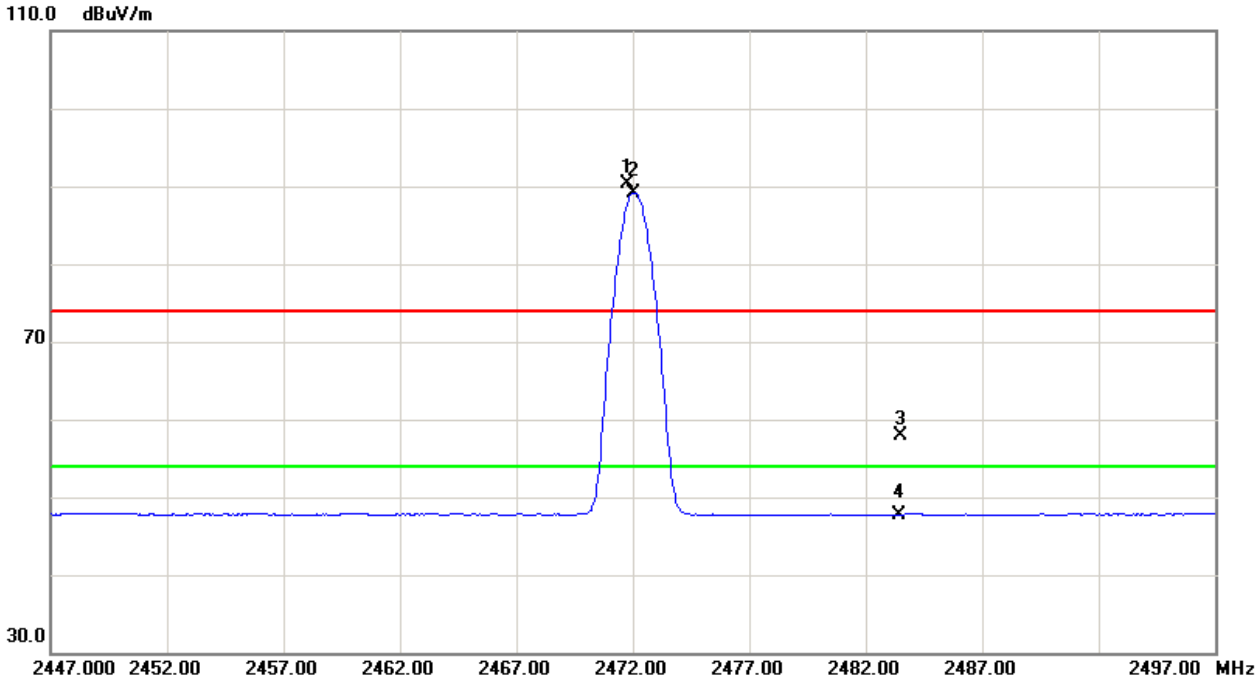
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

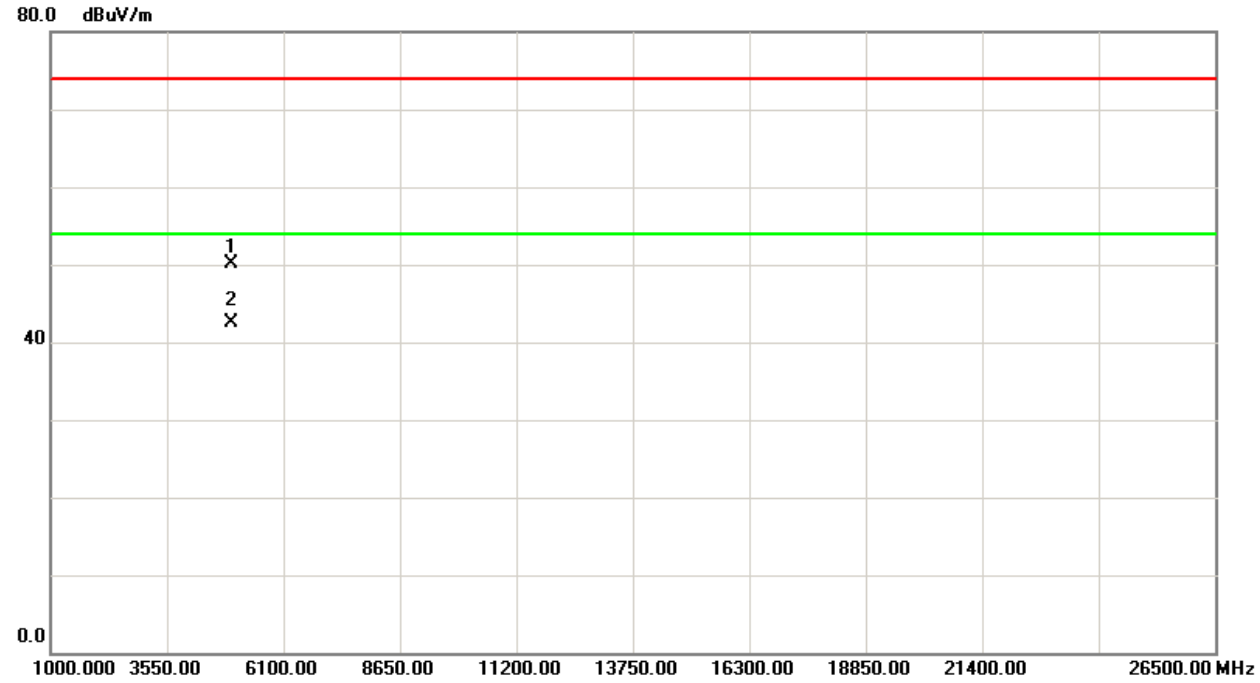
(6) EUT Orthogonal Axis：

"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

Orthogonal Axis：X
TX 2472MHz (Above 1000 MHz, Vertical)





EUT	2.4G Wireless Presenter	Model Name	I5
Temperature	25℃	Relative Humidity	60 %
Pressure	1009 hPa	Test Voltage	DC 1.5V
Test Mode	TX 2472MHz		

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)	
2471.75	**H**	**57.04**	**55.85**	**34.33**	**91.37**	**90.18**	**114.00**	**94.00**	**X/F**
2483.50	H	24.45	13.43	34.37	58.82	47.80	74.00	54.00	X/E
4944.05	H	42.56	32.65	6.79	49.35	39.44	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.

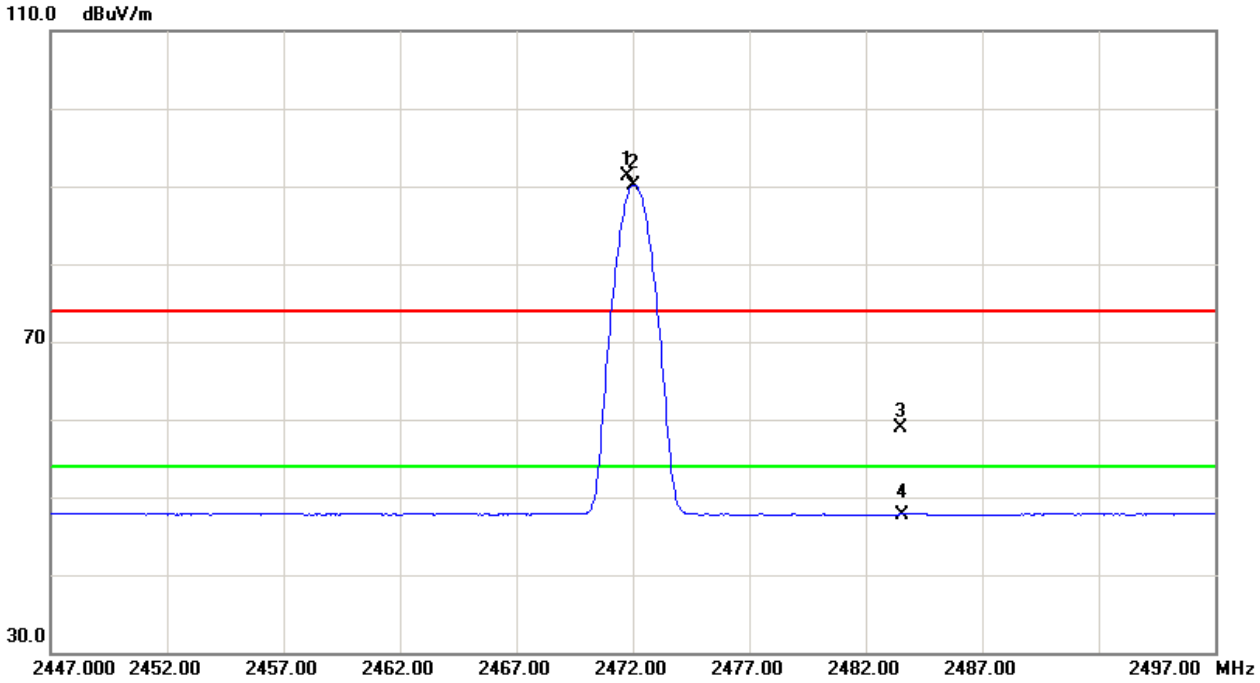
(5) A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

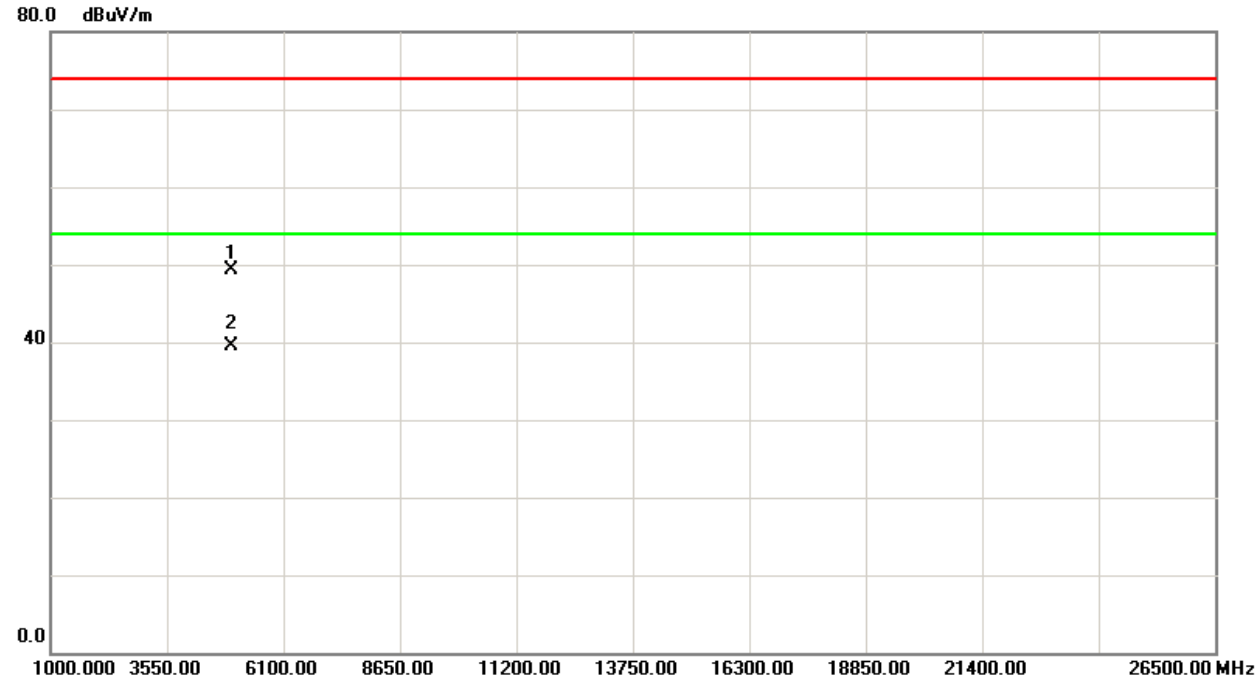
(6) EUT Orthogonal Axis：

"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

Orthogonal Axis：X
TX 2472MHz (Above 1000 MHz, Horizontal)





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.16.2013

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

5.2 TEST PROCEDURE

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

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP

5.5 EUT OPERATION CONDITIONS

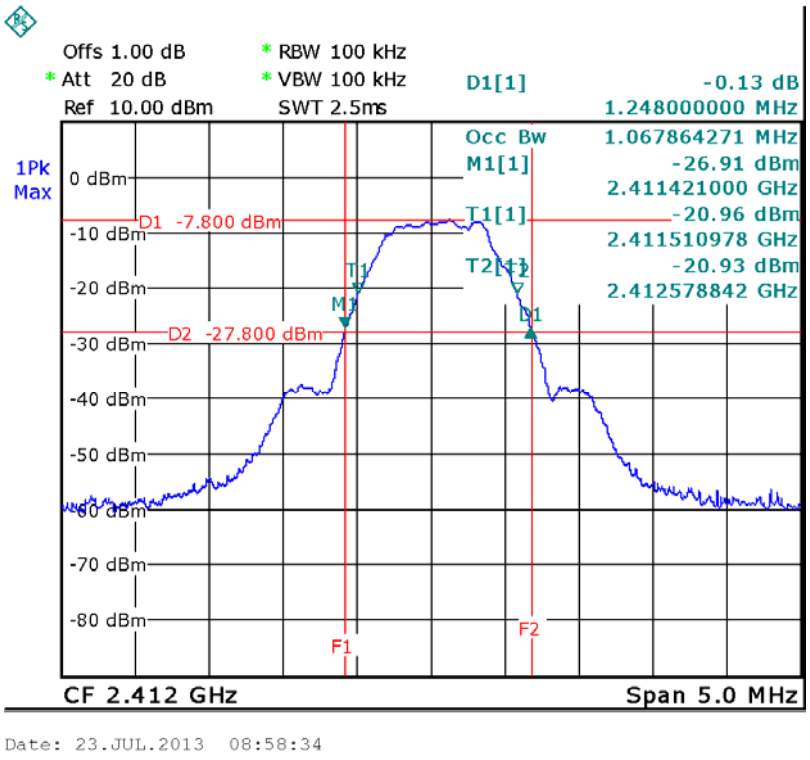
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

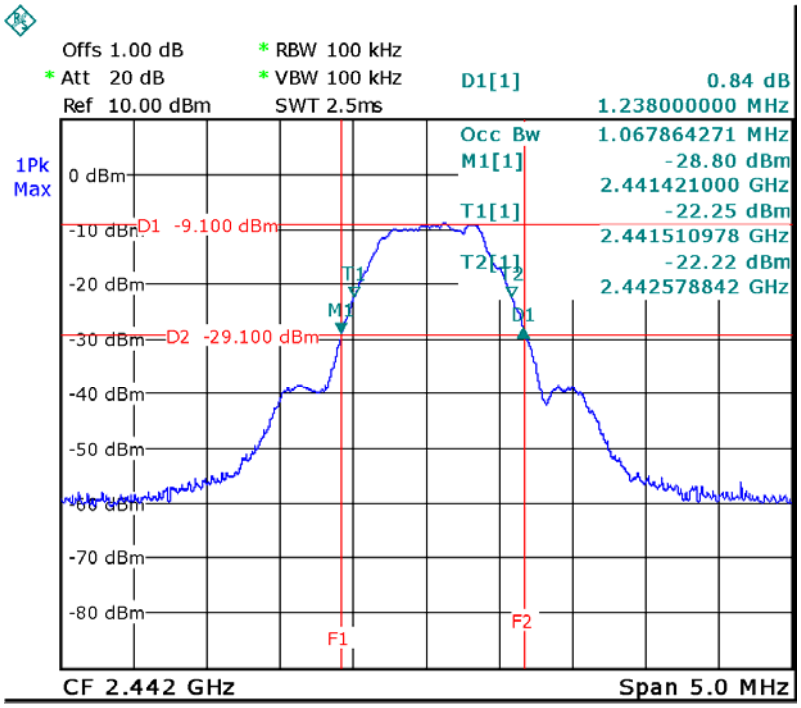
EUT	2.4G Wireless Presenter	Model Name	I5
Temperature	25℃	Relative Humidity	55 %
Pressure	1009 hPa	Test Voltage	DC 1.5V
Test Mode	TX CH 01/03/05		

Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)
CH 01	2412	1.248
CH 03	2442	1.238
CH 05	2472	1.257

TX CH 01

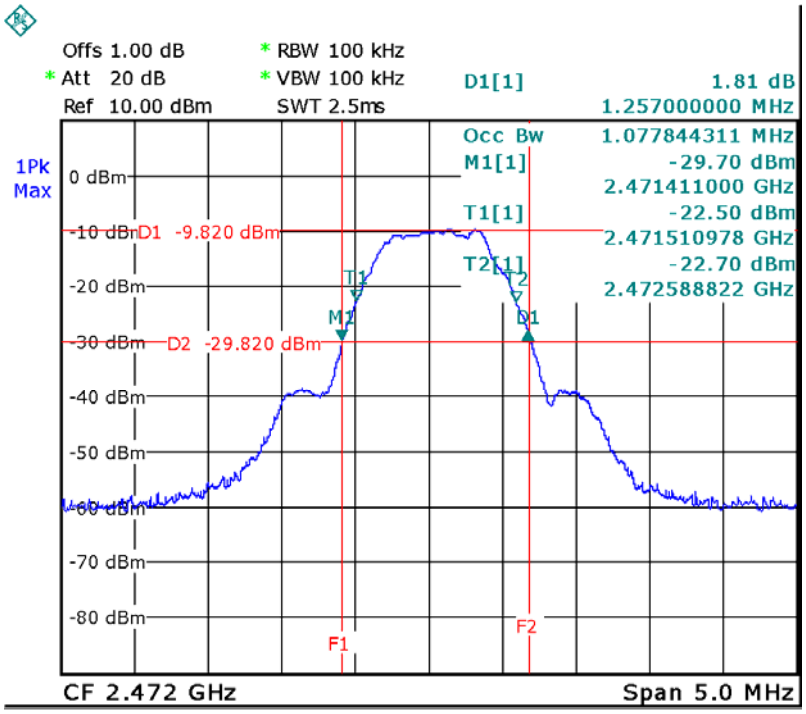


TX CH 03



Date: 23.JUL.2013 08:59:21

TX CH 05



Date: 23.JUL.2013 09:00:15

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 (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
960~1000	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.16.2013

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

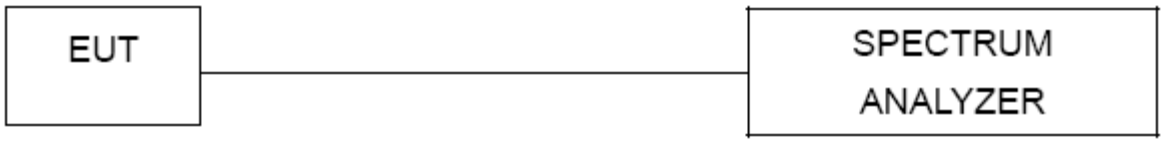
6.1.2 TEST PROCEDURE

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

6.1.3 DEVIATION FROM STANDARD

No deviation.

6.1.4 TEST SETUP



6.1.5 EUT OPERATION CONDITIONS

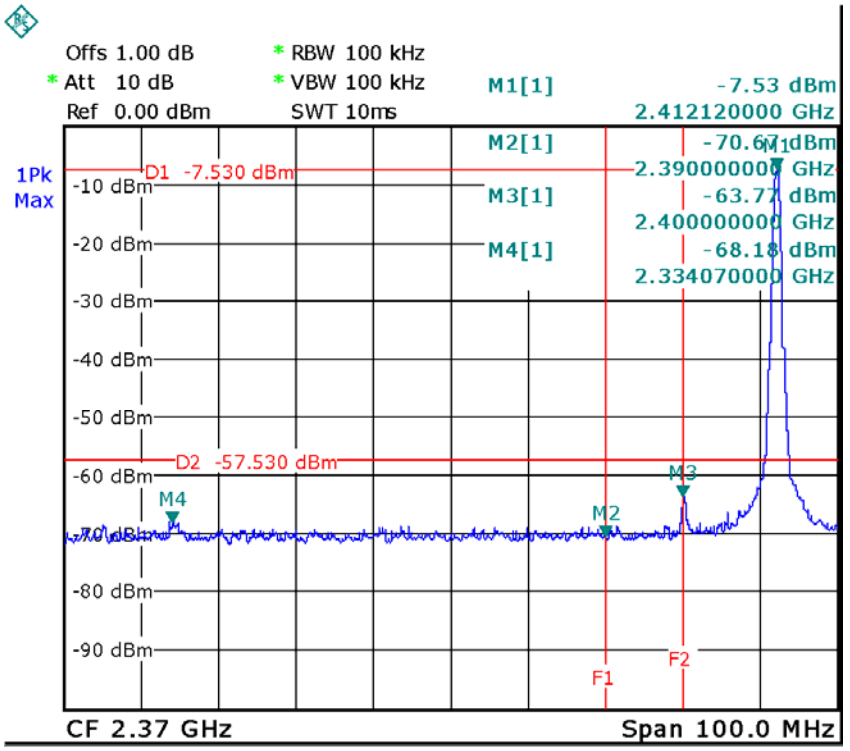
The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

6.1.6 TEST RESULTS

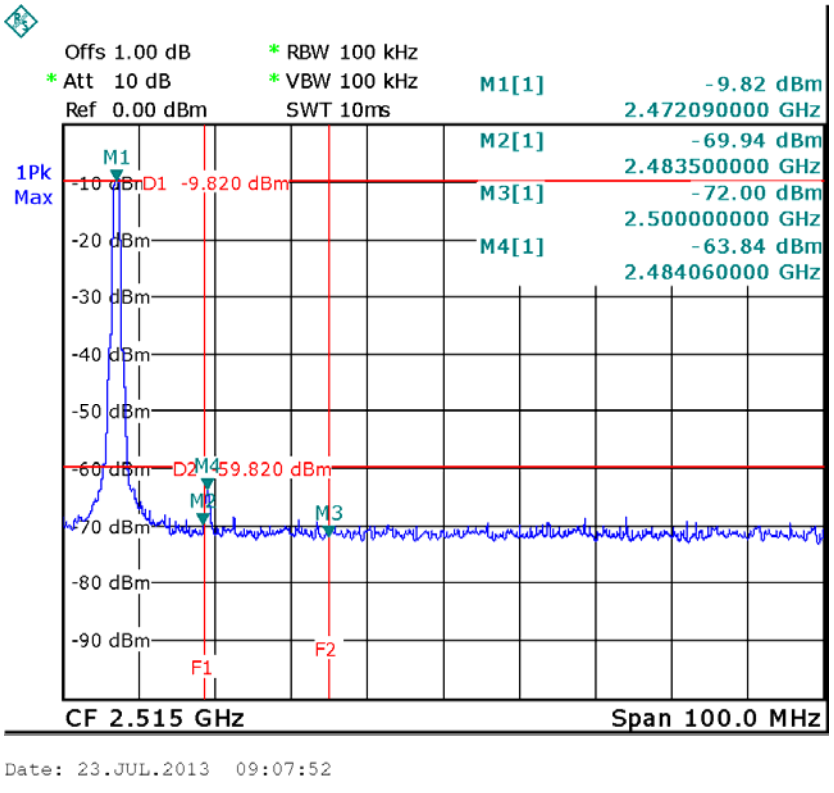
EUT	2.4G Wireless Presenter	Model Name	I5
Temperature	25℃	Relative Humidity	55 %
Pressure	1009 hPa	Test Voltage	DC 1.5V
Test Mode	TX CH01, CH 03, CH 05		

Channel of Worst Data: CH34			
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)
2400.00	-63.77	2484.06	-63.84
Result			
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 to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.			

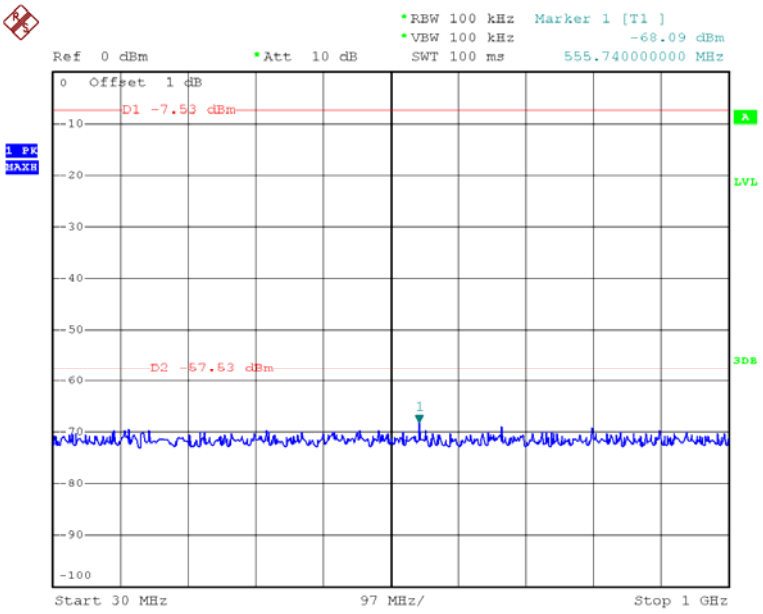
TX CH 01



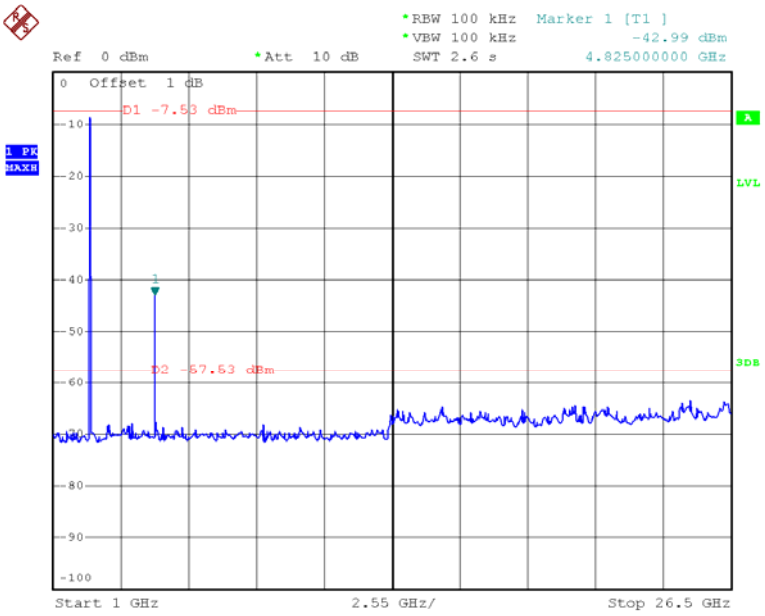
TX CH 05



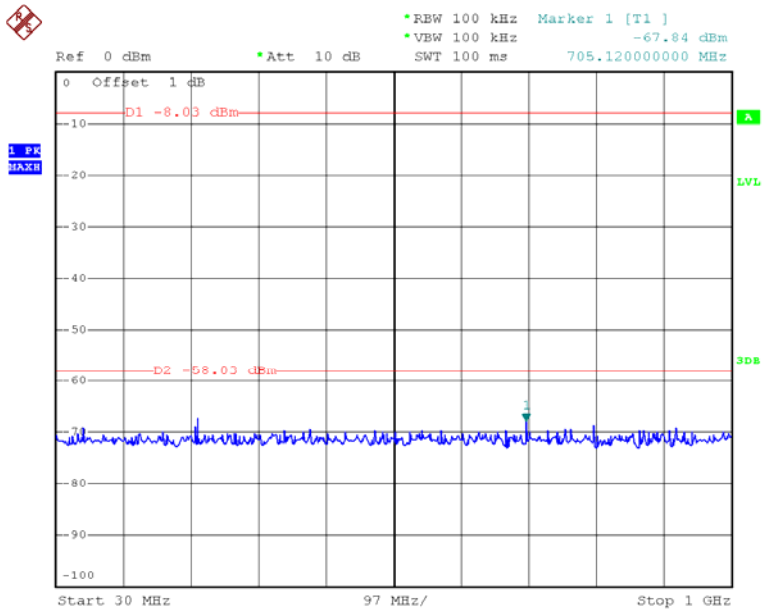
TX CH 01 (30MHz~1GHz)



TX CH 01(1GHz～10th Harmonic)

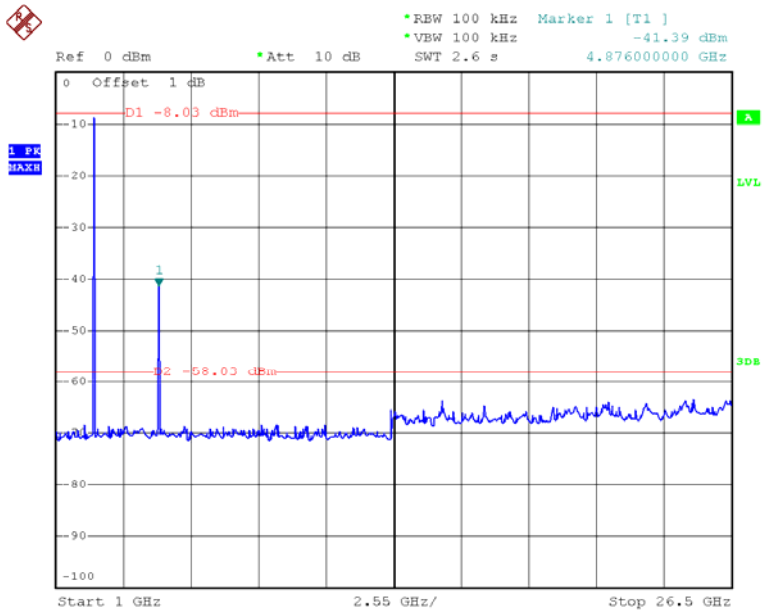


TX CH 03 (30MHz~1GHz)



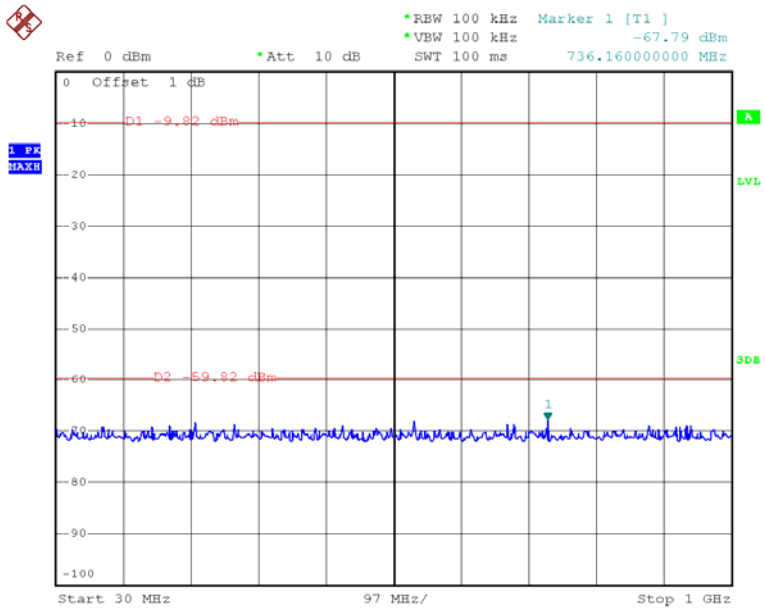
Date: 23.JUL.2013 11:21:31

TX CH 03 (1GHz～10th Harmonic)



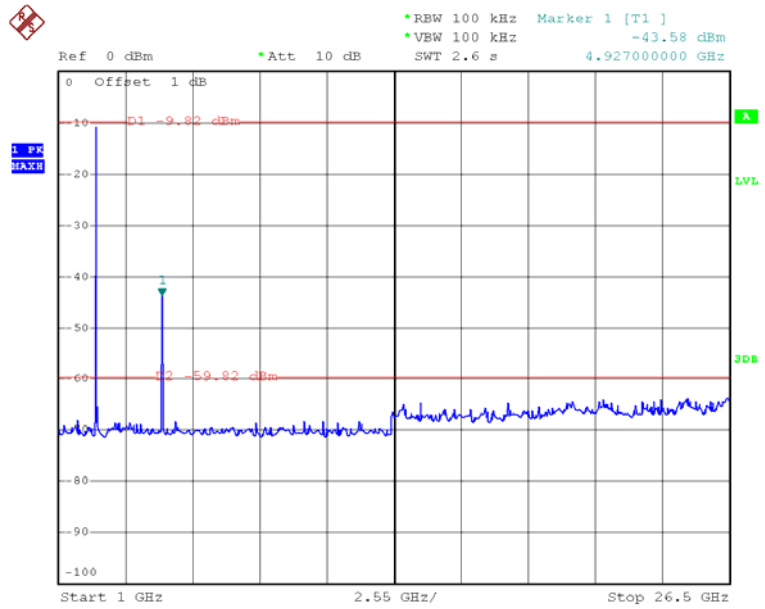
Date: 23.JUL.2013 11:21:46

TX CH 05(30MHz~1GHz)



Date: 23.JUL.2013 11:22:16

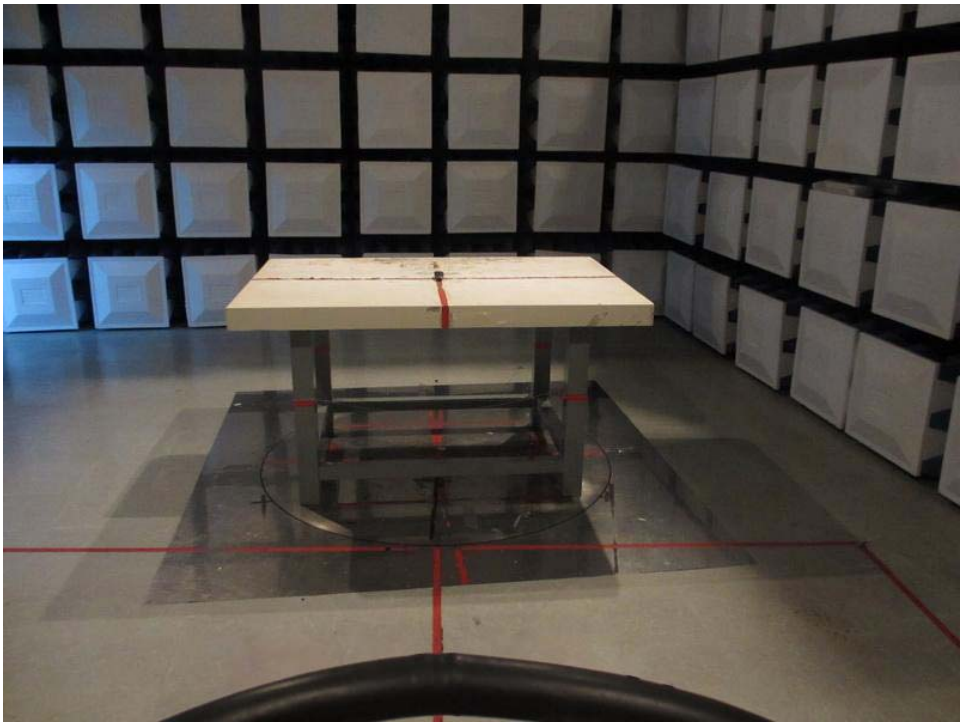
TX CH 05(1GHz～10th Harmonic)

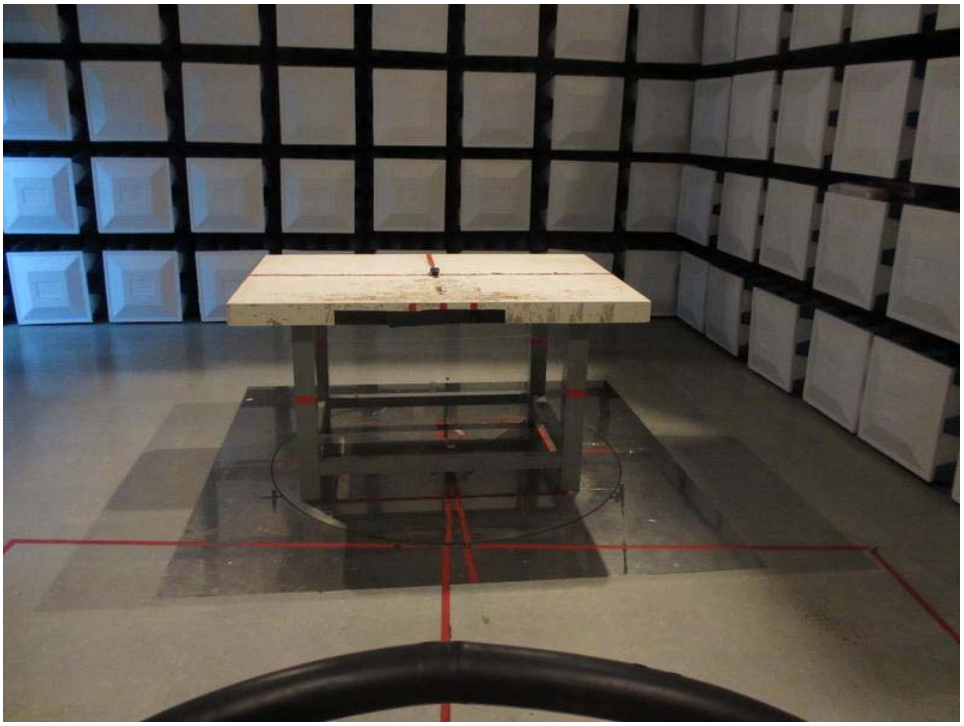


Date: 23.JUL.2013 11:22:32

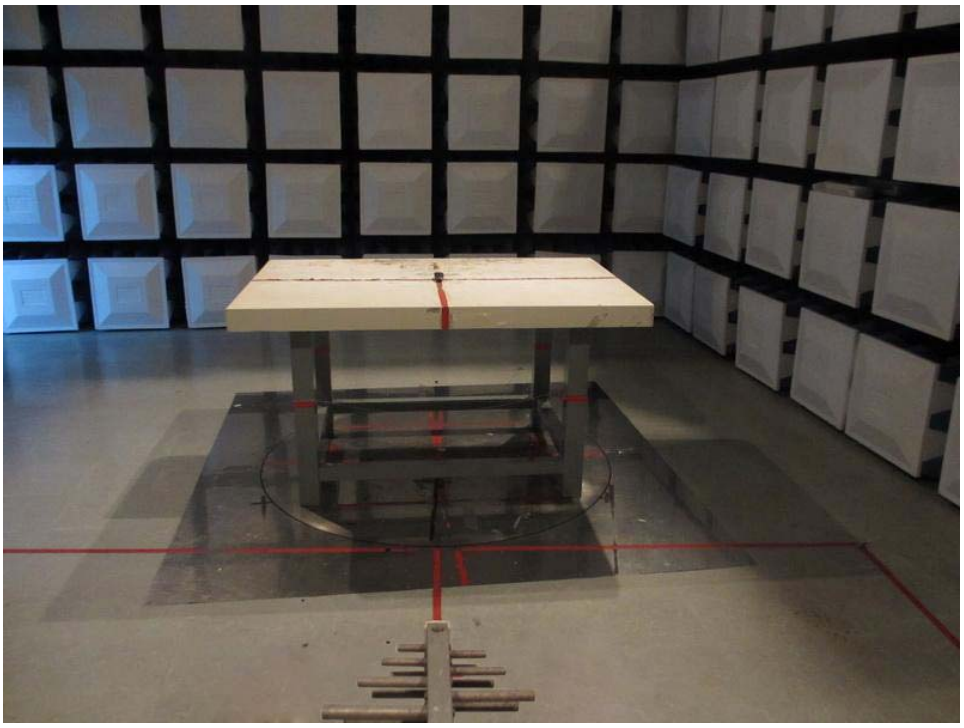
7. EUT TEST PHOTO

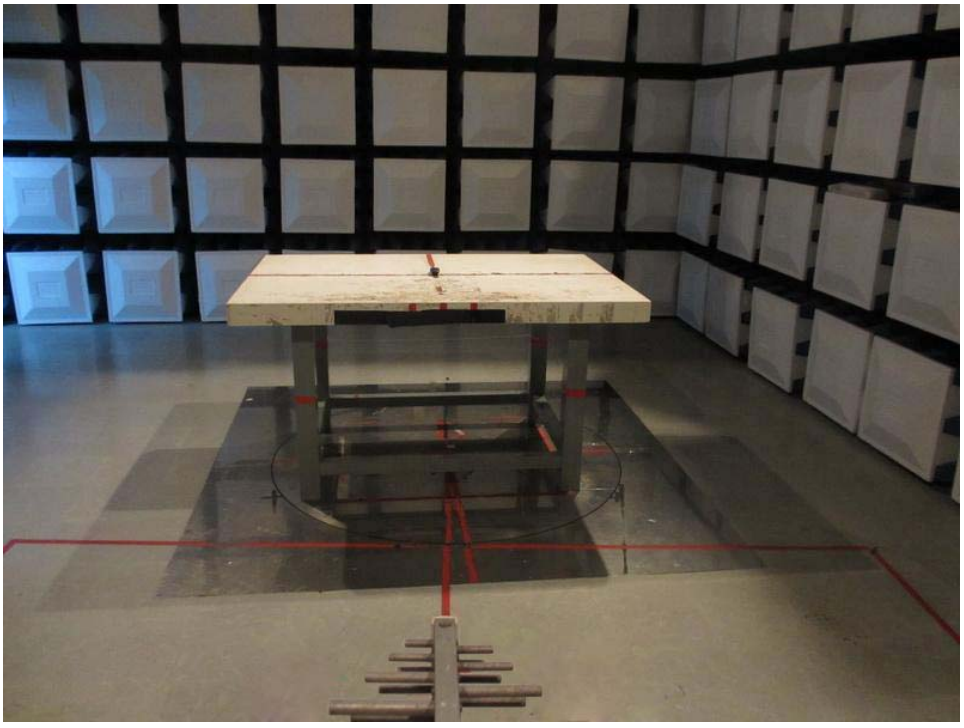
Radiated Measurement Photos
9K-30MHz





Radiated Measurement Photos
30MHz-1GHz





Radiated Measurement Photos
ABOVE 1GHz