

EMC TEST REPORT

For

Fusion

Model Number: ---
FCC ID: TLDFUSION

Report Number : WT088001432

Test Laboratory	:	Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory Guangdong EMC Compliance Test Center
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TEST REPORT DECLARATION

Applicant : COGENT SYSTEMS (SHENZHEN) INC.
Address : Fiyta Hi-tech Building, Gaoxinnanyi Avenue, Southern District of
Hi-tech Park, Nanshan District, Shenzhen China
Manufacturer : COGENT SYSTEMS (SHENZHEN) INC.
Address : Fiyta Hi-tech Building, Gaoxinnanyi Avenue, Southern District of
Hi-tech Park, Nanshan District, Shenzhen China
EUT Description : Fusion
Model Number ---

FCC ID Number TLDFUSION

Test Standards:

FCC Part 15 15.247

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the test method **DA 00-705** and measurement of digital transmission systems operating under section 15.247 . EUT tested as described in this report is in compliance with FCC Rules Part 15.247.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Tested by:

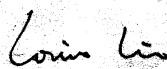


(Dewelly Yang)

Date:

Aug.06, 2008

Checked by:



(Louis Lin)

Date:

Aug.06, 2008

Approved by:



(Peter Lin)

Date:

Aug.06, 2008

1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
Conducted Disturbance	15.207	Pass
Radiated disturbance	15.247 d	Pass
Maximum Peak Output Power	15.207(a)	Pass
20 dB Bandwidth	15.247(b)(1)	Pass
Band Edge measurements	15.247(a)(1)	Pass
Frequency Separation	15.209(a) (f)	Pass
Number of the Hopping Frequency	15.247(a)(1)	Pass
Time of Occupancy	15.247(a)(1)(iii)	Pass
Peak power density	15.247(a)(1)(iii)	Pass
Antenna Requirement	15.247	Pass
Spectrum Bandwidth of a Direct Sequence Spread Spectrum System	15.247(a)(2)	Pass
Maximum Peak Output Power	15.247(b)	Pass
Spurious emissions at antenna terminals	2.1051	Pass
Power Spectral Density	15.247(e)	Pass
Band Edge Measurement	15.247(d)	Pass
Antenna Requirement	15.203	Pass

2. GENERAL INFORMATION

2.1. Report information

- 2.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.
- 2.1.2. The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.
- 2.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Committee for Laboratories (CNAL) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is L0579.

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number are 97379(open area test site) and 274801(semi anechoic chamber).

The Laboratory is listed in Voluntary Control Council for Interference by Information Technology Equipment (VCCI), and the registration number are R-1974(open area test site) , R-1966(semi anechoic chamber),C-2117(mains ports conducted interference measurement) and T-180(telecommunication ports conducted interference measurement).

The Laboratory is registered to perform emission tests with Industry Canada (IC), and the registration number is IC4174.

TUV Rhineland accredits the Laboratory for conformance to IEC and EN standards, the registration number is E2024086Z02.

Measurement Uncertainty

2.3. Measurement Uncertainty

Conducted Disturbance : 9kHz~30MHz 3.5dB

Radiated Disturbance: 30MHz~1000MHz 4.5dB
1GHz~18GHz 4.6dB

3. PRODUCT DESCRIPTION

3.1. EUT Description

Description : Fusion

Manufacturer : COGENT SYSTEMS (SHENZHEN) INC.

Model Number : ----

Input Power : DC 3.6V supply by Li-ion battery

Adapter : Model: DSA-0101F-05 A

: Input: AC 100-240V 50/60Hz 0.3A

Output: DC 5V 2A

The EUT include Bluetooth module, Wi-Fi module GPRS module and GPS module.

The working frequency of GPS is higher than 960MHz, according to 15.101 b, the test needn't do.

GPRS module have passed fcc test. The FCC ID is MIVGSM0108.

the test was performed with the Bluetooth, Wi-Fi, scan and connect to PC mode.

Bluetooth

Operate Frequency : 2402 – 2480MHz, 79 channels

Channel Spacing : 1MHz

C). Modulation type : Frequency Hopping Spread Spectrum (FHSS)

Antenna Designation: Chip Antenna, 0.85 dBi, Non-User Replaceable (Fixed)

Bluetooth

Operate Frequency : 2412 – 2462MHz, 11 channels

Channel Spacing : 5MHz

Antenna
Designation:

Chip Antenna, 0.85 dBi, Non-User Replaceable (Fixed)

Table 2 The working Frequency List(Wi-Fi)

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: TLDFUSION filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

3.3. Block Diagram of EUT Configuration

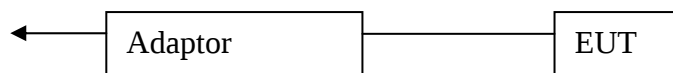


Figure 1 Setup1

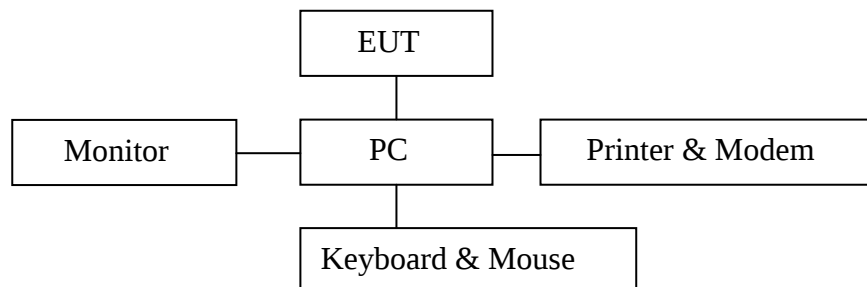


Figure 2 Setup 2

3.4. Operating Condition of EUT

Mode 1: Scan

Mode 2: connect to pc(run test data to download data)

Mode 3: Bluetooth channel low (2402MHz)

Mode 4: Bluetooth channel Med (2441MHz)

Mode 5: Bluetooth channel High (2480MHz)

Mode 6: wi-fi channel low (2412MHz)

Mode 7: wi-fi channel med (2437MHz)

Mode 8: wi-fi channel High (2462MHz)

3.5. Support Equipment List

Table 3 The working Frequency List(Wi-Fi)

Name	Model No	S/N	Manufacturer	Used “ √ ”
PC	2672	99-1N31N	IBM	✓
Adaptor for Notebook	02K6809	---	LITE	✓
Printer	BJC-265SP	EVX81604	CANON	✓
Adaptor for Printer	AD-300	--	CANON	✓
Modem	TM-EC5658V	03402406009	TP-Link	✓
Adaptor for Modem	MWY-0A220-AC0 90100	--	TP-Link	✓

3.6. Test Conditions

Date of test: Jul.20- Aug.03,2008

Date of EUT Receive: Jul.21,,2008

Temperature: 24-26 °C

Relative Humidity: 55-60%

4. TEST EQUIPMENT USED

4.1. Test Equipment Used to Measure Conducted Disturbance

Table 4 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB2603	EMI Test Receiver	Rohde & Schwarz	ESCS30	Jan.24, 2008	1 Year
SB3321	AMN	Rohde & Schwarz	ESH2-Z5	Jan.24, 2008	1 Year
SB2604	AMN	Rohde & Schwarz	ESH3-Z5	Jan.24, 2008	1 Year
SB3436	EMI Test Receiver	Rohde & Schwarz	ESI26	Jan.24, 2008	1 Year
SB3440	Bilog Antenna	Chase	CBL6112B	Jan.24, 2008	1 Year
SB3435	Horn Antenna	Rohde & Schwarz	HF906	Jan.24, 2008	1 Year
SB3435/01	Amplifier(1-18GHz)	Rohde & Schwarz	---	Jan.24, 2008	1 Year
SB3435/02	Amplifier(18-40GHz)	Rohde & Schwarz	---	May.04, 2008	1 Year
SB3435/03	Horn Antenna	Rohde & Schwarz	AT4560	May.04, 2008	1 Year
SB3450/01	3m Semi-anechoic chamber	Albatross Projects	9X6X6	Jan.24, 2008	1 Year
SB3437/02	Power probe	R&S	URV5-Z2	Jan.24, 2008	1 Year
SB3437	Power meter	R&S	NRVD	Jan.24, 2008	1 Year

5. CONDUCTED DISTURBANCE TEST

5.1. Test Standard and Limit

5.1.1. Test Standard

FCC Part 15 15.107 15. 207

5.1.2. Test Limit

Table 5 Conducted Disturbance Test Limit (Class B)

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

- Decreasing linearly with logarithm of the frequency
- The lower limit shall apply at the transition frequency.

5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions from both sides of AC line. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

5.4. Test Data

Table 6 Conducted Disturbance Test Data

Model: Mode: 1							
Line							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.150	0.1	61.4	61.5	66	47.2	47.3	56
0.214	0.1	49.8	49.9	63.0	34.1	34.2	53.0
0.286	0.1	41.9	42.0	60.6	27.3	27.4	50.6
0.362	0.1	39.3	39.4	58.6	29.8	29.9	48.6
0.572	0.1	36.4	36.4	56	23.1	23.2	46
0.904	0.1	36.1	36.2	56	19.2	19.3	46

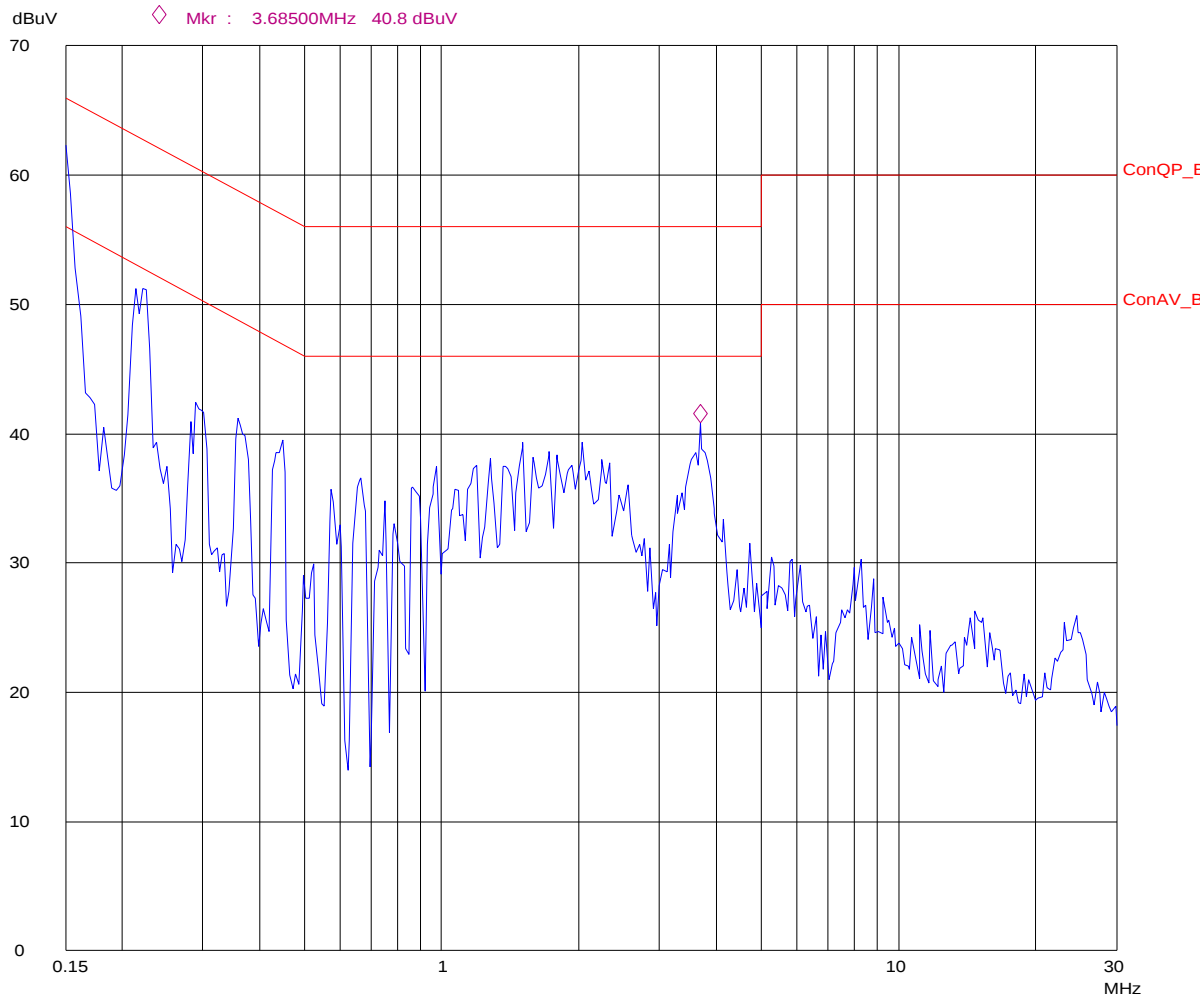
Table 7 Conducted Disturbance Test Data

Model: Mode: 1							
Neutral							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.150	0.1	60.8	60.9	66	46.6	46.7	56
0.222	0.1	48.5	48.6	62.7	35.8	35.9	52.7
0.290	0.1	39.3	39.4	60.5	23.0	23.1	50.5
0.358	0.1	38.1	38.2	58.7	24.3	24.4	48.7
2.030	0.2	37.7	37.9	56	22.1	22.3	46
3.685	0.2	39.3	39.5	56	23.6	23.8	46

REMARKS: 1. Emission level(dBuV)=Read Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB) =LISN Factor (dB) + Cable Factor (dB)+Limiter Factor(dB)
 3. The other emission levels were very low against the limit.

Conducted Disturbance

EUT: M/N:Fusion
Op Cond: Scan
Test Spec: N
Comment: AC 120V/60Hz



Conducted Disturbance

EUT: M/N:Fusion
Op Cond: Scan
Test Spec: L
Comment: AC 120V/60Hz

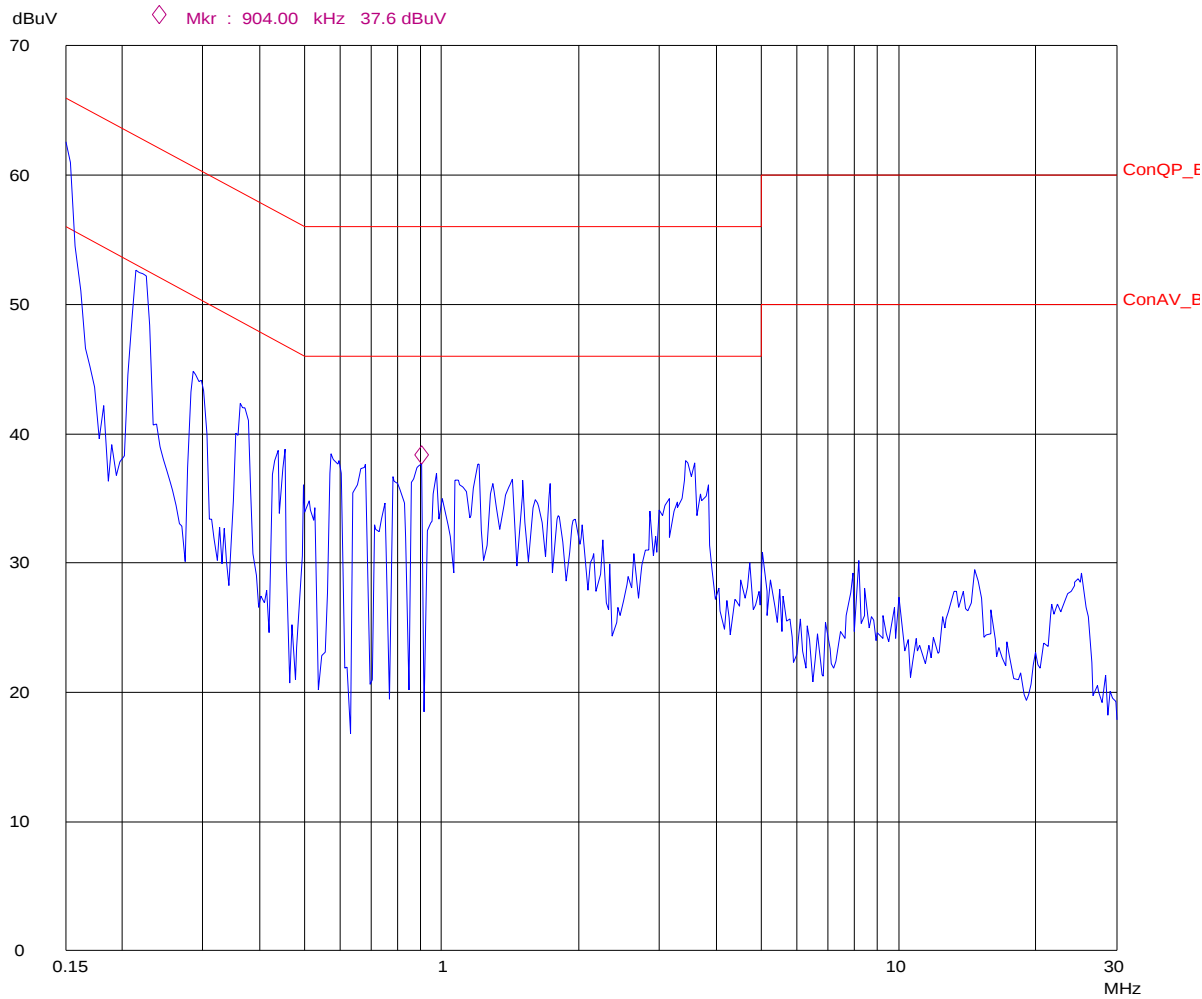


Table 8 Conducted Disturbance Test Data

Model:
Mode: 2

Line							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.150	0.1	59.9	60.0	66	46.1	46.2	56
0.234	0.1	48.2	48.3	62.3	35.0	35.1	52.3
0.302	0.1	40.7	40.8	60.1	27.3	27.4	50.1
0.390	0.1	39.7	39.8	58.0	30.4	30.5	48.0
0.704	0.1	38.2	38.3	56	24.6	24.7	46
1.265	0.2	37.4	37.6	56	16.6	16.8	46

Table 9 Conducted Disturbance Test Data

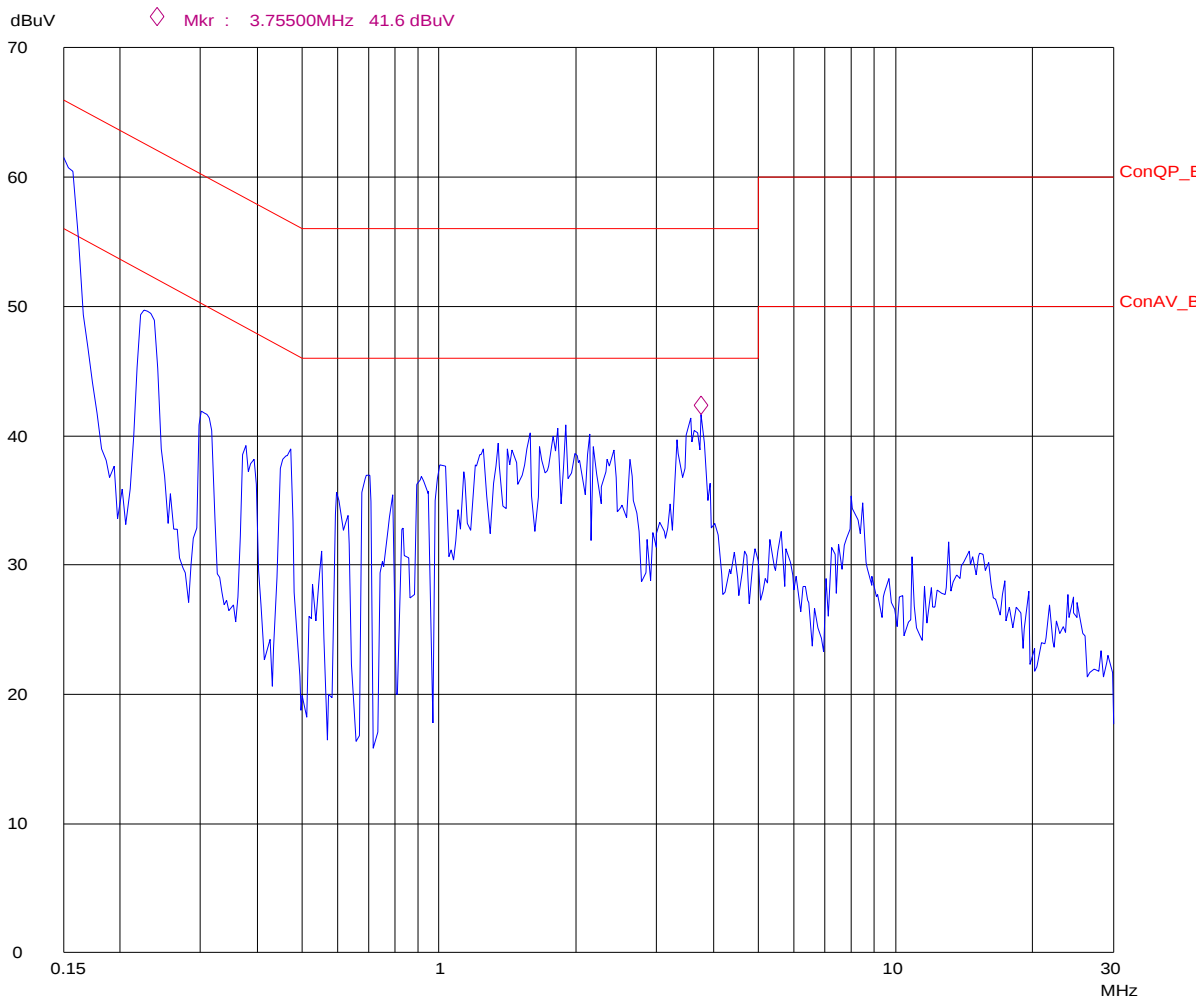
Model:
Mode: 2

Neutral							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.150	0.1	59.8	59.9	66	46.0	46.1	56
0.226	0.1	47.3	47.4	62.6	32.7	32.8	52.6
0.302	0.1	39.5	39.6	60.1	22.2	22.3	50.1
0.474	0.1	36.2	36.3	56.4	21.3	21.4	46.4
1.895	0.2	38.1	38.3	56	22.8	23.0	46
3.755	0.2	37.7	37.9	56	23.1	23.3	46

REMARKS: 1. Emission level(dBuV)=Read Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB) =LISN Factor (dB) + Cable Factor (dB)+Limiter Factor(dB)
 3. The other emission levels were very low against the limit.

Conducted Disturbance

EUT: M/N:Fusion
Op Cond: Connect to PC
Test Spec: N
Comment: AC 120V/60Hz



Conducted Disturbance

EUT: M/N:Fusion
Op Cond: Connect to PC
Test Spec: L
Comment: AC 120V/60Hz

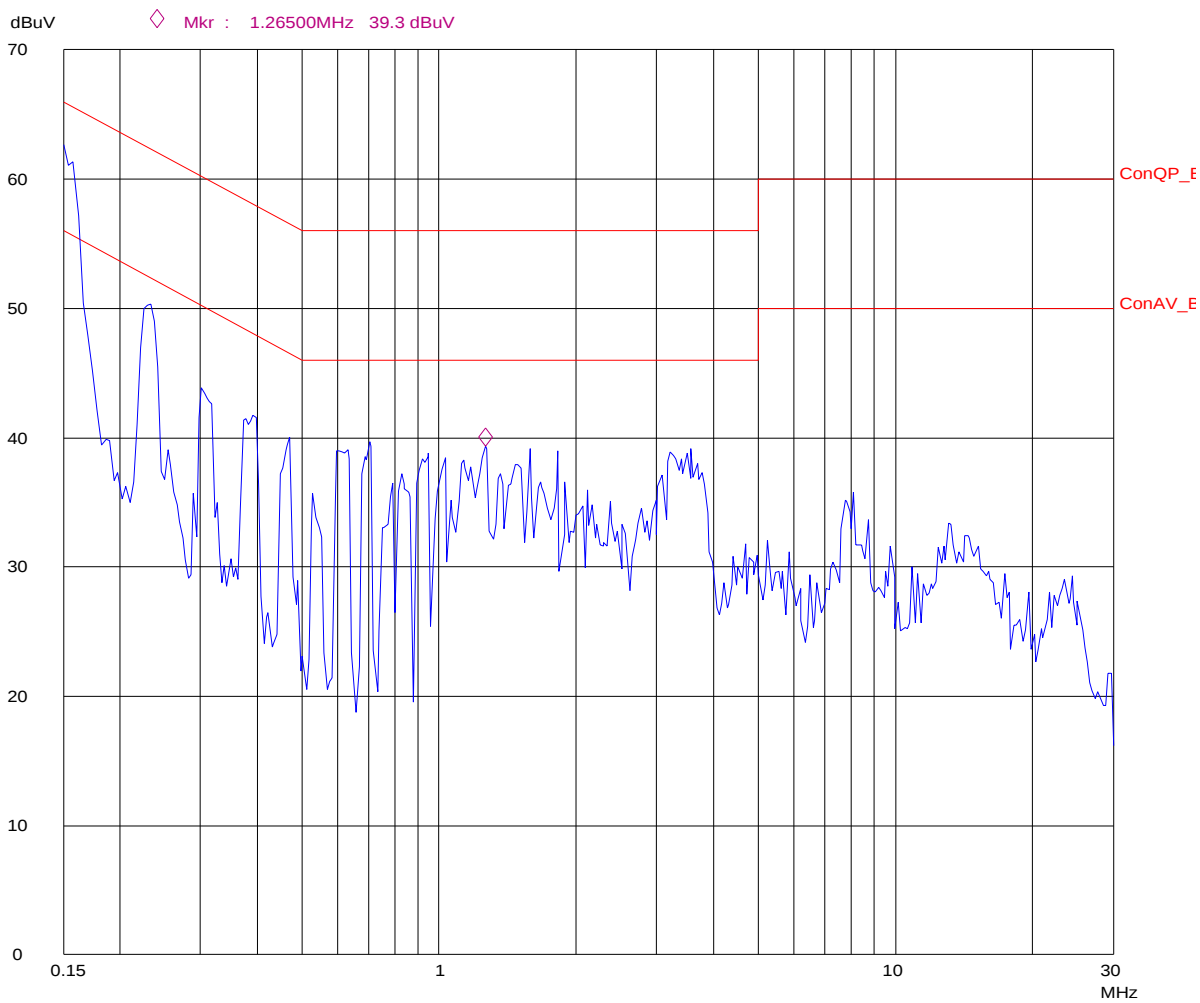


Table 10 Conducted Disturbance Test Data

Model: Mode: 4							
Line							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.150	0.1	61.4	61.5	66	47.2	47.3	56
0.214	0.1	49.8	49.9	63.0	34.1	34.2	53.0
0.286	0.1	41.9	42.0	60.6	27.3	27.4	50.6
0.362	0.1	39.3	39.4	58.6	29.8	29.9	48.6
0.572	0.1	36.3	36.4	56	23.2	23.2	46
0.904	0.1	36.1	36.2	56	19.2	19.3	46

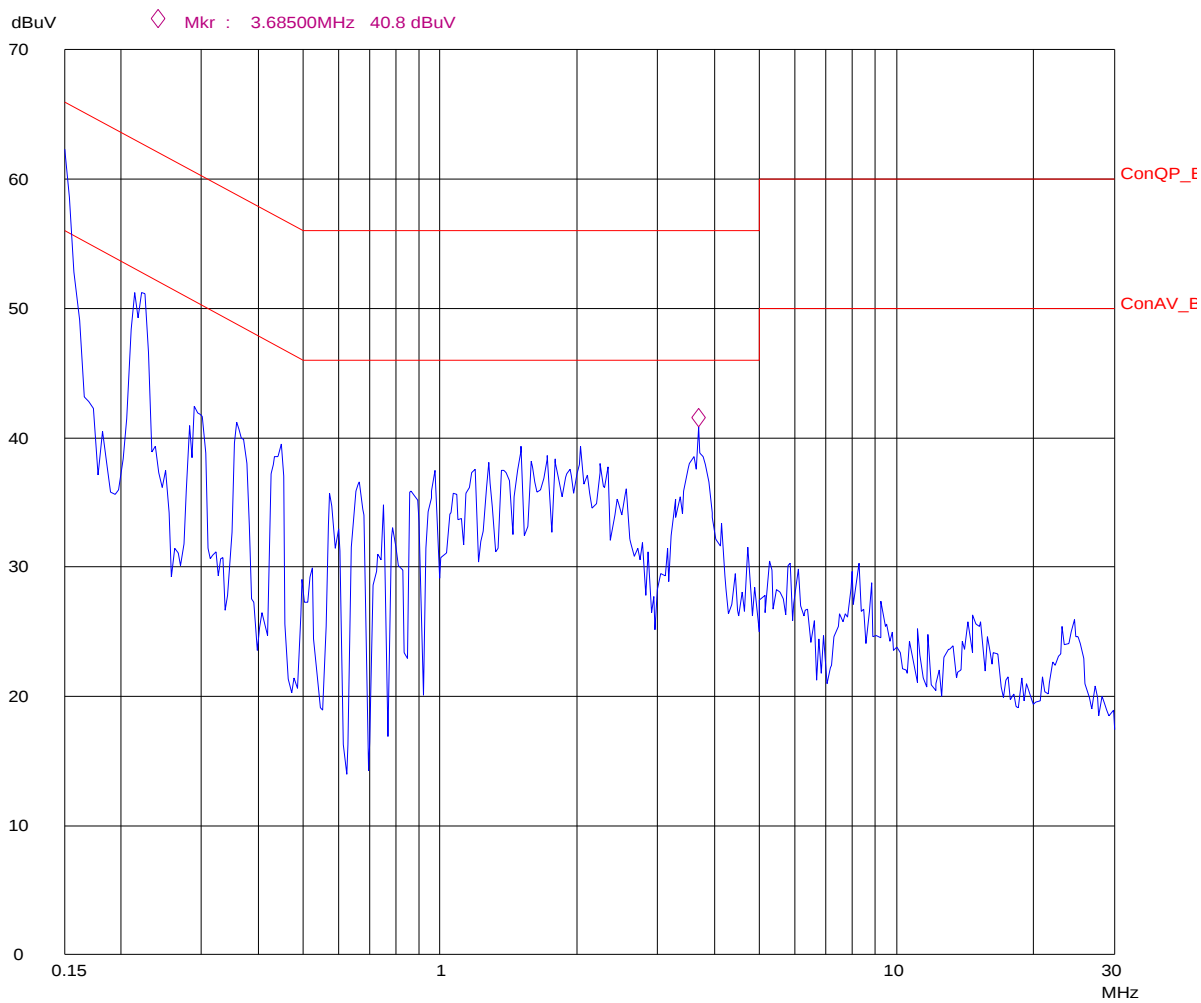
Table 11 Conducted Disturbance Test Data

Model: Mode: 4							
Neutral							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.150	0.1	60.8	60.9	66	46.6	46.7	56
0.222	0.1	48.5	48.6	62.7	35.8	35.9	52.7
0.290	0.1	39.3	39.4	60.5	23.0	23.1	50.5
0.358	0.1	38.1	38.2	58.7	24.3	24.4	48.7
2.030	0.2	37.7	37.9	56	22.1	22.3	46
3.685	0.2	39.3	39.5	56	23.6	23.8	46

REMARKS: 1. Emission level(dBuV)=Read Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB) =LISN Factor (dB) + Cable Factor (dB)+Limiter Factor(dB)
 3. The other emission levels were very low against the limit.

Conducted Disturbance

EUT: M/N:Fusion
Op Cond: BT channel Med
Test Spec: N
Comment: AC 120V/60Hz



Conducted Disturbance

EUT: M/N:Fusion
Op Cond: BT channel Med
Test Spec: L
Comment: AC 120V/60Hz

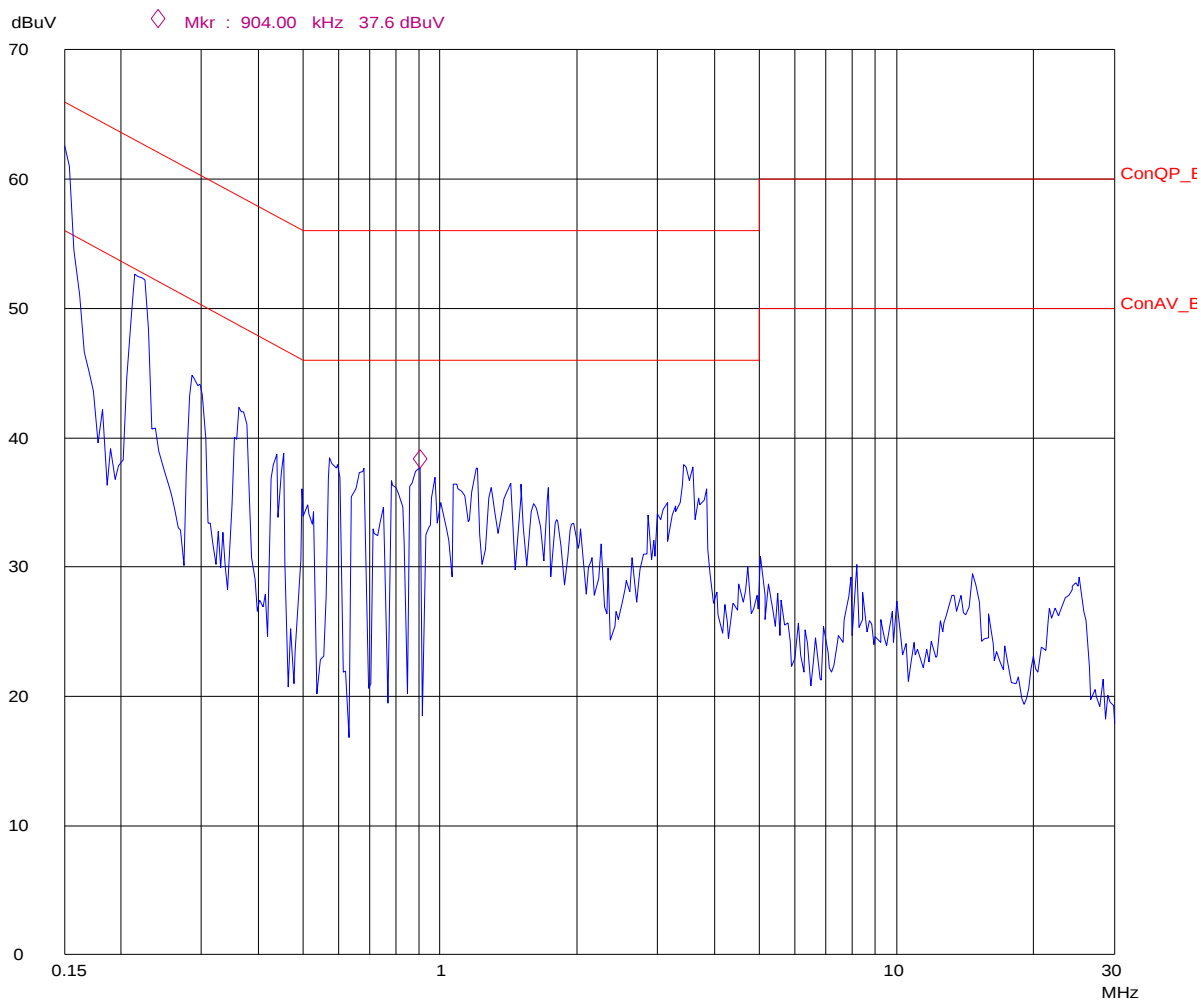


Table 12 Conducted Disturbance Test Data

Model: Mode: 6							
Line							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.150	0.1	61.4	61.5	66	47.2	47.3	56
0.214	0.1	49.8	49.9	63.0	34.1	34.2	53.0
0.286	0.1	41.9	42.0	60.6	27.3	27.4	50.6
0.362	0.1	39.3	39.4	58.6	29.8	29.9	48.6
0.572	0.1	36.3	36.4	56	23.1	23.2	46
0.904	0.1	36.1	36.2	56	19.2	19.3	46

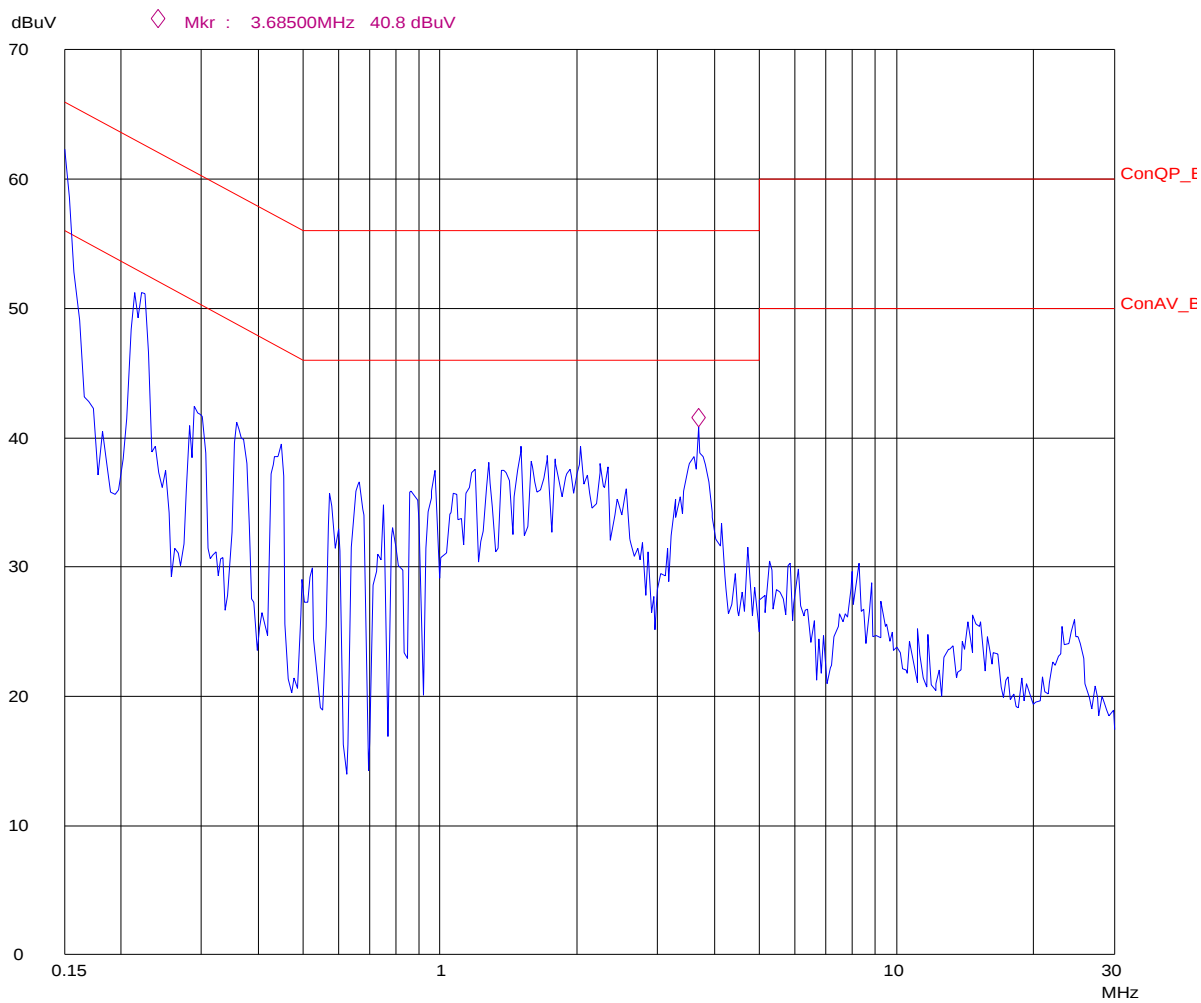
Table 13 Conducted Disturbance Test Data

Model: Mode: 6							
Neutral							
Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
		Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)	Reading (dB μ V)	Emission Level (dB μ V)	Limits (dB μ V)
0.150	0.1	60.8	60.9	66	46.6	46.7	56
0.222	0.1	48.5	48.6	62.7	35.8	35.9	52.7
0.290	0.1	39.3	39.4	60.5	23.0	23.1	50.5
0.358	0.1	38.1	38.2	58.7	24.3	24.4	48.7
2.030	0.2	37.7	37.9	56	22.1	22.3	46
3.685	0.2	39.3	39.5	56	23.6	23.8	46

REMARKS: 1. Emission level(dBuV)=Read Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB) =LISN Factor (dB) + Cable Factor (dB)+Limiter Factor(dB)
 3. The other emission levels were very low against the limit.

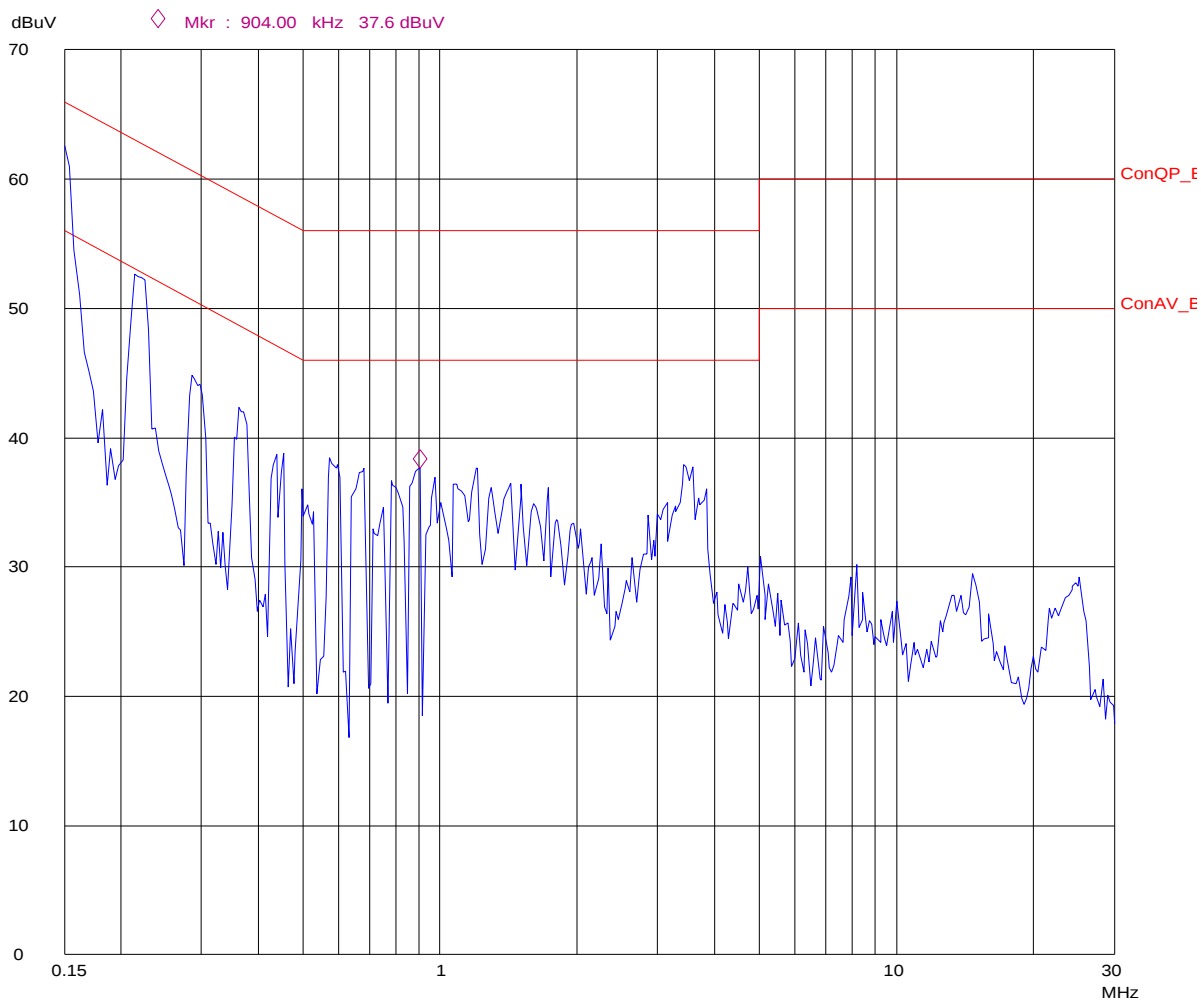
Conducted Disturbance

EUT: M/N:Fusion
Op Cond: Wi-Fi channel Med
Test Spec: N
Comment: AC 120V/60Hz



Conducted Disturbance

EUT: M/N:Fusion
Op Cond: Wi-Fi channel Med
Test Spec: L
Comment: AC 120V/60Hz



6. RADIATED DISTURBANCE TEST

6.1. Test Standard and Limit

6.1.1. Test Standard

FCC Part 15 15.247 d 15.109

6.1.2. Test Limit

Table 14 Radiated Disturbance Test Limit

FREQUENCY MHz	FIELD STRENGTHS LIMITS ($\mu\text{V/m}$)	FIELD STRENGTHS LIMITS dB ($\mu\text{V/m}$)
30 ~ 88	100	40.0
88 ~ 216	150	43.5
216 ~ 960	200	46.0
960 ~	500	54.0

* The lower limit shall apply at the transition frequency.

* The test distance is 3m.

6.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

The frequency spectrum from 30 MHz to 25 GHz was investigated. Measurements were made at 3 meters

the setting of the EMI test receiver is

30-1000MHz Detector=QP RBW=120kHz VBW=300kHz

1-25GHz Detector=Peak RBW=1MHz RBW=3MHz

AV Detector=PEAK RBW=1MHz RBW=10Hz

6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

The EUT shall be measured in the XYZ three position, and the test data which was shown in the follow was the worst case.

6.4. Test Data

Emissions don't show below are too low against the limits, the test curves are shown in the APPENDIX I .

Note: 1. Emission level (dBuV/m)=Reading Value(dBuV) + Correction Factor(dB/m)+ Antenna Factor (dB/m)

2. Correction Factor (dB/m) = Cable Factor (dB)+Amplifier Factor(dB)

3. The other emission levels were very low against the limit.

Table 15 General Radiated Emission Data

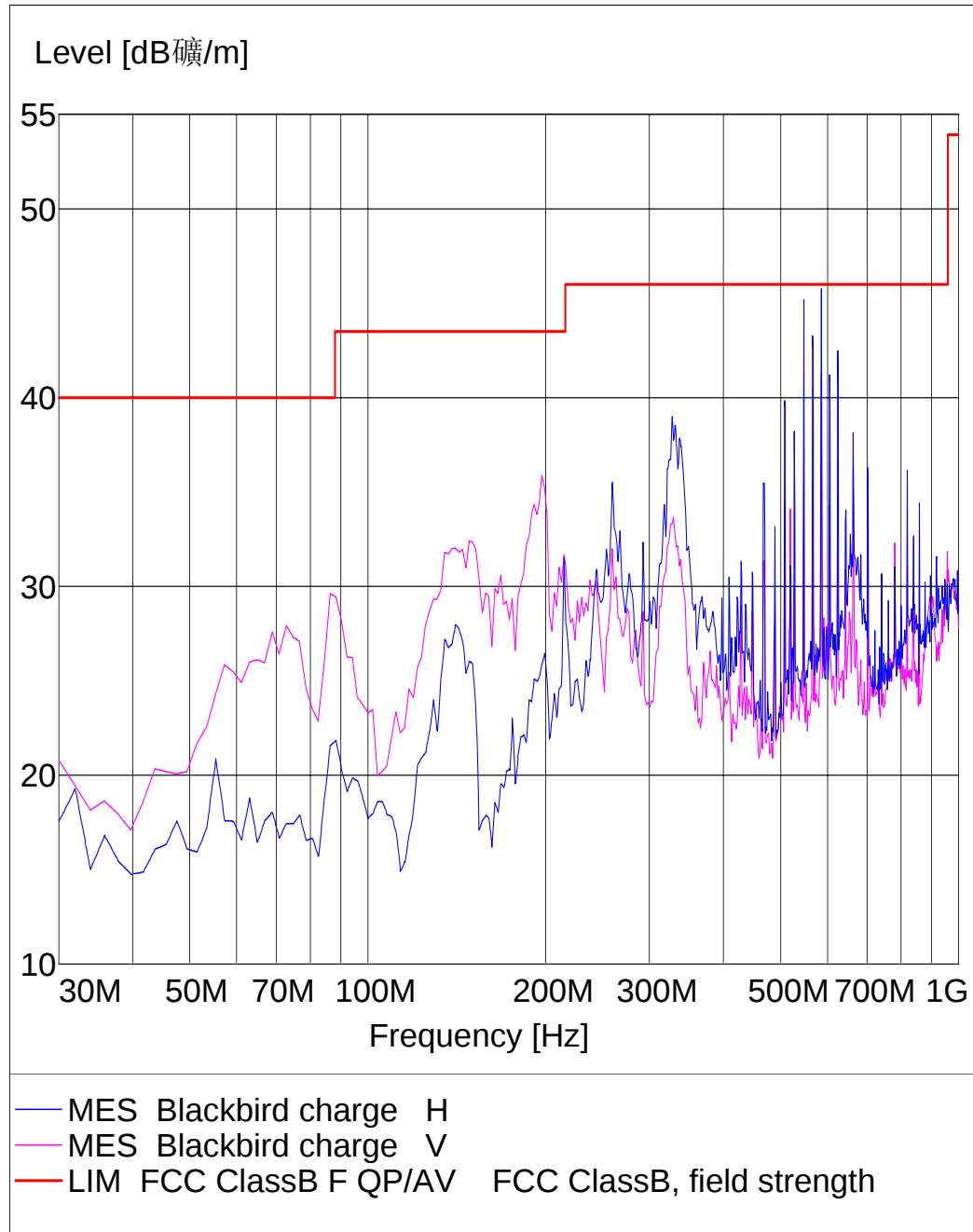
Model number: Test Mode: 1							
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Detector
192.541	V	20.6	2.4	9.9	32.9	43.5	QP
327.414	H	18.8	2.9	14.4	36.1	46.0	QP
508.196	H	18.0	3.7	17.6	39.3	46.0	QP
545.997	H	19.2	3.9	18.7	41.8	46.0	QP
584.969	H	22.0	3.9	18.6	44.5	46.0	QP
624.829	H	18.6	4.3	19.1	42.0	46.0	QP

Table 16 General Radiated Emission Data

Model number: Test Mode: 2							
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Detector
779.979	V	17.0	4.7	20.2	41.9	46.0	QP
324.989	H	27.3	2.9	14.4	44.6	46.0	QP
350.991	H	25.6	3.2	15.9	44.7	46.0	QP
377.010	H	24.3	3.2	15.9	43.4	46.0	QP
585.951	H	20.7	4.1	18.6	43.4	46.0	QP
659.819	H	18.8	4.2	18.9	41.9	46.0	QP

Radiated Emission

EUT: Fusion
Manufacturer:
Operating Condition: Scan
Test Site: SMQ EMC lab SAC
Operator:
Test Specification: horizontal&vertical
Comment: AC120V/60Hz



Radiated Emission

EUT: Fusion
Manufacturer:
Operating Condition: connect to pc
Test Site: SMQ EMC lab SAC
Operator:
Test Specification: horizontal&vertical
Comment: AC120V/60Hz

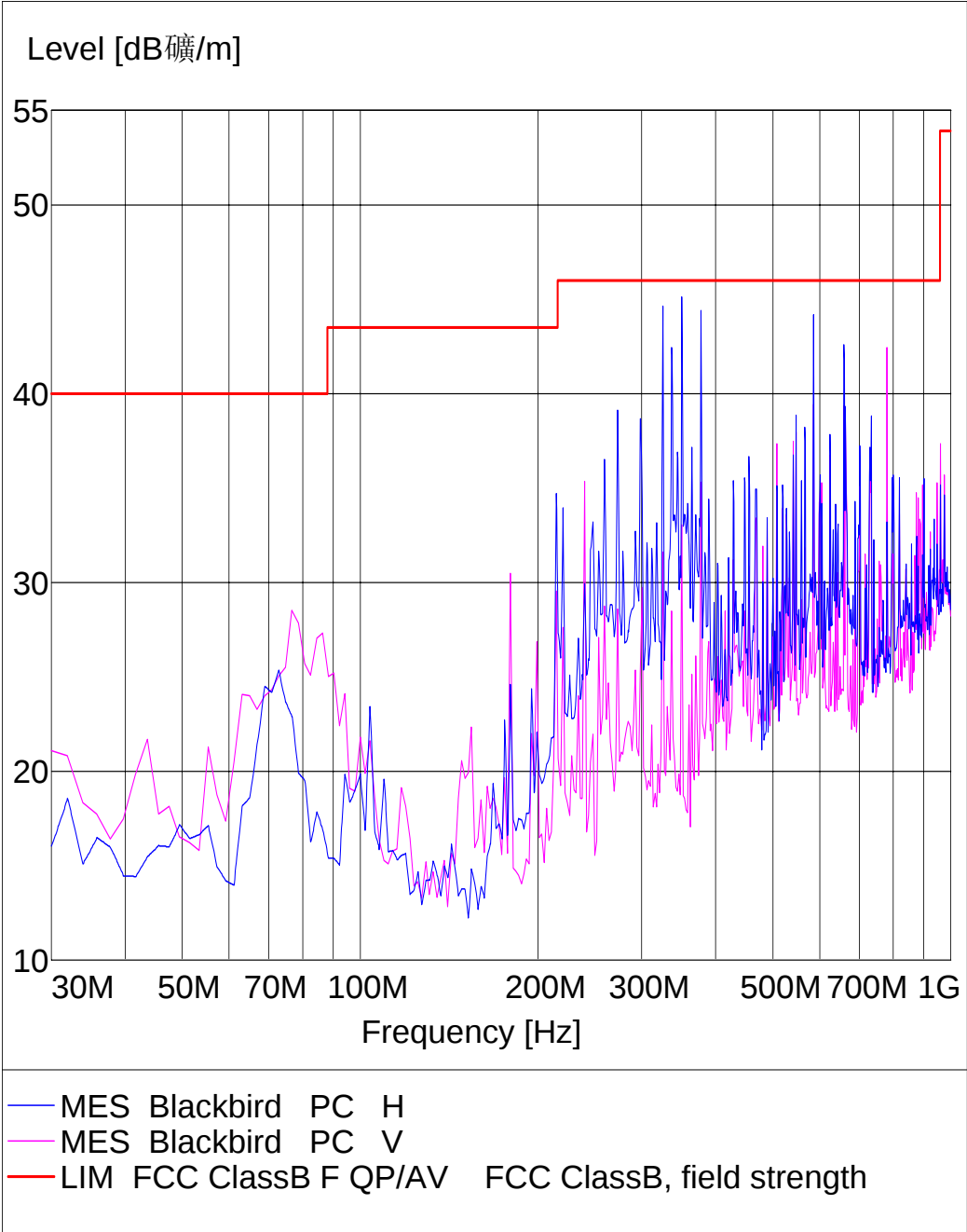


Table 17 General Radiated Emission Data

Model number: Test Mode: 3(Bluetooth channel Low)							
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Detector
192.541	V	20.5	2.4	9.9	32.8	43.5	QP
327.414	H	18.8	2.9	14.4	36.1	46.0	QP
508.196	H	18.2	3.7	17.6	39.5	46.0	QP
545.997	H	19.0	3.9	18.7	41.6	46.0	QP
584.969	H	21.8	3.9	18.6	44.3	46.0	QP
624.829	H	18.6	4.3	19.1	42.0	46.0	QP
2401.998	V	64.9	-32.2	28.5	61.2	----	Fundamental Peak
2401.998	V	63.8	-32.2	28.5	60.1	----	Fundamental AV
4804.010	V	49.7	-31.0	33.3	52.0	74.0	Peak
4804.010	V	46.3	-31.0	33.3	48.6	54.0	AV
2401.998	H	60.8	-32.2	28.5	57.1	----	Fundamental Peak
2401.998	H	60.0	-32.2	28.5	56.3	----	Fundamental AV
4804.010	H	50.7	-31.0	33.3	53.0	74.0	Peak
4804.010	H	48.9	-31.0	33.3	51.2	54.0	AV

Table 18 General Radiated Emission Data

Model number: Test Mode: 4(Bluetooth channel Med)							
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Detector
192.541	V	20.6	2.4	9.9	32.9	43.5	QP
327.414	H	18.8	2.9	14.4	36.1	46.0	QP
508.196	H	18.0	3.7	17.6	39.3	46.0	QP
545.997	H	19.2	3.9	18.7	41.8	46.0	QP
584.969	H	22.0	3.9	18.6	44.5	46.0	QP
624.829	H	18.6	4.3	19.1	42.0	46.0	QP
2441.005	V	62.9	-32.2	28.5	59.2	----	Fundamental Peak
2441.005	V	61.5	-32.2	28.5	57.8	----	Fundamental AV
4882.014	V	48.7	-31.0	33.3	51.0	74.0	Peak
4882.014	V	44.3	-31.0	33.3	46.6	54.0	AV
2441.005	H	58.3	-32.2	28.5	54.6	----	Fundamental Peak
2441.005	H	57.2	-32.2	28.5	53.5	----	Fundamental AV
4882.014	H	52.3	-31.0	33.3	54.6	74.0	Peak
4882.014	H	47.7	-31.0	33.3	50.0	54.0	AV

Table 19 General Radiated Emission Data

Model number: Test Mode: 5(Bluetooth channel High)							
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Detector
192.541	V	20.6	2.4	9.9	32.9	43.5	QP
327.414	H	18.8	2.9	14.4	36.1	46.0	QP
508.196	H	18.0	3.7	17.6	39.3	46.0	QP
545.997	H	19.2	3.9	18.7	41.8	46.0	QP
584.969	H	22.0	3.9	18.6	44.5	46.0	QP
624.829	H	18.6	4.3	19.1	42.0	46.0	QP
2480.002	V	52.7	-32.2	28.5	49.0	----	Fundamental Peak
2480.002	V	46.7	-32.2	28.5	43.0	----	Fundamental AV
4960.018	V	46.9	-31.0	33.3	49.2	74.0	Peak
4960.018	V	44.6	-31.0	33.3	46.9	54.0	AV
2480.002	H	51.8	-32.2	28.5	48.1	----	Fundamental Peak
2480.002	H	49.6	-32.2	28.5	45.9	----	Fundamental AV
4960.018	H	43.7	-31.0	33.3	46.0	74.0	Peak
4960.018	H	40.3	-31.0	33.3	42.6	54.0	AV

Table 20 General Radiated Emission Data

Model number: Test Mode: 6 (wi-fi channel low)							
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Detector
192.541	V	20.6	2.4	9.9	32.9	43.5	QP
327.414	H	18.8	2.9	14.4	36.1	46.0	QP
508.196	H	18.0	3.7	17.6	39.3	46.0	QP
545.997	H	19.2	3.9	18.7	41.8	46.0	QP
584.969	H	22.0	3.9	18.6	44.5	46.0	QP
624.829	H	18.6	4.3	19.1	42.0	46.0	QP
2414.537	V	97.7	-32.2	28.5	94.0	----	Fundamental Peak
2414.537	V	74.2	-32.2	28.5	70.5	----	Fundamental AV
4834.112	V	56.1	-31.0	33.3	58.4	74.0	Peak
4834.112	V	42.2	-31.0	33.3	44.5	54.0	AV
7247.711	V	57.2	-28.3	36.4	65.3	74.0	Peak
7247.711	V	43.5	-28.3	36.4	51.6	54.0	AV
9658.304	V	56.7	-28.2	37.5	66.0	74.0	Peak
9658.304	V	43.0	-28.2	37.5	52.3	54.0	AV
2415.503	H	98.7	-32.2	28.5	95.0	----	Fundamental Peak
2415.503	H	77.8	-32.2	28.5	74.1	----	Fundamental AV
4831.495	H	56.5	-31.0	33.3	58.8	74.0	Peak
4831.495	H	42.1	-31.0	33.3	44.4	54.0	AV
7249.104	H	57.8	-28.3	36.4	65.9	74.0	Peak
7249.104	H	43.4	-28.3	36.4	51.5	54.0	AV
9666.116	H	56.5	-28.2	37.5	65.8	74.0	Peak
9666.116	H	42.8	-28.2	37.5	52.1	54.0	AV

Table 21 General Radiated Emission Data

Model number: Test Mode: 7 (wi-fi channel med)							
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Detector
192.541	V	20.6	2.4	9.9	32.9	43.5	QP
327.414	H	18.8	2.9	14.4	36.1	46.0	QP
508.196	H	18.0	3.7	17.6	39.3	46.0	QP
545.997	H	19.2	3.9	18.7	41.8	46.0	QP
584.969	H	22.0	3.9	18.6	44.5	46.0	QP
624.829	H	18.6	4.3	19.1	42.0	46.0	QP
2432.088	V	101.9	-32.2	28.5	98.2	----	Fundamental Peak
2432.088	V	78.4	-32.2	28.5	74.7	----	Fundamental AV
4874.800	V	56.9	-31.0	33.3	59.2	74.0	Peak
4874.800	V	43.0	-31.0	33.3	45.3	54.0	AV
7307.230	V	57.3	-28.3	36.4	65.4	74.0	Peak
7307.230	V	43.7	-28.3	36.4	51.8	54.0	AV
9738.747	V	56.3	-28.2	37.5	65.6	74.0	Peak
9738.747	V	42.8	-28.2	37.5	52.1	54.0	AV
2433.994	H	102.4	-32.2	28.5	98.7	----	Fundamental Peak
2433.94	H	82.1	-32.2	28.5	78.4	----	Fundamental AV
4875.018	H	57.1	-31.0	33.3	59.4	74.0	Peak
4875.018	H	43.0	-31.0	33.3	45.3	54.0	AV

Table 22 General Radiated Emission Data

Model number: Test Mode: 6 (wi-fi channel low)							
Frequency (MHz)	Polarization	Reading Value (dB μ V)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level dB (μ V/m)	Limits dB (μ V/m)	Detector
192.541	V	20.6	2.4	9.9	32.9	43.5	QP
327.414	H	18.8	2.9	14.4	36.1	46.0	QP
508.196	H	18.0	3.7	17.6	39.3	46.0	QP
545.997	H	19.2	3.9	18.7	41.8	46.0	QP
584.969	H	22.0	3.9	18.6	44.5	46.0	QP
624.829	H	18.6	4.3	19.1	42.0	46.0	QP
2463.282	V	103.9	-32.2	28.5	100.2	----	Fundamental Peak
2463.282	V	77.6	-32.2	28.5	73.9	----	Fundamental AV
4924.701	V	57.3	-31.0	33.3	59.6	74.0	Peak
4924.701	V	43.8	-31.0	33.3	46.1	54.0	AV
7387.730	V	56.3	-28.3	36.4	64.4	74.0	Peak
7387.730	V	43.9	-28.3	36.4	52.0	54.0	AV
9843.691	V	56.8	-28.2	37.5	66.1	74.0	Peak
9843.691	V	43.2	-28.2	37.5	52.5	54.0	AV
2463.292	H	102.4	-32.2	28.5	98.7	----	Fundamental Peak
2463..292	H	76.2	-32.2	28.5	72.5	----	Fundamental AV
4924.780	H	56.9	-31.0	33.3	59.2	74.0	Peak
4924.780	H	43.8	-31.0	33.3	46.1	54.0	AV
7387.730	H	56.3	-28.3	36.4	64.4	74.0	Peak
7387.730	H	43.1	-28.3	36.4	51.2	54.0	AV
9843.691	H	55.6	-28.2	37.5	64.9	74.0	Peak
9843.691	H	43.1	-28.2	37.5	52.4	54.0	AV

Table 23 Restricted Band Radiated Emission Data

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	
12.51975 -	240 - 285	3345.8 - 3358	
12.52025	322 - 335.4	3600 - 4400	
12.57675 -			
12.57725			
13.36 - 13.41			

All the emission of the above band were less than the limit 20dB.

7. MAXIMUM PEAK OUTPUT POWER (BLUE TOOTH)

7.1. Test Standard and Limit

7.1.1. Test Standard

FCC 15.247 (b)

7.1.2. Test Limit

Table 24 Peak output power Limit

Frequency MHz	Channels	Types of Devices	Power
2400-2483.5	≥ 75	Hopping	1 Watt

7.2. Test Procedure

Remove the antenna from the EUT and then connect the transmitter output to the power meter via a suitable attenuator. Set the EUT transmitting continuously to each of low, middle, and high frequency.

7.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

7.4. Test Data

Table 25 Peak output power data

Channel	Frequency (MHz)	Reading (dBm)	Limit	Result
Low	2402	-11.1	1W (30dBm)	Pass
Middle	2441	-11.3	1W (30dBm)	Pass
High	2480	-11.6	1W (30dBm)	Pass

8. HOPPING CHANNEL 20 DB BANDWIDTH

8.1. Test Standard and Limit

8.1.1. Test Standard

FCC 15.247 (a)

8.1.2. Test Limit

For frequency hopping systems operating in the 2400MHz-2483.5 MHz no limit for 20dB bandwidth.

8.2. Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=10KHz (1 % of Bandwidth.), Span= 3MHz, Sweep=auto
4. Mark the peak frequency and –20dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

8.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

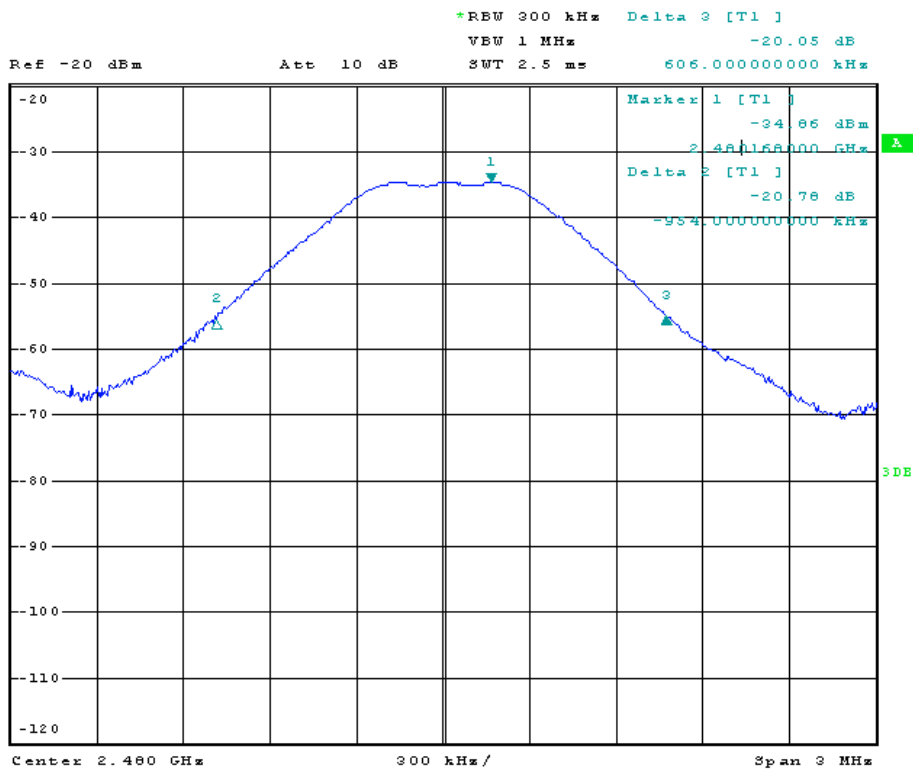
8.4. Test Data

Table 26 bandwidth test data

Channel	Frequency (MHz)	20 dB Bandwidth
Low	2402	1.518MHz
Mid	2441	1.530MHz
High	2480	1.560MHz



1 PE
MAXH



Date: 31.JUL.2008 22:15:38

9. BAND EDGES MEASUREMENT(BLUE TOOTH)

9.1. Test Standard and Limit

9.1.1. Test Standard

FCC Part 15 15.247(c)

9.2. Band Edge FCC 15.247(c) Limit

According to § 15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

9.3. Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.488GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.
7. Radiated Emission refer to section 9.

9.4. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

9.5. Test Data

NOTE: The band edge emission plot shows 32.0dBc. The emission of carrier strength list in the test result of channel 1 is 60.1V/m (AV), so the maximum field strength(AV) in restrict band is $60.1 - 32.0 = 28.1$ dBuV/m which is under 54dBuV/m(AV) limit.

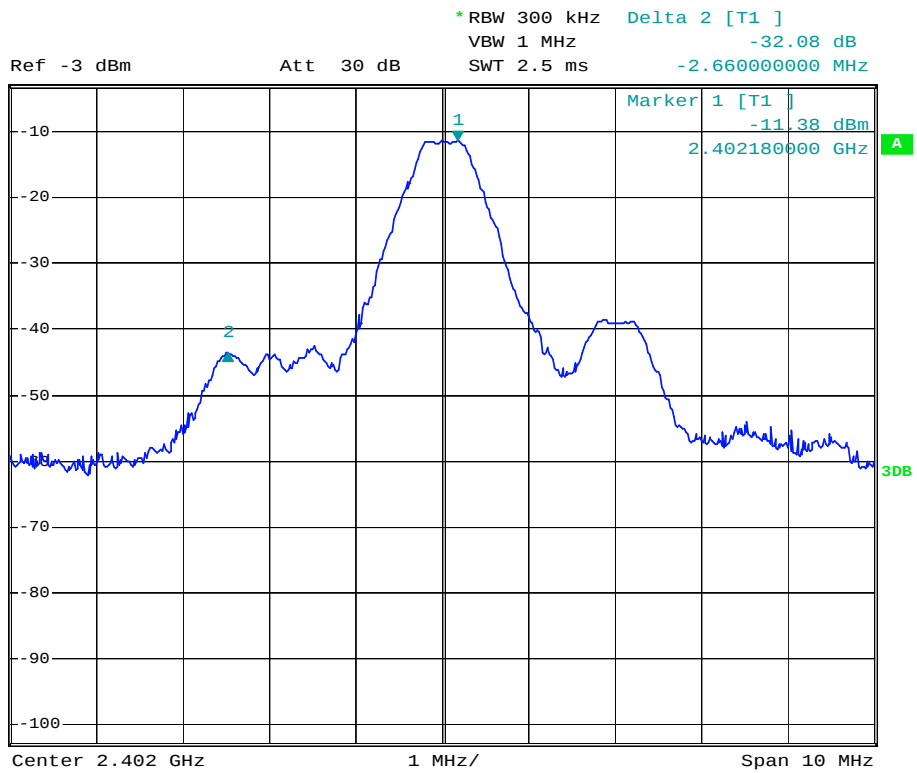
The emission of carrier strength list in the test result of channel 1 is 61.2V/m (PK), so the maximum field strength (PK)in restrict band is $61.2 - 32.0 = 29.2$ dBuV/m which is under 74dBuV/m (PK)limit.

The band edge emission plot shows 43.8dBc. The emission of carrier strength list in the test result of channel 1 is 46.9dBuV/m (AV), so the maximum field strength (AV)in restrict band is $46.9 - 43.8 = 3.1$ dBuV/m which is under 54dBuV/m (AV)limit.

The emission of carrier strength list in the test result of channel 1 is 49.2V/m (PK), so the maximum field strength (PK)in restrict band is $49.2 - 43.8 = 5.4$ dBuV/m which is under 74dBuV/m (PK)limit.



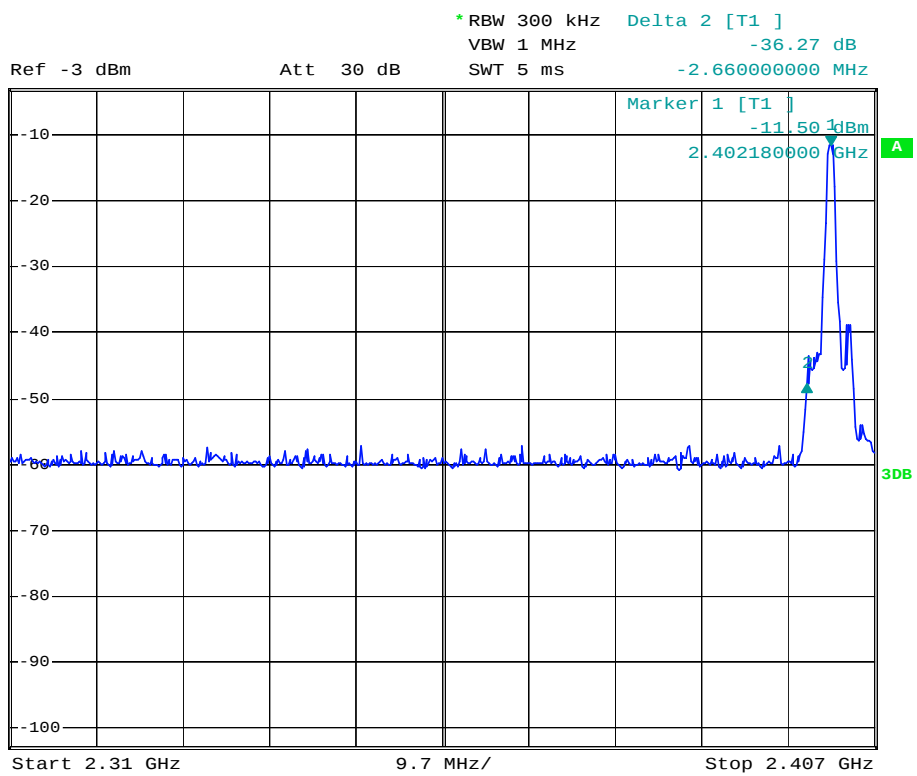
1 PK
VIEW



Date: 31.JUL.2008 22:35:17



1 PK
MAXH



Date: 31.JUL.2008 22:36:03



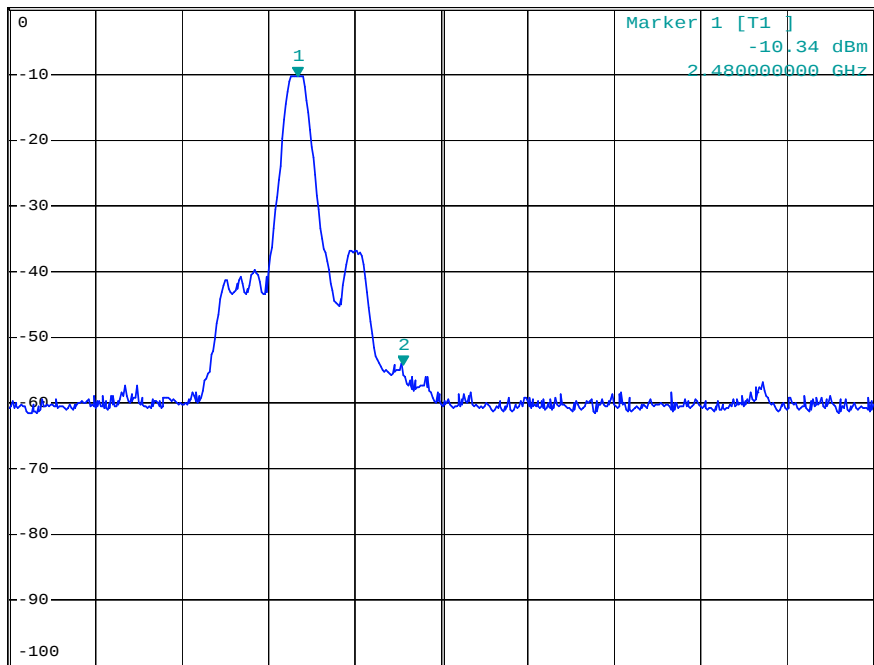
* RBW 300 kHz Marker 2 [T1]
VBW 1 MHz -54.17 dBm
SWT 2.5 ms 2.483680000 GHz

Ref 0 dBm

Att 30 dB

2.483680000 GHz

1 PK
VIEW



Start 2.47 GHz

3 MHz/

Stop 2.5 GHz

Date: 6.AUG.2008 22:37:40

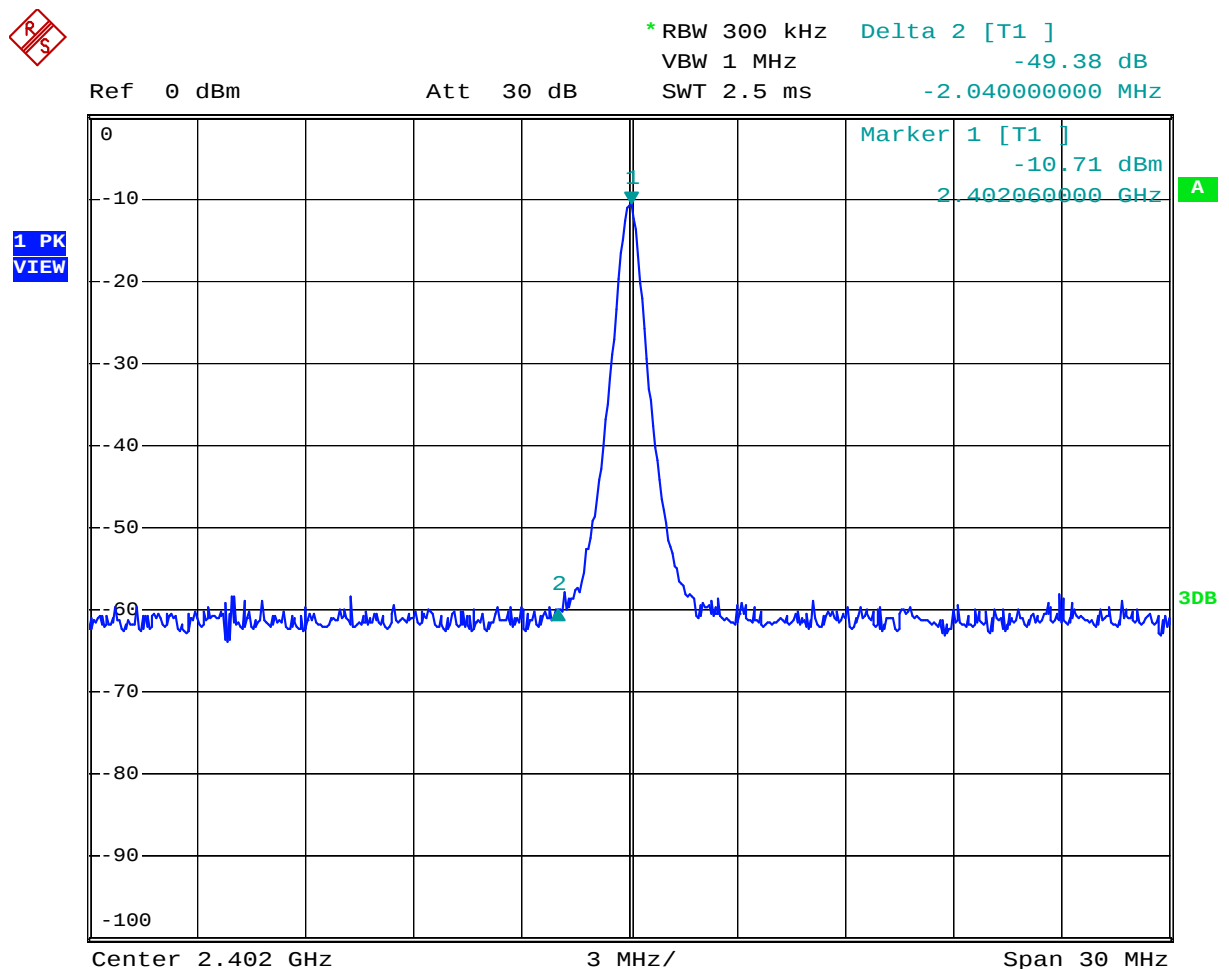
Band edge for no modulation.

NOTE: The band edge emission plot of shows 49.3dBc. The emission of carrier strength list in the test result of channel 1 is 60.1V/m (AV), so the maximum field strength(AV) in restrict band is $60.1 - 49.3 = 10.8$ dBuV/m which is under 54dBuV/m(AV) limit.

The emission of carrier strength list in the test result of channel 1 is 61.2V/m (PK), so the maximum field strength (PK)in restrict band is $61.2 - 49.3 = 11.9$ dBuV/m which is under 74dBuV/m (PK)limit.

The band edge emission plot of shows 44.6dBc. The emission of carrier strength list in the test result of channel 1 is 46.9dBuV/m (AV), so the maximum field strength (AV)in restrict band is $46.9 - 44.6 = 2.3$ dBuV/m which is under 54dBuV/m (AV)limit.

The emission of carrier strength list in the test result of channel 1 is 49.2V/m (PK), so the maximum field strength (PK)in restrict band is $49.2 - 44.6 = 4.6$ dBuV/m which is under 74dBuV/m (PK)limit.



Date: 6.AUG.2008 22:38:40



*RBW 300 kHz Delta 2 [T1]
VBW 1 MHz -55.02 dB
SWT 2.5 ms 3.560000000 MHz

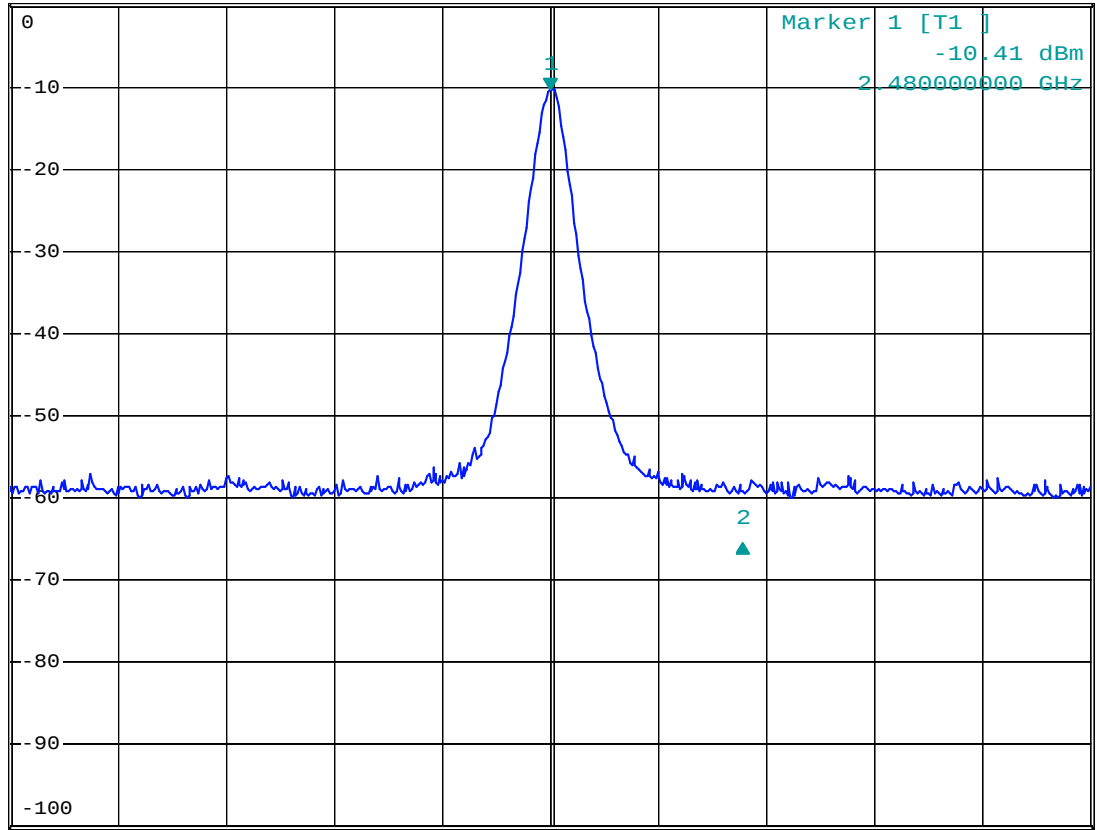
Ref 0 dBm

Att 30 dB

SWT 2.5 ms

3.560000000 MHz

1 PK
MAXH



Center 2.48 GHz

2 MHz/

Span 20 MHz

Date: 6.AUG.2008 22:35:20

10. NUMBER OF HOPPING CHANNEL(BLUE TOOTH)

10.1.Test Standard and Limit

10.1.1.Test Standard

FCC Part 15 15.247(a)

10.2.Limit

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

10.3.Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW,VBW=100KHz,
5. Max hold, view and count how many channel in the band.

10.4.Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

10.5.Test Data

The nominal channel spacing of the Bluetooth system is 1Mhz independent of the operating mode.

The maximum “initial carrier frequency tolerance” which is allowed for Bluetooth is $f_{center} = 75 \text{ kHz}$.

This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/07-E) for three frequencies (2402, 2441, 2480 MHz).

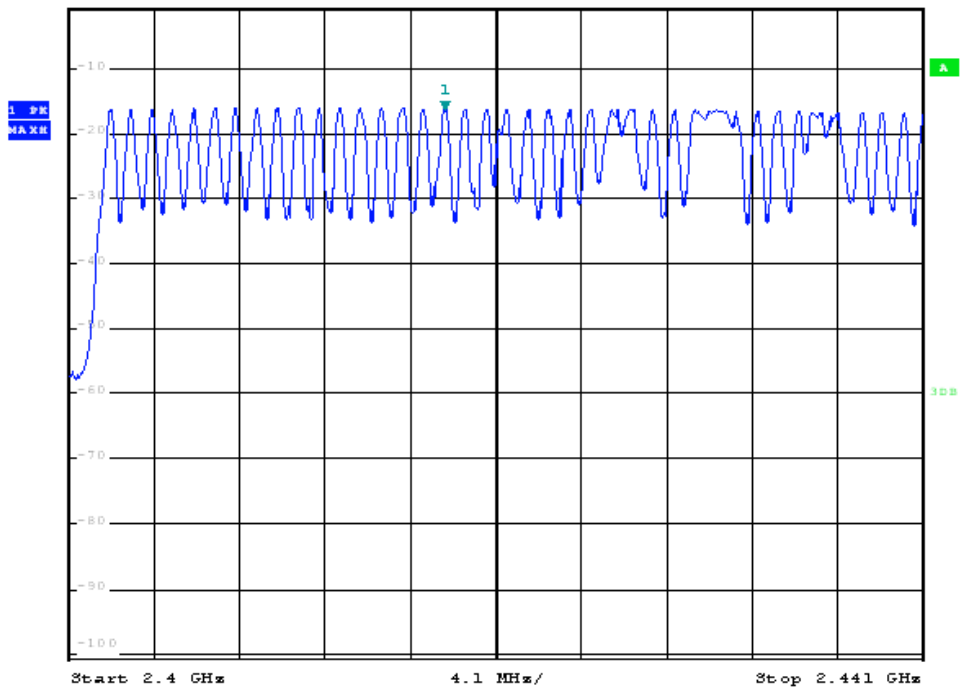
Additionally an example for the channel separation is given in the test report

Table 27 Number of hopping channel test data

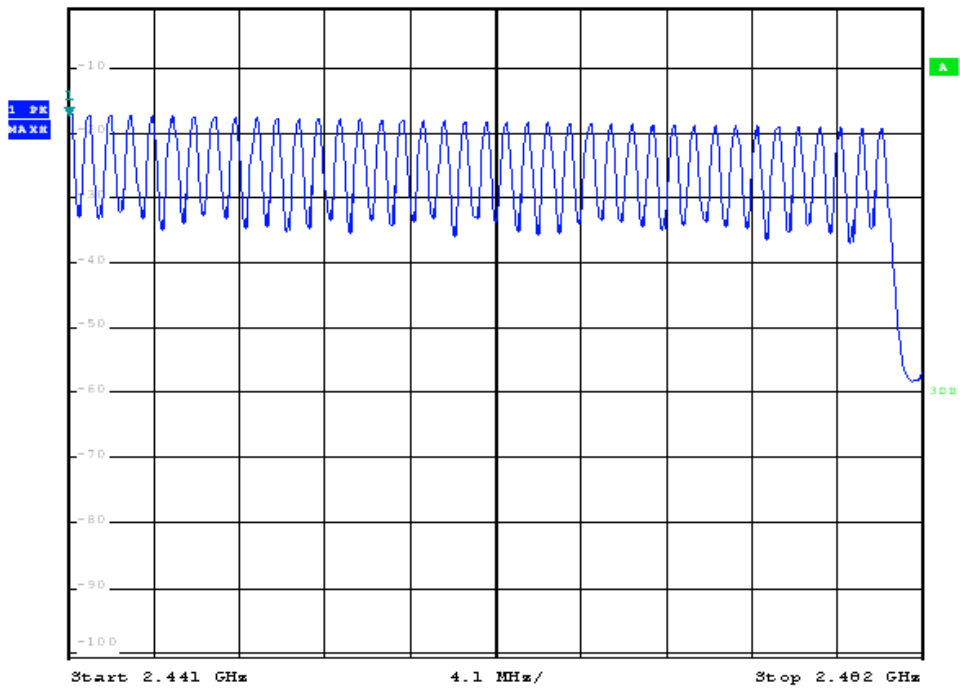
Total No of hopping channel	Limit (CH)	Measurement result (CH)	Result
	>15	79	Pass



• RBW 300 kHz Marker 1 (T1)
VBW 1 MHz -16.25 dBm
Ref -1 dBm Att 30 dB SWT 2.5 ms 2.418040000 GHz



• RBW 300 kHz Marker 1 (T1)
VBW 1 MHz -17.53 dBm
Ref -1 dBm Att 30 dB SWT 2.5 ms 2.441000000 GHz



11. CHANNEL SEPARATION

11.1. Test Standard and Limit

11.1.1. Test Standard

FCC Part 15 15.247(a)

11.2. Limit

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25KHz or the 20dB bandwidth of the hopping channel, whichever is greater.

11.3. Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel .
4. Set the spectrum analyzer as RBW,VBW=100KHz, Adjust Span to 5 MHz, Sweep = auto.
5. Max hold. Mark 3 Peaks of hopping channel and record the 3 peaks frequency.

11.4. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

11.5. Test Data

Table 28 Channel separation test data

Channel separation	Limit	Result
MHz	kHz	
1	$\geq 25\text{KHz}$ or $2/3 \times 20\text{ dB}$ bandwidth	Pass



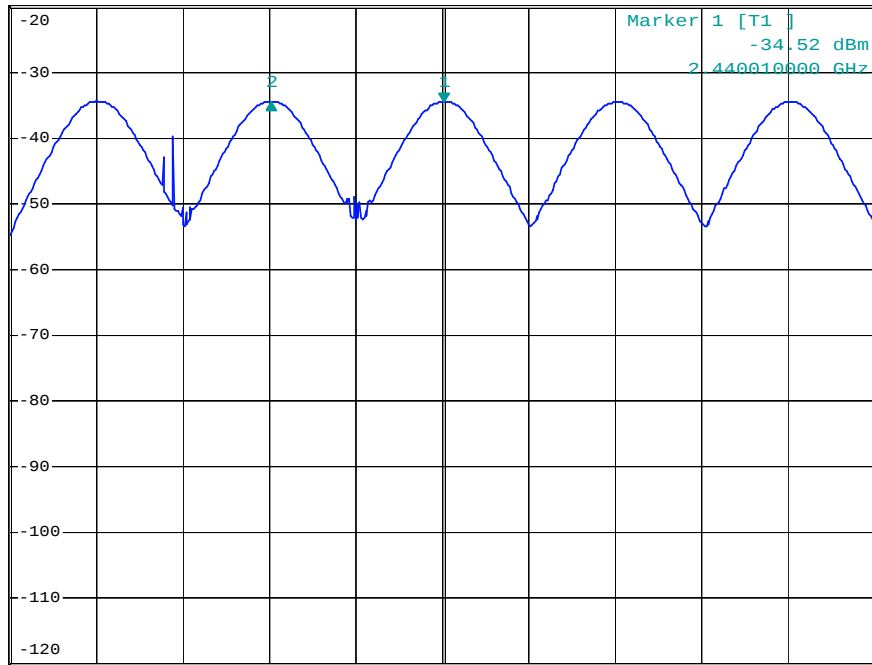
* RBW 300 kHz Delta 2 [T1]
VBW 1 MHz 0.07 dB
SWT 2.5 ms -1.000000000 MHz

Ref -20 dBm

Att 10 dB

-1.000000000 MHz

1 PK
VIEW



Center 2.44 GHz

500 kHz/

Span 5 MHz

Date: 31.JUL.2008 21:50:00

12. TIME OF OCCUPANCY (DWELL TIME)

12.1.Test Standard and Limit

12.1.1.Test Standard

FCC Part 15 15.247(f)

12.2. Limit

The average time of occupancy on any frequency shall not exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

12.3.Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW,VBW=100KHz, Span = 0Hz , Adjust Sweep = 30s.
5. Repeat above procedures until all frequency measured were complete.

12.4.Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

12.5.Test Data

The EUT working on DH3 mode only.

A period time = $0.4 * 79 = 31.6$ (s)

Dwell time = time slot length * hop rate / number of hopping channels *31.6

DH3 dwell time= $0.390*1600/2/79*31.6=124.8\text{ms}$

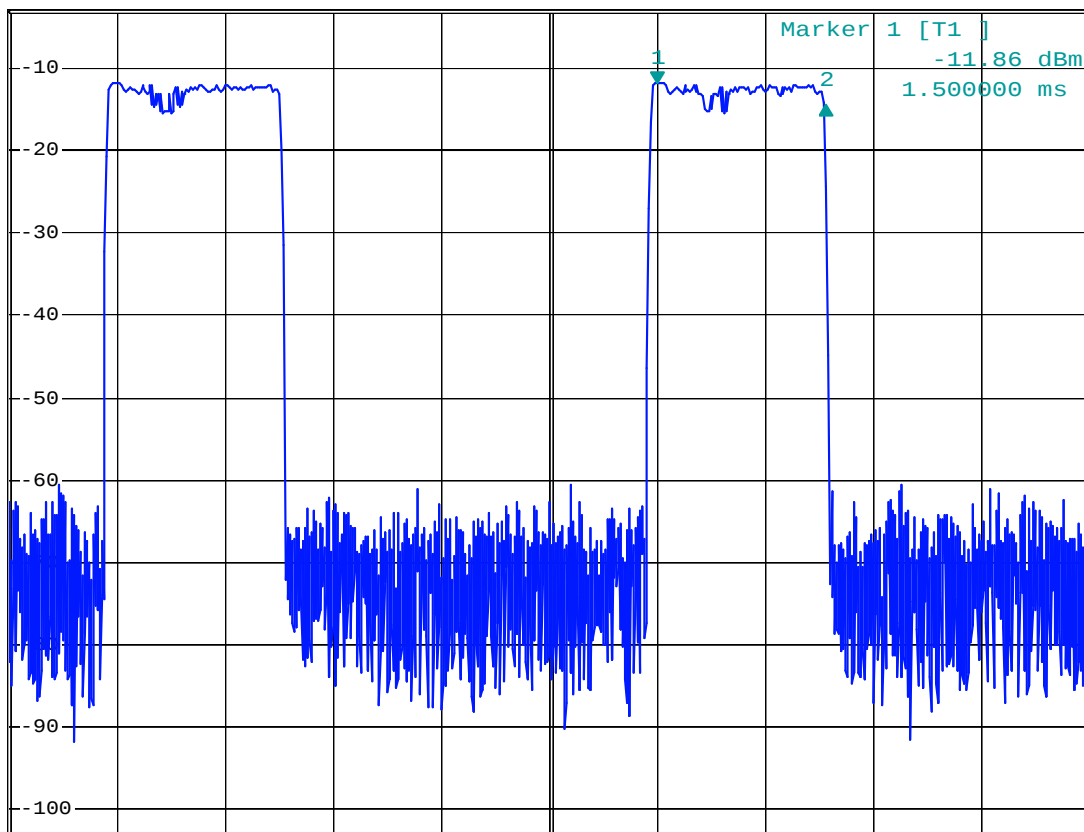


RBW 300 kHz Delta 2 [T1]
VBW 1 MHz -2.67 dB
SWT 2.5 ms 390.000000 μ s

Ref -3 dBm

Att 30 dB

1 AP
VIEW



A

3DB

Center 2.441 GHz

250 μ s/

Date: 31.JUL.2008 22:41:13

13. PEAK POWER SPECTRAL DENSITY(BLUE TOOTH)

13.1.Test Standard and Limit

13.1.1.Test Standard

FCC Part 15 15.247(d)

13.2.Peak Power Spectral Density Limit

According to §15.247(d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3kHz band during any time interval of continuous transmission.

13.3.Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3KHz, VBW = 10KHz, Span = 300KHz, Sweep=100s
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were compl.

13.4.Test Arrangement

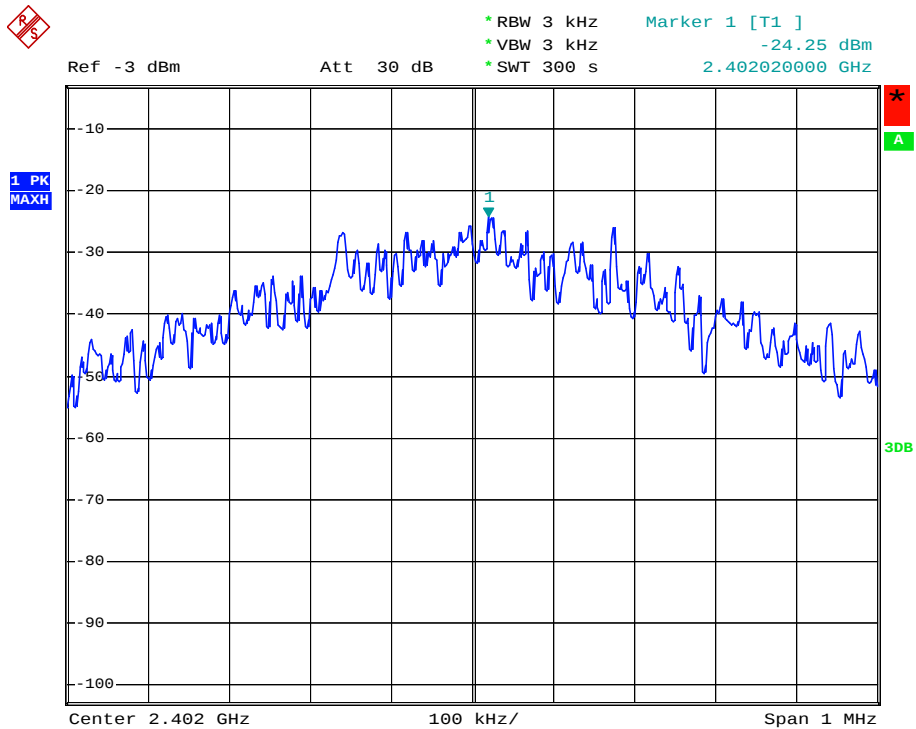
The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

13.5.Test Data

Table 29 Peak power test data

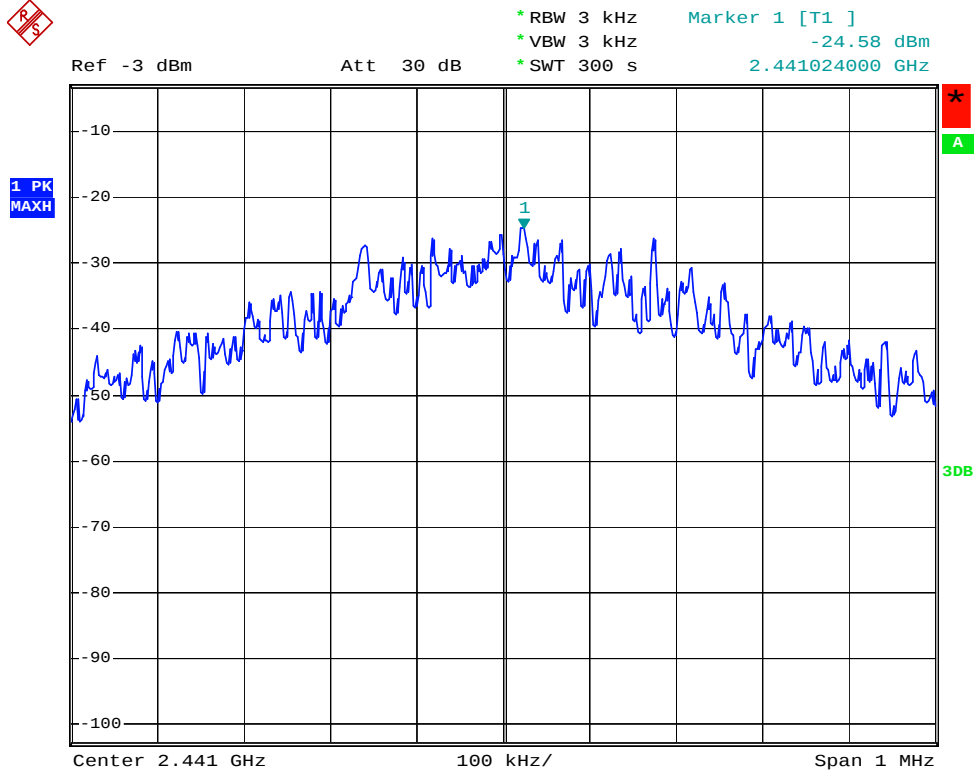
channel	RF Power Density Level (dBm)	Limit(dBm)
2402MHz	-24.2	8
2441MHz	-24.5	8
2480MHz	-23.6	8

low



Date: 31.JUL.2008 22:55:55

Mid

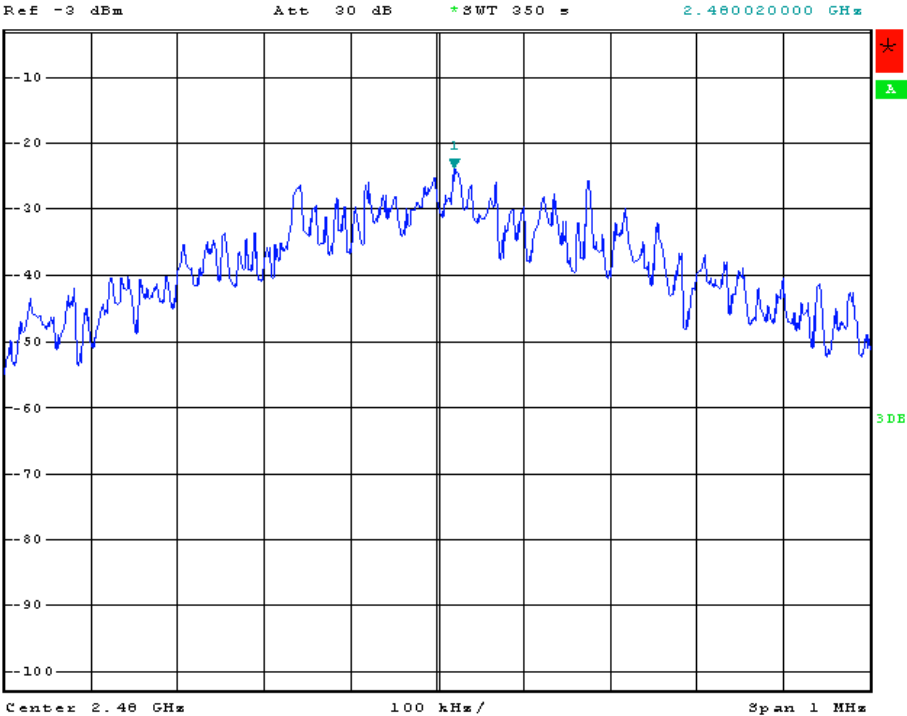


Date: 31.JUL.2008 22:50:18

High



*RBW 3 kHz Marker 1 [T1]
*VBW 3 kHz -23.65 dBm
*SMT 350 m 2.480020000 GHz



Date: 31.JUL.2008 22:57:00

14. ANTENNA REQUIREMENT (BLUE TOOTH)

14.1.Standard Applicable

For intentional device, according to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

And according to § 15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

14.2.Antenna Connected Construction

The antenna used in this product is chip antenna. the antenna is soldered on PCB. The Peak Gain of the antenna is 0dBi.

15. 6DB BANDWIDTH MEASUREMENT (WI-FI)

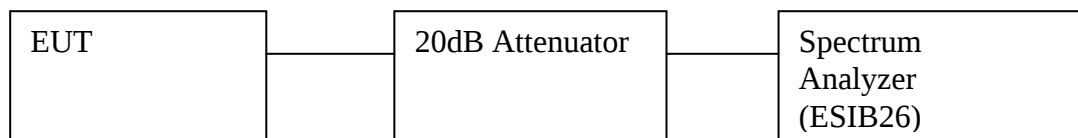
15.1.LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

15.2.TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

15.3.TEST SETUP

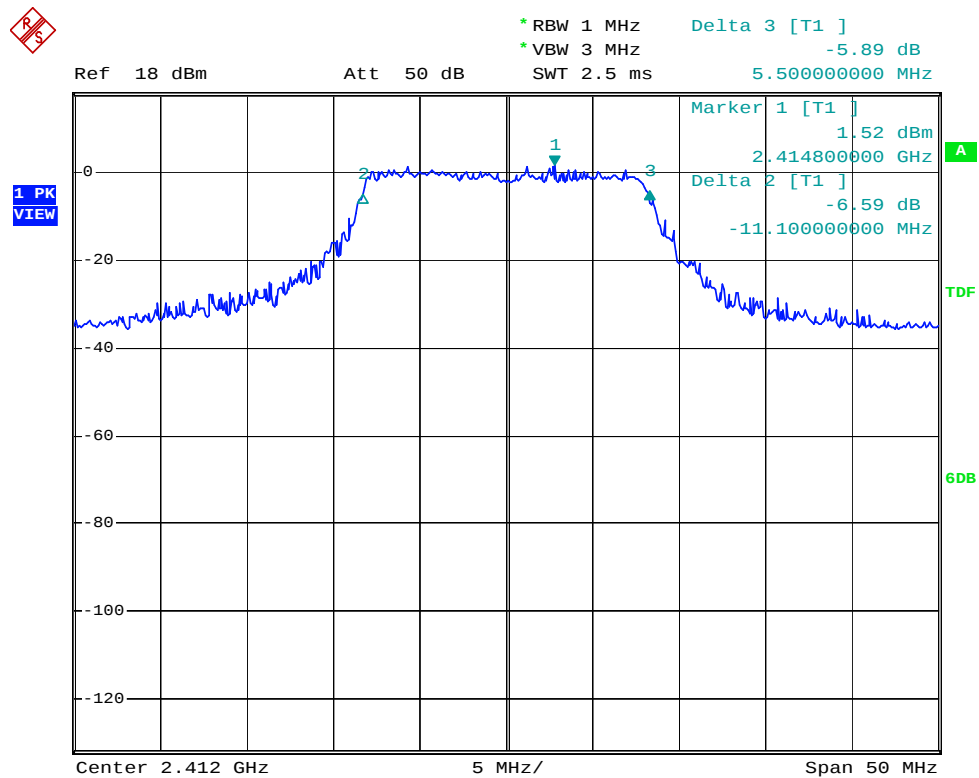


15.4.Test Data

Table 30 6dB Bandwidth Test Data

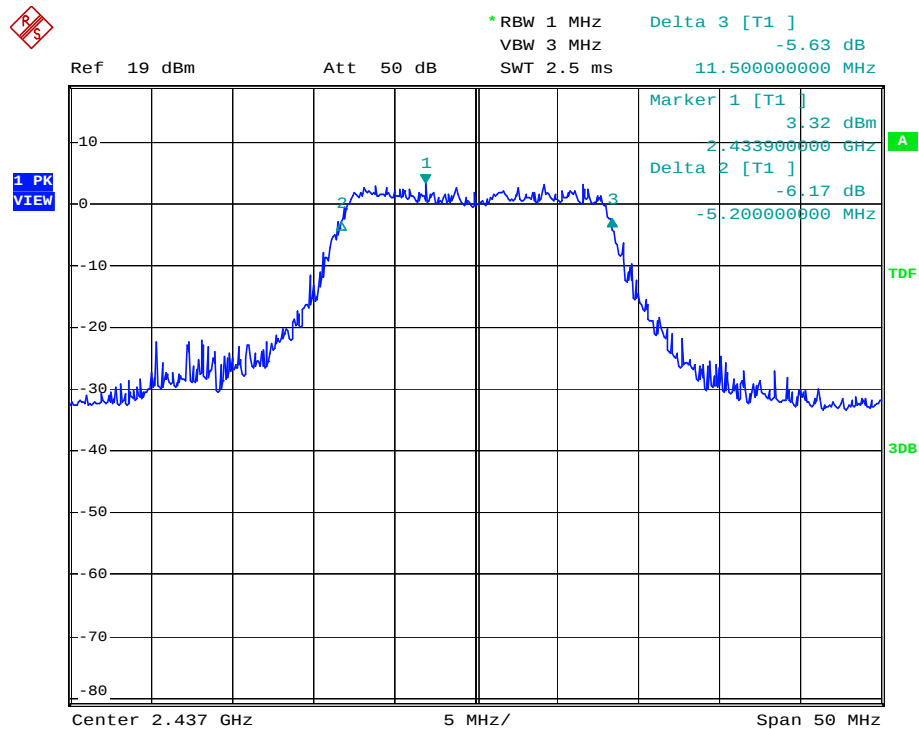
CHANNEL	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	results
Ch1	16.6	0.5	Pass
Ch6	16.7	0.5	Pass
Ch11	16.9	0.5	Pass

Channel low



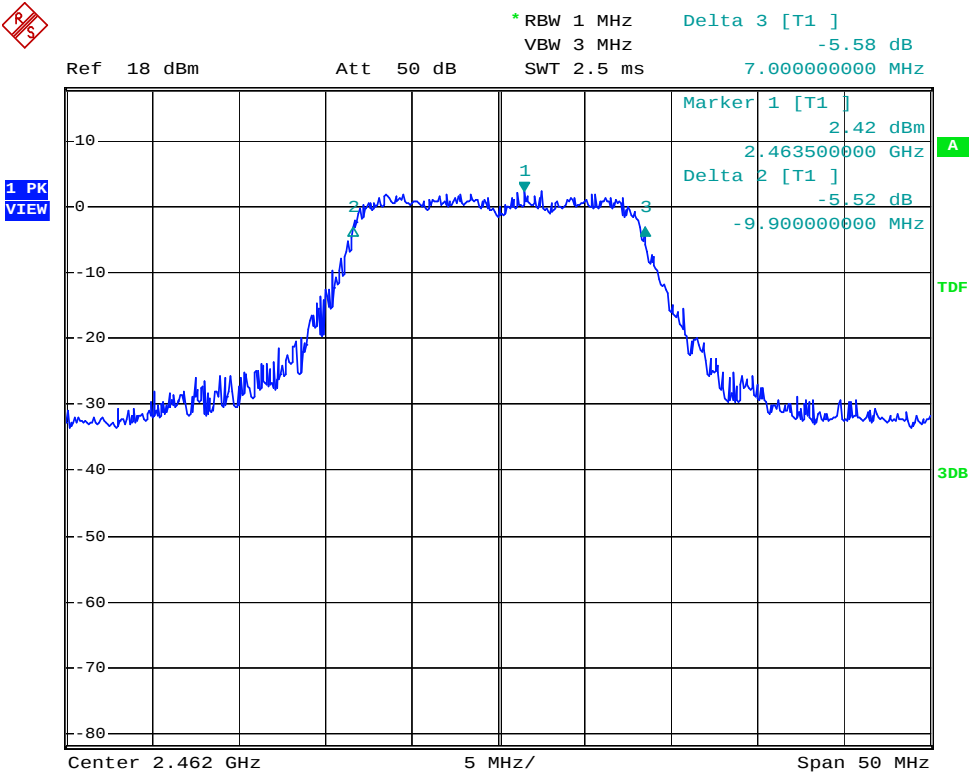
Date: 3.AUG.2008 23:56:28

Channel med



Date: 4.AUG.2008 00:24:02

Channel High



Date: 4.AUG.2008 00:37:13

16. MAXIMUM PEAK OUTPUT POWER (WI-FI)

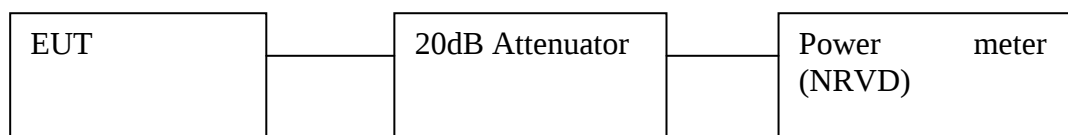
16.1.LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

16.2.TEST PROCEDURES

1. A detector was used on the output port of the EUT. An power meter was used to read the response of the detector.
- 2.set the power meter to Peak Power measurement mode.
3. let the EUT working in transmit mode, and record the reading of the power meter.
4. the output power= reading+20dB

16.3.TEST SETUP



16.4.EUT OPERATING CONDITIONS

Same as Item 4.3.6

16.5.Test Data

Table 31 Peak output power data

Channel	Frequency (MHz)	Reading (dBm)	Limit	Result
Low	2412	12.4	1W (30dBm)	Pass
Middle	24371	13.7	1W (30dBm)	Pass
High	2462	12.9	1W (30dBm)	Pass

17. POWER SPECTRAL DENSITY MEASUREMENT (WI-FI)

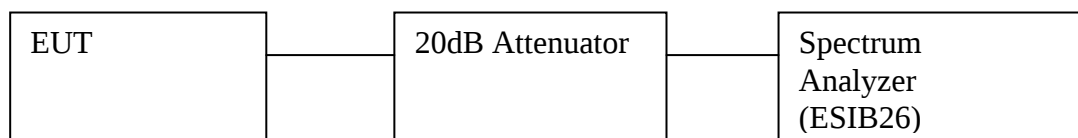
17.1.LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

17.2.TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 3kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

17.3.TEST SETUP

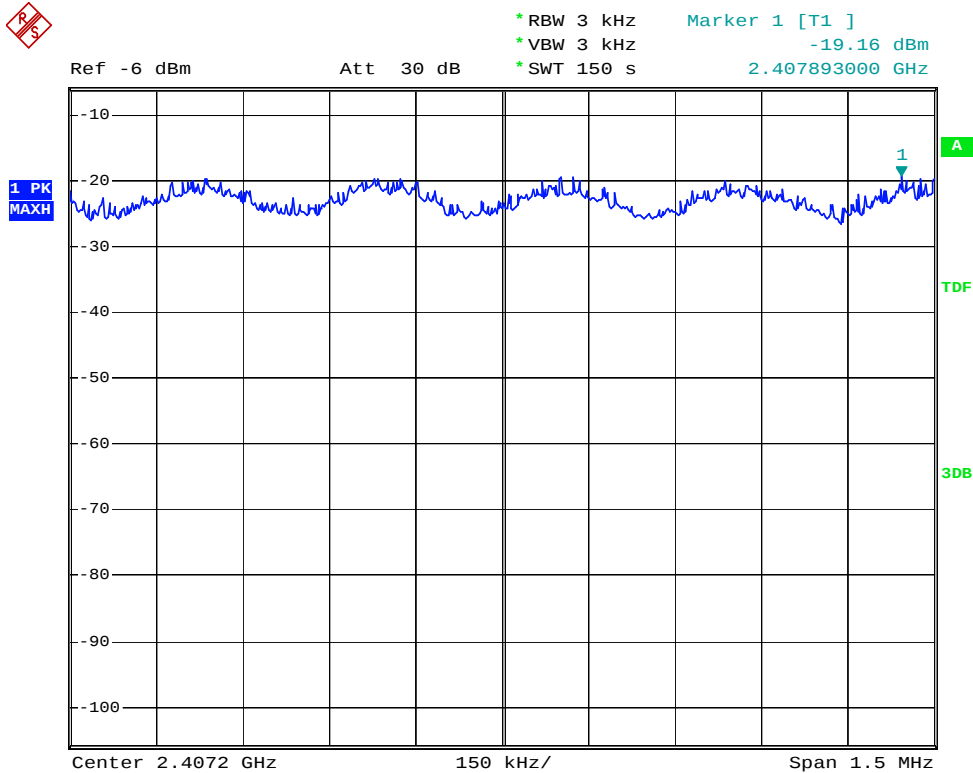


17.4.Test Data

Table 32 Power Density Test Data

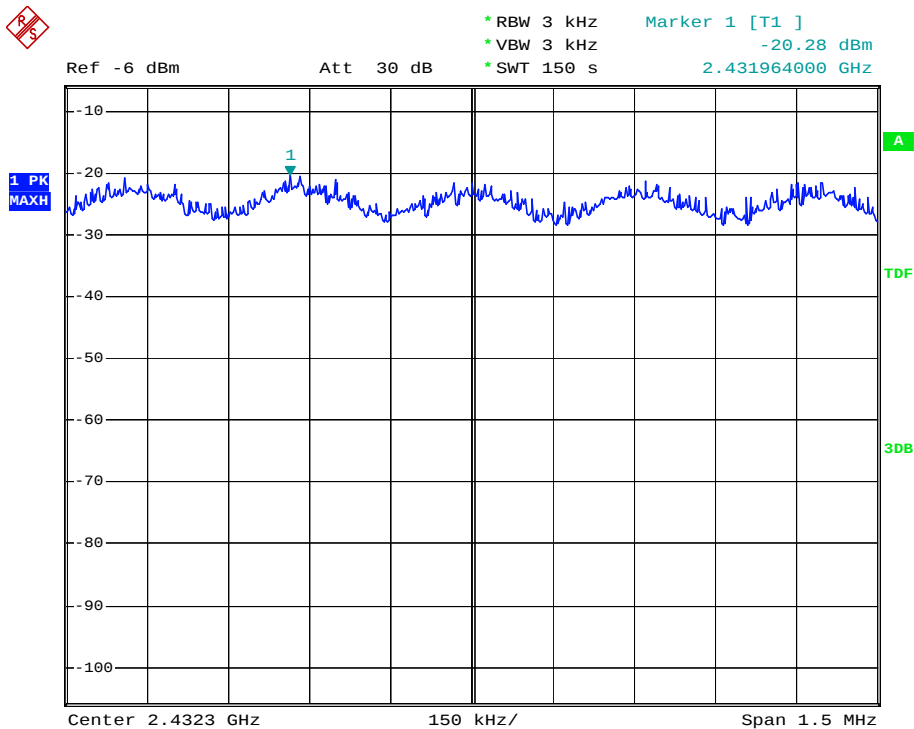
channel	RF Power Density Level (dBm)	Limit(dBm)
2412MHz	-19.1	8
2437MHz	-20.2	8
2462MHz	-21.0	8

ch1



Date: 4.AUG.2008 00:18:03

Ch6



Date: 4.AUG.2008 00:31:33

Ch11

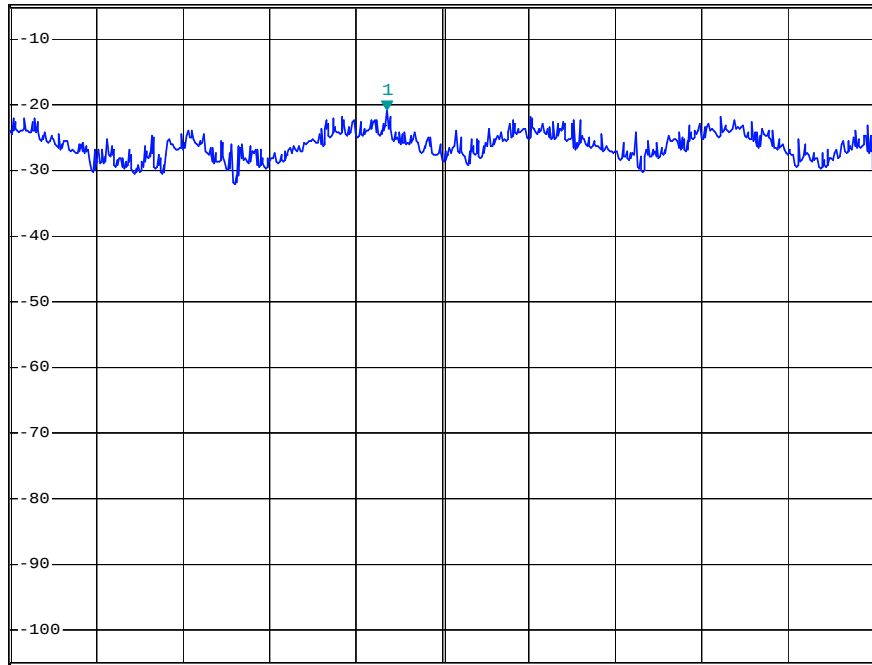


* RBW 3 kHz Marker 1 [T1]
* VBW 3 kHz -21.01 dBm
* SWT 150 s 2.468904000 GHz

Ref -5 dBm

Att 30 dB

1 PK
MAXH



Center 2.469 GHz

150 kHz/

Span 1.5 MHz

Date: 4.AUG.2008 00:46:07

18. BAND EDGES MEASUREMENT (WI-FI)

18.1.LIMITS OF BAND EDGES MEASUREMENT

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

18.2.TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

The spectrum plots (Peak RBW=VBW=100kHz) are attached on the following pages.

18.3.EUT OPERATING CONDITION

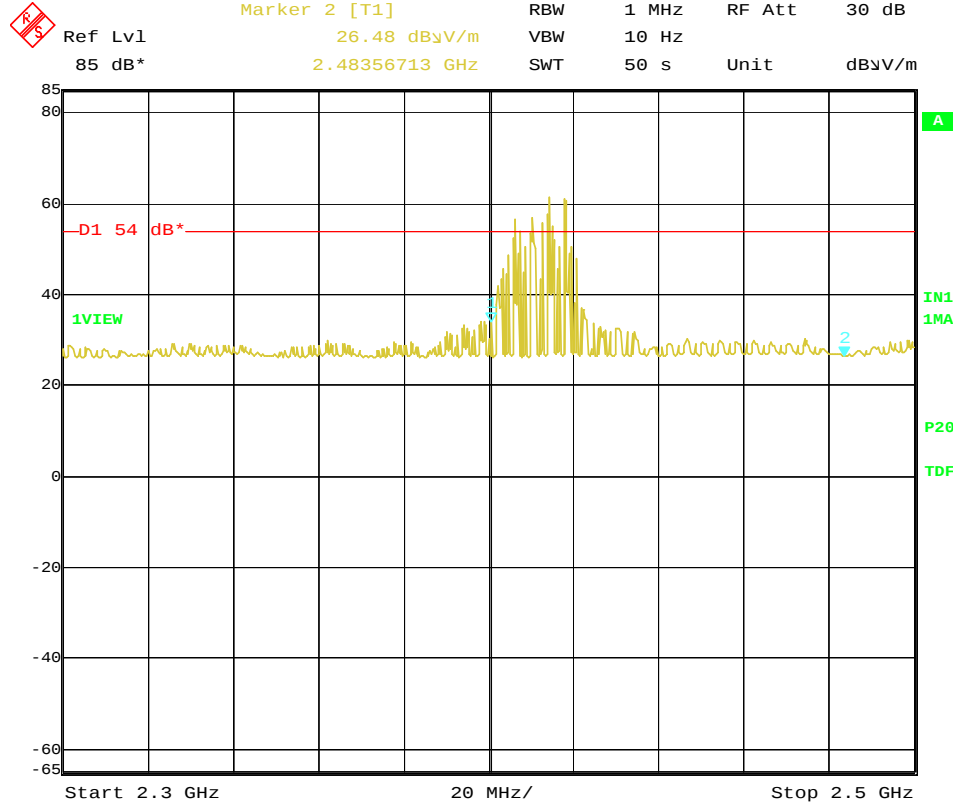
Mode1

Mode 3

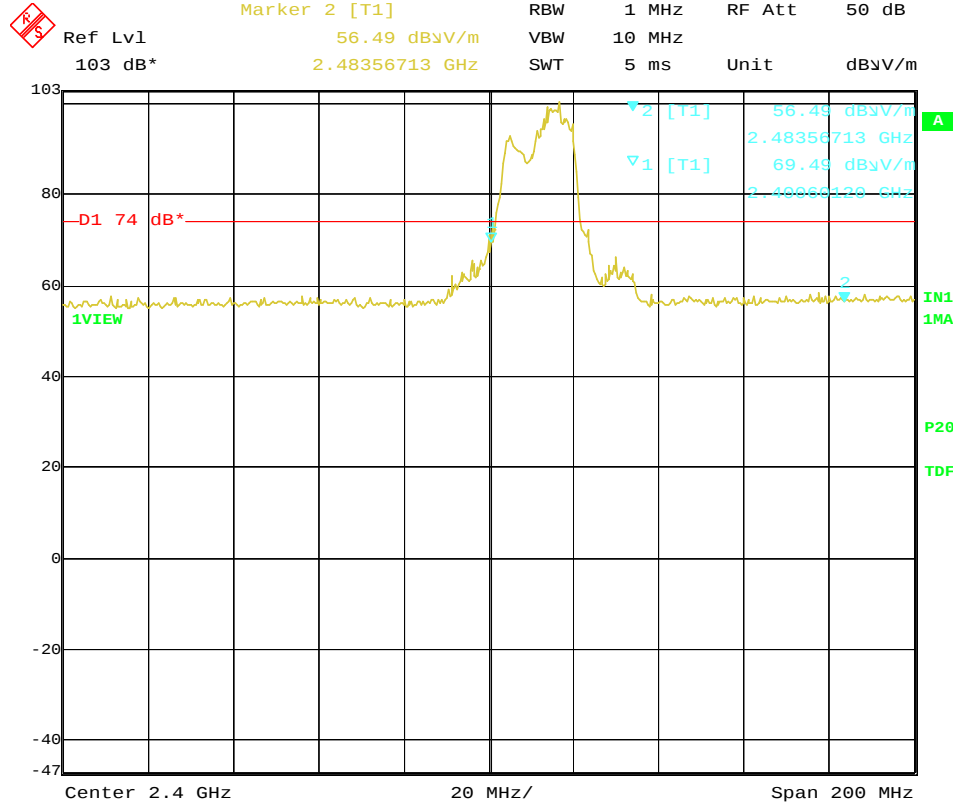
18.4.TEST RESULTS

The spectrum plots are attached on the following images. It shows compliance with the requirement in part 15.247(d).

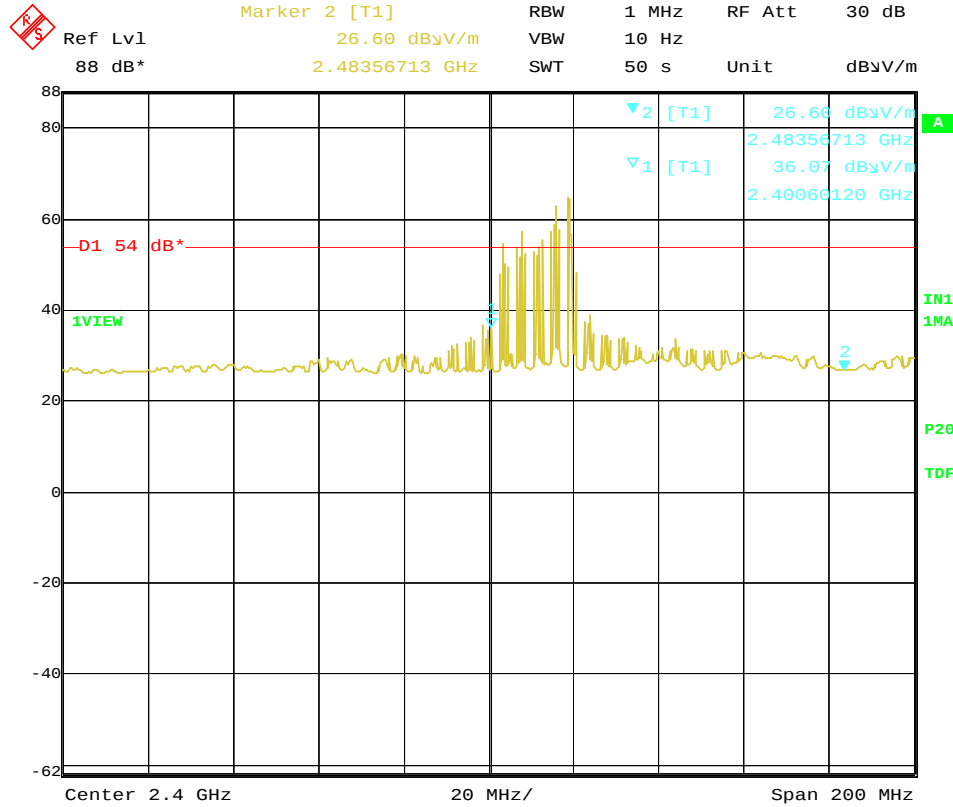
Ch1 AV Horizontal



Ch1 Peak Horizontal

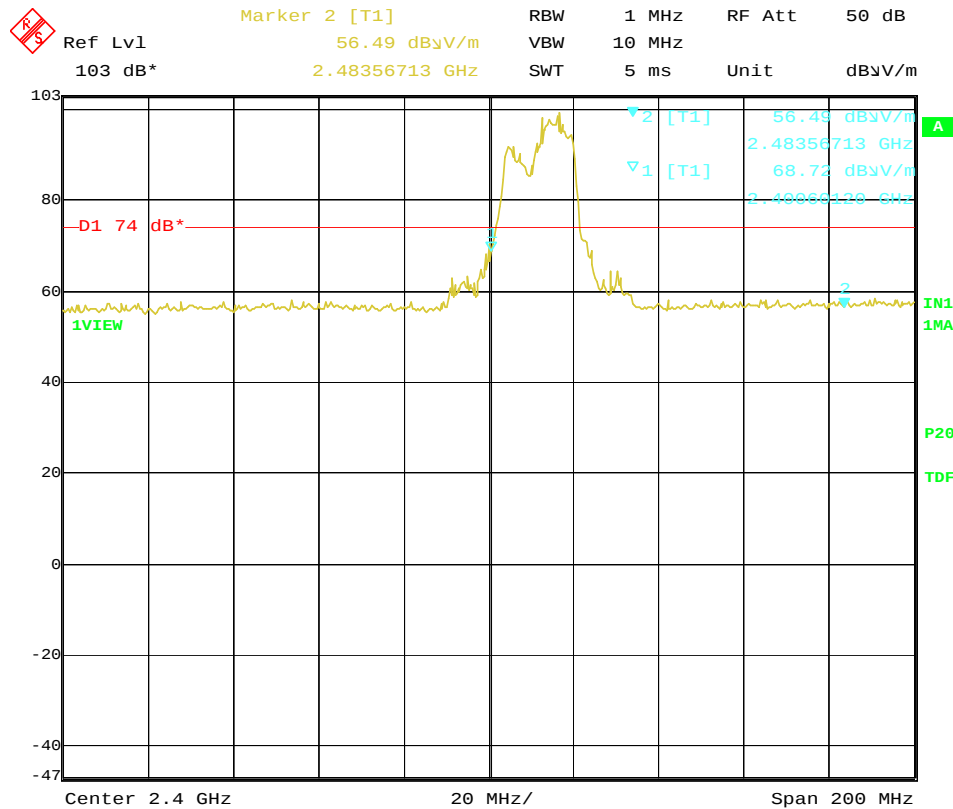


Ch1 AV Vertical



Date: 8.AUG.2008 14:08:30

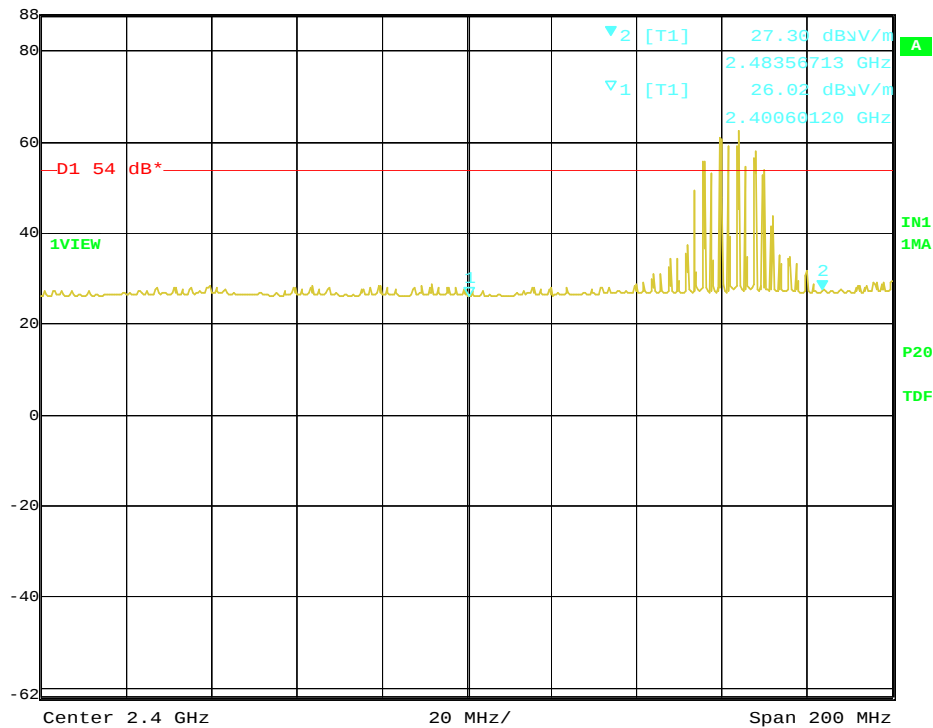
Ch1 Peak Vertical



Date: 8.AUG.2008 14:00:24

Ch11 AV Horizontal

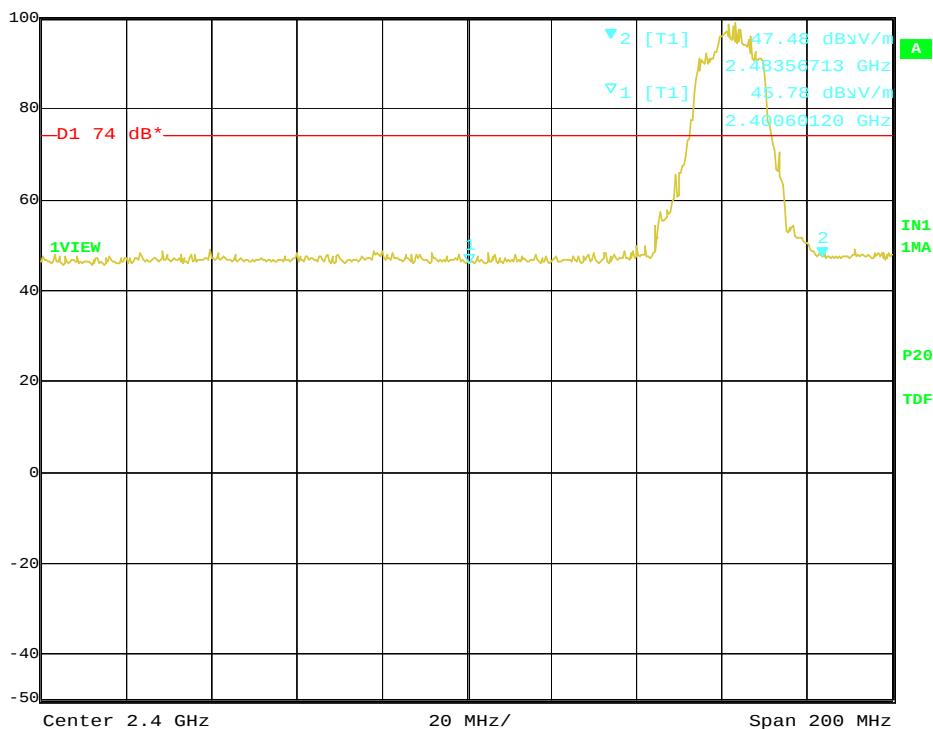

 Ref Lvl 88 dB*
 Marker 2 [T1] 27.30 dB μ V/m 2.48356713 GHz
 RBW 1 MHz RF Att 30 dB
 VBW 10 Hz
 SWT 50 s Unit dB μ V/m



Date: 8.AUG.2008 14:14:27

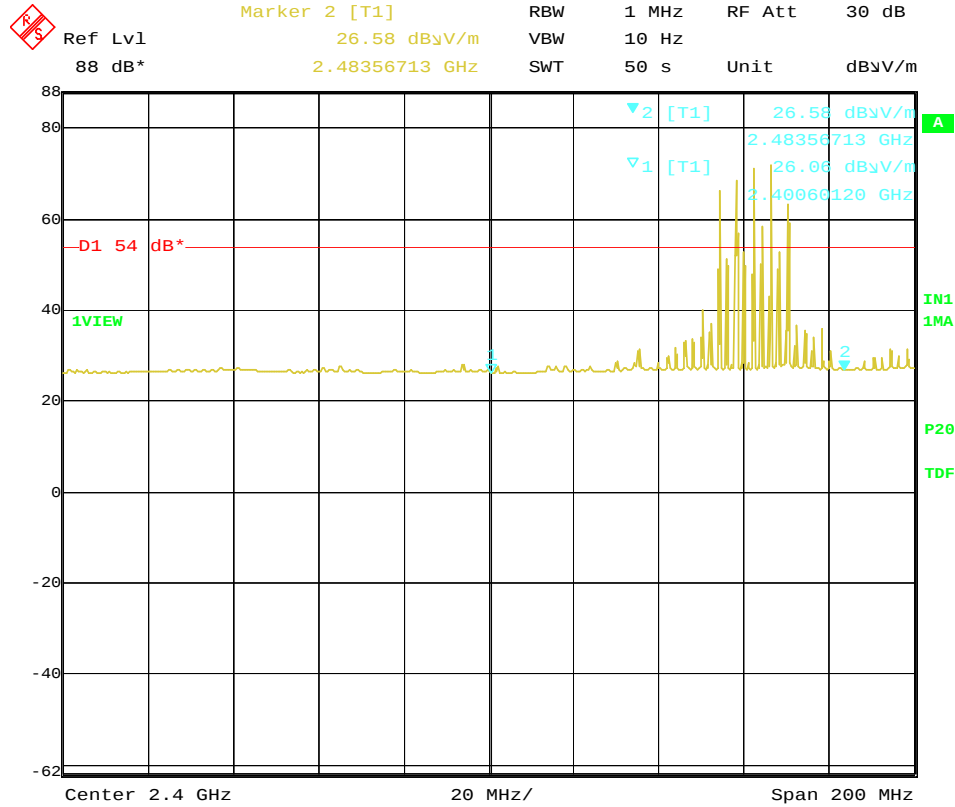
Ch11 Peak Horizontal


 Ref Lvl 100 dB*
 Marker 2 [T1] 47.48 dB μ V/m 2.48356713 GHz
 RBW 1 MHz RF Att 40 dB
 VBW 10 MHz
 SWT 5 ms Unit dB μ V/m



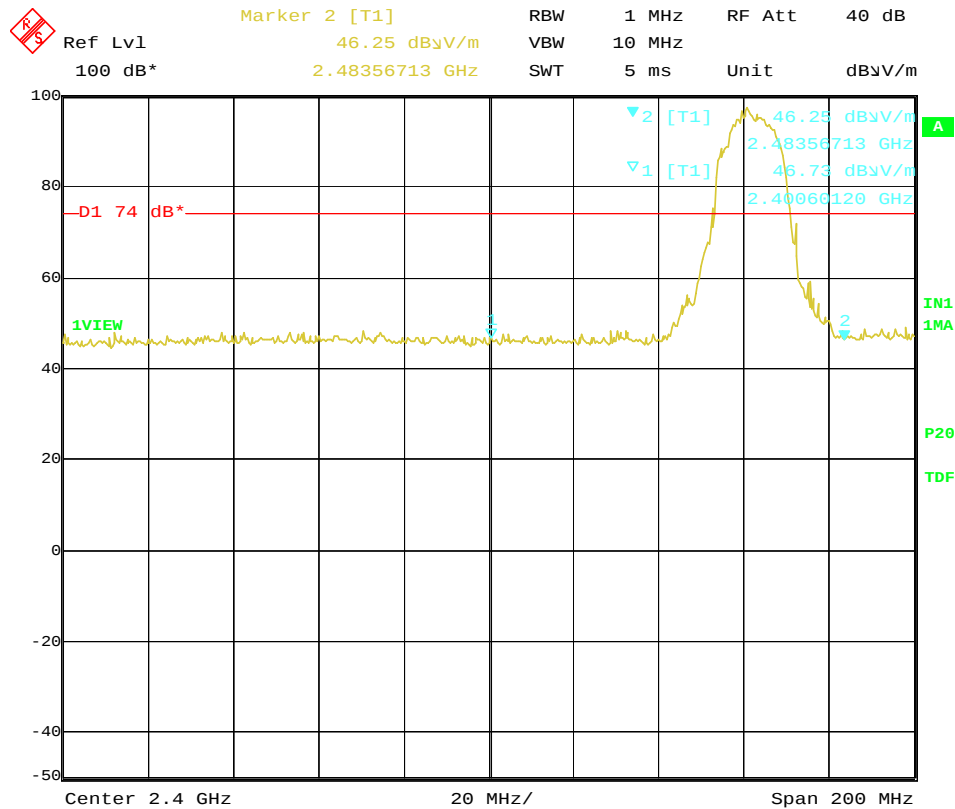
Date: 8.AUG.2008 14:15:53

Ch11 AV Vertical



Date: 8.AUG.2008 14:12:42

Ch11 Peak Vertical



Date: 8.AUG.2008 14:16:23

19. ANTENNA REQUIREMENT (WI-FI)

19.1. STANDARD APPLICABLE

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

19.2. ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is chip antenna. the antenna is soldered on PCB. The Peak Gain of the antenna is 0dBi.

20. MPE CALCULATION

Equation from page 18 of OET Bulletin 65, Edition 97-01

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

where: S = power density

P = power input to the antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 13.7 (dBm)

Maximum peak output power at antenna input terminal: 23.4 (mW)

Peak Antenna gain(typical): 0 (dBi)

Maximum antenna gain: 1 (numeric)

Prediction distance: 20 (cm)

Prediction frequency: 2450 (MHz)

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm²)

Power density at prediction frequency: 0.004 (mW/cm²)

APPENDIX I TEST PHOTO

Photo 1 Conducted Emission Test



Photo 2 Conducted Emission Test



Photo 3 Conducted Emission Test



Photo 4 Radiated Emission Test

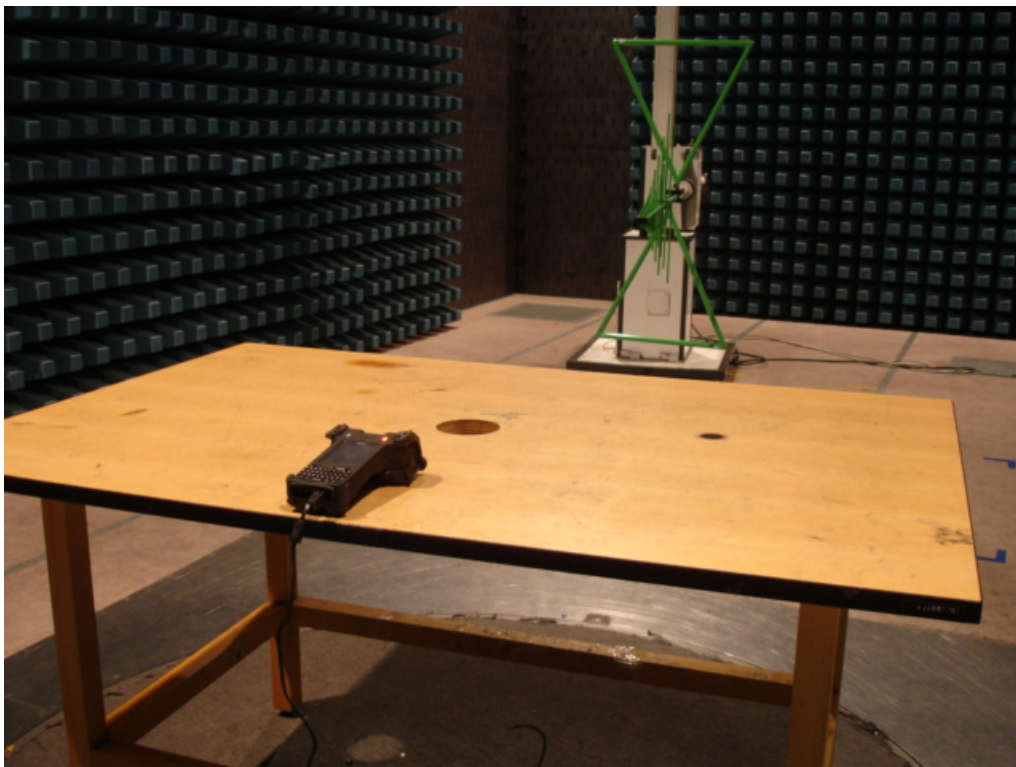


Photo 5 Radiated Emission Test



Photo 6 Radiated Emission Test

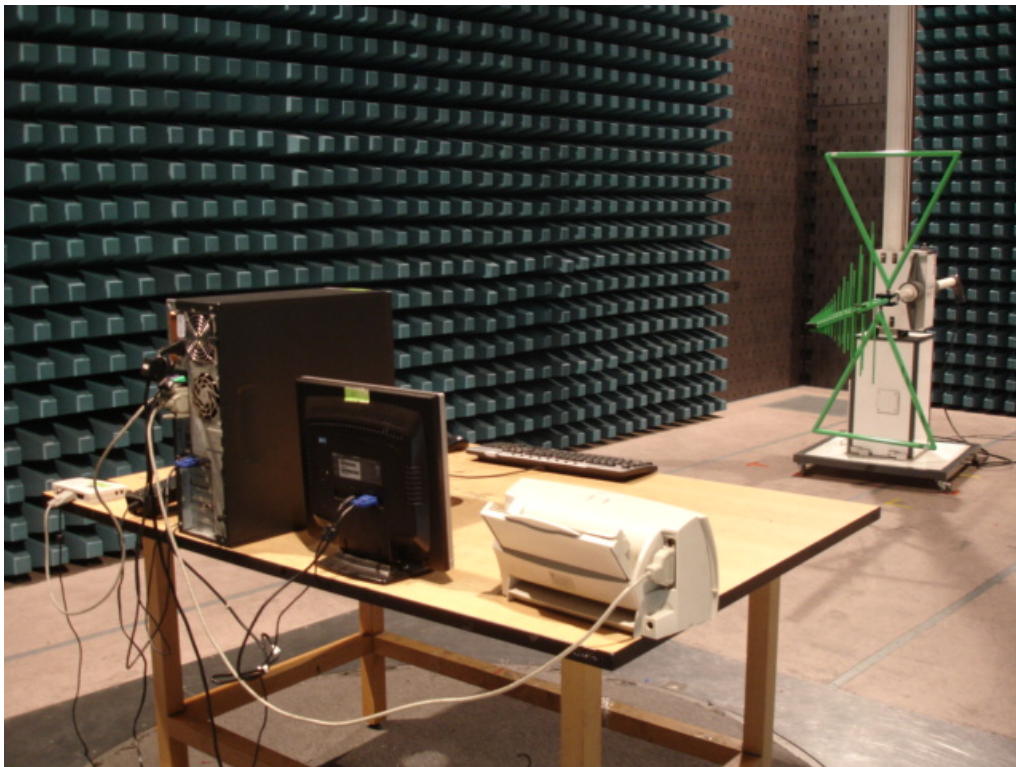
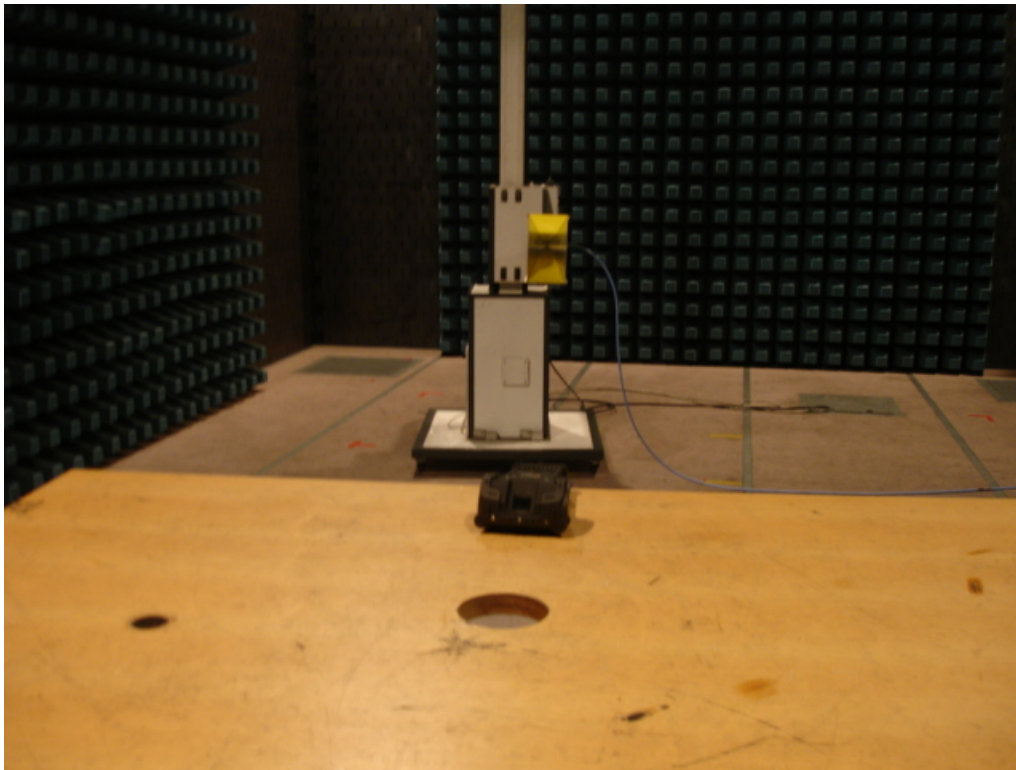


Photo 7 Radiated Emission Test



APPENDIX II EUT PHOTO

Photo 1 Appearance of EUT



Photo 2 Appearance of EUT



Photo 3 Inside of EUT



Photo 4 Inside of EUT



Photo 5 Inside of EUT

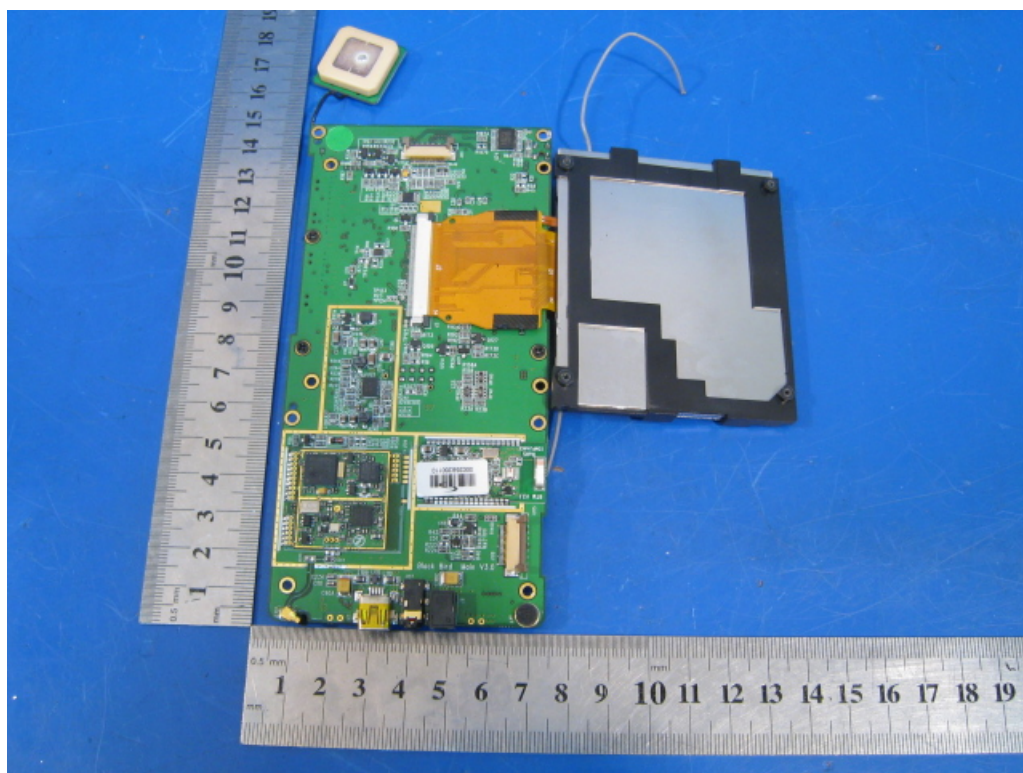


Photo 6 Inside of EUT

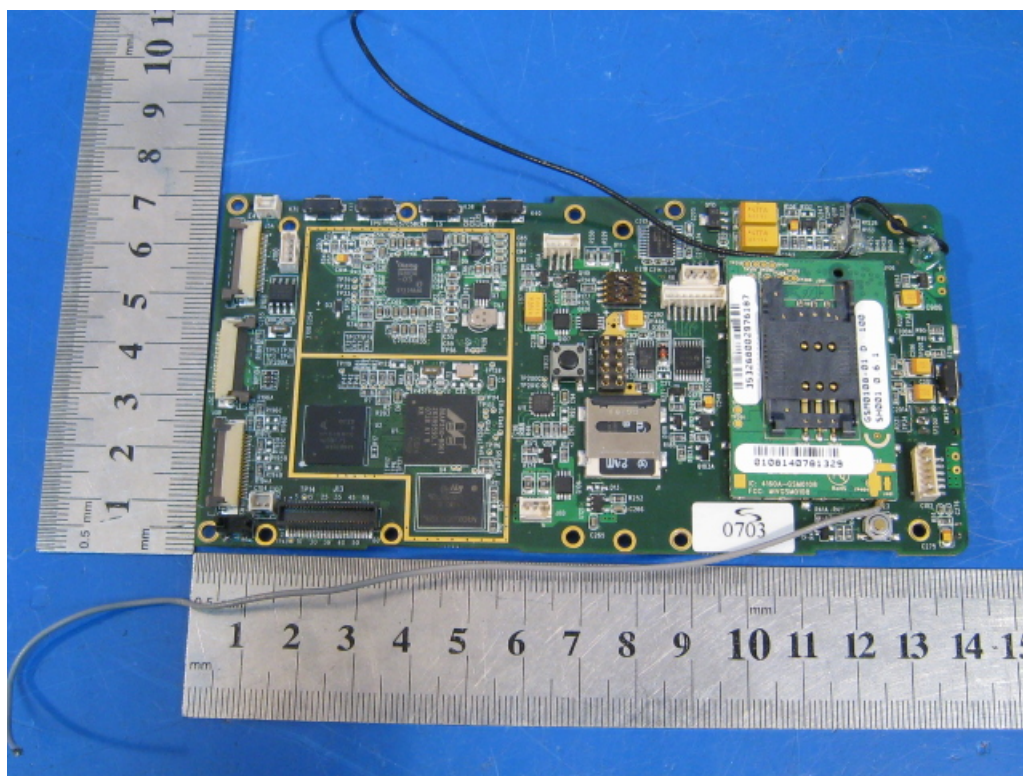


Photo 7 Inside of EUT

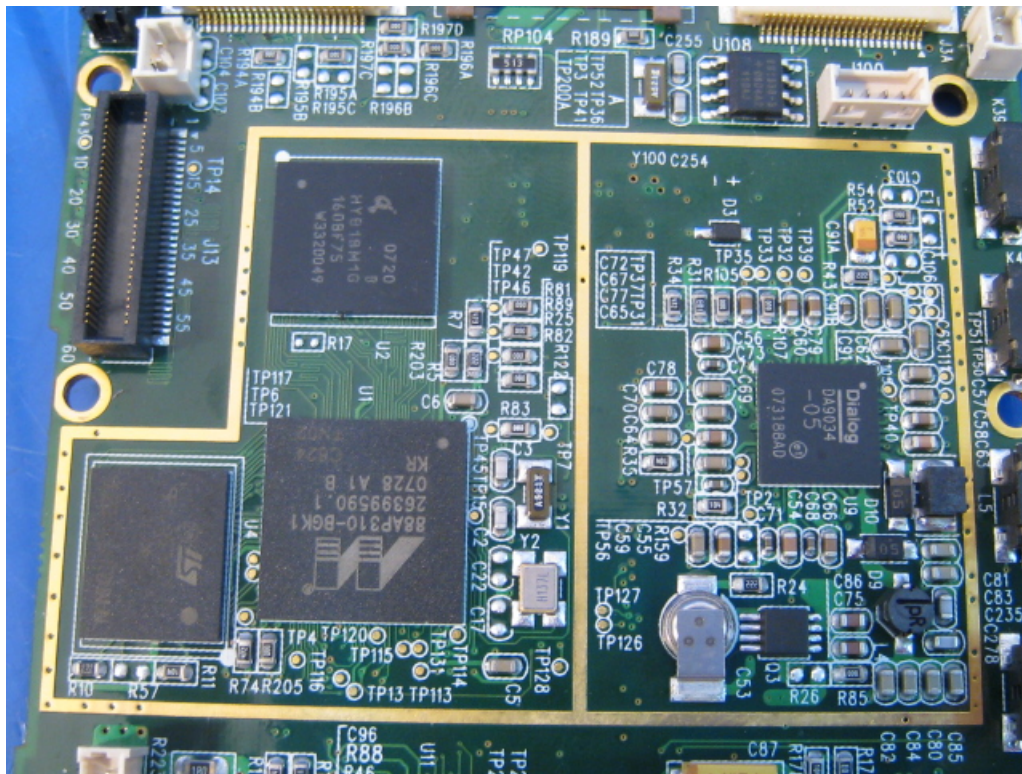


Photo 8 Inside of EUT (GPS module)

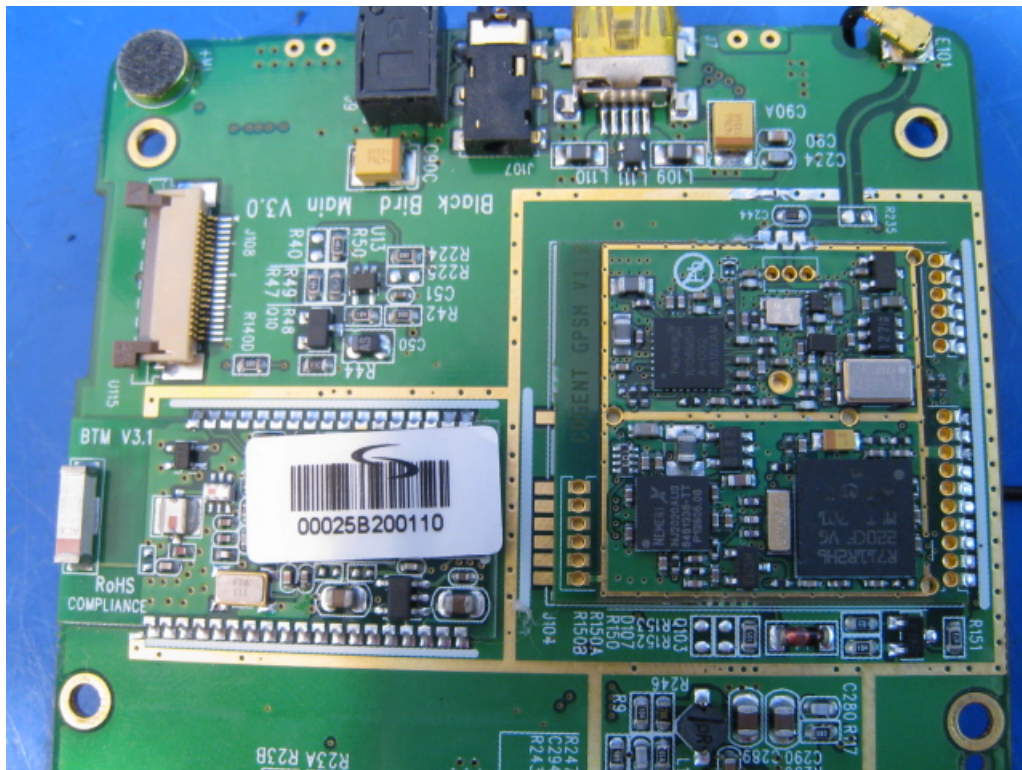


Photo 9 Inside of EUT (Wi-Fi module)

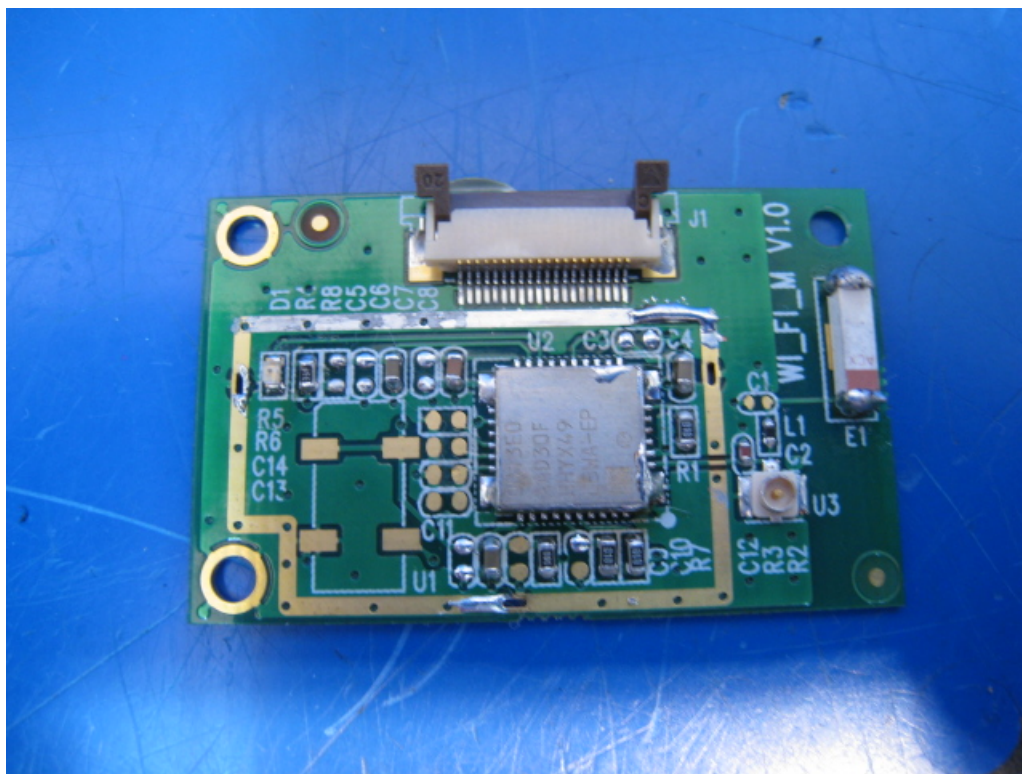


Photo 10 Inside of EUT (Wi-Fi module)

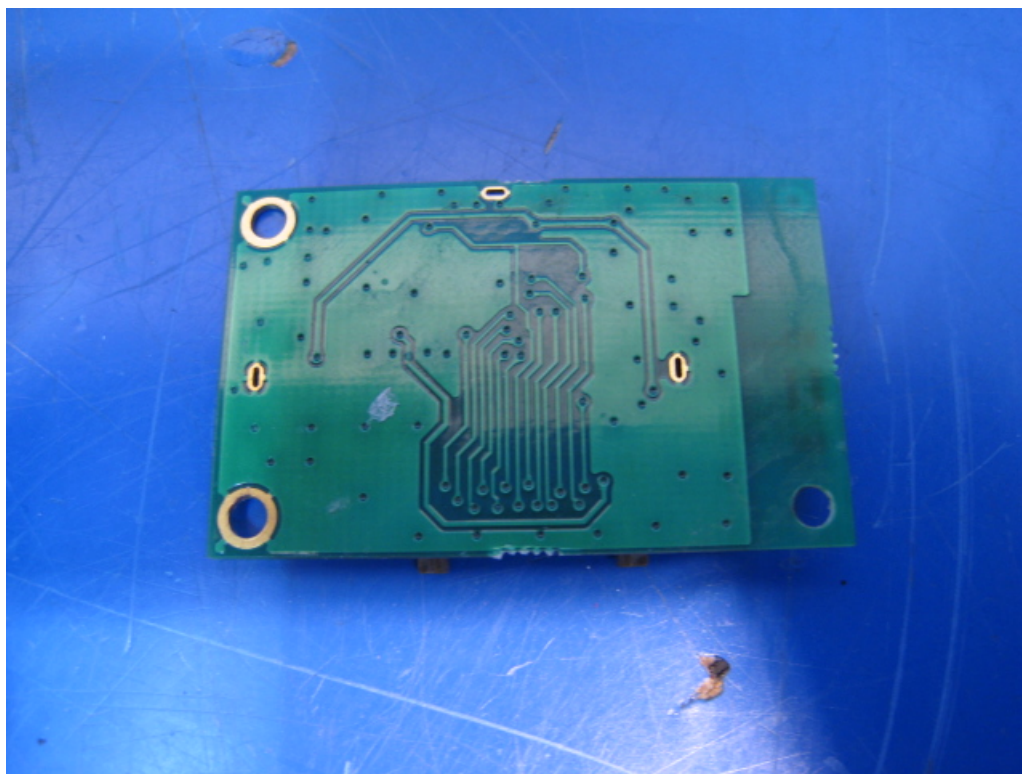


Photo 11 Inside of EUT

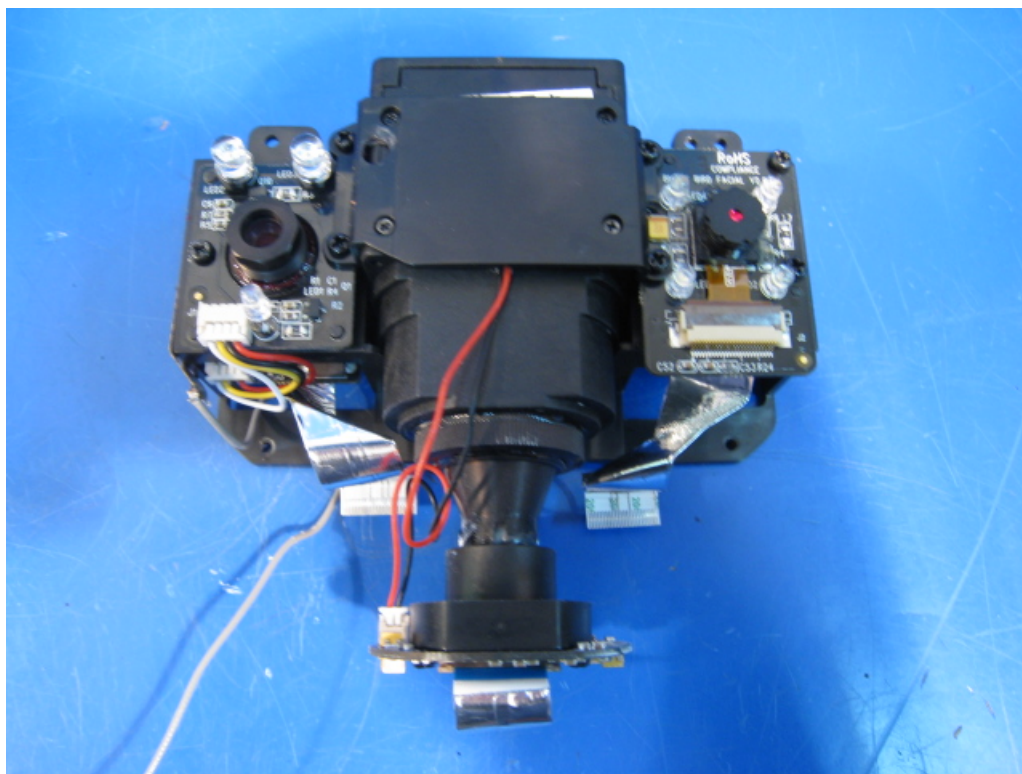


Photo 12 Inside of EUT

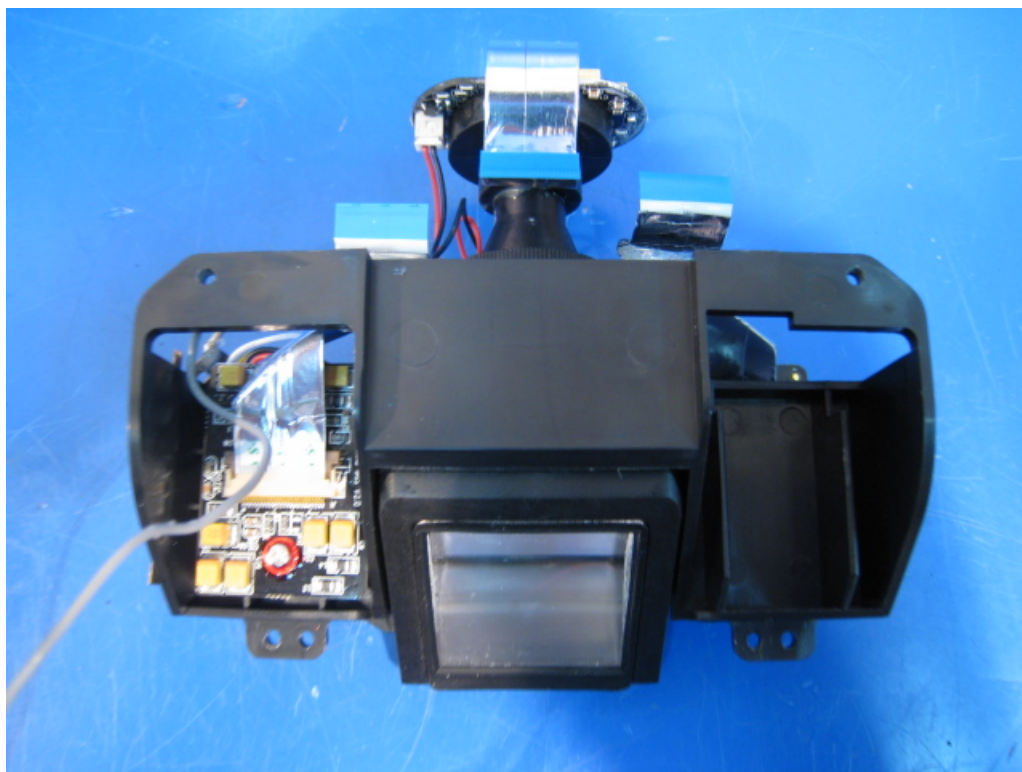


Photo 13 Inside of EUT (Bluetooth Module)



Photo 14 Inside of EUT (Bluetooth Module)



Photo 15 adaptor

