

DATE: 23 January 2011

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report


for

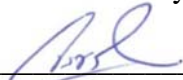
Micronet Ltd.

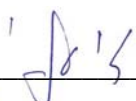
Equipment under test:

**Bluetooth and WiFi Module
(Bluetooth Radio)**

NBOARD811

Written by: 
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Approved by: 
A. Sharabi, Test Engineer

Approved by: 
I. Raz, EMC Laboratory Manager

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This report relates only to items tested.

Measurement/Technical Report for Micronet Ltd.

Bluetooth and WiFi Module (Bluetooth Radio)

NBOARD811

FCC ID: U8ONB811

This report concerns: Original Grant: X
Class I Change:
Class II Change:

Equipment type:

Limits used:
47CFR15 Section 15.247

Measurement procedure used is ANSI C63.4-2003.

Application for Certification
prepared by:
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Israel
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Applicant for this device:
(different from "prepared by")
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1. General Information

1.1 Administrative Information

| | |
|--------------------------------|---|
| Manufacturer: | Micronet Ltd. |
| Manufacturer's Address: | P.O.B. 11524 27 Hametsuda St., Azor, 58001, Israel Tel: +972-3-558 4884 Fax: +972-3-558 4885 |
| Manufacturer's Representative: | Natan Shvarts |
| Equipment Under Test (E.U.T): | Bluetooth and WiFi Module (Bluetooth Radio) |
| Equipment Model No.: | NBOARD811 |
| Equipment Serial No.: | Not Designated |
| Date of Receipt of E.U.T: | 24.10.10 |
| Start of Test: | 24.10.10 |
| End of Test: | 17.11.10 |
| Test Laboratory Location: | I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780 |
| Test Specifications: | FCC Part 15 Subpart C |

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 *Product Description*

NBOARD811 is a small board PCB which provide W-LAN (WiFi) + Bluetooth (hereinafter: BT) feature. This feature provided by embedded module IC which manufacture by "Azurewave" in Taiwan and consists of wireless LAN connection feature according to IEEE802.11 b/g and bluetooth 2.1+EDR connection protocol (two protocols in one IC).

1.4 *Test Methodology*

Radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 *Test Facility*

The radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing September 3, 2009).

I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 *Measurement Uncertainty*

Radiated Emission

The Open Site complies with the ± 4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. System Test Configuration

2.1 Justification

The WiFi & BT radio module was embedded inside the Micronet CE-507 full configuration Mobile Data Terminal. During the tests, the module worked in continuous transmit/receive mode, on one channel (as we choose), without frequencies hopping, according to the manufacturer tools (based on "Marvel" 8688 chipset) which runs on the above terminal and provides full control of the terminal.

Bidirectional communication which operates the WiFi & BT module in a required channel was used.

To select the worst case host to be tested for Limited Modular Approval certification, an exploratory radiated emission test, 2nd harmonic -4th harmonic, was performed inside the shielded room.

The hosts, with the radio module in constant transmission, were placed on a 0.8 meter high wooden table, 1m meter from the tests antennas, which were 1 m high.

The results of the exploratory radiated emission tests are shown in the table below.

| Host Model | Peak (dB μ V) | |
|--------------------------|-------------------|--------|
| | CE-504 | CE-507 |
| 2 nd Harmonic | 33.5 | 36.7 |
| 3 rd Harmonic | 31.4 | 34.5 |
| 4 th Harmonic | - | - |

Based on the above exploratory radiated emission screening and the construction of the host models which is differ only by the size of the screen, the CE-507 was selected as the 'worst' case host.

The E.U.T. was tested simulating vehicle installation.

2.2 EUT Exercise Software

The Software that operates the module was received from the manufacturer and run on the Micronet CE-507 full configuration Mobile Data Terminal.

The software operated the module in continuous mode in any channel, baud & modulation were needed.

All the commands were given through a laptop that was connected by "Active sync" (mobile connection of Microsoft) protocol, to the EUT by USB OTG input.

Intermodulation testing was performed in order to examine all the radio devices transmitting simultaneously by WiFi, BT, and GSM.

2.3 Special Accessories

No special accessories were needed in order to achieve compliance.

2.4 Equipment Modifications

No modifications were needed in order to achieve compliance.

2.5 Configuration of Tested System

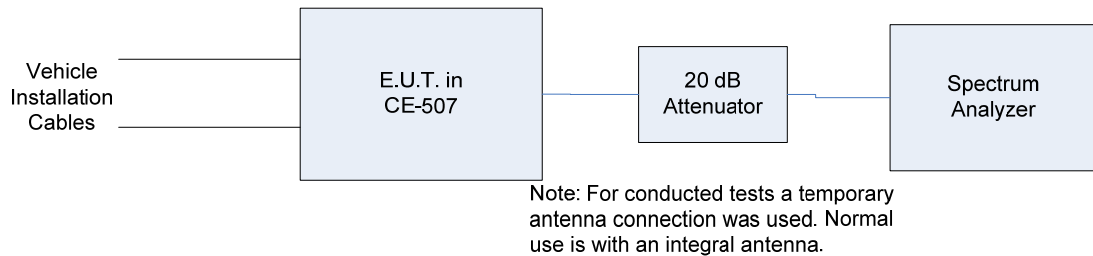


Figure 1. Conducted Tests Setup

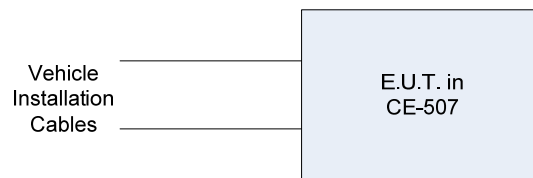


Figure 2. Radiated Tests Setup

3. Test Set-up Photos



Figure 3. Screening Test CE-504



Figure 4. Screening Test CE-507



Figure 5. Radiated Emission Test



Figure 6. Conducted Emission from Antenna Port Tests

4. 6dB Minimum Bandwidth

4.1 Test Specification

F.C.C. Part 15, Subpart C: 15.247(a)(2)

4.2 Test procedure

The E.U.T. was set to the applicable test frequency. The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (cable loss = 1 dB). The spectrum analyzer was set to 100 kHz resolution BW and 300 kHz video BW. The spectrum bandwidth of the E.U.T. at the point of 26 dB below maximum peak power was measured and recorded.

The E.U.T. was tested at 2402, 2455, and 2482 MHz with the modulation.

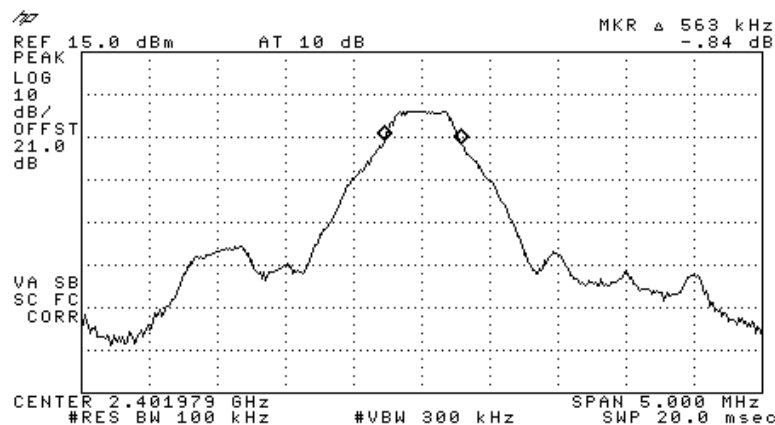


Figure 7. 2401.979 MHz

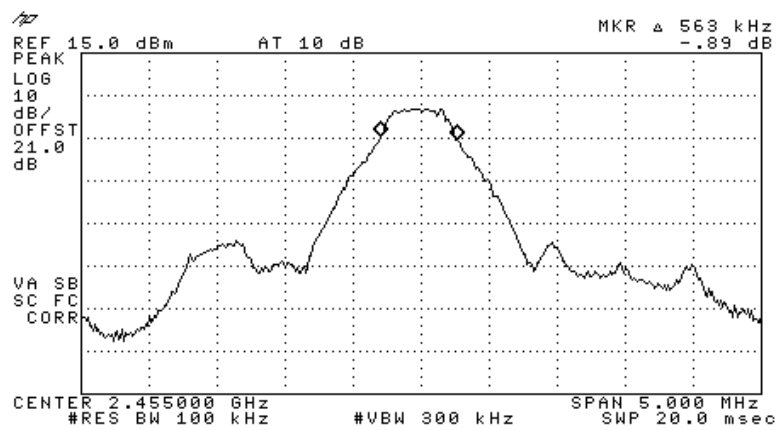


Figure 8. 2455.000 MHz

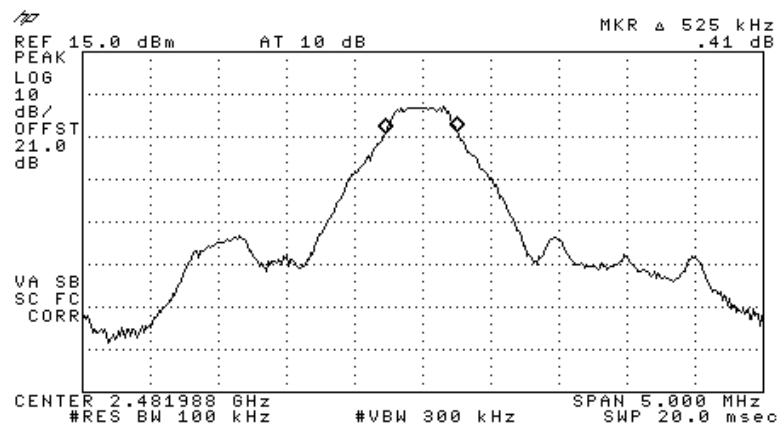


Figure 9. 2481.988 MHz

4.3 Test Results

E.U.T Description: Bluetooth and WiFi Module (Bluetooth Radio)

Model: NBOARD811

Serial Number: Not Designated

| Operation Frequency (MHz) | Bandwidth Reading (MHz) | Specification (MHz) |
|---------------------------------|-------------------------------|------------------------|
| 2401.979 | 0.563 | >0.5 |
| 2455.000 | 0.563 | >0.5 |
| 2481.988 | 0.525 | >0.5 |

Figure 10 Test Results

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

4.4 Test Equipment Used.

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|----------------------------|--------------|---------------|---------------|--------------------|--------|
| EMI Receiver | HP | 85422E | 3906A00276 | November 10, 2009* | 1 year |
| RF Section | HP | 85420E | 3705A00248 | November 10, 2009* | 1 year |
| Antenna Log Periodic | A.H. Systems | SAS-200/511 | 253 | January 29, 2009 | 2 year |
| Antenna Mast | ARA | AAM-4A | 1001 | N/A | N/A |
| Turntable | ARA | ART-1001/4 | 1001 | N/A | N/A |
| Mast & Table Controller | ARA | ACU-2/5 | 1001 | N/A | N/A |
| Printer | HP | LaserJet 2200 | JPKGC19982 | N/A | N/A |

Figure 11 Test Equipment Used

* Testing was performed before 10 November 2010.

5. Number of Hopping Frequencies

Section 15.247(a)(1)(iii)

5.1 Test Specification

F.C.C., Part 15, Subpart C

5.2 Test Procedure

The E.U.T. was set to hopping mode.

The spectrum analyzer was set to the following parameters:

Detector Function: Peak

Trace: Maximum Hold

The number of hopping frequencies is $10 + 10 + 10 + 10 + 10 + 1 = 51$ (See plot below).

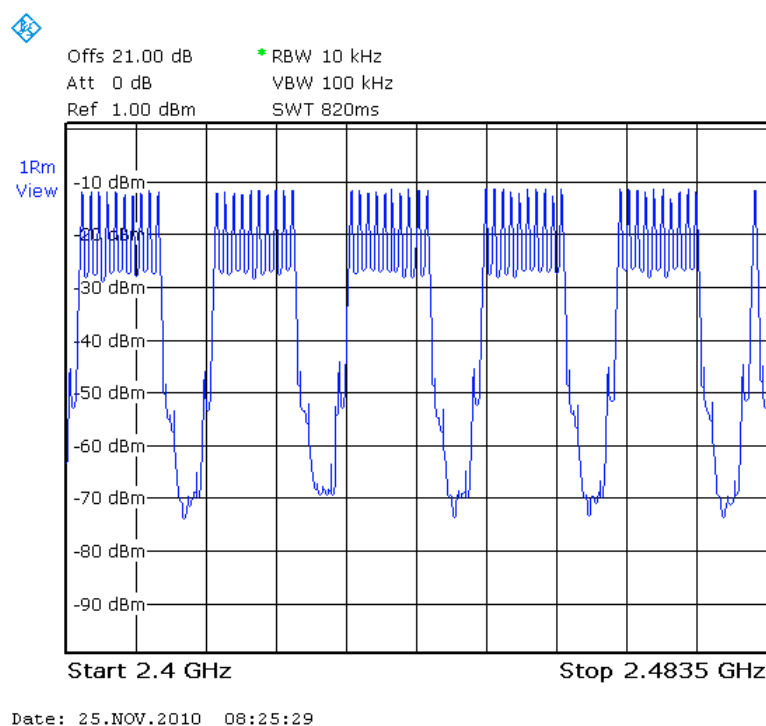


Figure 12 Number of Hopping Frequencies

5.3 Results table

E.U.T. Description: Bluetooth and WiFi Module (Bluetooth Radio)

Model No.: NBOARD811

Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, 15.247(a)(1)(iii)

| Number of Hopping Frequencies | Specification |
|-------------------------------|---------------|
| 51 | >15 |

Figure 13 Number of Hopping Frequencies

TEST PERSONNEL:

Tester Signature:  Date: 07.02.11
Typed/Printed Name: A. Sharabi

5.4 Test Instrumentation Used

| Instrument | Manufacturer | Model | Serial Number | Calibration | |
|-------------------|---------------|-------|--------------------|-----------------------|--------|
| | | | | Last Calibration Date | Period |
| Spectrum Analyzer | RHODE&SCHWARZ | FSL6 | 100194 | July 22, 2010 | 1 Year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G 2W20 | October 12, 2010 | 1 Year |
| Cable | TestLINE | 18 | 11556 | October 12, 2010 | 1 year |

6. Channel Frequency Separation

6.1 Test Specification

Specification: FCC Part 15, Subpart C, 15.247(a) (1)

6.2 Test procedure

The E.U.T. was set to hopping mode.

The spectrum analyzer was set to the following parameters:

Span: 5 MHz

RBW: 10kHz

VBW: 100kHz

Detector Function: Peak

Trace: Maximum Hold

The marker delta function to determine the separation between the peaks of the adjacent channels was used.

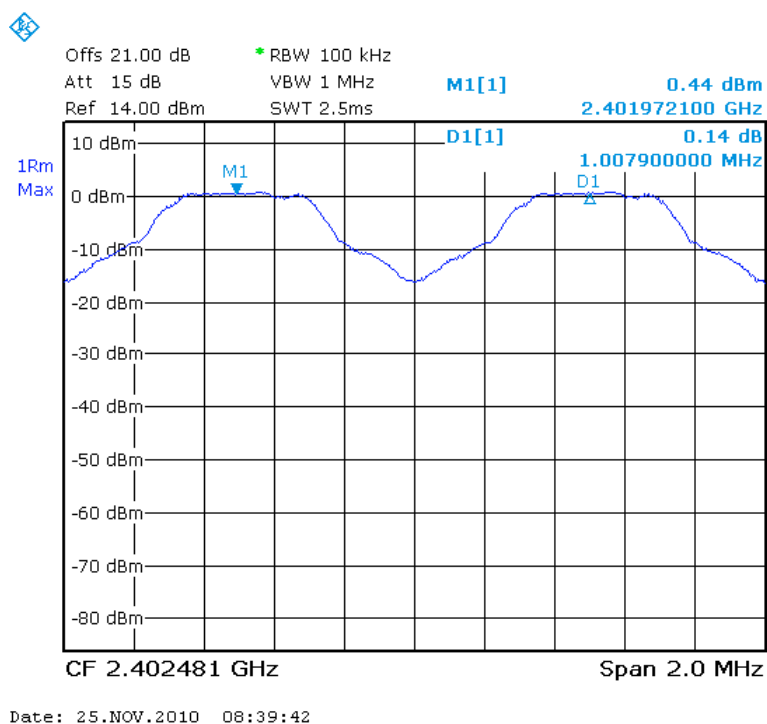


Figure 14. 2.402481 GHz.

6.3 Results table

E.U.T. Description: Bluetooth and WiFi Module (Bluetooth Radio)

Model No.: NBOARD811

Serial Number: Not Designated

Specification: FCC Part 15, Subpart C, 15.247(a) (1)

| Channel Frequency Separation (kHz) | Specification (kHz) | Margin (kHz) |
|---|------------------------|-----------------|
| 1007 | >650 | 357 |

Figure 15 Channel Frequency Separation

JUDGEMENT: Passed by 357 kHz

TEST PERSONNEL:

Tester Signature:  Date: 07.02.11

Typed/Printed Name: A. Sharabi

6.4 Test Instrumentation Used

| Instrument | Manufacturer | Model | Serial Number | Calibration | |
|-------------------|---------------|-------|--------------------|-----------------------|--------|
| | | | | Last Calibration Date | Period |
| Spectrum Analyzer | RHODE&SCHWARZ | FSL6 | 100194 | July 22, 2010 | 1 Year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G 2W20 | October 12, 2010 | 1 Year |
| Cable | TestLINE | 18 | 11556 | October 12, 2010 | 1 year |

7. Maximum Radiated Peak Power Output

7.1 Test Specification

F.C.C. Part 15, Subpart C: 15.247(b)

7.2 Test procedure

The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (cable loss = 1 dB). The Spectrum Analyzer was set to 1.0 MHz resolution BW and 1 MHz video BW. Peak power level was measured at selected operation frequencies.

The E.U.T. was tested at 2402, 2455, and 2482 MHz.

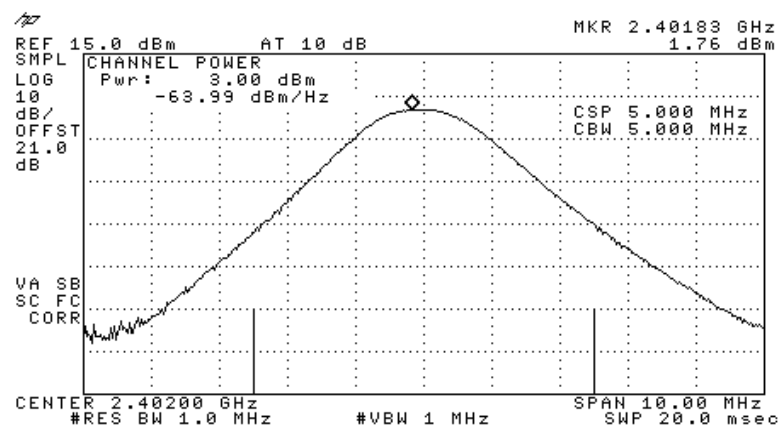


Figure 16 2402.00 MHz

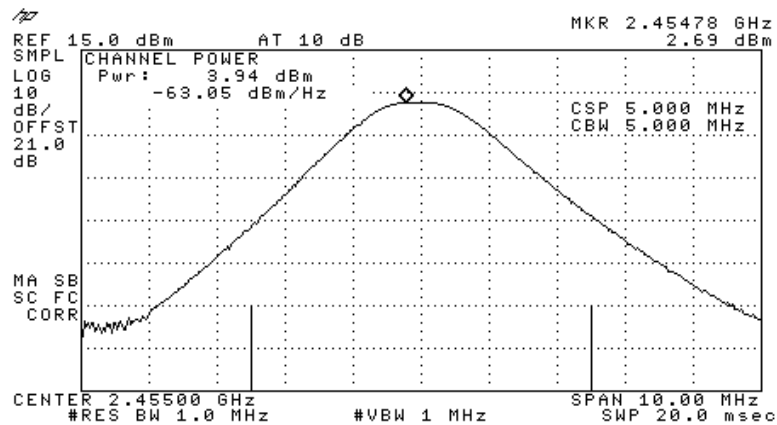


Figure 17 2455.00 MHz

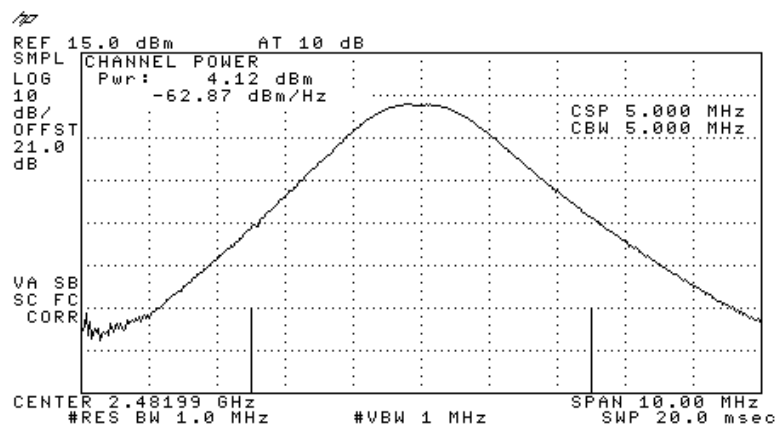


Figure 18 2481.99 MHz

7.3 Results Calculation

E.U.T. Description: Bluetooth and WiFi Module (Bluetooth Radio)

Model No.: NBOARD811

Serial Number: Not Designated

Specification: F.C.C. Part 15, Subpart C

| Operation Frequency (MHz) | Peak Power Output (dBm) | Specification (dBm) | Margin (dB) |
|---------------------------------|-------------------------------|------------------------|----------------|
| 2402.00 | 3.00 | 30.00 | -27.00 |
| 2455.00 | 3.94 | 30.00 | -26.06 |
| 2481.99 | 4.12 | 30.00 | -25.88 |

Figure 19 Maximum Radiated Peak Power Output

JUDGEMENT:

Passed by 25.88 dB

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

7.4 Test Equipment Used.

Maximum Radiated Peak Power Output

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|-------------------------|--------------|---------------|---------------|--------------------|---------|
| Receiver | HP | 85422E | 3906A00276 | November 10, 2009* | 1 year |
| RF Section | HP | 85420E | 3705A00248 | November 10, 2009* | 1 year |
| Antenna Mast | ARA | AAM-4A | 1001 | N/A | N/A |
| Turntable | ARA | ART-1001/4 | 1001 | N/A | N/A |
| Mast & Table Controller | ARA | ACU-2/5 | 1001 | N/A | N/A |
| Printer | HP | LaserJet 2200 | JPKGC19982 | N/A | N/A |
| Antenna-Log Periodic | A.H.System | SAS-200/511 | 253 | January 29, 2009 | 2 years |

Figure 20 Test Equipment Used

* Testing was performed before 10 November 2010.

8. Dwell Time on Each Channel

8.1 Test Specification

FCC Part 15, Section 15.247(a)(1)(iii)

8.2 Test Procedure

The E.U.T. was tested in radiated mode using the substitution antenna. The spectrum analyzer was set to 100 kHz RBW and 100 kHz VBW.

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

8.3 Test Results

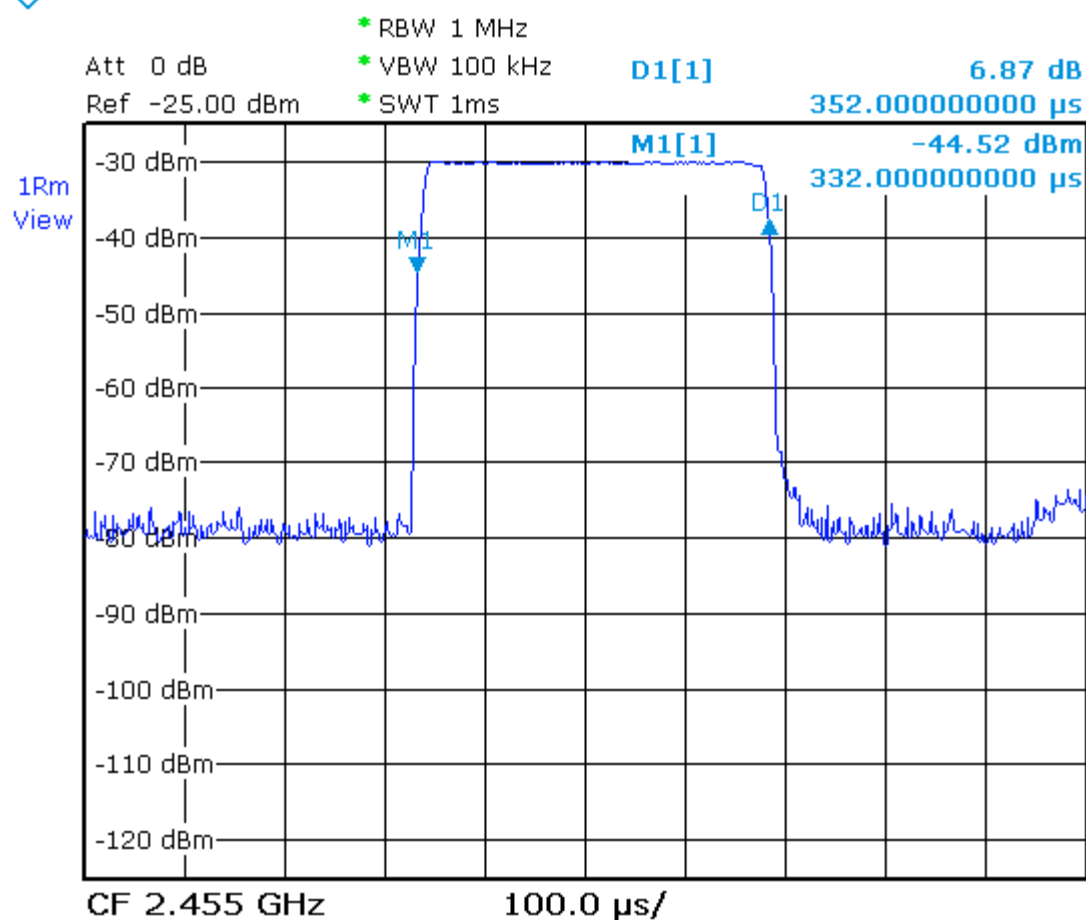
The E.U.T met the requirements of the FCC Part 15, Section 15.247(a)(1)(iii).

Additional information of the results is given in

Time of occupancy for one channel pulse width= 352usec

Tested sweep time = 50 channels X 400msec = 20sec

$20\text{sec}/352\text{usec} = 1136$ number of times one channel transmit within 20sec frame



Date: 25.NOV.2010 12:16:36

Figure 21 — Pulse Duration

8.4 Test Equipment Used.

| Instrument | Manufacturer | Model | Serial Number | Calibration | |
|-------------------|---------------|-------|---------------|-----------------------|--------|
| | | | | Last Calibration Date | Period |
| Spectrum Analyzer | RHODE&SCHWARZ | FSL6 | 100194 | July 22, 2010 | 1 Year |
| Cable | TestLINE | 18 | 11556 | October 12, 2010 | 1 year |

9. Peak Power Output Out of 2400-2483.5 MHz Band

9.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (cable loss = 1 dB). The spectrum analyzer was set to 100 kHz resolution BW except for the frequency range 9 kHz-150 kHz where the RBW was set to 1 kHz and the frequency range 150 kHz-10 MHz where the RBW was set to 10 kHz. The frequency range from 9 kHz to 25 GHz was scanned. Level of spectrum components out of the 2400-2483.5 MHz was measured at the selected operation frequencies.

The E.U.T. was tested at 2402, 2455, and 2482 MHz with the modulation.

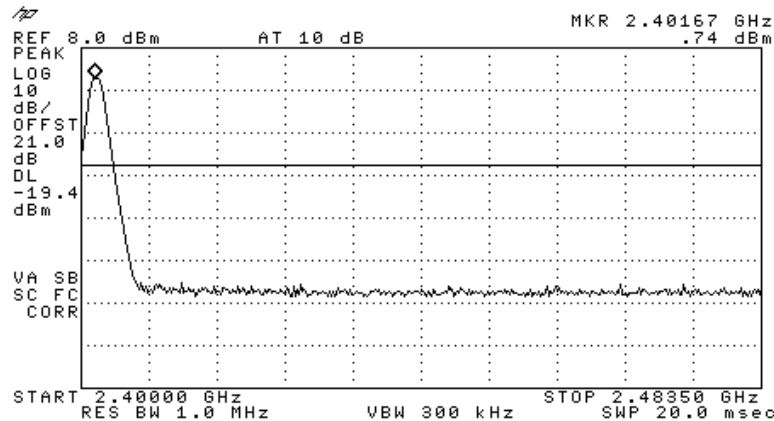


Figure 22 — 2402MHz

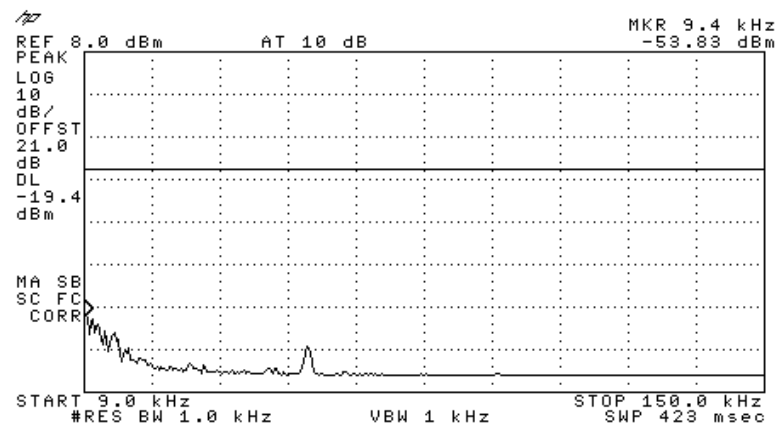


Figure 23 — 2402MHz

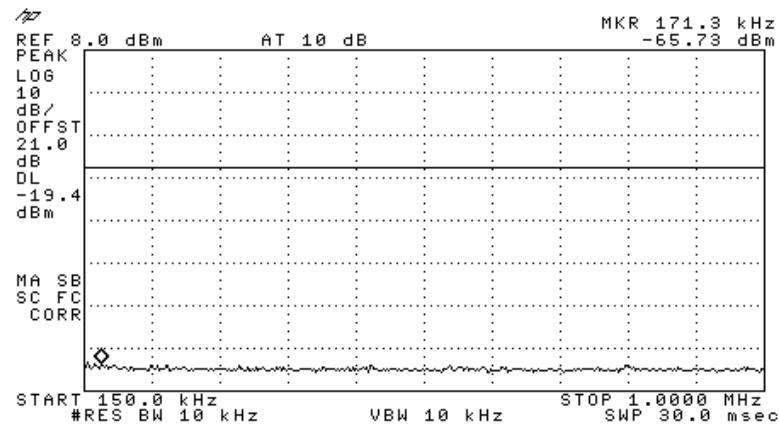


Figure 24 — 2402MHz

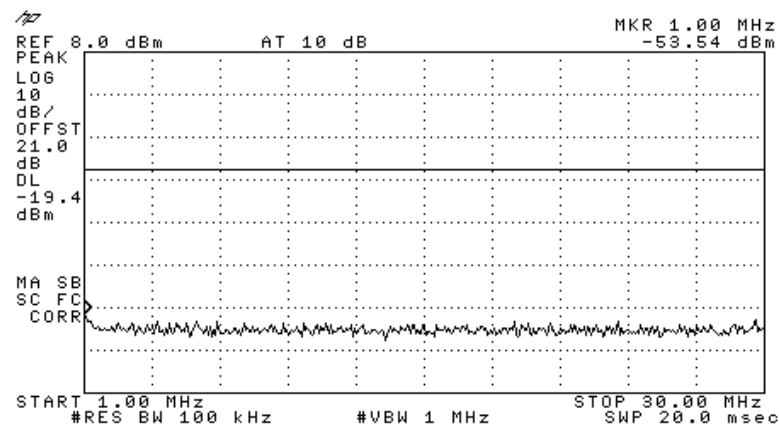


Figure 25 — 2402MHz

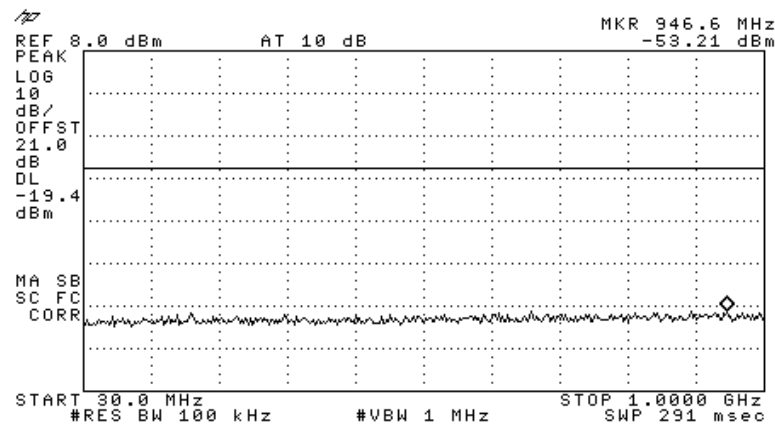


Figure 26 — 2402MHz

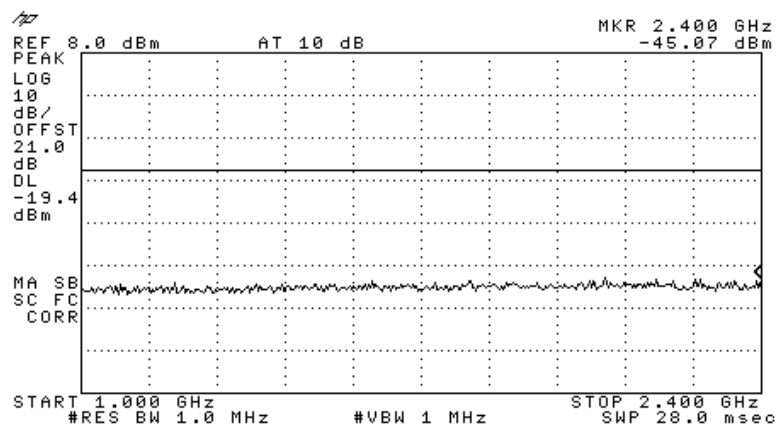


Figure 27 — 2402MHz

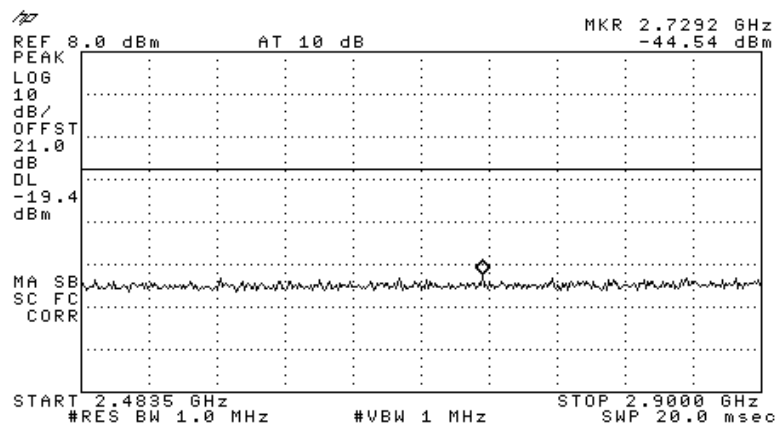


Figure 28 — 2402MHz

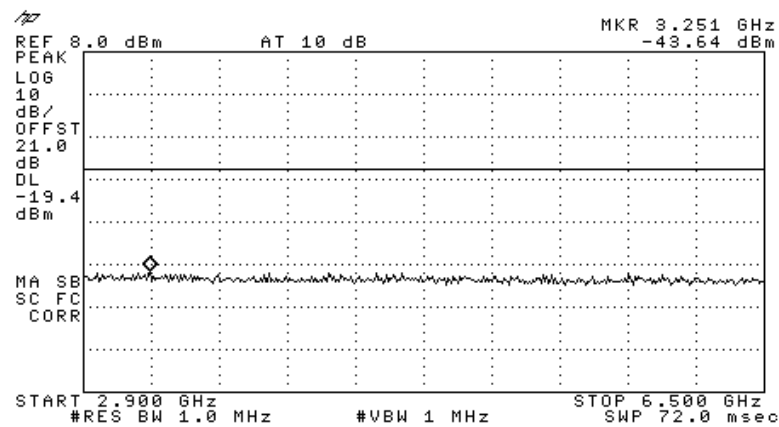


Figure 29 — 2402MHz

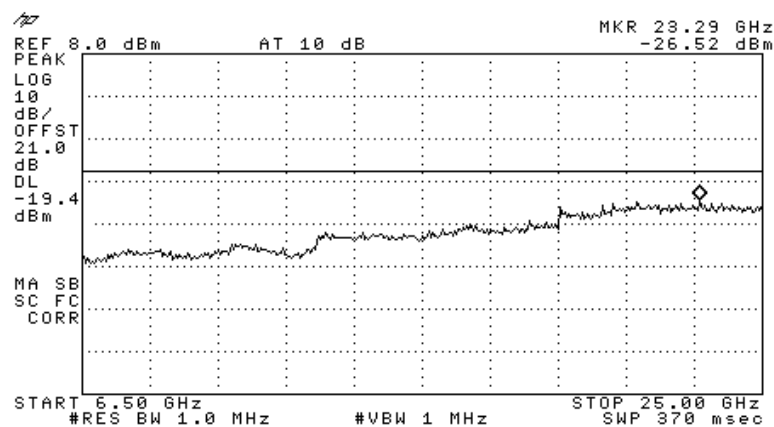


Figure 30 — 2402MHz

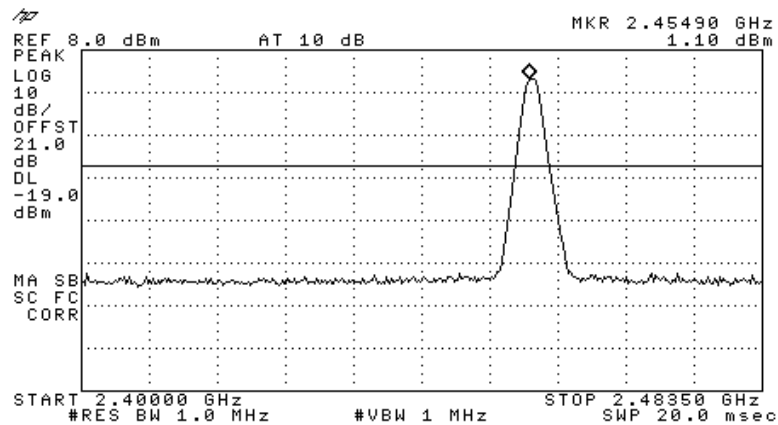


Figure 31 — 2455MHz

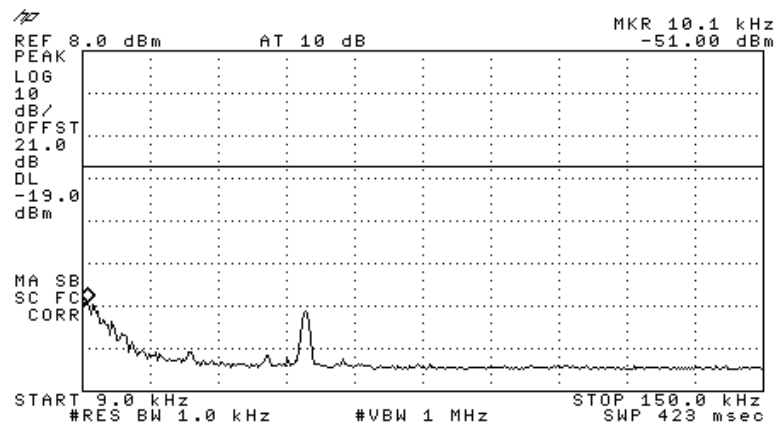


Figure 32 — 2455MHz

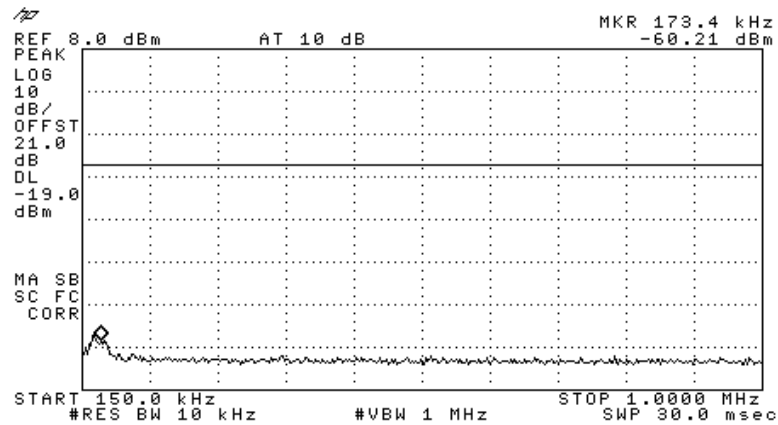


Figure 33 — 2455MHz

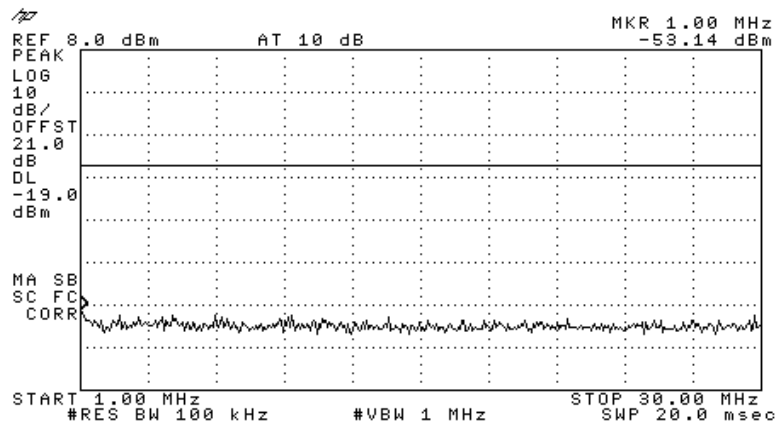


Figure 34 — 2455MHz

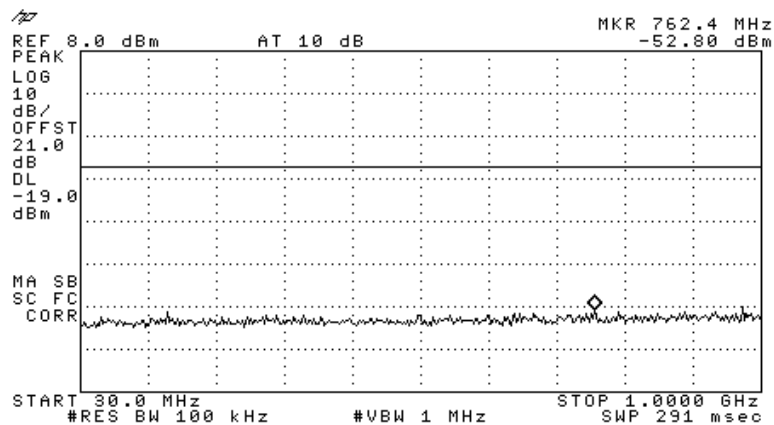


Figure 35 — 2455MHz

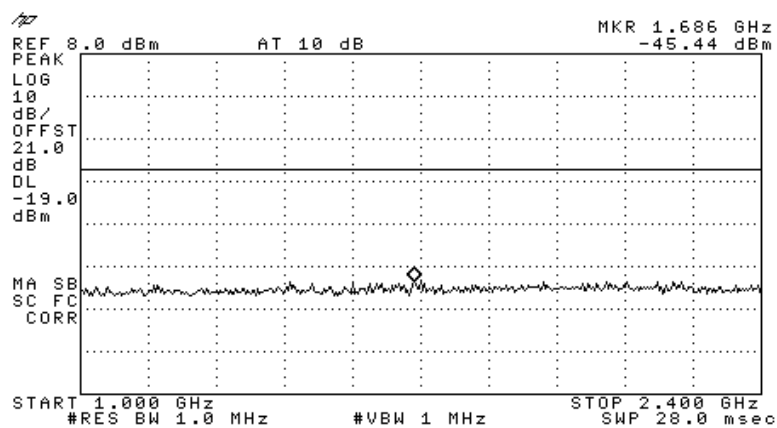


Figure 36 — 2455MHz

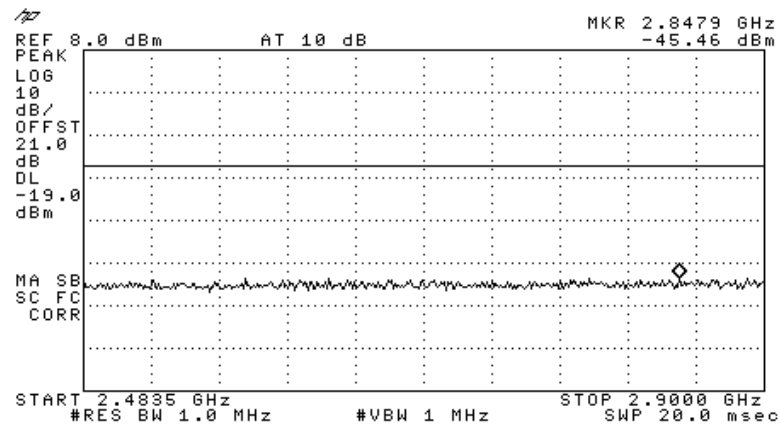


Figure 37 — 2455MHz

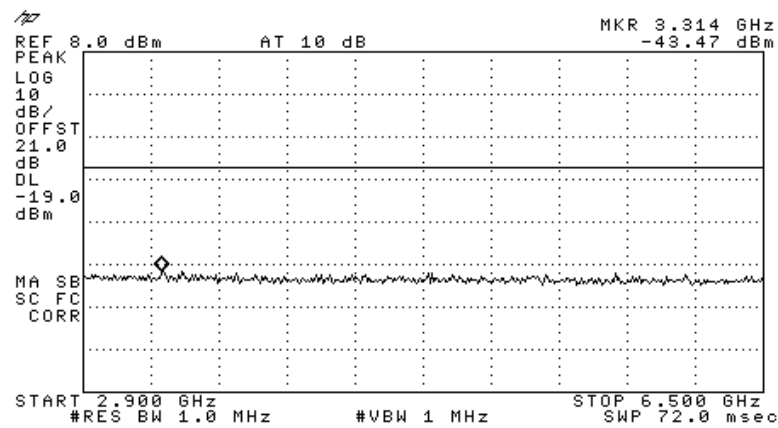


Figure 38 — 2455MHz

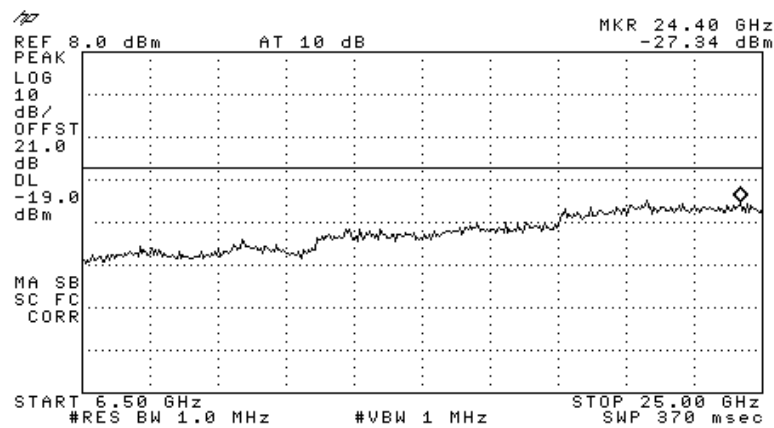


Figure 39 — 2455MHz

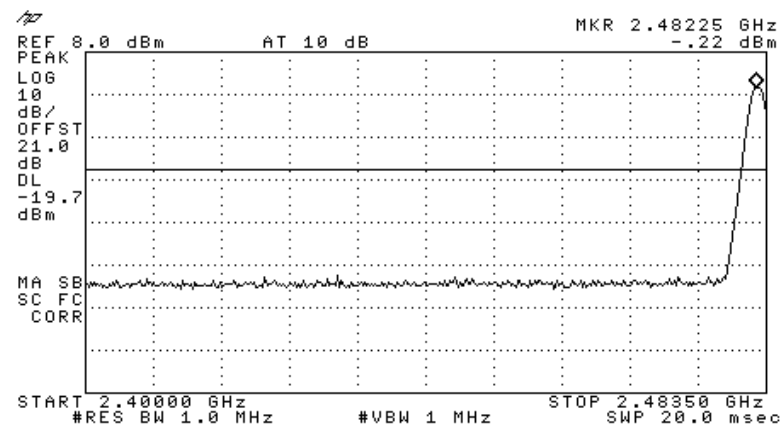


Figure 40 — 2482MHz

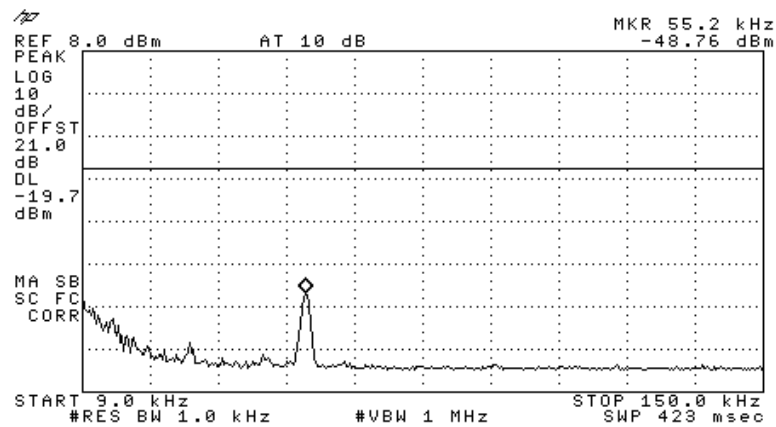


Figure 41 — 2482MHz

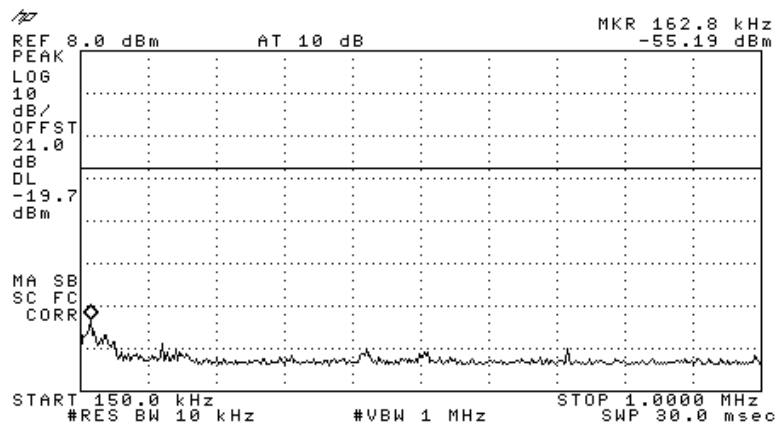


Figure 42 — 2482MHz

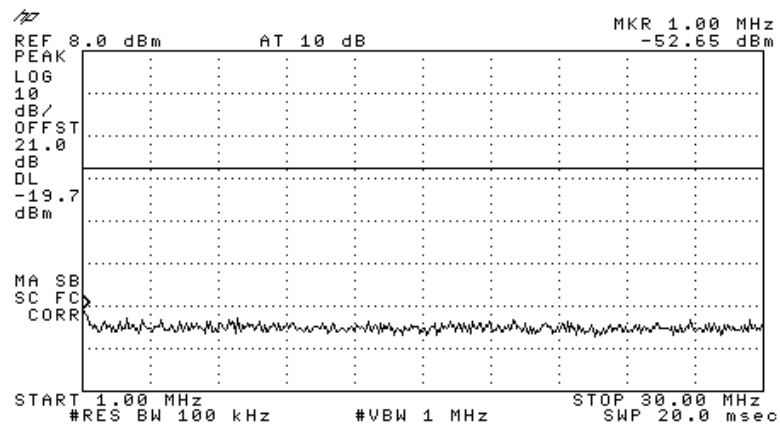


Figure 43 — 2482MHz

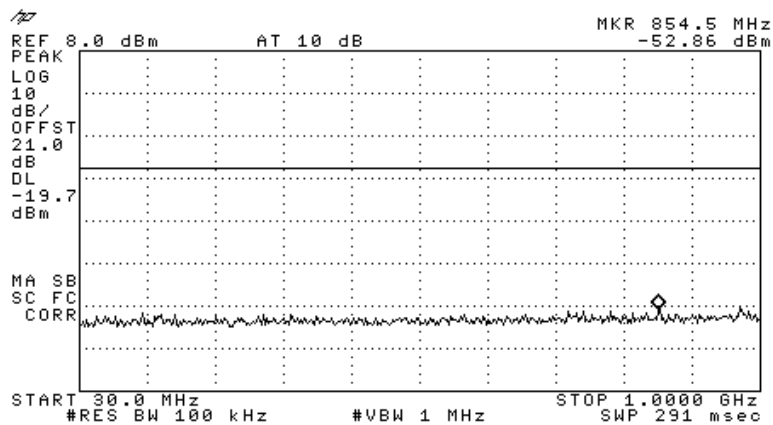


Figure 44 — 2482MHz

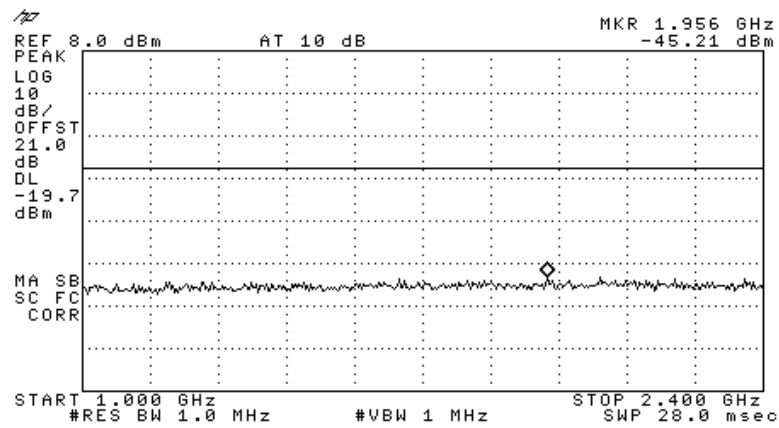


Figure 45 — 2482MHz

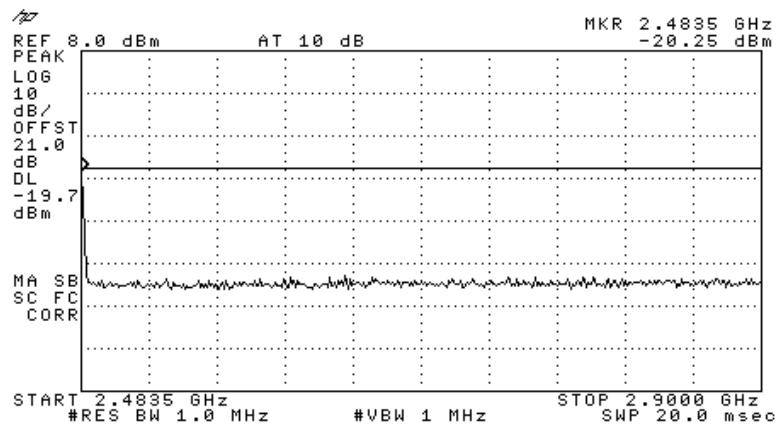


Figure 46 — 2482MHz

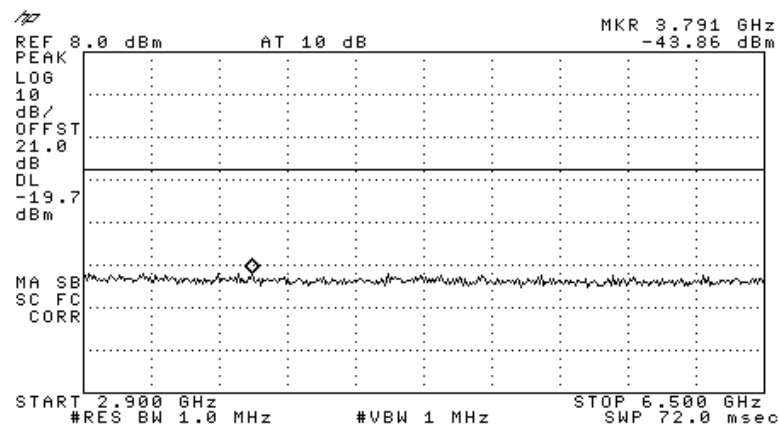


Figure 47 — 2482MHz

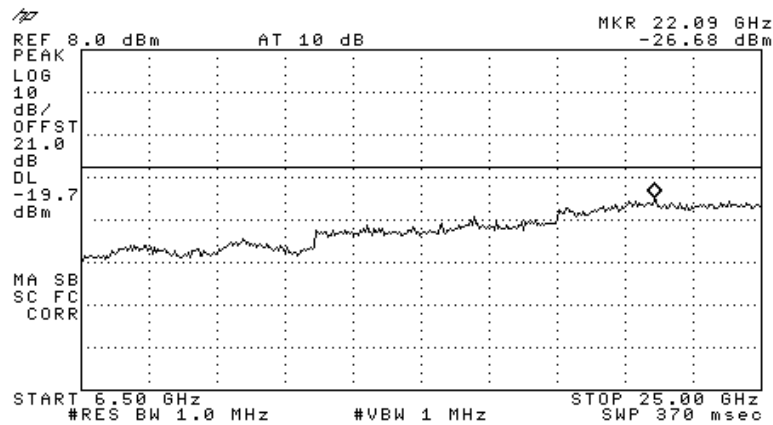


Figure 48 — 2482MHz

Peak Power Output Out of Band

9.2 Results table

E.U.T Description: Bluetooth and WiFi Module (Bluetooth Radio)

Model No.: NBOARD811

Serial Number: Not Designated


Specification: F.C.C. Part 15, Subpart C (15.247)

| Operation Frequency (MHz) | Reading (dBm) | Specification (dBm) | Margin (dB) |
|---------------------------|---------------|---------------------|-------------|
| 2402 | -26.52 | -19.4 | -7.12 |
| 2455 | -27.34 | -19.0 | -8.34 |
| 2482 | -20.25 | -19.7 | 0.55 |

Figure 49 Peak Power Output of 2400.0-2483.5 MHz Band

JUDGEMENT: Passed by 0.55 dB

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

9.3 Test Equipment Used

| Instrument | Manufacturer | Model | Serial Number | Calibration | |
|-------------------|--------------|-------|--------------------|-----------------------|--------|
| | | | | Last Calibration Date | Period |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 14, 2010 | 1 year |
| Attenuator | Jyebao | - | FAT-AM5AF5G6G 2W20 | October 12, 2010 | 1 year |
| Cable | TestLINE | 18 | 11556 | October 12, 2010 | 1 year |

10. 20 dB Bandwidth

10.1 Test procedure

Specification: FCC Part 15, Subpart C (15.247-a2)

10.2 Test procedure

The E.U.T. was set to the applicable test frequency. The spectrum analyzer was set to 30 kHz resolution BW. The spectrum bandwidth of the E.U.T. at the point of 20 dB below maximum peak power was measured and recorded.

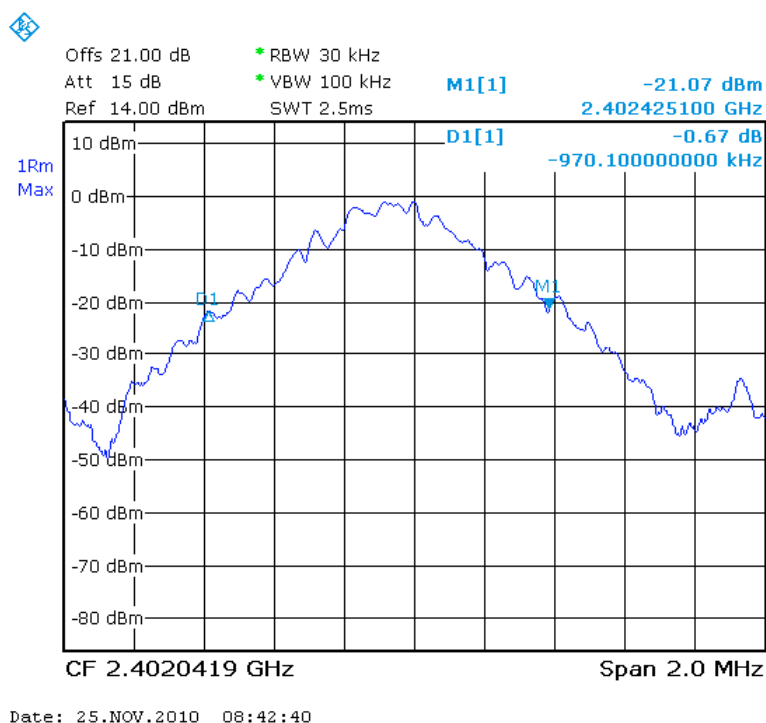
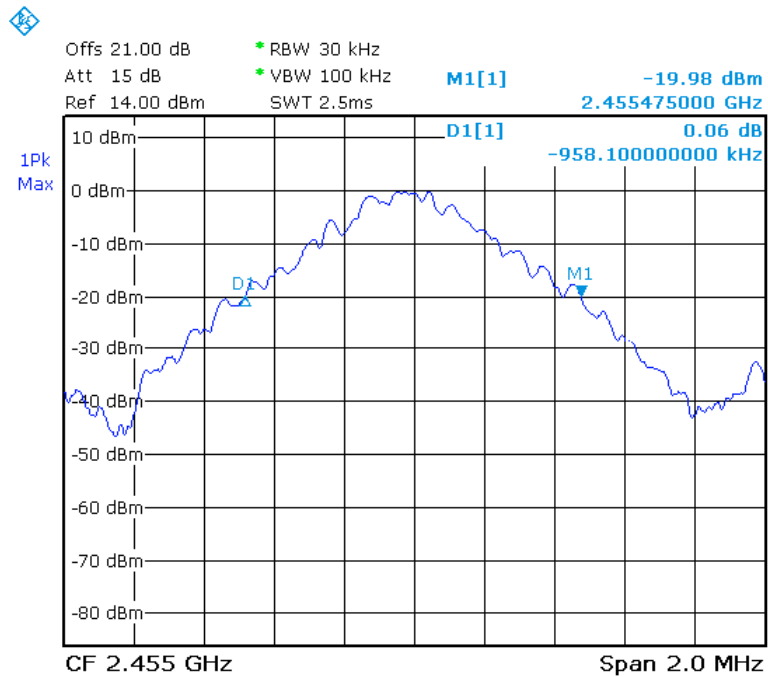
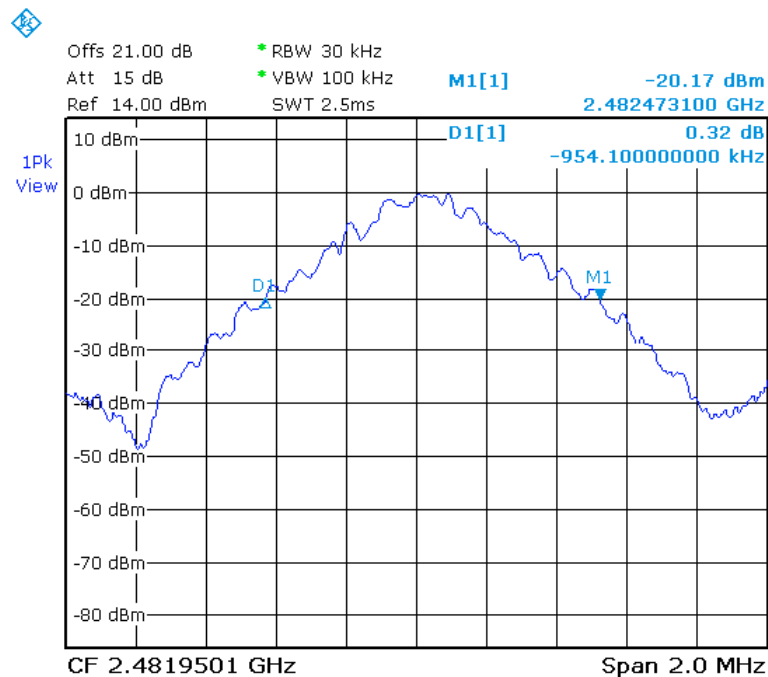


Figure 50 — 2402.0 MHz



Date: 25.NOV.2010 08:44:22

Figure 51 — 2455.0 MHz



Date: 25.NOV.2010 08:46:07

Figure 52 — 2481.0 MHz

10.3 Results table

E.U.T Description: Bluetooth and WiFi Module (Bluetooth Radio)

Model No.: NBOARD811

Serial Number: Not Designated

Specification: FCC Part 15, Subpart C (15.247-a2)

| Operation Frequency (MHz) | Reading (kHz) |
|---------------------------------|------------------|
| 2402 | 970.10 |
| 2455 | 958.10 |
| 2481 | 954.10 |

Figure 53 20 dB Bandwidth

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

10.4 Test Equipment Used.

| Instrument | Manufacturer | Model | Serial Number | Calibration | |
|-------------------|---------------|-------|-----------------------|------------------|--------|
| | | | | Last Calibr. | Period |
| Spectrum Analyzer | RHODE&SCHWARZ | FSL6 | 100194 | July 22, 2010 | 1 Year |
| Attenuator | Jyebao | - | FAT-AM5AF5G 6G2W20 | October 12, 2010 | 1 year |
| Cable | TestLINE | 18 | 11556 | October 12, 2010 | 1 year |

11. Band Edge

[In Accordance with section 15.247(d)]

11.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20 dB) and an appropriate coaxial cable (cable loss = 1 dB). The spectrum analyzer was set to 100 kHz resolution BW and the video BW at 300 kHz. Maximum power level below 2400 MHz and above 2483.5 MHz was measured relative to power level at 2400 MHz, and 2483.5 MHz correspondingly.

The E.U.T. was tested using modulation.

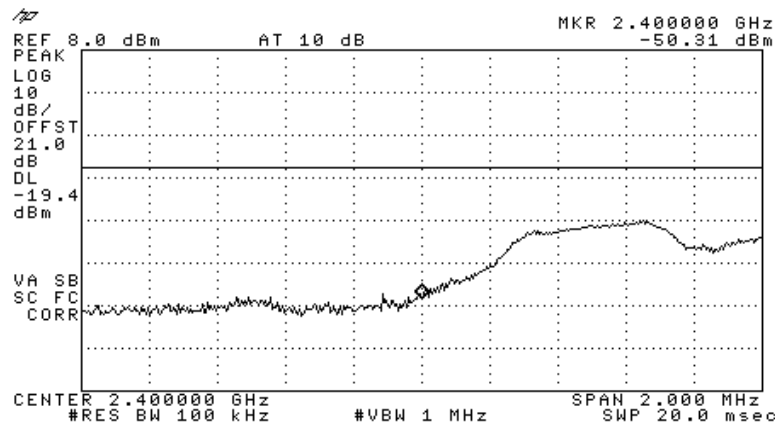


Figure 54 — 2400 MHz

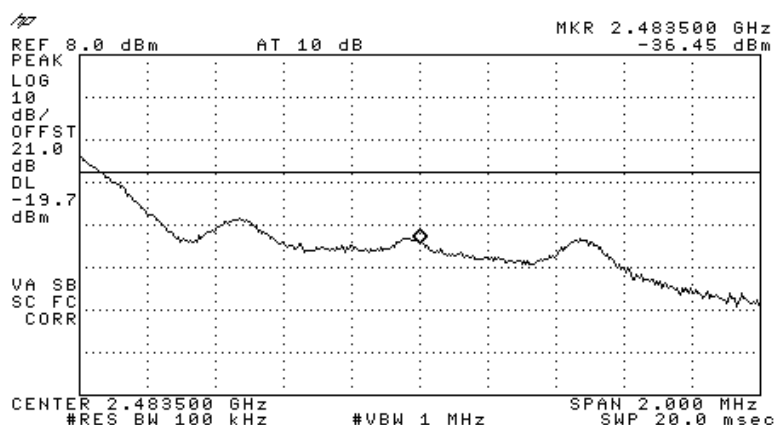


Figure 55 — 2483.5 MHz

11.2 Results table

E.U.T. Description: Bluetooth and WiFi Module (Bluetooth Radio)

Model No.: NBOARD811

Serial Number: Not Designated

Specification: F.C.C. Part 15, Subpart C (15.247 (d))

| Operation Frequency (MHz) | Band Edge Frequency (MHz) | Spectrum Level (dBm) | Specification (dBm) | Margin (dB) |
|---------------------------|---------------------------|----------------------|---------------------|-------------|
| 2400.00 | 2400.00 | -50.31 | -19.4 | -30.91 |
| 2483.50 | 2483.50 | -36.45 | -19.7 | -16.75 |

Figure 56 Band Edge

JUDGEMENT:

Passed by 16.75 dB

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

11.3 Test Equipment Used.

Band edge Spectrum

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|-------------------------|--------------|---------------|---------------|--------------------|---------|
| Receiver | HP | 85422E | 3906A00276 | November 10, 2009* | 1 year |
| RF Section | HP | 85420E | 3705A00248 | November 10, 2009* | 1 year |
| Antenna Mast | ARA | AAM-4A | 1001 | N/A | N/A |
| Turntable | ARA | ART-1001/4 | 1001 | N/A | N/A |
| Mast & Table Controller | ARA | ACU-2/5 | 1001 | N/A | N/A |
| Printer | HP | LaserJet 2200 | JPKGC19982 | N/A | N/A |
| Antenna-Log Periodic | A.H.System | SAS-200/511 | 253 | January 29, 2009 | 2 years |

Figure 57 Test Equipment Used

* Test was performed before 10 November 2010.

12. Radiated Emission, 9 kHz – 30 MHz

12.1 Test Specification

9 kHz-30 MHz, FCC, Part 15, Subpart C, Section 209

12.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 3.1.

The frequency range 9 kHz-30 MHz was scanned.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 9 kHz-30MHz, the loop antenna was rotated on its vertical axis. The antenna height (center of loop) was 1 meter at a distance of 3 meters.

The E.U.T. was operated at the frequency of 2402, 2455, and 2482 MHz. These frequencies were measured using a peak detector.

12.3 Measured Data

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart C, Section 209 specification.

The results for all three operating frequencies were the same.

No signals were detected in the frequency range of 9 kHz – 30 MHz.

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

12.4 Test Instrumentation Used, Radiated Measurements

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|-------------------------|--------------|---------------|---------------|--------------------|--------|
| EMI Receiver | HP | 85422E | 3906A00276 | November 10, 2009* | 1 year |
| RF Section | HP | 85420E | 3705A00248 | November 10, 2009* | 1 year |
| Active Loop Antenna | EMCO | 6502 | 9506-2950 | October 19, 2010 | 1 year |
| Antenna Mast | ARA | AAM-4A | 1001 | N/A | N/A |
| Turntable | ARA | ART-1001/4 | 1001 | N/A | N/A |
| Mast & Table Controller | ARA | ACU-2/5 | 1001 | N/A | N/A |
| Printer | HP | LaserJet 2200 | JPKGC19982 | N/A | N/A |

* Test was performed before 10 November 2010.

12.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS: Field Strength [dB μ V/m]

RA: Receiver Amplitude [dB μ V]

AF: Receiving Antenna Correction Factor [dB/m]

CF: Cable Attenuation Factor [dB]

Example: $FS = 30.7 \text{ dB}\mu\text{V (RA)} + 14.0 \text{ dB (AF)} + 0.9 \text{ dB (CF)} = 45.6 \text{ dB}\mu\text{V}$

No external pre-amplifiers are used.

13. Radiated Emission 30 – 2500 MHz

13.1 Test Specification

30 MHz- 25000 MHz, F.C.C., Part 15, Subpart C

13.2 Test Procedure

The E.U.T. operation mode and test set-up are as described in Section 3.

See Section 3.1 Justification of the System Test Configuration concerning the E.U.T. orientation for this test.

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground.

The frequency range 30 MHz-25000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The levels of the emissions within the frequency ranges of the restricted bands (Section 15.205 of FCC Part 15) were compared to the limits of the table in Section 15.209 (a), General Requirements.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 30-1000 MHz, the readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

In the frequency range 1-2.9 GHz, a computerized EMI receiver complying to CISPR 16 requirements was used.

In the frequency range 2.9-25.0 GHz, a spectrum analyzer including a low noise amplifier was used. During average measurements, the IF bandwidth was 1 MHz and the video bandwidth was 100Hz. During peak measurements, the IF bandwidth was 1 MHz and the video bandwidth was 3 MHz.

The test distance was 3 meters.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The E.U.T. was tested in three operating channels and frequencies (0(2.402 GHz); 35 (2.4555 GHz); 50 (2.48198 GHz)).

13.3 Test Data

JUDGEMENT: Passed by 7.6 dB

The EUT met the requirements of the F.C.C. Part 15, Subpart C, specification.
The results for all three operation channels were the same.

For the operation channel 1 (2.402 GHz), the margin between the emission level and the specification limit is in the worst case 7.6 dB at the frequency of 2390.00 MHz, vertical polarization.

For the operation channel 8 (2.455 GHz), the margin between the emission level and the specification limit is in the worst case 18.7 dB at the frequency of 4910.00 MHz, vertical polarization.

For the operation channel 14 (2.481 GHz), the margin between the emission level and the specification limit is in the worst case 9.4 dB at the frequency of 2483.50 MHz, vertical polarization.

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

Radiated Emission Above 1 GHz

E.U.T Description Bluetooth and WiFi Module (Bluetooth Radio)
Type NBOARD811
Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2402 MHz

| Freq. | Polarity | Peak Reading | Peak. Specification | Margin |
|---------|----------|----------------|---------------------|--------|
| (MHz) | (H/V) | (dB μ V/m) | (dB μ V/m) | (dB) |
| 2390.00 | H | 47.5 | 74.0 | -26.5 |
| 2390.00 | V | 49.1 | 74.0 | -24.9 |
| 4804.00 | H | 53.4* | 74.0 | -20.6 |
| 4804.00 | V | 54.5* | 74.0 | -19.5 |

Figure 58. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL. Detector: Peak

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Peak Reading” includes correction factor.

“Correction Factor” = Antenna Factor + Cable Loss

* “Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain + Band Pass Filter

Radiated Emission Above 1 GHz

E.U.T Description Bluetooth and WiFi Module (Bluetooth Radio)
Type NBOARD811
Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: 2402 MHz

| Freq. | Polarity | Average Reading | Average Specification | Margin |
|---------|----------|-----------------|-----------------------|--------|
| (MHz) | (H/V) | (dB μ V/m) | (dB μ V/m) | (dB) |
| 2390.00 | H | 45.3 | 54.0 | -8.7 |
| 2390.00 | V | 46.4 | 54.0 | -7.6 |
| 4804.00 | H | 38.5* | 54.0 | -15.5 |
| 4804.00 | V | 36.6* | 54.0 | -17.4 |

**Figure 59. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Average Reading” includes correction factor.

“Correction Factor” = Antenna Factor + Cable Loss

* “Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain + Band Pass Filter

Radiated Emission Above 1 GHz

E.U.T Description Bluetooth and WiFi Module (Bluetooth Radio)
Type NBOARD811
Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2455 MHz

| Freq. | Polarity | Peak Reading | Peak Specification | Margin |
|---------|----------|--------------|--------------------|--------|
| (MHz) | (H/V) | (dBμV/m) | (dB μV/m) | (dB) |
| 4910.00 | H | 53.7 | 74.0 | -20.3 |
| 4910.00 | V | 54.6 | 74.0 | -19.4 |

**Figure 60. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Peak**

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Peak Margin” includes correction factor.

“Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain + Band Pass Filter

Radiated Emission Above 1 GHz

E.U.T Description Bluetooth and WiFi Module (Bluetooth Radio)
Type NBOARD811
Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: 2455MHz

| Freq. | Polarity | Average Reading | Average Specification | Margin |
|---------|----------|-----------------|-----------------------|--------|
| (MHz) | (H/V) | (dBμ V/m) | (dB μ V/m) | (dB) |
| 4910.00 | H | 33.0 | 54.0 | -21.0 |
| 4910.00 | V | 35.3 | 54.0 | -18.7 |

**Figure 61. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Average Reading” includes correction factor.

“Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain + Band Pass Filter

Radiated Emission Above 1 GHz

E.U.T Description Bluetooth and WiFi Module (Bluetooth Radio)
Type NBOARD811
Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Peak
Operation Frequency: 2482 MHz

| Freq. | Polarity | Peak Reading | Peak Specification | Margin |
|---------|----------|--------------|--------------------|--------|
| (MHz) | (H/V) | (dBμV/m) | (dB μV/m) | (dB) |
| 2483.50 | H | 47.4 | 74.0 | -26.6 |
| 2483.50 | V | 48.7 | 74.0 | -25.3 |
| 4962.00 | H | 53.4* | 74.0 | -20.6 |
| 4962.00 | V | 55.3* | 74.0 | -18.7 |

**Figure 62. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Peak**

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Peak Reading” includes correction factor.

“Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

* “Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain + Band Pass Filter

Radiated Emission Above 1 GHz

E.U.T Description Bluetooth and WiFi Module (Bluetooth Radio)
Type NBOARD811
Serial Number: Not Designated

Specification: FCC, Part 15, Subpart C

Antenna Polarization: Horizontal/Vertical Frequency range: 1.0 GHz to 25.0 GHz
Test Distance: 3 meters Detector: Average
Operation Frequency: 2482 MHz

| Freq. | Polarity | Average Reading | Average Specification | Margin |
|---------|----------|-----------------|-----------------------|--------|
| (MHz) | (H/V) | (dBμV/m) | (dB μV/m) | (dB) |
| 2483.50 | H | 43.4 | 54.0 | -10.6 |
| 2483.50 | V | 44.6 | 54.0 | -9.4 |
| 4962.00 | H | 32.4* | 54.0 | -21.6 |
| 4962.00 | V | 35.3* | 54.0 | -18.7 |

**Figure 63. Radiated Emission. Antenna Polarization: HORIZONTAL / VERTICAL.
Detector: Average**

Notes:

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

“Average Reading” includes correction factor.

Correction Factor = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

* “Correction Factor” = Antenna Factor + Cable Loss- Low Noise Amplifier Gain + Band Pass Filter

13.4 Test Instrumentation Used, Radiated Measurements

| Instrument | Manufacturer | Model | Serial No. | Last Calibration Date | Period |
|--------------------------------------|-----------------|------------------|------------|-----------------------|---------|
| EMI Receiver | HP | 85422E | 3906A00276 | November 10, 2009* | 1 Year |
| RF Filter Section | HP | 85420E | 3705A00248 | November 10, 2009* | 1 Year |
| Antenna Biconical | ARA | BCD 235/B | 1041 | August 1, 2010 | 1 Year |
| Antenna Log Periodic | ARA | LPD-2010/A | 1038 | March 24, 2010 | 1 Year |
| Antenna Log Periodic | A.H. Systems | SAS-200/511 | 253 | January 29, 2009 | 2 Years |
| Double Ridged Waveguide Horn Antenna | EMCO | 3115 | 29845 | March 14, 2010 | 2 Years |
| Horn Antenna | ARA | SWH-28 | 1008 | December 23, 2008 | 2 Years |
| Low Noise Amplifier | DBS MICROWAVE | LNA-DBS-0411N313 | 013 | January 13, 2010 | 1 Year |
| Low Noise Amplifier | Sophia Wireless | LNA 28-B | 232 | January 13, 2010 | 1 Year |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | March 14, 2010 | 1 Year |
| Spectrum Analyzer | HP | 8546E | 3442A00275 | January 11, 2010 | 1 Year |
| Antenna Mast | ARA | AAM-4A | 1001 | N/A | N/A |
| Turntable | ARA | ART-1001/4 | 1001 | N/A | N/A |
| Mast & Table Controller | ARA | ACU-2/5 | 1001 | N/A | N/A |
| Printer | HP | LaserJet 2200 | JPKG19982 | N/A | N/A |

* Test was performed before 10 November 2010.

13.5 Field Strength Calculation 30 – 1000 MHz

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$[\text{dB}\mu\text{V/m}] \text{ FS} = \text{RA} + \text{AF} + \text{CF}$$

| | |
|-----|--|
| FS: | Field Strength [dB $\mu\text{V/m}$] |
| RA: | Receiver Amplitude [dB μV] |
| AF: | Receiving Antenna Correction Factor [dB/m] |
| CF: | Cable Attenuation Factor [dB] |

Example: $\text{FS} = 30.7 \text{ dB}\mu\text{V (RA)} + 14.0 \text{ dB (AF)} + 0.9 \text{ dB (CF)} = 45.6 \text{ dB}\mu\text{V}$

No external pre-amplifiers are used.

14. Radiated Power Spectral Density

[In accordance with section 15.247(d)]

14.1 Test procedure

The E.U.T. antenna terminal was connected to the spectrum analyzer through an external attenuator (20dB) and an appropriate coaxial cable (cable loss = 1 dB). The spectrum analyzer was set to 3 kHz resolution BW and sweep time of 1 second for each 3 kHz “window”. The spectrum peaks were located at each of the 3 operating frequencies with modulation.

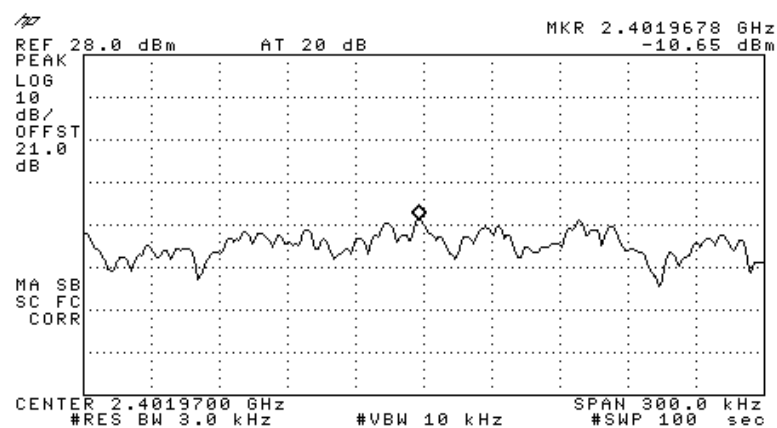


Figure 64 — 2402 MHz

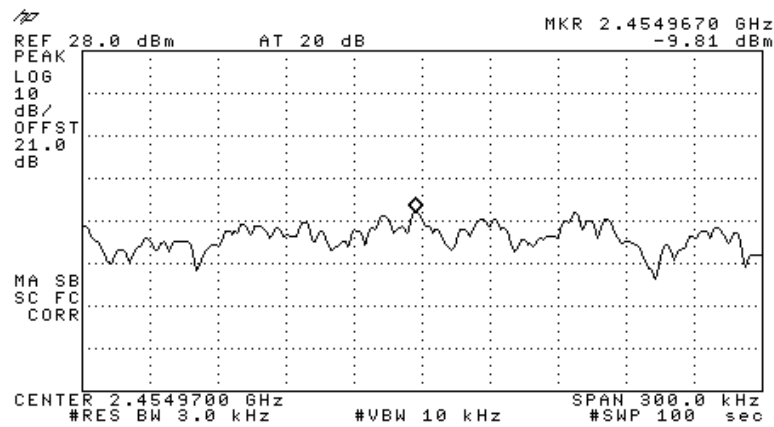


Figure 65 — 2455 MHz

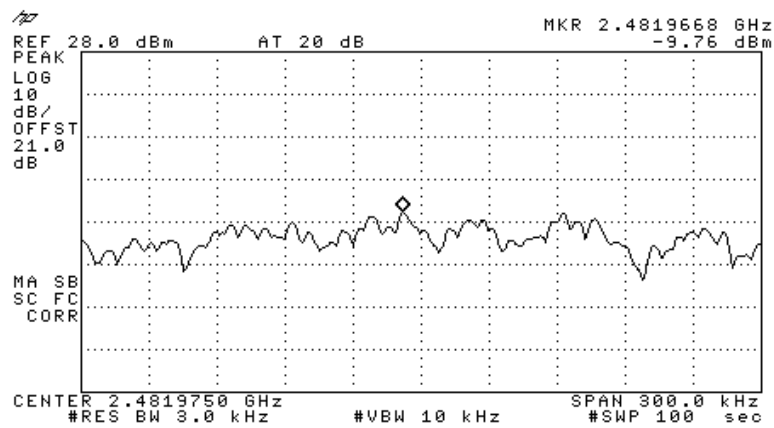


Figure 66 — 2482MHz

14.2 Results table

E.U.T. Description: Bluetooth and WiFi Module (Bluetooth Radio)

Model No.: NBOARD811

Serial Number: Not Designated


Specification: F.C.C. Part 15, Subpart C (15.247(d))

| Operation Frequency (MHz) | Spectral Density Result (dBm) | Specification (dBm) | Margin (dB) |
|-------------------------------------|--|----------------------------|--------------------|
| 2402 | -10.65 | 8.0 | -18.65 |
| 2455 | -9.81 | 8.0 | -17.81 |
| 2482 | -9.76 | 8.0 | -17.76 |

Figure 67 Test Results

JUDGEMENT: Passed

TEST PERSONNEL:

Tester Signature: 

Date: 07.02.11

Typed/Printed Name: A. Sharabi

14.3 Test Equipment Used.

Transmitted Power Density

| Instrument | Manufacturer | Model | Serial Number | Calibration | Period |
|-------------------------|--------------|---------------|---------------|--------------------|---------|
| EMI Receiver | HP | 85422E | 3906A00276 | November 10, 2009* | 1 year |
| RF Section | HP | 85420E | 3705A00248 | November 10, 2009* | 1 year |
| Antenna Log Periodic | A.H. Systems | SAS-200/511 | 253 | January 29, 2009 | 2 years |
| Antenna Mast | ARA | AAM-4A | 1001 | N/A | N/A |
| Turntable | ARA | ART-1001/4 | 1001 | N/A | N/A |
| Mast & Table Controller | ARA | ACU-2/5 | 1001 | N/A | N/A |
| Printer | HP | LaserJet 2200 | JPKG19982 | N/A | N/A |

Figure 68 Test Equipment Used

* Test was performed before 10 November 2010

15. Antenna Gain/Information

The antenna gain is 0 dBi.

16. R.F Exposure/Safety

Typical use of the E.U.T. is inside a Micronet Mobile Data terminal which can be handheld or located inside a motor vehicle. The typical distance between the E.U.T. and the user is 3.5 cm .

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 2445 MHz is: $1 \frac{mW}{cm^2}$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

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

P_t- Transmitted Power 4.12 dBm= 2.58 mw (Peak)

G_T- Antenna Gain, 0 dBi = 1

R- Distance from Transmitter using 3.5 cm worst case

(c) The power density is :

$$S = \frac{2.58 \times 1}{4\pi(3.5)^2} = 0.017 \frac{mW}{cm^2}$$

(d) This is below the FCC limit.

17. APPENDIX B - CORRECTION FACTORS

17.1 Correction factors for CABLE

from EMI receiver
to test antenna
at 3 meter range.

| FREQUENCY (MHz) | CORRECTION FACTOR (dB) | FREQUENCY (MHz) | CORRECTION FACTOR (dB) |
|--------------------|------------------------------|--------------------|------------------------------|
| 10.0 | 0.3 | 1200.0 | 7.3 |
| 20.0 | 0.6 | 1400.0 | 7.8 |
| 30.0 | 0.8 | 1600.0 | 8.4 |
| 40.0 | 0.9 | 1800.0 | 9.1 |
| 50.0 | 1.1 | 2000.0 | 9.9 |
| 60.0 | 1.2 | 2300.0 | 11.2 |
| 70.0 | 1.3 | 2600.0 | 12.2 |
| 80.0 | 1.4 | 2900.0 | 13.0 |
| 90.0 | 1.6 | | |
| 100.0 | 1.7 | | |
| 150.0 | 2.0 | | |
| 200.0 | 2.3 | | |
| 250.0 | 2.7 | | |
| 300.0 | 3.1 | | |
| 350.0 | 3.4 | | |
| 400.0 | 3.7 | | |
| 450.0 | 4.0 | | |
| 500.0 | 4.3 | | |
| 600.0 | 4.7 | | |
| 700.0 | 5.3 | | |
| 800.0 | 5.9 | | |
| 900.0 | 6.3 | | |
| 1000.0 | 6.7 | | |

NOTES:

1. The cable type is RG-214.
2. The overall length of the cable is 27 meters.
3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

17.2 Correction factors for CABLE

from EMI receiver
to test antenna
at 3 meter range.

| FREQUENCY (GHz) | CORRECTION FACTOR (dB) |
|--------------------|------------------------------|
| 1.0 | 1.2 |
| 2.0 | 1.6 |
| 3.0 | 2.0 |
| 4.0 | 2.4 |
| 5.0 | 3.0 |
| 6.0 | 3.4 |
| 7.0 | 3.8 |
| 8.0 | 4.2 |
| 9.0 | 4.6 |
| 10.0 | 5.0 |
| 12.0 | 5.8 |

NOTES:

1. The cable type is RG-8.
2. The overall length of the cable is 10 meters.

17.3 Correction factors for CABLE

from spectrum analyzer
to test antenna above 2.9 GHz

| FREQUENCY (GHz) | CORRECTION FACTOR (dB) | FREQUENCY (GHz) | CORRECTION FACTOR (dB) |
|--------------------|------------------------------|--------------------|------------------------------|
| 1.0 | 1.9 | 14.0 | 9.1 |
| 2.0 | 2.7 | 15.0 | 9.5 |
| 3.0 | 3.5 | 16.0 | 9.9 |
| 4.0 | 4.2 | 17.0 | 10.2 |
| 5.0 | 4.9 | 18.0 | 10.4 |
| 6.0 | 5.5 | 19.0 | 10.7 |
| 7.0 | 6.0 | 20.0 | 10.9 |
| 8.0 | 6.5 | 21.0 | 11.2 |
| 9.0 | 7.0 | 22.0 | 11.6 |
| 10.0 | 7.5 | 23.0 | 11.9 |
| 11.0 | 7.9 | 24.0 | 12.3 |
| 12.0 | 8.3 | 25.0 | 12.6 |
| 13.0 | 8.7 | 26.0 | 13.0 |

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.
2. The cable is used for measurements above 2.9 GHz.
3. The overall length of the cable is 10 meters.

12.6 Correction factors for LOG PERIODIC ANTENNA

**Type LPD 2010/A
at 3 and 10 meter ranges.**

Distance of 3 meters

| FREQUENCY (MHz) | AFE (dB/m) |
|--------------------|---------------|
| 200.0 | 9.1 |
| 250.0 | 10.2 |
| 300.0 | 12.5 |
| 400.0 | 15.4 |
| 500.0 | 16.1 |
| 600.0 | 19.2 |
| 700.0 | 19.4 |
| 800.0 | 19.9 |
| 900.0 | 21.2 |
| 1000.0 | 23.5 |

Distance of 10 meters

| FREQUENCY (MHz) | AFE (dB/m) |
|--------------------|---------------|
| 200.0 | 9.0 |
| 250.0 | 10.1 |
| 300.0 | 11.8 |
| 400.0 | 15.3 |
| 500.0 | 15.6 |
| 600.0 | 18.7 |
| 700.0 | 19.1 |
| 800.0 | 20.2 |
| 900.0 | 21.1 |
| 1000.0 | 23.2 |

NOTES:

1. Antenna serial number is 1038.
2. The above lists are located in file number 38M30.ANT for a 3 meter range,
and file number 38M100.ANT for a 10 meter range.
3. The files mentioned above are located on the disk marked "Radiated Emission
Test EMI Receiver".

17.4 Correction factors for LOG PERIODIC ANTENNA
Type SAS-200/511
at 3 meter range.

| FREQUENCY | ANTENNA FACTOR |
|-----------|-------------------|
| (GHz) | (dB) |
| 1.0 | 24.9 |
| 1.5 | 27.8 |
| 2.0 | 29.9 |
| 2.5 | 31.2 |
| 3.0 | 32.8 |
| 3.5 | 33.6 |
| 4.0 | 34.3 |
| 4.5 | 35.2 |
| 5.0 | 36.2 |
| 5.5 | 36.7 |
| 6.0 | 37.2 |
| 6.5 | 38.1 |

| FREQUENCY | ANTENNA FACTOR |
|-----------|-------------------|
| (GHz) | (dB) |
| 7.0 | 38.6 |
| 7.5 | 39.2 |
| 8.0 | 39.9 |
| 8.5 | 40.4 |
| 9.0 | 40.8 |
| 9.5 | 41.1 |
| 10.0 | 41.7 |
| 10.5 | 42.4 |
| 11.0 | 42.5 |
| 11.5 | 43.1 |
| 12.0 | 43.4 |
| 12.5 | 44.4 |
| 13.0 | 44.6 |

NOTES:

1. Antenna serial number is 253.
2. The above lists are located in file number SAS3M0.ANT for a 3 meter range.
3. The files mentioned above are located on the disk marked "Antenna Factors".

17.5 Correction factors for **BICONICAL ANTENNA**

**Type BCD-235/B,
at 3 meter range**

| FREQUENCY (MHz) | AFE (dB/m) |
|---------------------------|----------------------|
| 20.0 | 19.4 |
| 30.0 | 14.8 |
| 40.0 | 11.9 |
| 50.0 | 10.2 |
| 60.0 | 9.1 |
| 70.0 | 8.5 |
| 80.0 | 8.9 |
| 90.0 | 9.6 |
| 100.0 | 10.3 |
| 110.0 | 11.0 |
| 120.0 | 11.5 |
| 130.0 | 11.7 |
| 140.0 | 12.1 |
| 150.0 | 12.6 |
| 160.0 | 12.8 |
| 170.0 | 13.0 |
| 180.0 | 13.5 |
| 190.0 | 14.0 |
| 200.0 | 14.8 |
| 210.0 | 15.3 |
| 220.0 | 15.8 |
| 230.0 | 16.2 |
| 240.0 | 16.6 |
| 250.0 | 17.6 |
| 260.0 | 18.2 |
| 270.0 | 18.4 |
| 280.0 | 18.7 |
| 290.0 | 19.2 |
| 300.0 | 19.9 |
| 310 | 20.7 |
| 320 | 21.9 |
| 330 | 23.4 |
| 340 | 25.1 |
| 350 | 27.0 |

NOTES:

1. Antenna serial number is 1041.
2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

17.6 Correction factors for Double-Ridged Waveguide Horn

**Model: 3115, S/N 29845
at 3 meter range.**

| FREQUENCY (GHz) | ANTENNA FACTOR (dB 1/m) | ANTENNA Gain (dBi) | FREQUENCY (GHz) | ANTENNA FACTOR (dB 1/m) | ANTENNA Gain (dBi) |
|--------------------|-------------------------------|--------------------------|--------------------|-------------------------------|--------------------------|
| 1.0 | 24.8 | 5.4 | 10.0 | 38.8 | 11.4 |
| 1.5 | 26.1 | 7.6 | 10.5 | 38.9 | 11.8 |
| 2.0 | 28.6 | 7.7 | 11.0 | 39.0 | 12.1 |
| 2.5 | 29.8 | 8.4 | 11.5 | 39.6 | 11.8 |
| 3.0 | 31.4 | 8.4 | 12.0 | 39.8 | 12.0 |
| 3.5 | 32.4 | 8.7 | 12.5 | 39.6 | 12.5 |
| 4.0 | 33.7 | 8.6 | 13.0 | 40.0 | 12.5 |
| 4.5 | 33.4 | 9.9 | 13.5 | 39.8 | 13.0 |
| 5.0 | 34.5 | 9.7 | 14.0 | 40.2 | 13.0 |
| 5.5 | 35.1 | 9.9 | 14.5 | 40.6 | 12.9 |
| 6.0 | 35.4 | 10.4 | 15.0 | 41.3 | 12.4 |
| 6.5 | 35.6 | 10.8 | 15.5 | 39.5 | 14.6 |
| 7.0 | 36.2 | 10.9 | 16.0 | 38.8 | 15.5 |
| 7.5 | 37.3 | 10.4 | 16.5 | 40.0 | 14.6 |
| 8.0 | 37.7 | 10.6 | 17.0 | 41.4 | 13.4 |
| 8.5 | 38.3 | 10.5 | 17.5 | 44.8 | 10.3 |
| 9.0 | 38.5 | 10.8 | 18.0 | 47.2 | 8.1 |
| 9.5 | 38.7 | 11.1 | | | |

17.7 Correction factors for

Horn Antenna
Model: SWH-28
at 1 meter range.

| FREQUENCY (GHz) | APE (dB /m) | Gain (dBi) |
|---------------------------|-----------------------|----------------------|
| 18.0 | 40.3 | 16.1 |
| 19.0 | 40.3 | 16.3 |
| 20.0 | 40.3 | 16.1 |
| 21.0 | 40.3 | 16.3 |
| 22.0 | 40.4 | 16.8 |
| 23.0 | 40.5 | 16.4 |
| 24.0 | 40.5 | 16.6 |
| 25.0 | 40.5 | 16.7 |
| 26.0 | 40.6 | 16.4 |

17.8 Correction factors for ACTIVE LOOP ANTENNA

Model 6502

S/N 9506-2950

| FREQUENCY | Magnetic Antenna Factor | Electric Antenna Factor |
|-----------|-------------------------------|-------------------------------|
| (MHz) | (dB) | (dB) |
| .009 | -35.1 | 16.4 |
| .010 | -35.7 | 15.8 |
| .020 | -38.5 | 13.0 |
| .050 | -39.6 | 11.9 |
| .075 | -39.8 | 11.8 |
| .100 | -40.0 | 11.6 |
| .150 | -40.0 | 11.5 |
| .250 | -40.0 | 11.6 |
| .500 | -40.0 | 11.5 |
| .750 | -40.1 | 11.5 |
| 1.000 | -39.9 | 11.7 |
| 2.000 | -39.5 | 12.0 |
| 3.000 | -39.4 | 12.1 |
| 4.000 | -39.7 | 11.9 |
| 5.000 | -39.7 | 11.8 |
| 10.000 | 40.2 | 11.3 |
| 15.000 | -40.7 | 10.8 |
| 20.000 | -40.5 | 11.0 |
| 25.000 | -41.3 | 10.2 |
| 30.000 | 42.3 | 9.2 |