

FCC Test Report

EQUIPMENT : 3.65GHz MIMO miniPCI Radio
BRAND NAME : Dbii
MODEL NO. : F36N-PRO
FCC ID : VKV-F36N
STANDARD : 47 CFR FCC Part 90
APPLICANT : Dbii Networks Limited
201 Oak Ave, #D Carlsbad, CA 92008 United States
MANUFACTURER : Dbii Networks
16F-3, No. 482, Sec. 5, Zhongxiao E. Rd., Xinyi District, Taipei 11083 Taiwan

The product sample received on Sep. 28, 2011 and completely tested on Oct. 19, 2011. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/TIA-603-D-2010 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.


Reviewed by: Jordan Hsiao



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SUMMARY OF TEST RESULT

| Conformance Test Specifications | | | | | |
|---------------------------------|----------|---|--|---|----------|
| Report Clause | FCC Rule | Description | Measured | Limit | Result |
| 3.1 | 15.107 | AC Line Conducted Emissions | Average level: 44.45dBuV under 11.55dB | FCC 15.207 limits | Complied |
| 3.2 | 2.1049 | Occupied Bandwidth (Maximum for each channel bandwidth) | 5MHz: 5.35MHz 10MHz: 10.27MHz 20MHz: 17.77MHz | Information only | Complied |
| 3.3 | 90.1321 | EIRP Power (Maximum for each channel bandwidth) | 5MHz: 35.45dBm 10MHz: 35.89dBm 20MHz: 35.64dBm | 5MHz: 37dBm 10MHz: 40dBm 20MHz: 43dBm | Complied |
| 3.3 | 90.1321 | EIRP Power Density (Maximum for each channel bandwidth) | 5MHz: 29.85dBm/MHz 10MHz: 27.34dBm/MHz 20MHz: 24.08dBm/MHz | 30dBm/MHz | Complied |
| 3.4 | 90.1321 | Transmitter Radiated Spurious Emissions | 69.54dBuV/m margin 12.66dB | -13dBm/MHz or 82.2 dBuV/m @ 3m | Complied |
| 3.5 | 2.1051 | Transmitter Conducted Spurious Emissions | -52.75dBm margin 36.75dB | -16dBm/1MHz @ single port | Complied |
| - | 2.1033 | Emission Types | D1D | Information only | Complied |
| 3.6 | 90.210 | Spectrum Mask Emissions | Device complies with spectral mask – refer to test data | Mask B | Complied |
| 3.7 | 90.213 | Frequency Tolerance | 5.90 ppm | To be specified in the station authorization | Complied |
| 4 | 2.1091 | Maximum Permissible Exposure | 0.7726 mW/cm ² | 1 mW/cm ² | Complied |



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1 General Description

1.1 Product Information

1.1.1 Test Specification Information

| RF General Information | | | | | |
|---|-----------|---------------------|----------------|-------------------------|-------------------------|
| Frequency Range (MHz) | Modulaton | Ch. Frequency (MHz) | Channel Number | Channel Bandwidth (MHz) | Designation of Emission |
| 3650-3700 | OFDM | 3653.4-3668.4 | 1-4 | 5 | 5M35D1D |
| 3650-3700 | OFDM | 3658.4-3668.4 | 1-3 | 10 | 10M27D1D |
| 3650-3700 | OFDM | 3663.4 | 1 | 20 | 17M77D1D |
| Note 1: Modulation and Coding Scheme (MCS) index value include 0 – 7. | | | | | |

| Modulation Code Scheme | | | |
|------------------------|-----|------------|-------------|
| Modulation Type | MCS | Modulation | Coding Rate |
| OFDM | 0 | BPSK | 1/2 |
| OFDM | 1 | BPSK | 3/4 |
| OFDM | 2 | QPSK | 1/2 |
| OFDM | 3 | QPSK | 3/4 |
| OFDM | 4 | 16-QAM | 1/2 |
| OFDM | 5 | 16-QAM | 3/4 |
| OFDM | 6 | 16-QAM | 2/3 |
| OFDM | 7 | 64-QAM | 3/4 |

Transmitter Outputs & Receiver Inputs Information

| Worst Case Mode Abbreviations | Transmitter Outputs | Receiver Inputs | Transmitter Output Signals | Conducted Output Power (dBm) | EIRP - Output Power (dBm) | Co-location |
|--------------------------------------|----------------------------|------------------------|-----------------------------------|-------------------------------------|----------------------------------|--------------------|
| OFDM-2TX-5 | 2 (CDD) | 2 | Correlated | 20.44 | 35.45 | N/A |
| OFDM-2TX-10 | 2 (CDD) | 2 | Correlated | 20.88 | 35.89 | N/A |
| OFDM-2TX-20 | 2 (CDD) | 2 | Correlated | 20.63 | 35.64 | N/A |

Note 1: CDD - Cyclic Delay Diversity (CDD) modes (e.g., legacy modes in 802.11n devices). In CDD modes, the same digital data is carried by each transmit antenna, but with different cyclic delays.

Note 2: STBC - Space Time Block Codes (STBC) for which different digital data is carried by each transmit antenna during any symbol period.

Note 3: SM - Spatial Multiplexing MIMO (SM-MIMO), for which independent data streams are sent to each transmit antenna.

Note 4: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other.

Note 5: Worst case mode abbreviations and test frequency define in test report clause 2.1 and 2.2.

EUT Contention Protocols
☒ **Restricted Contention Protocols:**

Restricted contention protocols can prevent co-frequency interference only to radio equipment that uses the same or similar protocols. The IEEE 802.16 standard is an example of a restricted contention protocol. Equipment incorporating such a protocol relies on scheduling so as to avoid interference among multiple transmitters using the same protocol.

☐ **Unrestricted Contention Protocols:**

Unrestricted contention protocols can prevent co-frequency interference to radio equipment that uses dissimilar contention protocols. The IEEE 802.11 standard is an example of an unrestricted contention protocol. Equipment incorporating such a protocol listens to the channel before transmitting. If the equipment senses that another radio is operating co-channel, it will not transmit, thereby avoiding co-channel interference to equipment using similar or dissimilar contention-based protocols.

Note 1: Refer as FCC KDB628591 D01 V12R01 TCB Exclusion List: radio equipment operating in the 3650 MHz band using unrestricted contention based protocol (Part 90 Subpart Z).

Note 2: 3650-3675 MHz for Restricted Protocol, and 3650-3700 MHz for Unrestricted Protocol.

1.1.2 Antenna Information

| Antenna Information | | | | | | |
|---------------------|---------------|----------|---------------|-------|-------|------------|
| Ant. No. | Power Setting | Category | Type | Brand | Model | Gain (dBi) |
| 1 | 1 | Integral | Panel (Patch) | NSA | N/A | 12 |

| Antenna Directional Gain | | | | | |
|---|------------|--|-------------------------|--------------------------------|------------------------|
| Ant. No. | Modulation | Transmitter Outputs Signals Correlated | Transmitter Outputs (N) | Antenna Gain Combination (dBi) | Directional Gain (dBi) |
| 1 | OFDM | Correlated | 2 | 12, 12 | 15.01 |
| <p>Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows</p> <ul style="list-style-type: none"> Any transmit signals are correlated, Directional Gain = $G_{ANT} + 10 \log(N)$ dBi All transmit signals are completely uncorrelated, Directional Gain = G_{ANT} <p>Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:</p> <ul style="list-style-type: none"> Any transmit signals are correlated, Directional Gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$ dBi All transmit signals are completely uncorrelated, Directional Gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N]$ dBi | | | | | |

1.1.3 Presentation of Equipment

| Presentation of Equipment | |
|--|---|
| EUT Serial No. | N/A <input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering |
| <input checked="" type="checkbox"/> Stand-alone | |
| <input type="checkbox"/> Combined (EUT where the radio part is fully integrated within another device) | |
| <input type="checkbox"/> Plug-in radio (EUT intended for a variety of host systems) | |
| <input type="checkbox"/> Other: | |

1.1.4 EUT Operational Condition

| | | | |
|-----------------------------|--|---|---|
| Supply Voltage | <input type="checkbox"/> AC mains | <input checked="" type="checkbox"/> DC | |
| Type of DC Source | <input type="checkbox"/> Internal DC supply | <input checked="" type="checkbox"/> External DC adapter | <input type="checkbox"/> Battery |
| Operational Voltage | <input checked="" type="checkbox"/> Vnom (110 V) | <input checked="" type="checkbox"/> Vmax (126.5 V) | <input checked="" type="checkbox"/> Vmin (93.5 V) |
| Operational Climatic | <input checked="" type="checkbox"/> Tnom (0°C) | <input checked="" type="checkbox"/> Tmax (50°C) | <input checked="" type="checkbox"/> Tmin (-30°C) |

1.2 Accessories and Support Equipment

| Accessories | | | | |
|-------------|-----------|------------|------------|------------|
| No. | Equipment | Brand Name | Model Name | Serial No. |
| 1 | - | - | - | - |

| Support Equipment | | | | |
|-------------------|--------------|------------|------------|------------|
| No. | Equipment | Brand Name | Model Name | Serial No. |
| 1 | Notebook | DELL | D400 | NB-P |
| 2 | Mouse | Logitech | AMS0706W | MO-A |
| 3 | Modem | ACEEX | DM1414 | MD-E |
| 4 | Power Supply | GWINSTEK | GPC-50300 | - |

1.3 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing.

- ♦ None

1.4 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 90
- ♦ ANSI/TIA-603-D-2010
- ♦ FCC KDB 965270
- ♦ FCC KDB 662911
- ♦ FCC KDB 412172

1.5 Testing Information

| Testing Location | | | |
|-------------------------------------|--------|---|------------------|
| <input type="checkbox"/> | HWA YA | ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055 | |
| <input checked="" type="checkbox"/> | JHUBEI | ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085 | |
| Test Condition | | Test Site No. | Test Engineer |
| RF Conducted | | TH01-CB | Allen Liu |
| Radiated Emission | | 03CH01-CB | Magic Lai |
| AC Conducted Emission | | CO01-CB | Sin Chang |
| | | | Test Environment |
| | | | 24.3°C / 58% |
| | | | 24.5°C / 57% |
| | | | 24°C / 54% |

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

| Measurement Uncertainty | | | |
|--|---------------|--------------------------|-------|
| Test Item | | Uncertainty | Limit |
| AC Line Conducted Emissions | | ±2.26 dB | N/A |
| Occupied Bandwidth | | ±8.5×10 ⁻⁸ Hz | N/A |
| EIRP Power | | ±0.53 dB | N/A |
| EIRP Power Density | | ±0.53 dB | N/A |
| Transmitter Radiated Spurious Emissions | 30 – 1000 MHz | ±2.28 dB | N/A |
| | 1 – 18 GHz | ±2.59 dB | N/A |
| | 18 – 40 GHz | ±2.37 dB | N/A |
| | 40 – 200 GHz | N/A | N/A |
| Transmitter Conducted Spurious Emissions | 30 – 1000 MHz | ±0.51 dB | N/A |
| | 1 – 18 GHz | ±0.67 dB | N/A |
| | 18 – 40 GHz | ±0.83 dB | N/A |
| | 40 – 60 GHz | N/A | N/A |
| Spectrum Mask Emissions | | ±0.67 dB | N/A |
| Frequency Tolerance | | ±8.5×10 ⁻⁸ Hz | N/A |
| Maximum Permissible Exposure | | ±0.53 dB | N/A |

2 Test Configuration

2.1 Worst Case Modulation Configuration

| The Worst Case Modulation Configuration | | | | | |
|--|-----------------------|------------|-------------------------------|-------------------------|------------------|
| Worst Case Mode Abbreviations | Frequency Range (MHz) | Modulation | Number of Transmitter Outputs | Channel Bandwidth (MHz) | Data Rate or MCS |
| OFDM-2TX-5 | 3650-3700 | OFDM | 2TX | 5 | MCS0 |
| OFDM-2TX-10 | 3650-3700 | OFDM | 2TX | 10 | MCS0 |
| OFDM-2TX-20 | 3650-3700 | OFDM | 2TX | 20 | MCS0 |
| <p>Note 1: If the equipment supports different modulations and/or data rates, comparison measurements of RF output power across all modulations and/or data rates need to be performed to define the worst case modulation/data rate which has to be used for the conformance testing.</p> <p>Note 2: nTX, n is the number of Transmitter Outputs (e.g. 3TX – three transmitter outputs).</p> <p>Note 3: Modulation and Coding Scheme (MCS) index value include 0 – 7.</p> | | | | | |

2.2 Test Frequencies Configuration

| Test Frequencies Configuration | | | |
|--|-----------------------|------------|---|
| Worst Case Mode Abbreviations | Frequency Range (GHz) | Modulation | Test Frequencies (MHz) – FX (Frequencies Abbreviations) |
| OFDM-2TX-5 | 3650-3700 | OFDM | 3653.4-(F1), 3663.4-(F2), 3668.4-(F3) |
| OFDM-2TX-10 | 3650-3700 | OFDM | 3658.4-(F1), 3663.4-(F2), 3668.4-(F3) |
| OFDM-2TX-20 | 3650-3700 | OFDM | 3663.4-(F2), only one channel. |
| <p>Note 1: The measurement shall be repeated at the lowest (F1), the middle(F2), and the highest (F3) frequency of the stated frequency range.</p> | | | |

2.3 Worst Case Power Setting Parameter

| The Worst Case Power Setting Parameter | | | | | |
|--|---------------|-------------------------------|-----------------|-----------------|------------------|
| Ant. No. | Power Setting | Worst Case Mode Abbreviations | Frequency (MHz) | Power Parameter | Data Rate or MCS |
| 1 | 1 | OFDM-2TX-5 | 3653.4 | 14 | MCS0 |
| 1 | 1 | OFDM-2TX-5 | 3663.4 | 14 | MCS0 |
| 1 | 1 | OFDM-2TX-5 | 3668.4 | 14 | MCS0 |
| 1 | 1 | OFDM-2TX-10 | 3658.4 | 15 | MCS0 |
| 1 | 1 | OFDM-2TX-10 | 3663.4 | 21 | MCS0 |
| 1 | 1 | OFDM-2TX-10 | 3668.4 | 13.5 | MCS0 |
| 1 | 1 | OFDM-2TX-20 | 3663.4 | 14.5 | MCS0 |
| <p>Note 1: If the equipment supports different modulations and/or data rates, comparison measurements of RF output power across all modulations and/or data rates need to be performed to define the worst case modulation/data rate which has to be used for the conformance testing.</p> <p>Note 2: If the equipment supports different power settings for different antennas installation, each power setting shall be performed for the conformance testing.</p> | | | | | |

2.4 The Worst Case RF Conducted Test Configuration

| The Worst Case RF Conducted Test Configuration | | | |
|---|---------------|-------------------------------|-----------------------|
| Ant. No. | Power Setting | Worst Case Mode Abbreviations | Test Frequencies (FX) |
| 1 | 1 | OFDM-2TX-5 | F1, F2, F3 |
| 1 | 1 | OFDM-2TX-10 | F1, F2, F3 |
| 1 | 1 | OFDM-2TX-20 | F2 |
| Maximum RF Conducted Power Setting | | | 1 |
| <p>Note 1: If the equipment supports different modulations and/or data rates, comparison measurements of RF output power across all modulations and/or data rates need to be performed to define the worst case modulation/data rate which has to be used for the conformance testing.</p> <p>Note 2: If the equipment supports different power settings for different antennas, each power setting shall be performed for the conformance testing.</p> | | | |

2.5 The Worst Case Radiated Test (Above 1GHz) Configuration

| The Worst Case Radiated Test (Above 1GHz) Configuration | | | |
|---|---------------|-------------------------------|-------------------------------|
| Ant. No. | Power Setting | Worst Case Mode Abbreviations | Test Channel Frequencies (FX) |
| 1 | 1 | OFDM-2TX-5 | F1, F2, F3 |
| 1 | 1 | OFDM-2TX-10 | F1, F2, F3 |
| 1 | 1 | OFDM-2TX-20 | F2 |

Note 1: Radiated test shall be measured while the EUT is situated in three orthogonal planes (if appropriate, i.e., hand-held or body-worn battery-powered devices) and antenna ports (if EUT with antenna diversity function).

Note 2: If EUT is consist of multiple antennas assembly (regardless of spatial multiplexing MIMO), the radiated test should be performed with highest antenna gain of each antenna type.

2.6 Worst Case Radiated Test (Below 1GHz) Configuration

| Worst Case Radiated Emission (Below 1GHz) Configuration | | | | | |
|---|----------|---------------|----------------|-------------------------------------|-----------------------|
| Test Mode | Ant. No. | Power Setting | Operating Mode | Worst Case Modulation Abbreviations | Test Frequencies (FX) |
| 1 | 1 | 1 | CTX | OFDM-2TX-5 | F2 |
| 2 | 1 | 1 | CTX | OFDM-2TX-10 | F2 |
| 3 | 1 | 1 | CTX | OFDM-2TX-20 | F2 |

Note 1: Radiated emissions shall be performed while the EUT is situated in three orthogonal planes (if appropriate, i.e., hand-held or body-worn battery-powered devices) and antenna ports (if EUT with antenna diversity function).

Note 2: Radiated emissions (below 1GHz) from digital circuitry contained within the transmitter and that the emissions are not intended to be radiated from the transmitter's antenna or radiated associated digital devices. Therefore different modulation and channel bandwidth mode shall not be influence radiated emissions (below 1GHz). If EUT could be used with different operating functions (e.g. AC or DC power source types.), Radiated emissions (below 1GHz) shall be performed each operating modes.

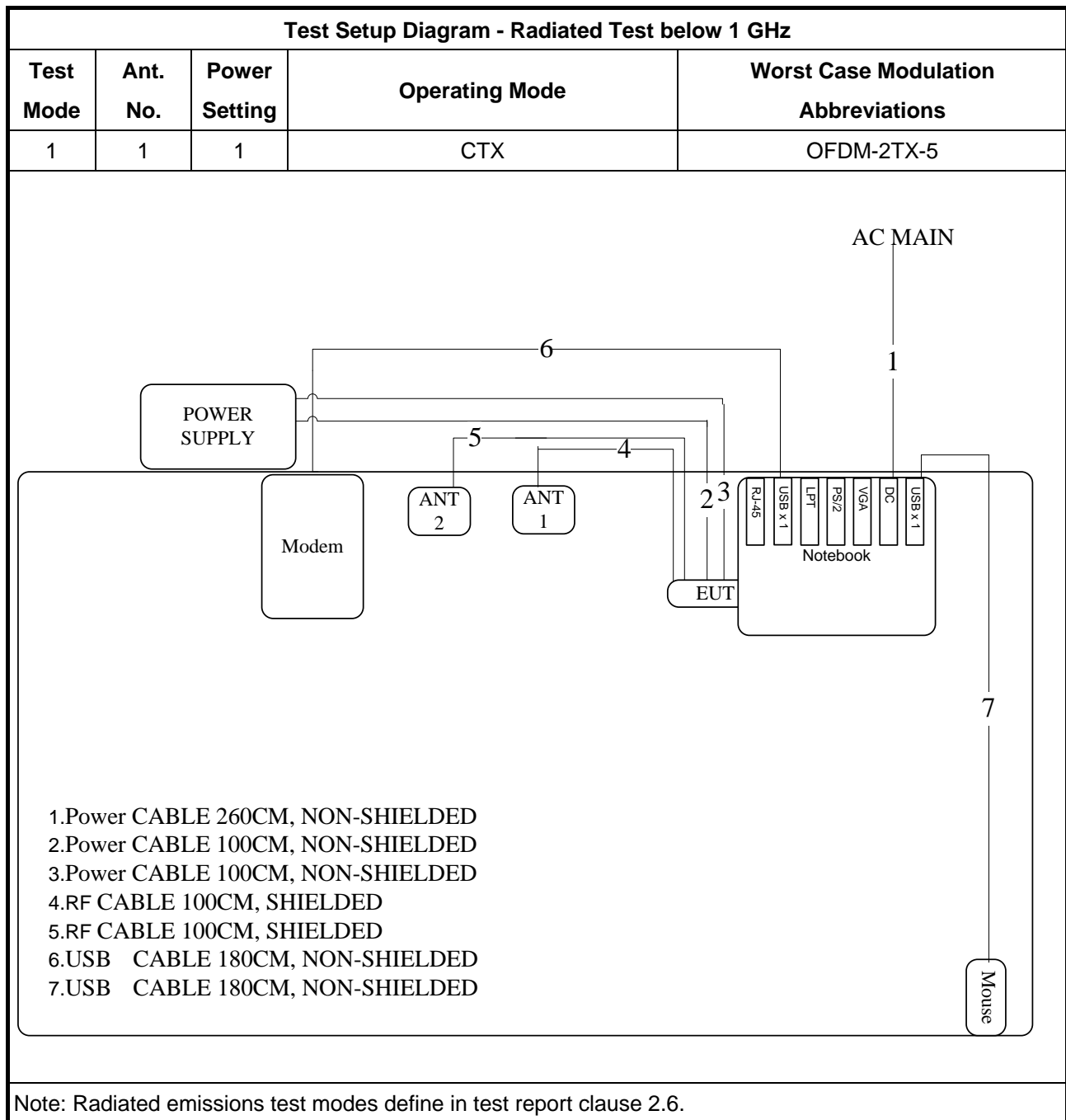
2.7 Worst Case AC Line Conducted Test Configuration

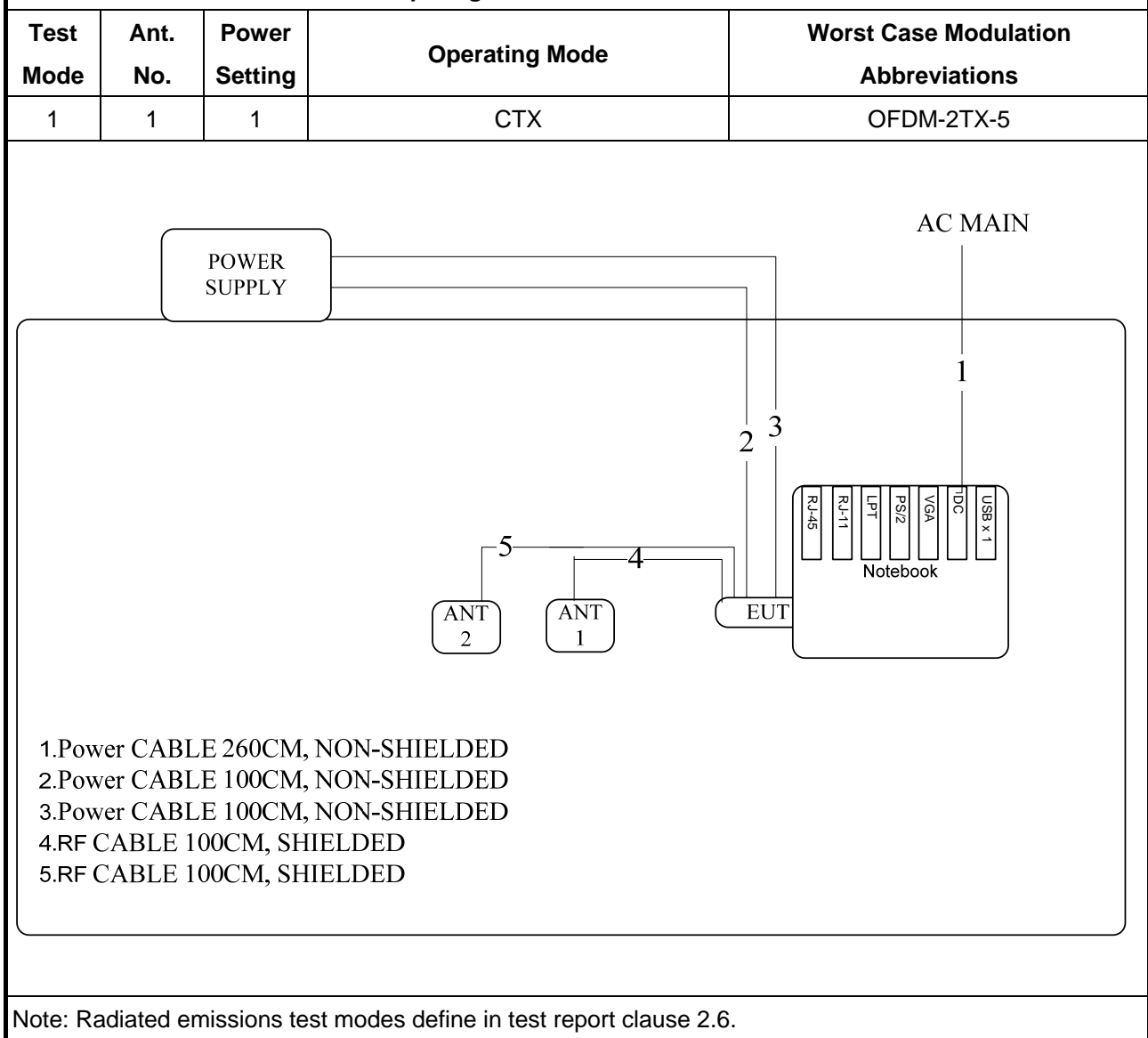
| Worst AC Line Conducted Test Configuration | | | | | |
|--|----------|---------------|----------------|-------------------------------------|-----------------------|
| Test Mode | Ant. No. | Power Setting | Operating Mode | Worst Case Modulation Abbreviations | Test Frequencies (FX) |
| 1 | 1 | 1 | CTX | OFDM-2TX-5 | F2 |

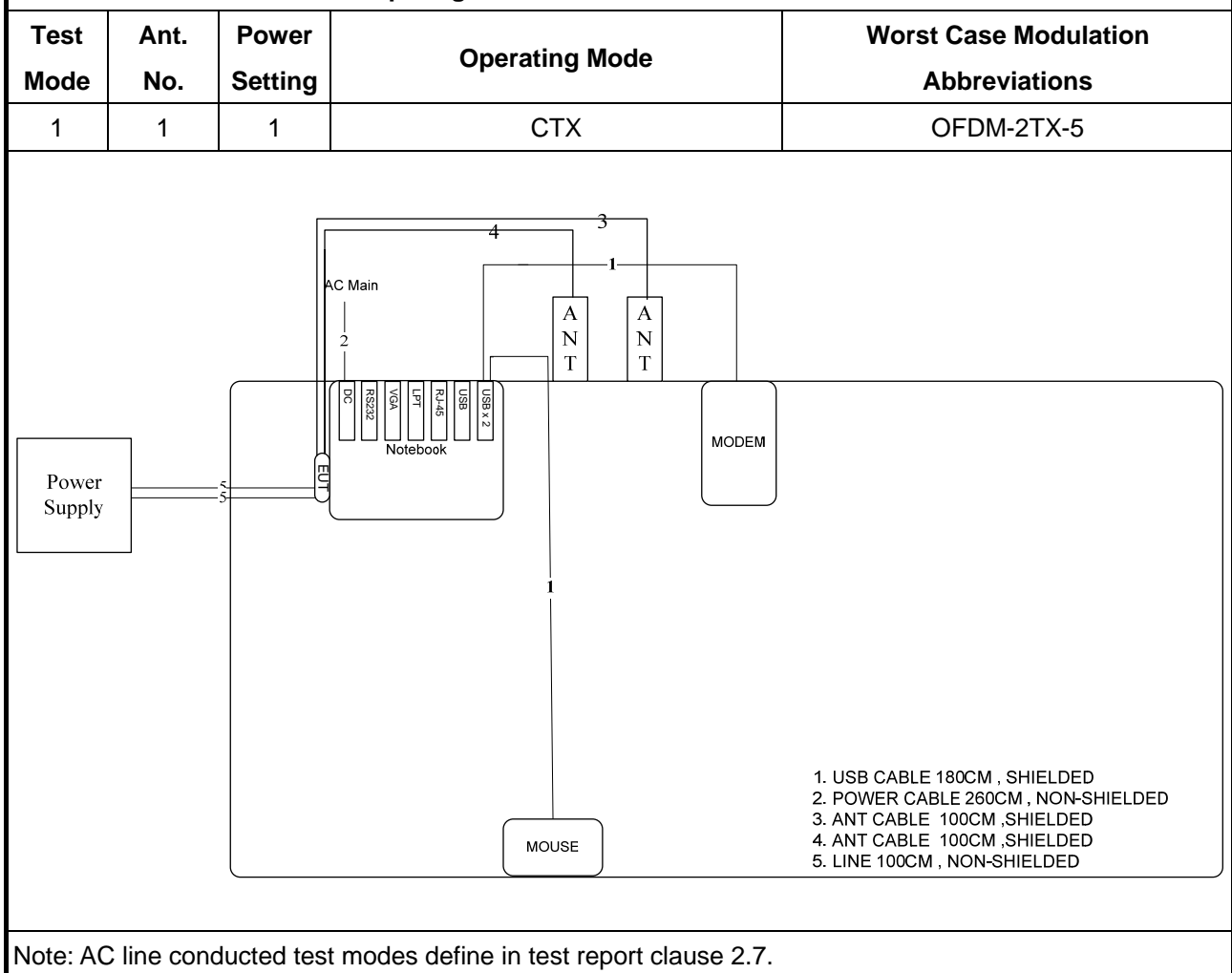
Note 1: AC line conducted emissions are from common mode current, different modulation mode could not be influence AC line conducted emissions. If EUT could be used for different operating functions (e.g. AC or DC power source types.), AC line conducted emissions shall be performed each operating modes.

2.8 Test Setup Diagram

For the purposes of this test report, if EUT's support equipment is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless EUT's support equipment could possible influence the test results. EUT setups describe the combination of EUT and EUT's support equipment used for testing.



Test Setup Diagram - Radiated Test above 1 GHz


Test Setup Diagram - AC Line Conducted Emissions Test


3 Transmitter Test Result

3.1 AC Line Conducted Emissions

3.1.1 Limit of AC Line Conducted Emissions

| AC Line Conducted Emissions Limit | | |
|-----------------------------------|------------|-----------|
| Frequency Emission (MHz) | Quasi-Peak | Average |
| 0.15-0.5 | 66 - 56 * | 56 - 46 * |
| 0.5-5 | 56 | 46 |
| 5-30 | 60 | 50 |

Note: Refer as FCC 15.107 limits. * Decreases with the logarithm of the frequency.

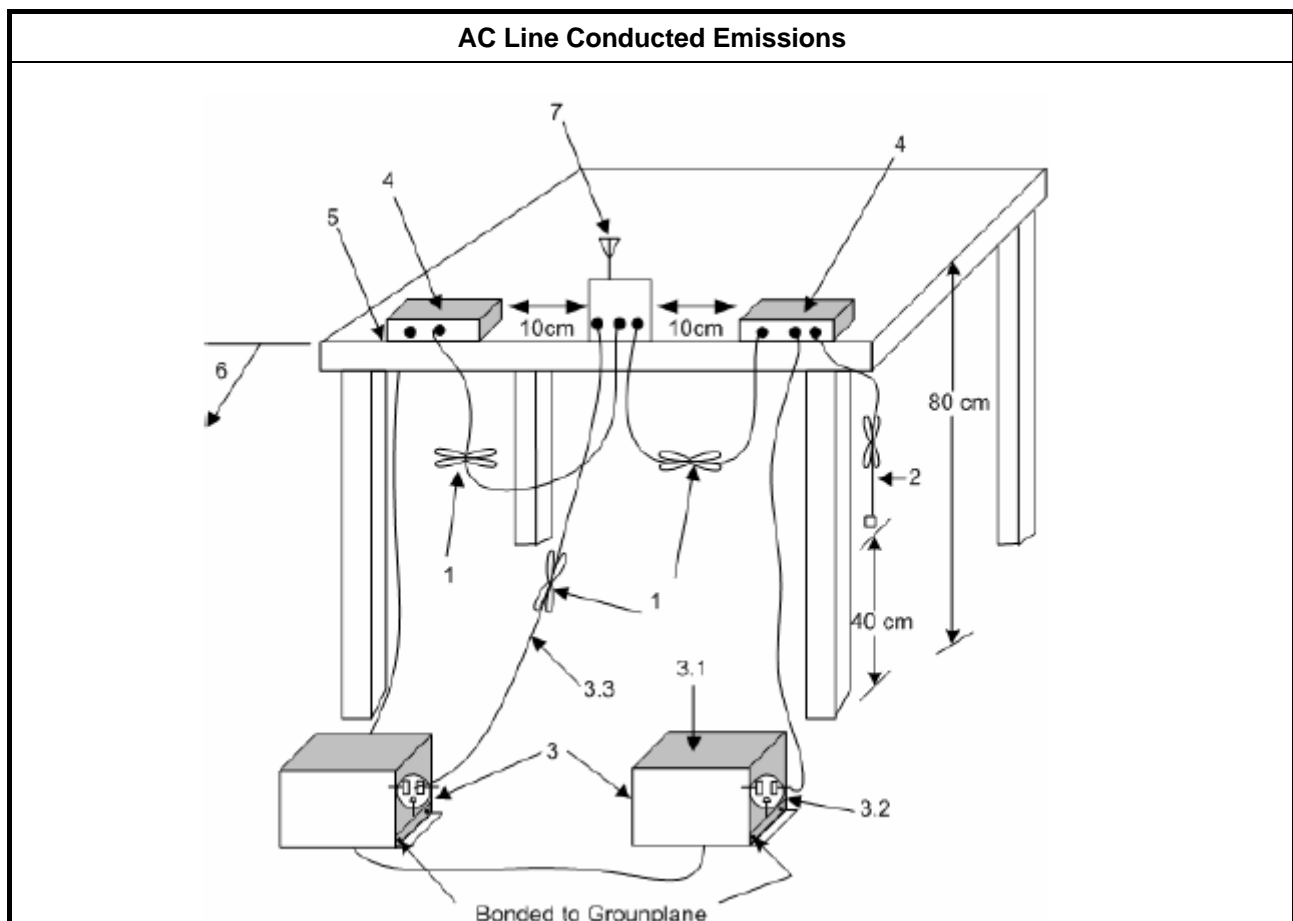
3.1.2 Measuring Instruments

Refer test equipment and calibration data list in test report clause 5.

3.1.3 Test Procedures

Method of measurement: Refer as ANSI/TIA-603-D-2010, clause 2.1.3.

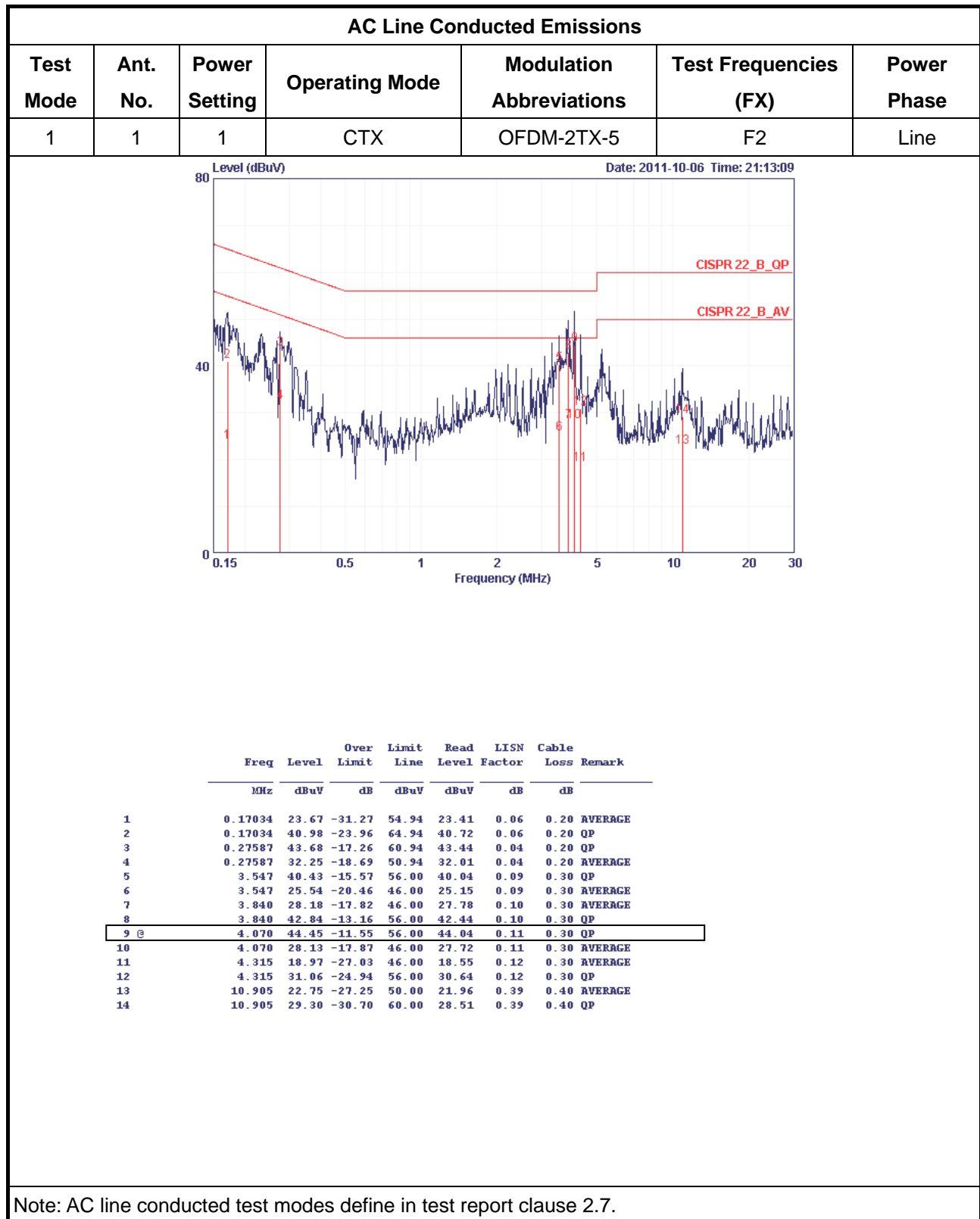
3.1.4 Test Setup



AC Line Conducted Emissions

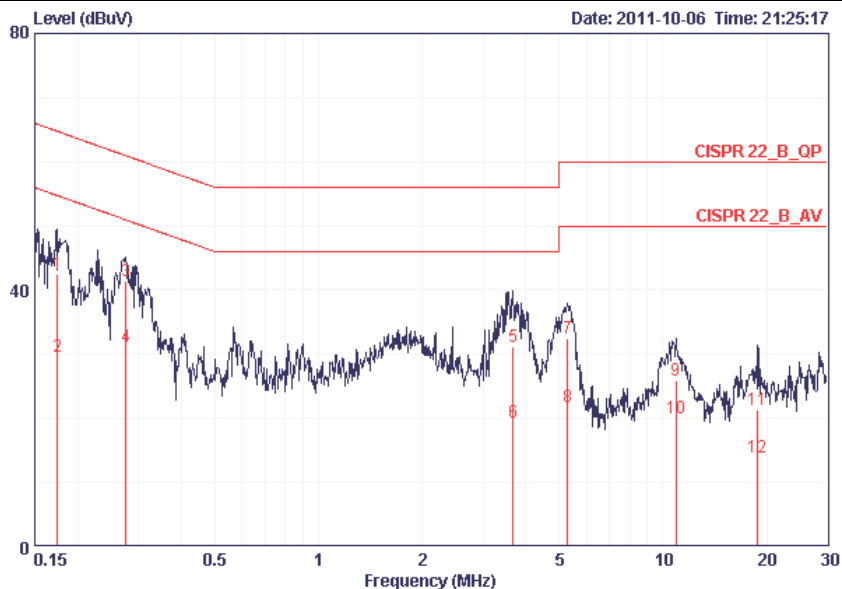
- ♦ Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.
- ♦ I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- ♦ EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 ohm loads. LISN can be placed on top of, or immediately beneath, reference ground plane.
 - All other equipment powered from additional LISN(s).
 - A multiple-outlet strip can be used for multiple power cords of non-EUT equipment.
 - LISN at least 80 cm from nearest part of EUT chassis.
- ♦ Non-EUT components of EUT system being tested.
- ♦ Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- ♦ Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- ♦ Antenna may be integral or detachable. If detachable, the antenna shall be attached for this test.

3.1.5 Test Result of AC Line Conducted Emissions



AC Line Conducted Emissions

| Test Mode | Ant. No. | Power Setting | Operating Mode | Modulation Abbreviations | Test Frequencies (FX) | Power Phase |
|-----------|----------|---------------|----------------|--------------------------|-----------------------|-------------|
| 1 | 1 | 1 | CTX | OFDM-2TX-5 | F2 | Neutral |



| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|----|---------|-------|------------|------------|------------|-------------|------------|---------|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.17491 | 42.53 | -22.19 | 64.72 | 42.24 | 0.09 | 0.20 | QP |
| 2 | 0.17491 | 29.57 | -25.15 | 54.72 | 29.28 | 0.09 | 0.20 | AVERAGE |
| 3 | 0.27587 | 41.48 | -19.46 | 60.94 | 41.20 | 0.08 | 0.20 | QP |
| 4 | 0.27587 | 31.21 | -19.73 | 50.94 | 30.93 | 0.08 | 0.20 | AVERAGE |
| 5 | 3.681 | 31.18 | -24.82 | 56.00 | 30.75 | 0.13 | 0.30 | QP |
| 6 | 3.681 | 19.45 | -26.55 | 46.00 | 19.02 | 0.13 | 0.30 | AVERAGE |
| 7 | 5.277 | 32.51 | -27.49 | 60.00 | 31.99 | 0.22 | 0.30 | QP |
| 8 | 5.277 | 21.75 | -28.25 | 50.00 | 21.23 | 0.22 | 0.30 | AVERAGE |
| 9 | 10.905 | 25.93 | -34.07 | 60.00 | 25.10 | 0.43 | 0.40 | QP |
| 10 | 10.905 | 19.96 | -30.04 | 50.00 | 19.13 | 0.43 | 0.40 | AVERAGE |
| 11 | 18.820 | 21.47 | -38.53 | 60.00 | 20.21 | 0.76 | 0.50 | QP |
| 12 | 18.820 | 14.04 | -35.96 | 50.00 | 12.78 | 0.76 | 0.50 | AVERAGE |

Note: AC line conducted test modes define in test report clause 2.7.

3.2 Occupied Bandwidth

3.2.1 Limit of Occupied Bandwidth

| | |
|--|------|
| 99% Occupied Bandwidth | None |
| Note 1: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the occupied bandwidth (OBW). These measurements shall also be performed at normal test conditions. | |

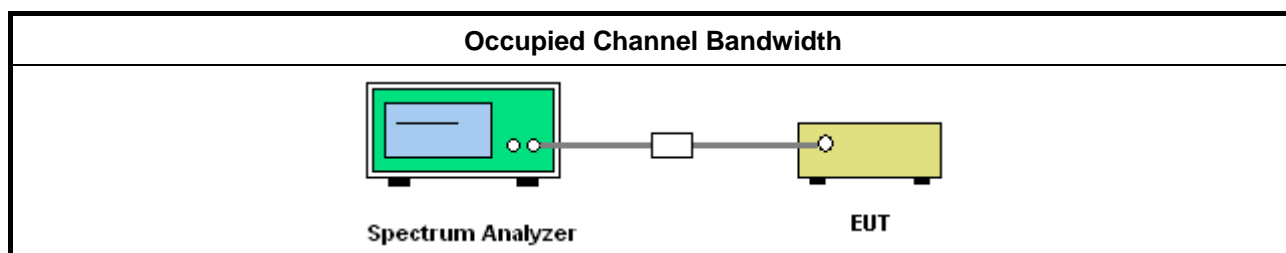
3.2.2 Measuring Instruments

Refer test equipment and calibration data list in test report clause 5.

3.2.3 Test Procedures

Method of measurement: Refer as ANSI/TIA-603-D-2010, clauses 1.3.4.4. In case of conducted measurements on smart antenna systems (equipment with multiple transmits chains) measurements need only to be performed on one of the active transmit chains (antenna outputs).

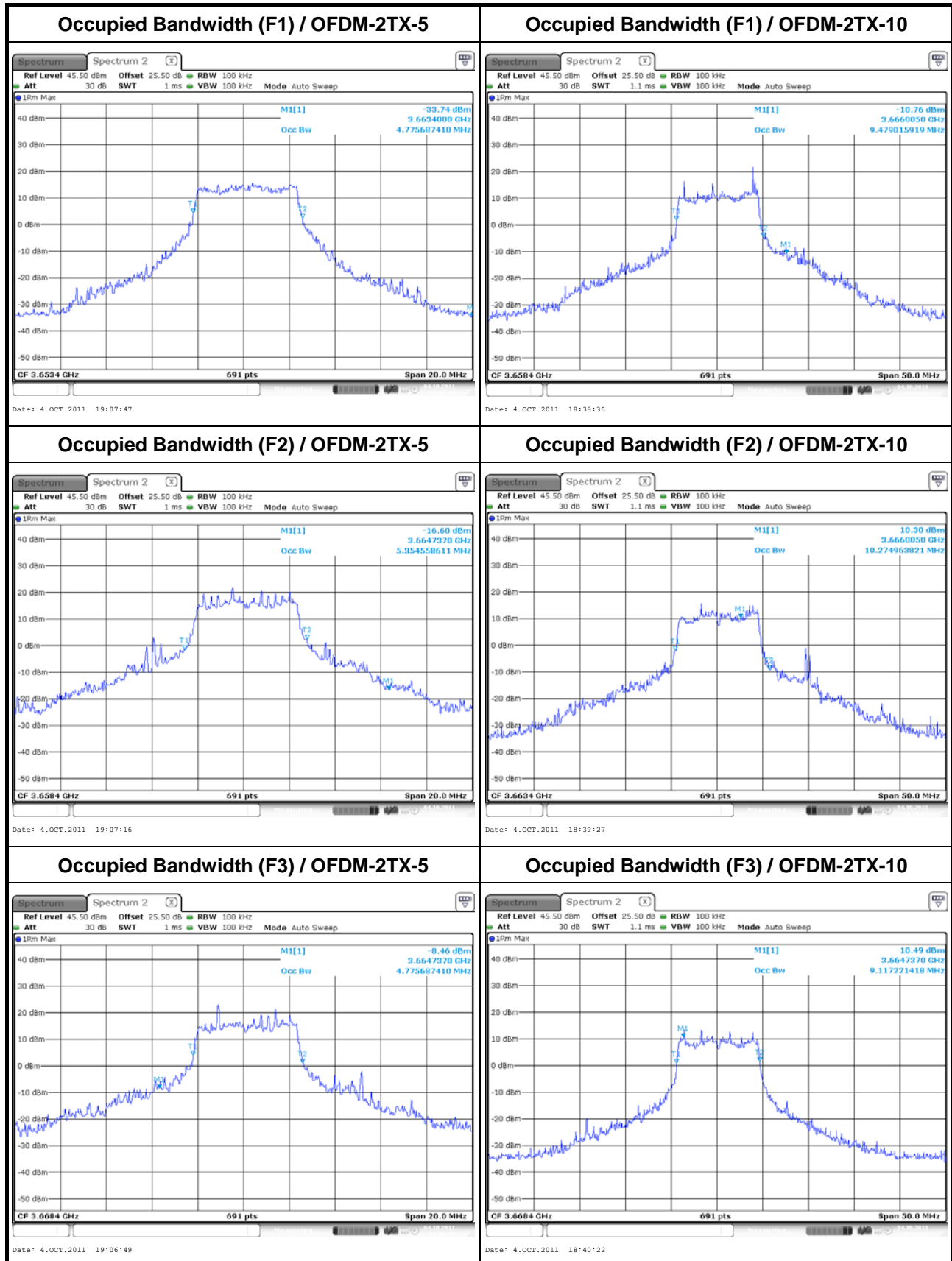
3.2.4 Test Setup



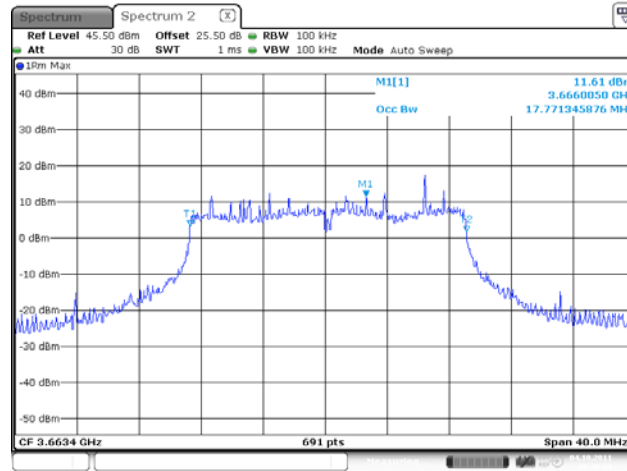
3.2.5 Test Result of Occupied Bandwidth

| Occupied Bandwidth – Power Setting 1 (Ant No. 1) | | | |
|--|-----------------------|-----------------------------|-------------|
| Worst Case Mode Abbreviations | Test Frequencies (FX) | Occupied Bandwidth (MHz) | Limit (MHz) |
| OFDM-2TX-5 | F1 | 4.77 | N/A |
| OFDM-2TX-5 | F2 | 5.35 | N/A |
| OFDM-2TX-5 | F3 | 4.77 | N/A |
| OFDM-2TX-10 | F1 | 9.47 | N/A |
| OFDM-2TX-10 | F2 | 10.27 | N/A |
| OFDM-2TX-10 | F3 | 9.11 | N/A |
| OFDM-2TX-20 | F2 | 17.77 | N/A |
| Test Result | | Complied | |
| Note 1: antenna no. and power setting define in test report clause 1.1.2 and 2.3. | | | |
| Note 2: worst case mode abbreviations and test frequency define in test report clause 2.1 and 2.2. | | | |
| Note 3: worst case RF conducted test define in test report clause 2.4. | | | |

3.2.6 Occupied Bandwidth Plots for Power Setting 1 (Ant No. 1)



Occupied Bandwidth (F2) / OFDM-2TX-20



3.3 EIRP Power and EIRP Power Density

3.3.1 Limit of EIRP Power and EIRP Power Density

| Frequency Band | Channel Bandwidth | EIRP Power | EIRP Power Density |
|----------------|-------------------|---------------|----------------------|
| 3650-3700 MHz | 5 MHz | 5 W (37 dBm) | 1 W/MHz (30 dBm/MHz) |
| 3650-3700 MHz | 10 MHz | 10 W (40 dBm) | 1 W/MHz (30 dBm/MHz) |
| 3650-3700 MHz | 20 MHz | 20 W (43 dBm) | 1 W/MHz (30 dBm/MHz) |

Note: For the applicable limit, see FCC 90.1321(a)

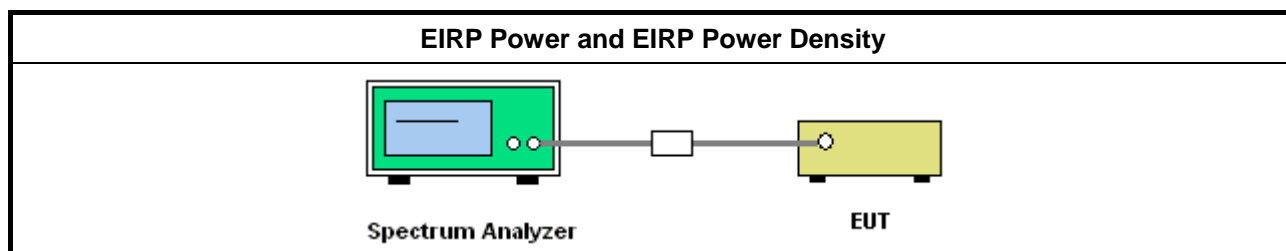
3.3.2 Measuring Instruments

Refer test equipment and calibration data list in test report clause 5.

3.3.3 Test Procedures

| |
|---|
| Method of measurement: |
| <input checked="" type="checkbox"/> Refer as FCC KDB 965270, band power and power density for spectrum analyzer measurement. |
| <input checked="" type="checkbox"/> Refer as FCC KDB 412172, EIRP power by conducted power adding the effective antenna gain. |
| <input checked="" type="checkbox"/> Refer as FCC KDB 662911, In-band power measurements must be tested using techniques that measure and sum the spectra across the transmitter outputs. In-band power and In-band power density measurements must be tested using techniques (1) or (2). (1) Measure and sum the spectra across the transmitter outputs. (2) Measure and add 10 log(N) dB. |
| <input type="checkbox"/> Refer as ANSI/TIA-603-D-2010, clause 3.2.1 for power meter measurement. |

3.3.4 Test Setup



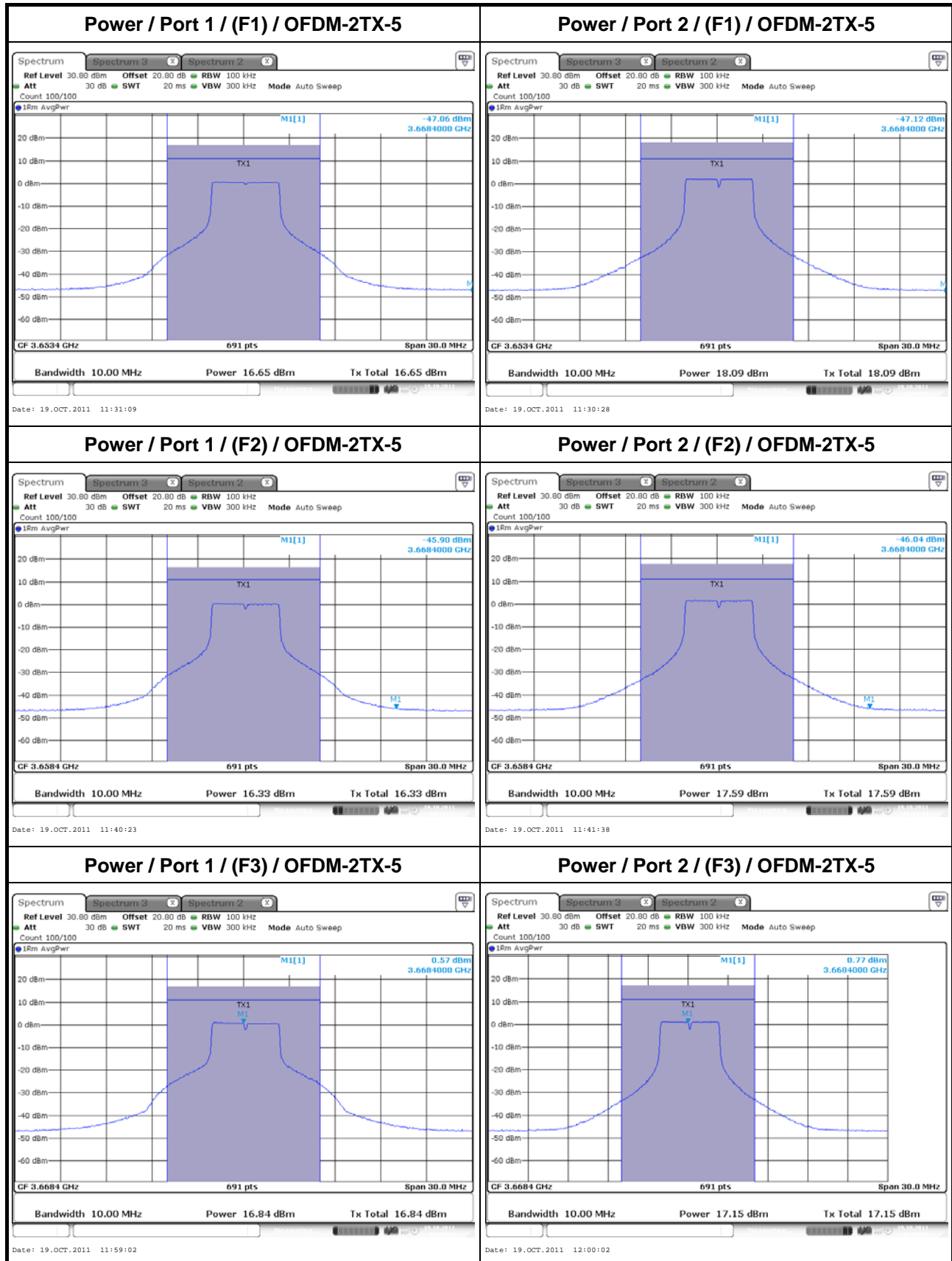
3.3.5 Test Result of EIRP Power

| EIRP Power - Power Setting 1 (Ant No. 1) | | | | | | | | | |
|---|-----------------------|-----------------------|--------|--------|--------|-------|-----------------------|------------------------|----------------|
| Worst Case Mode Abbreviations | Test Freq. (FX) | Conducted Power (dBm) | | | | | Dir. Gain (dBi) | EIRP Power (dBm) | Limit (dBm) |
| | | Port 1 | Port 2 | Port 3 | Port 4 | Total | | | |
| OFDM-2TX-5 | F1 | 16.65 | 18.09 | N/A | N/A | 20.44 | 15.01 | 35.45 | 37 |
| OFDM-2TX-5 | F2 | 16.33 | 17.59 | N/A | N/A | 20.02 | 15.01 | 35.03 | 37 |
| OFDM-2TX-5 | F3 | 16.84 | 17.15 | N/A | N/A | 20.01 | 15.01 | 35.02 | 37 |
| OFDM-2TX-10 | F1 | 17.24 | 18.42 | N/A | N/A | 20.88 | 15.01 | 35.89 | 40 |
| OFDM-2TX-10 | F2 | 16.72 | 18.46 | N/A | N/A | 20.69 | 15.01 | 35.70 | 40 |
| OFDM-2TX-10 | F3 | 16.38 | 17.04 | N/A | N/A | 19.73 | 15.01 | 34.74 | 40 |
| OFDM-2TX-20 | F2 | 16.92 | 18.23 | N/A | N/A | 20.63 | 15.01 | 35.64 | 43 |
| Test Result | | | | | | | | Complied | |
| Note 1: antenna no., directional gain and power setting define in test report clause 1.1.2 and 2.3. | | | | | | | | | |
| Note 2: worst case mode abbreviations and test frequency define in test report clause 2.1 and 2.2. | | | | | | | | | |
| Note 3: worst case RF conducted test define in test report clause 2.4. | | | | | | | | | |
| Note 4: EUT have 2 transmitter outputs (port 1 - port 2). | | | | | | | | | |

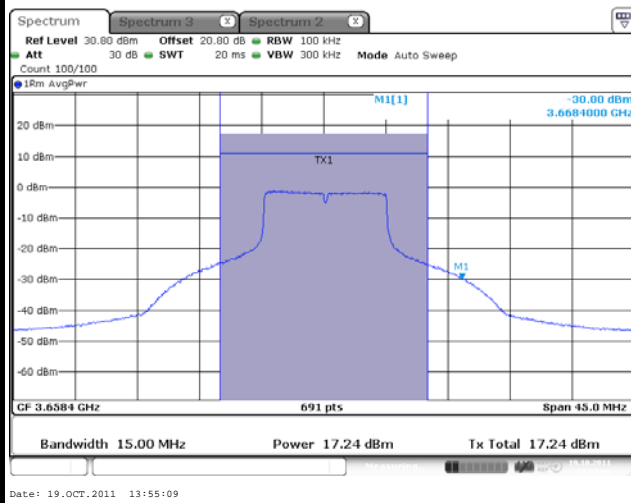
3.3.6 Test Result of EIRP Power Density

| EIRP Power Density - Power Setting 1 (Ant No. 1) | | | | | | | | | |
|---|-----------------------|-----------------------------------|--------|--------|--------|-------|-----------------------|-------------------------|--------------------|
| Worst Case Mode Abbreviations | Test Freq. (FX) | Conducted Power Density (dBm/MHz) | | | | | Dir. Gain (dBi) | EIRP PD (dBm/MHz) | Limit (dBm/MHz) |
| | | Port 1 | Port 2 | Port 3 | Port 4 | Total | | | |
| OFDM-2TX-5 | F1 | 11.14 | 12.15 | N/A | N/A | 14.68 | 15.01 | 29.69 | 30 |
| OFDM-2TX-5 | F2 | 11.01 | 11.95 | N/A | N/A | 14.52 | 15.01 | 29.53 | 30 |
| OFDM-2TX-5 | F3 | 11.55 | 12.09 | N/A | N/A | 14.84 | 15.01 | 29.85 | 30 |
| OFDM-2TX-10 | F1 | 9.00 | 9.62 | N/A | N/A | 12.33 | 15.01 | 27.34 | 30 |
| OFDM-2TX-10 | F2 | 8.57 | 9.79 | N/A | N/A | 12.23 | 15.01 | 27.24 | 30 |
| OFDM-2TX-10 | F3 | 8.40 | 8.43 | N/A | N/A | 11.43 | 15.01 | 26.44 | 30 |
| OFDM-2TX-20 | F2 | 5.82 | 6.29 | N/A | N/A | 9.07 | 15.01 | 24.08 | 30 |
| Test Result | | | | | | | | Complied | |
| Note 1: antenna no., directional gain and power setting define in test report clause 1.1.2 and 2.3. | | | | | | | | | |
| Note 2: worst case mode abbreviations and test frequency define in test report clause 2.1 and 2.2. | | | | | | | | | |
| Note 3: worst case RF conducted test define in test report clause 2.4. | | | | | | | | | |
| Note 4: EUT have 2 transmitter outputs (port 1 - port 2). | | | | | | | | | |

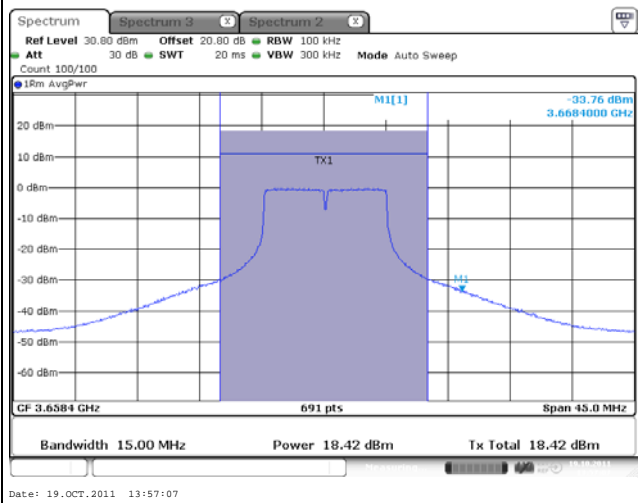
3.3.7 Conducted Power Plots for Power Setting 1 (Ant No. 1)



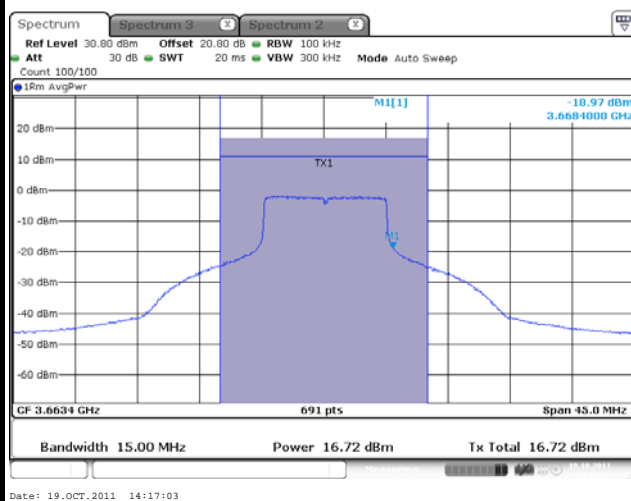
Power / Port 1 / (F1) / OFDM-2TX-10



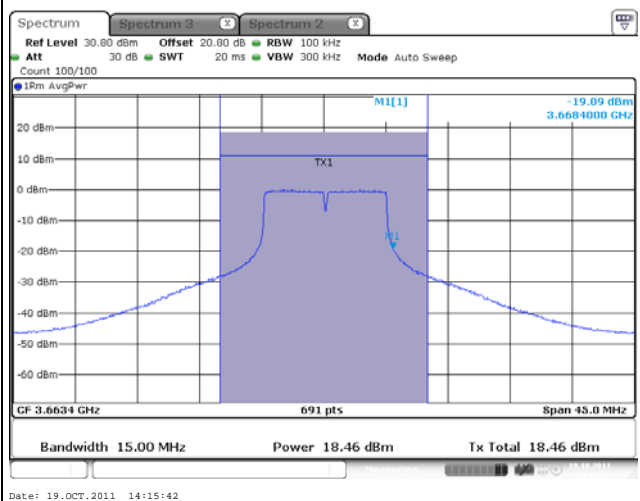
Power / Port 2 / (F1) / OFDM-2TX-10



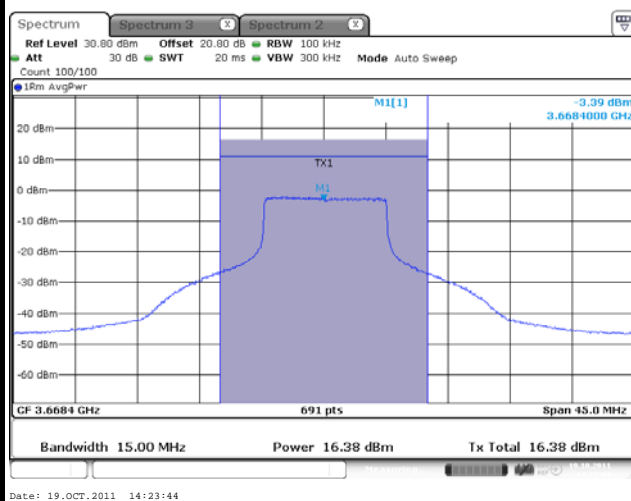
Power / Port 1 / (F2) / OFDM-2TX-10



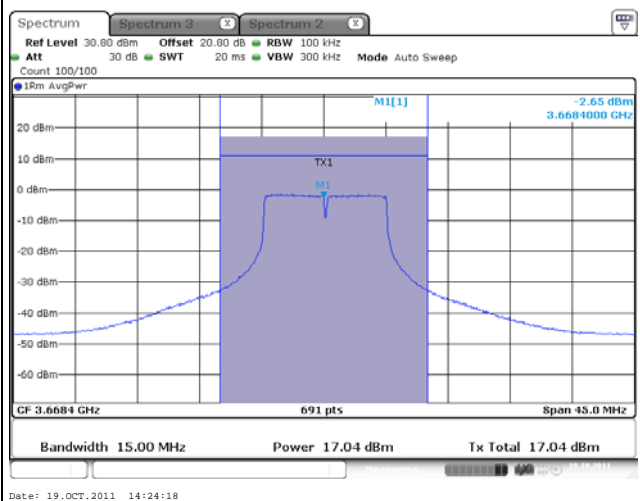
Power / Port 2 / (F2) / OFDM-2TX-10

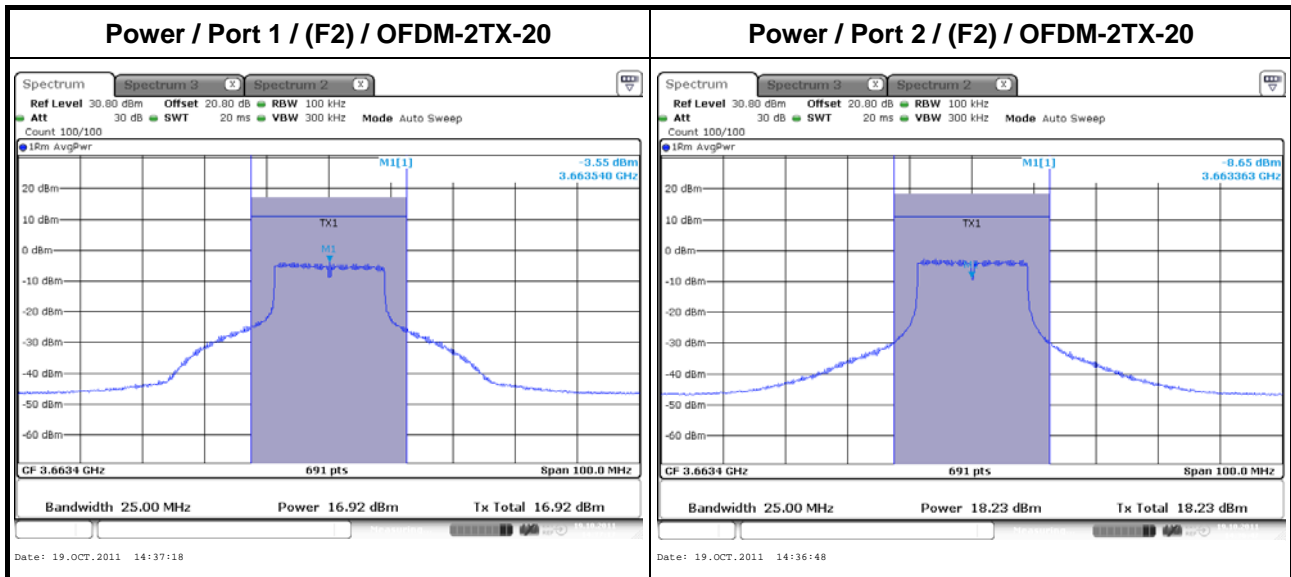


Power / Port 1 / (F3) / OFDM-2TX-10

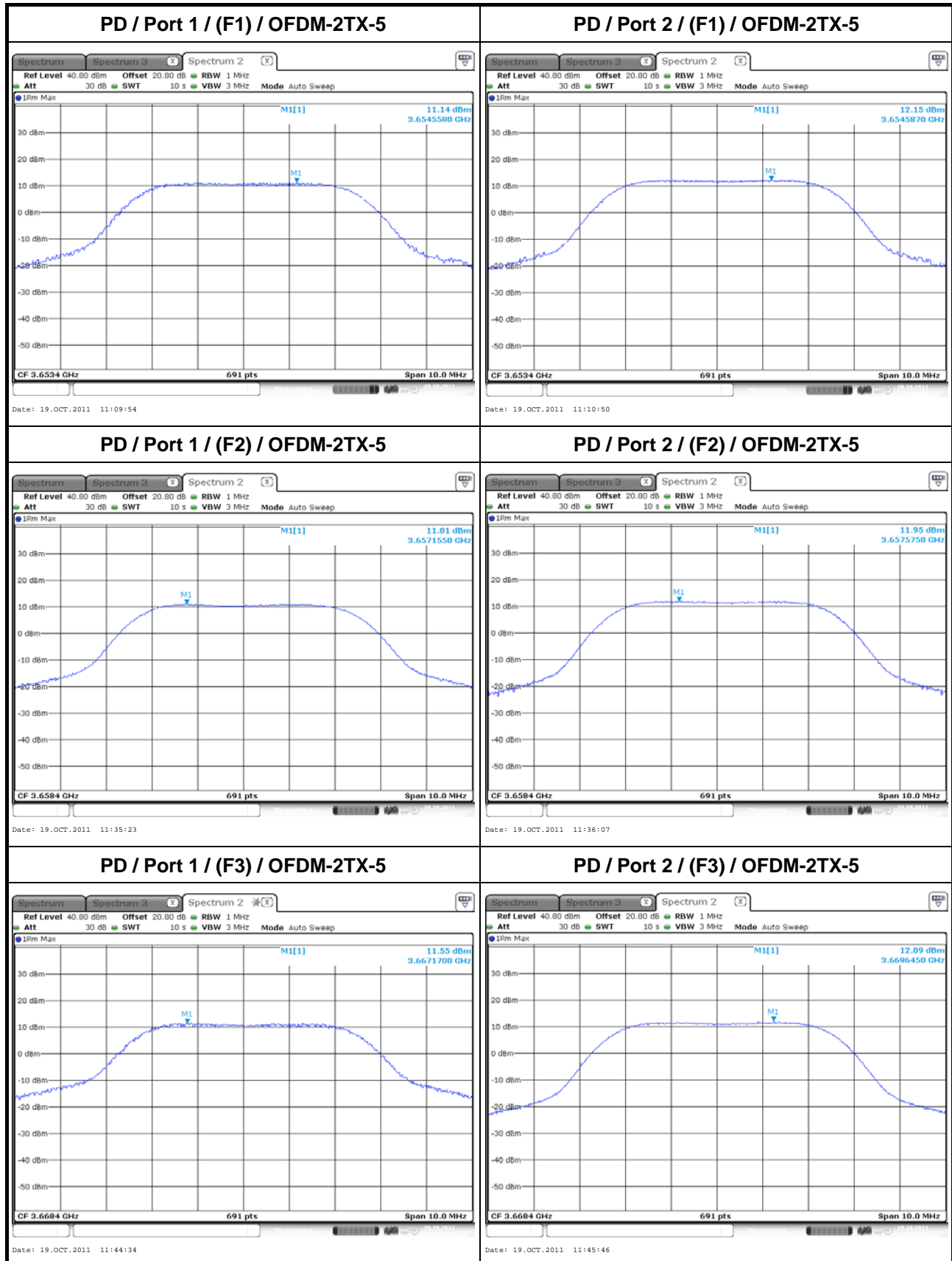


Power / Port 2 / (F3) / OFDM-2TX-10

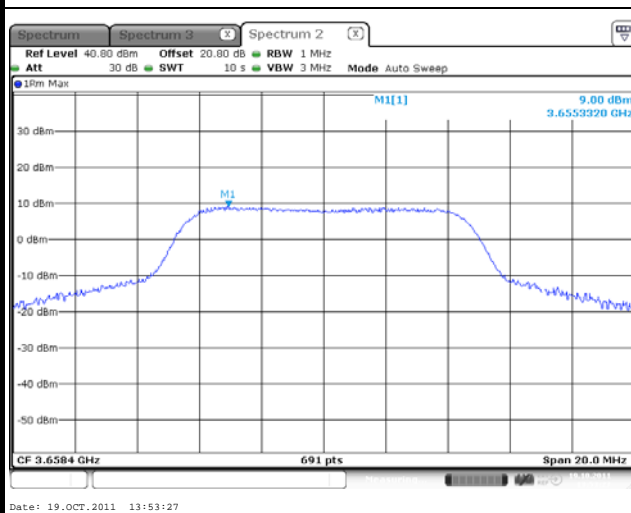




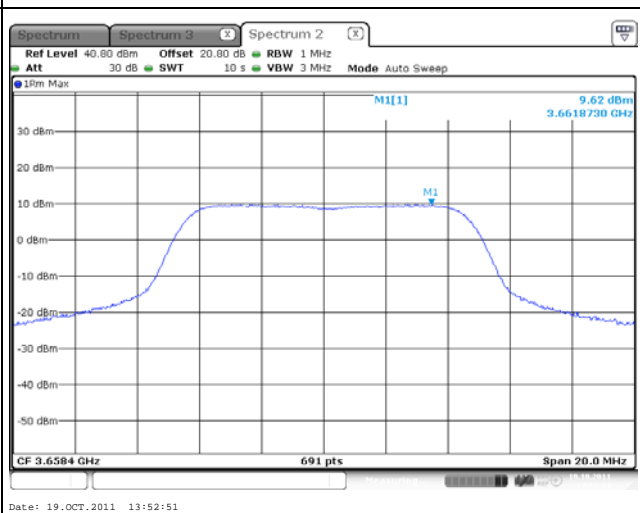
3.3.8 Conducted Power Density Plots for Power Setting 1 (Ant No. 1)



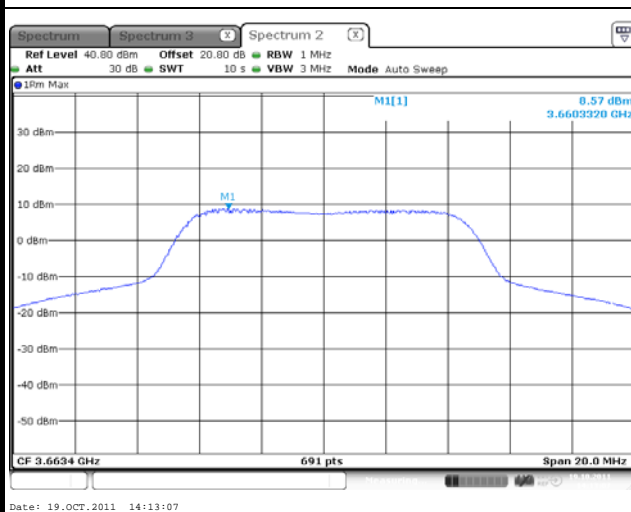
PD / Port 1 / (F1) / OFDM-2TX-10



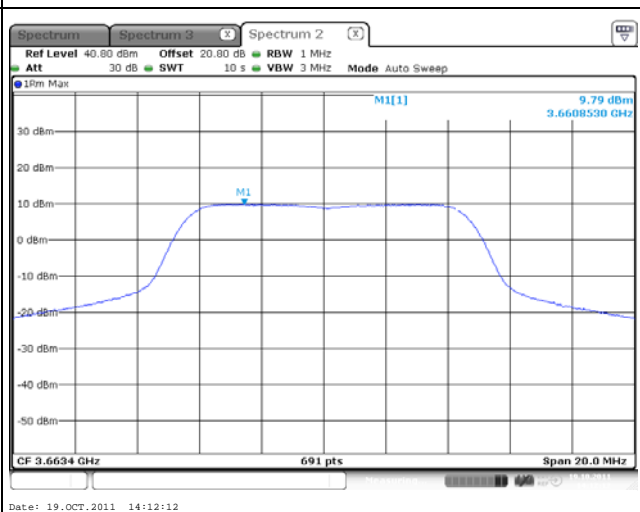
PD / Port 2 / (F1) / OFDM-2TX-10



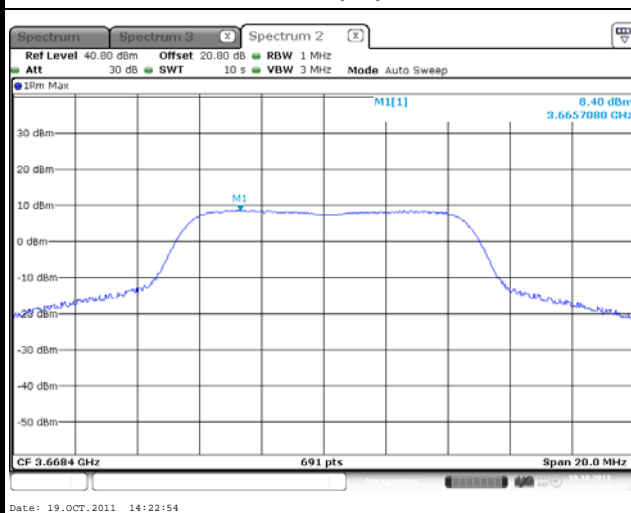
PD / Port 1 / (F2) / OFDM-2TX-10



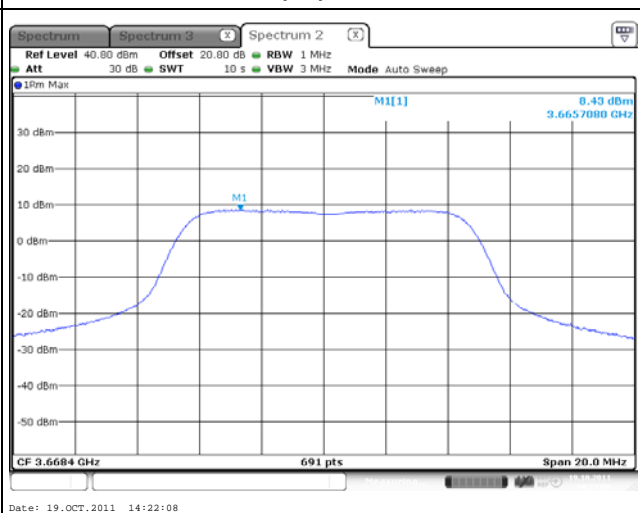
PD / Port 2 / (F2) / OFDM-2TX-10

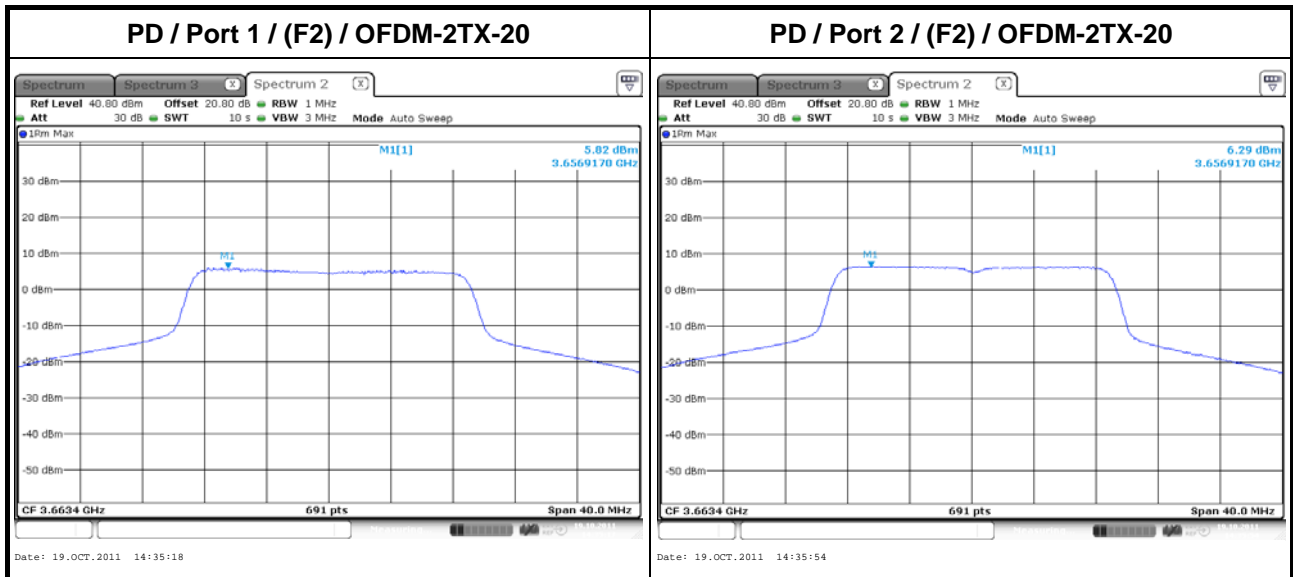


Power & PD / Port 1 / (F3) / OFDM-2TX-10



PD / Port 2 / (F3) / OFDM-2TX-10





3.4 Transmitter Radiated Spurious Emissions

3.4.1 Limit of Transmitter Radiated Spurious Emissions

Transmitter Radiated Spurious Emissions

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB (-13dBm). Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

Note: For the applicable limit, see FCC 90.1323

3.4.2 Measuring Instruments

Refer test equipment and calibration data list in test report clause 5.

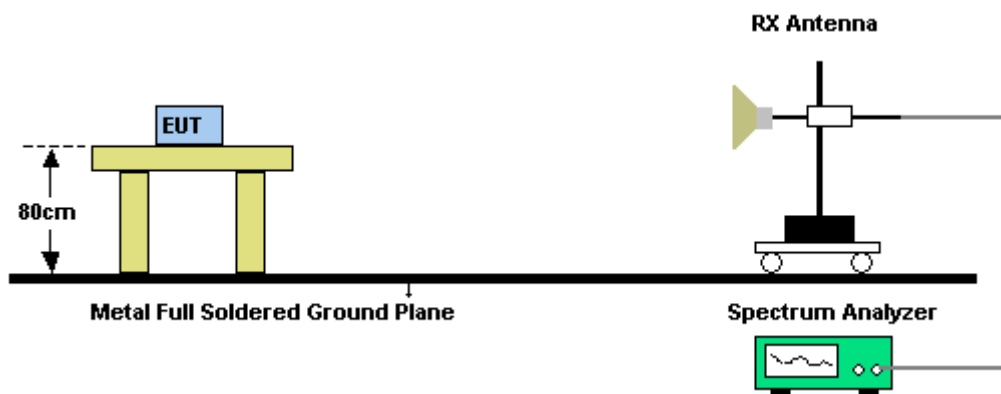
3.4.3 Test Procedures

Method of measurement:

- ☒ Refer as ANSI/TIA-603-D-2010, clause 3.2.12 for radiated measurement.
- ☒ Refer as FCC KDB 412172, using the equation (1) converted test result from EIRP to E-field strength.
Then $EIRP (dBm) = E\text{-field strength (dBuV/m at 3m)} - 95.2 \text{ dB}$
- ☒ In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB)
$$B = A + 10 \log (BW_{ref} / BW_{measured})$$
 - A is the value at the narrower measurement bandwidth;
 - B is the value referred to the reference bandwidth;

3.4.4 Test Setup

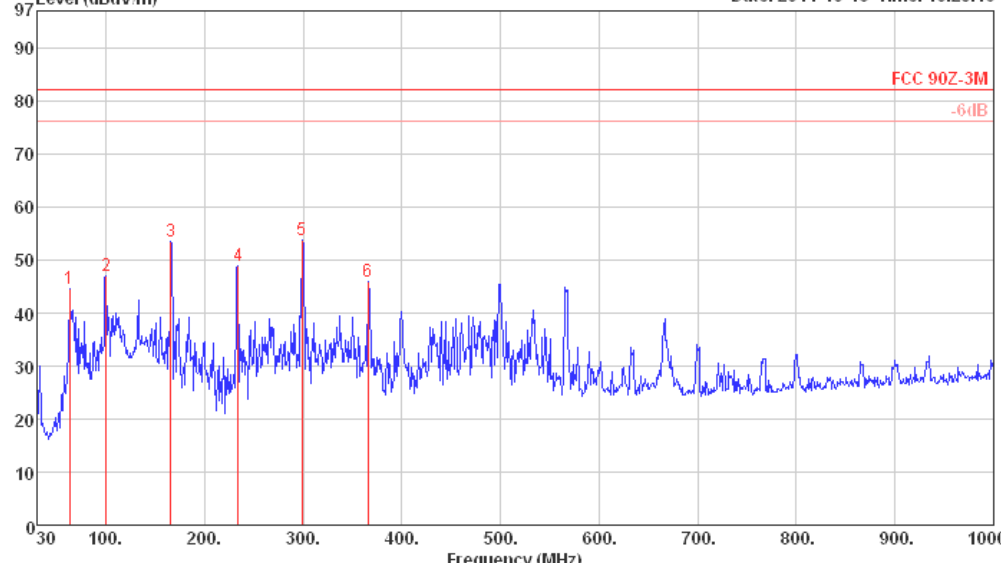
Transmitter Radiated Spurious Emissions



3.4.5 Test Result of Transmitter Radiated Spurious Emissions (Below 1GHz)

| Transmitter Radiated Spurious Emissions (Below 1GHz) | | | | | | |
|--|----------|---------------|----------------|--------------------------|-----------------------|------|
| Test Mode | Ant. No. | Power Setting | Operating Mode | Modulation Abbreviations | Test Frequencies (FX) | Pol. |
| 1 | 1 | 1 | CTX | OFDM-2TX-5 | F2 | V |

Level (dBuV/m) Date: 2011-10-18 Time: 10:25:46



Frequency (MHz)

| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|--------|--------|--------|--------|-------|--------------|--------|--------|--------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark |
| | | | | | | dB | dB/m | dB | |
| 1 | 62.98 | 44.50 | 82.20 | -37.70 | 64.66 | 0.86 | 6.73 | 27.75 | Peak |
| 2 | 99.84 | 47.12 | 82.20 | -35.08 | 62.53 | 1.20 | 10.99 | 27.60 | Peak |
| 3 | 165.80 | 53.57 | 82.20 | -28.63 | 66.84 | 1.53 | 12.47 | 27.27 | Peak |
| 4 | 233.70 | 48.94 | 82.20 | -33.26 | 62.59 | 1.83 | 11.55 | 27.03 | Peak |
| 5 | 298.69 | 53.82 | 82.20 | -28.38 | 65.27 | 2.10 | 13.35 | 26.90 | Peak |
| 6 | 365.62 | 45.98 | 82.20 | -36.22 | 55.97 | 2.23 | 15.14 | 27.36 | Peak |

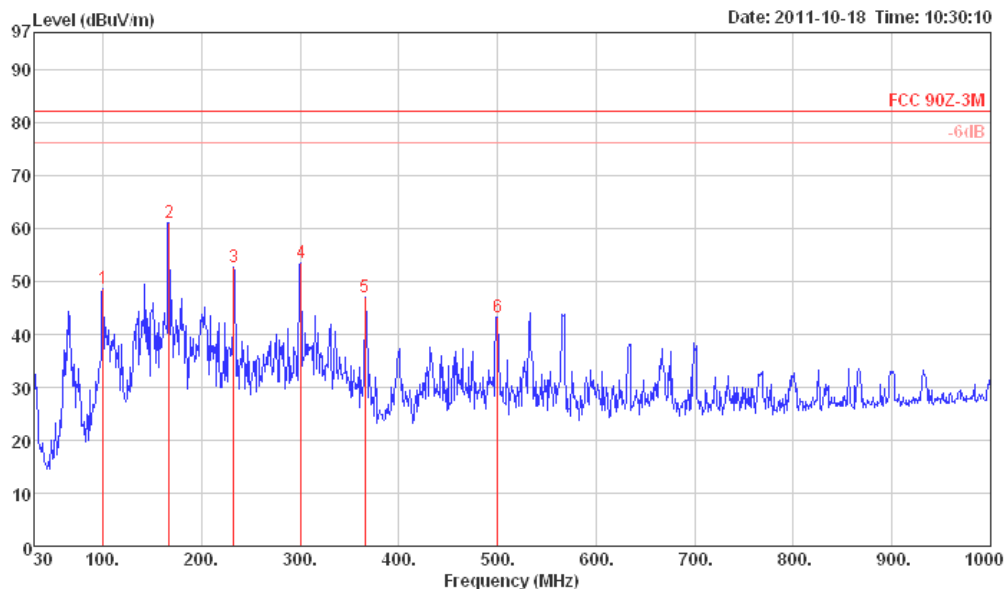
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Below 1GHz)

| Test Mode | Ant. No. | Power Setting | Operating Mode | Modulation Abbreviations | Test Frequencies (FX) | Pol. |
|-----------|----------|---------------|----------------|--------------------------|-----------------------|------|
| 1 | 1 | 1 | CTX | OFDM-2TX-5 | F2 | H |



| | Freq | Level | Limit | Over | Read | Cable | Antenna | Preamp | | |
|---|--------|--------|--------|--------|-------|-------|---------|--------|--------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | Remark | Pol/Phase |
| 1 | 99.84 | 48.59 | 82.20 | -33.61 | 64.00 | 1.20 | 10.99 | 27.60 | Peak | HORIZONTAL |
| 2 | 166.77 | 61.02 | 82.20 | -21.18 | 74.22 | 1.53 | 12.54 | 27.27 | Peak | HORIZONTAL |
| 3 | 232.73 | 52.69 | 82.20 | -29.51 | 66.41 | 1.83 | 11.48 | 27.03 | Peak | HORIZONTAL |
| 4 | 300.63 | 53.60 | 82.20 | -28.60 | 65.01 | 2.10 | 13.39 | 26.90 | Peak | HORIZONTAL |
| 5 | 365.62 | 47.02 | 82.20 | -35.18 | 57.01 | 2.23 | 15.14 | 27.36 | Peak | HORIZONTAL |
| 6 | 500.45 | 43.14 | 82.20 | -39.06 | 50.91 | 2.70 | 17.63 | 28.10 | Peak | HORIZONTAL |

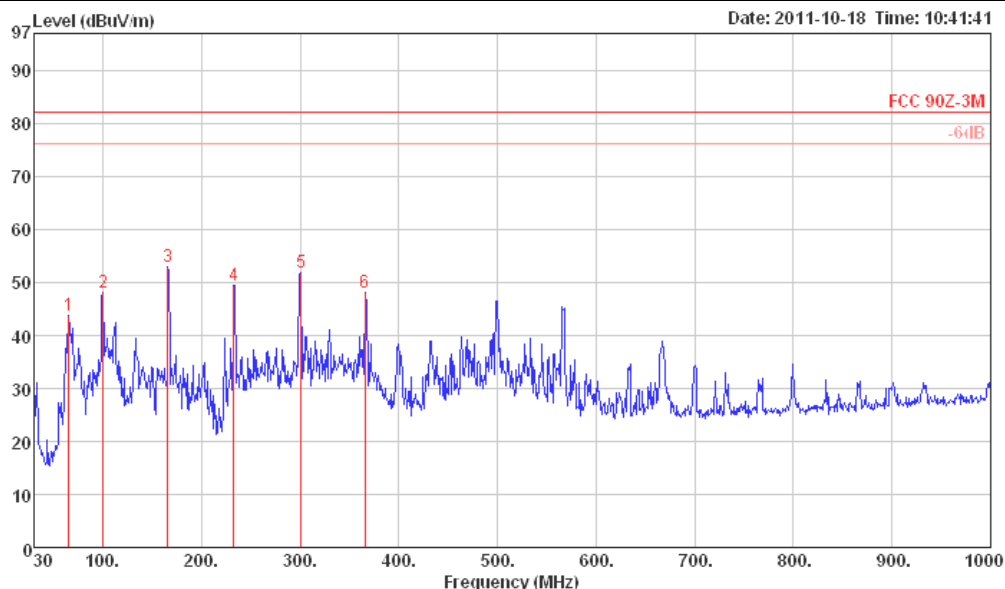
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Below 1GHz)

| Test Mode | Ant. No. | Power Setting | Operating Mode | Modulation Abbreviations | Test Frequencies (FX) | Pol. |
|-----------|----------|---------------|----------------|--------------------------|-----------------------|------|
| 1 | 1 | 1 | CTX | OFDM-2TX-10 | F2 | V |



| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | Pol/Phase |
|---|--------|--------|------------|------------|------------|------------|----------------|---------------|--------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | |
| 1 | 64.92 | 43.79 | 82.20 | -38.41 | 63.93 | 0.90 | 6.70 | 27.74 | Peak | VERTICAL |
| 2 | 99.84 | 48.07 | 82.20 | -34.13 | 63.48 | 1.20 | 10.99 | 27.60 | Peak | VERTICAL |
| 3 | 165.80 | 52.98 | 82.20 | -29.22 | 66.25 | 1.53 | 12.47 | 27.27 | Peak | VERTICAL |
| 4 | 232.73 | 49.56 | 82.20 | -32.64 | 63.28 | 1.83 | 11.48 | 27.03 | Peak | VERTICAL |
| 5 | 300.63 | 51.79 | 82.20 | -30.41 | 63.20 | 2.10 | 13.39 | 26.90 | Peak | VERTICAL |
| 6 | 365.62 | 48.21 | 82.20 | -33.99 | 58.20 | 2.23 | 15.14 | 27.36 | Peak | VERTICAL |

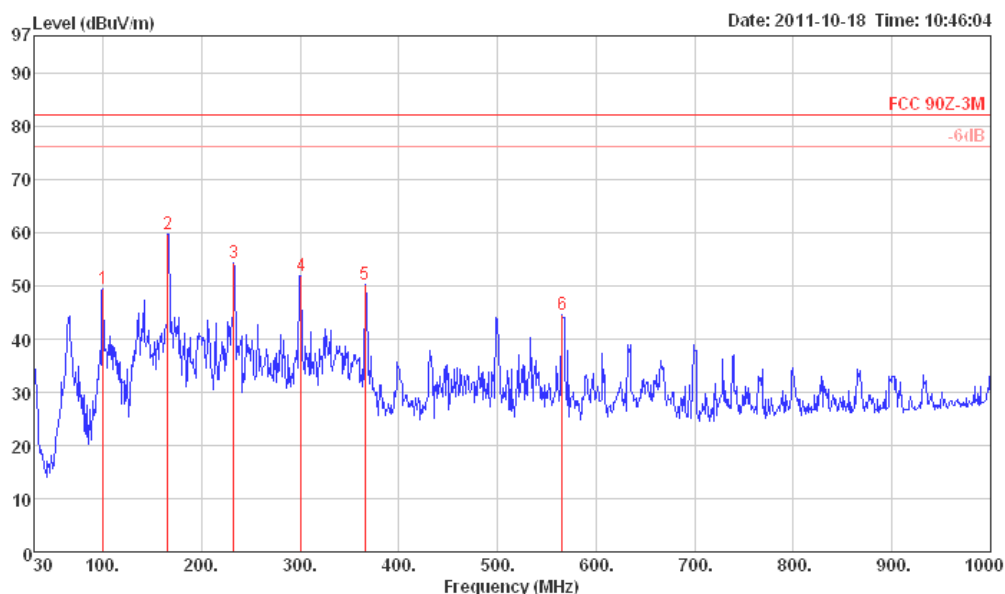
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Below 1GHz)

| Test Mode | Ant. No. | Power Setting | Operating Mode | Modulation Abbreviations | Test Frequencies (FX) | Pol. |
|-----------|----------|---------------|----------------|--------------------------|-----------------------|------|
| 1 | 1 | 1 | CTX | OFDM-2TX-10 | F2 | H |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|--------|--------|--------|--------|-------|--------------|--------|--------|--------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark |
| | | | | | | dB | dB/m | dB | |
| 1 | 99.84 | 49.38 | 82.20 | -32.82 | 64.79 | 1.20 | 10.99 | 27.60 | Peak |
| 2 | 165.80 | 59.78 | 82.20 | -22.42 | 73.05 | 1.53 | 12.47 | 27.27 | Peak |
| 3 | 232.73 | 54.30 | 82.20 | -27.90 | 68.02 | 1.83 | 11.48 | 27.03 | Peak |
| 4 | 300.63 | 51.95 | 82.20 | -30.25 | 63.36 | 2.10 | 13.39 | 26.90 | Peak |
| 5 | 365.62 | 50.28 | 82.20 | -31.92 | 60.27 | 2.23 | 15.14 | 27.36 | Peak |
| 6 | 565.44 | 44.59 | 82.20 | -37.61 | 51.49 | 2.83 | 18.37 | 28.10 | Peak |

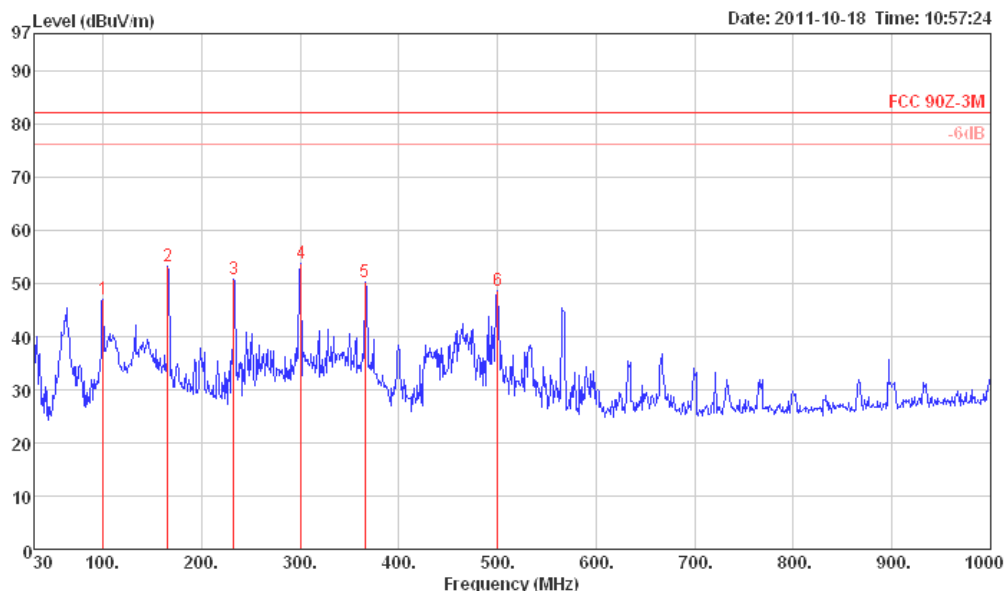
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Below 1GHz)

| Test Mode | Ant. No. | Power Setting | Operating Mode | Modulation Abbreviations | Test Frequencies (FX) | Pol. |
|-----------|----------|---------------|----------------|--------------------------|-----------------------|------|
| 1 | 1 | 1 | CTX | OFDM-2TX-20 | F2 | V |



| | Freq | Level | Limit | Over | Read | Cable | Antenna | Preamp | | |
|---|--------|--------|--------|--------|-------|-------|---------|--------|--------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark | Pol/Phase |
| 1 | 99.84 | 47.14 | 82.20 | -35.06 | 62.55 | 1.20 | 10.99 | 27.60 | Peak | VERTICAL |
| 2 | 165.80 | 53.36 | 82.20 | -28.84 | 66.63 | 1.53 | 12.47 | 27.27 | Peak | VERTICAL |
| 3 | 232.73 | 50.86 | 82.20 | -31.34 | 64.58 | 1.83 | 11.48 | 27.03 | Peak | VERTICAL |
| 4 | 300.63 | 53.79 | 82.20 | -28.41 | 65.20 | 2.10 | 13.39 | 26.90 | Peak | VERTICAL |
| 5 | 365.62 | 50.13 | 82.20 | -32.07 | 60.12 | 2.23 | 15.14 | 27.36 | Peak | VERTICAL |
| 6 | 500.45 | 48.52 | 82.20 | -33.68 | 56.29 | 2.70 | 17.63 | 28.10 | Peak | VERTICAL |

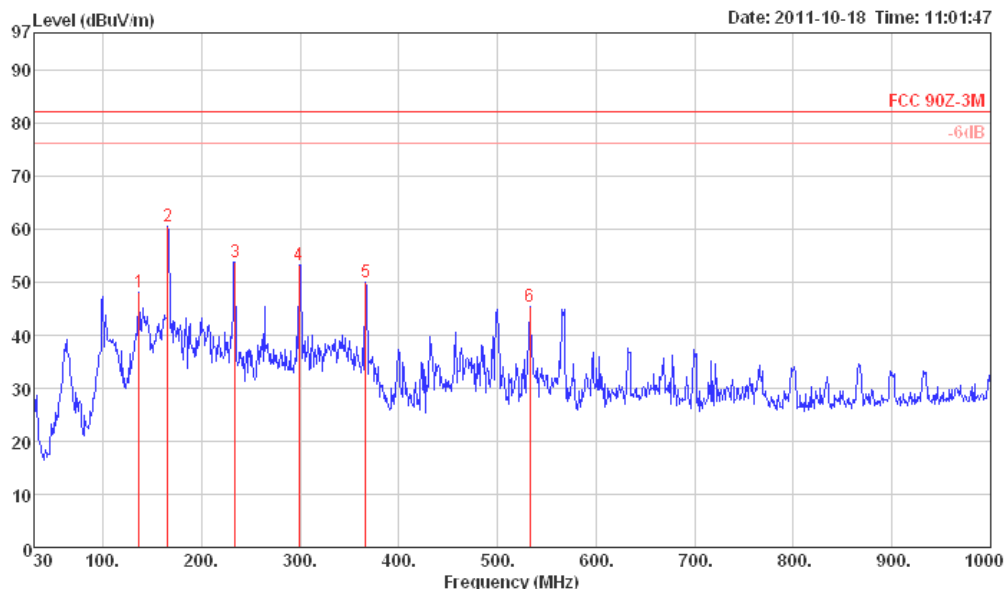
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Below 1GHz)

| Test Mode | Ant. No. | Power Setting | Operating Mode | Modulation Abbreviations | Test Frequencies (FX) | Pol. |
|-----------|----------|---------------|----------------|--------------------------|-----------------------|------|
| 1 | 1 | 1 | CTX | OFDM-2TX-20 | F2 | H |



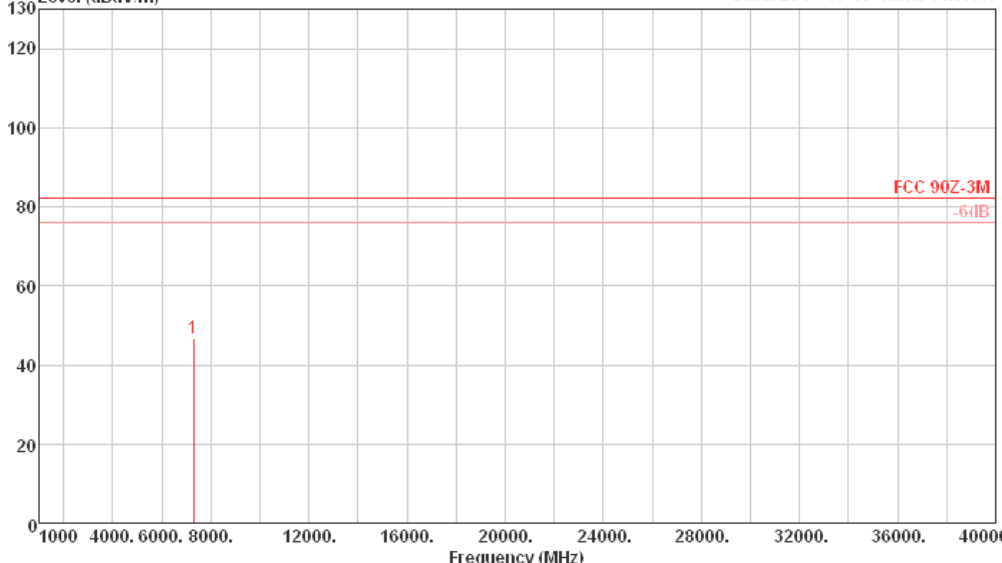
| | Freq | Level | Limit | Over | Read | Cable | Antenna | Preamp | | |
|---|--------|--------|--------|--------|-------|-------|---------|--------|--------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark | Pol/Phase |
| 1 | 136.70 | 48.15 | 82.20 | -34.05 | 61.87 | 1.37 | 12.32 | 27.41 | Peak | HORIZONTAL |
| 2 | 165.80 | 60.46 | 82.20 | -21.74 | 73.73 | 1.53 | 12.47 | 27.27 | Peak | HORIZONTAL |
| 3 | 233.70 | 53.87 | 82.20 | -28.33 | 67.52 | 1.83 | 11.55 | 27.03 | Peak | HORIZONTAL |
| 4 | 298.69 | 53.33 | 82.20 | -28.87 | 64.78 | 2.10 | 13.35 | 26.90 | Peak | HORIZONTAL |
| 5 | 366.59 | 49.92 | 82.20 | -32.28 | 59.89 | 2.23 | 15.17 | 27.37 | Peak | HORIZONTAL |
| 6 | 532.46 | 45.49 | 82.20 | -36.71 | 52.83 | 2.76 | 18.00 | 28.10 | Peak | HORIZONTAL |

Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

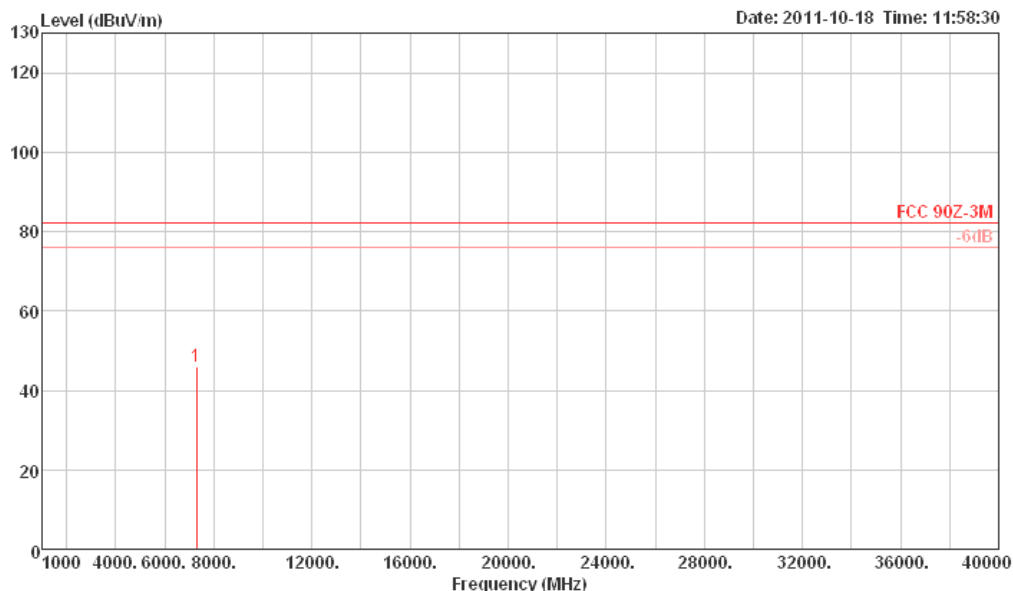
Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

3.4.6 Test Result of Transmitter Radiated Spurious Emissions (Above 1GHz)

| Transmitter Radiated Spurious Emissions (Above 1GHz) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------|--------------------------|--------|--------|-----------------------|-------|---------|--------|--------------|-----------|--|------|-------|-------|------|------|-------|---------|--------|--|--|--|-----|--------|--------|----|------|------|--------|--------|--------|-----------|---|---------|-------|-------|--------|-------|------|-------|-------|------|----------|
| Ant. No. | Power Setting | Modulation Abbreviations | | | Test Frequencies (FX) | | | | Polarization | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | OFDM-2TX-5 | | | F1 | | | | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div><div>Level (dBuV/m)</div><div>Date: 2011-10-18 Time: 11:57:48</div><div>Frequency (MHz)</div></div> <table><thead><tr><th></th><th>Freq</th><th>Level</th><th>Limit</th><th>Over</th><th>Read</th><th>Cable</th><th>Antenna</th><th>Preamp</th><th></th><th></th></tr><tr><th></th><th>MHz</th><th>dBuV/m</th><th>dBuV/m</th><th>dB</th><th>dBuV</th><th>Loss</th><th>Factor</th><th>Factor</th><th>Remark</th><th>Pol/Phase</th></tr></thead><tbody><tr><td>1</td><td>7308.90</td><td>46.67</td><td>82.20</td><td>-35.53</td><td>40.23</td><td>5.36</td><td>36.51</td><td>35.43</td><td>Peak</td><td>VERTICAL</td></tr></tbody></table> | | | | | | | | | | | | Freq | Level | Limit | Over | Read | Cable | Antenna | Preamp | | | | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark | Pol/Phase | 1 | 7308.90 | 46.67 | 82.20 | -35.53 | 40.23 | 5.36 | 36.51 | 35.43 | Peak | VERTICAL |
| | Freq | Level | Limit | Over | Read | Cable | Antenna | Preamp | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark | Pol/Phase | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 7308.90 | 46.67 | 82.20 | -35.53 | 40.23 | 5.36 | 36.51 | 35.43 | Peak | VERTICAL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Note 1: “>20dB” means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.</p> <p>Note 2: “N/F” means Nothing Found (No spurious emissions were detected.)</p> <p>Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-5 | F1 | H |



| | Freq | Level | Limit Line | Over Limit | Read Level | CableAntenna Loss Factor | Preamp Factor | Remark | Pol/Phase |
|---|---------|--------|---------------|---------------|---------------|-----------------------------|------------------|------------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | |
| 1 | 7308.34 | 46.07 | 82.20 | -36.13 | 39.63 | 5.36 | 36.51 | 35.43 Peak | HORIZONTAL |

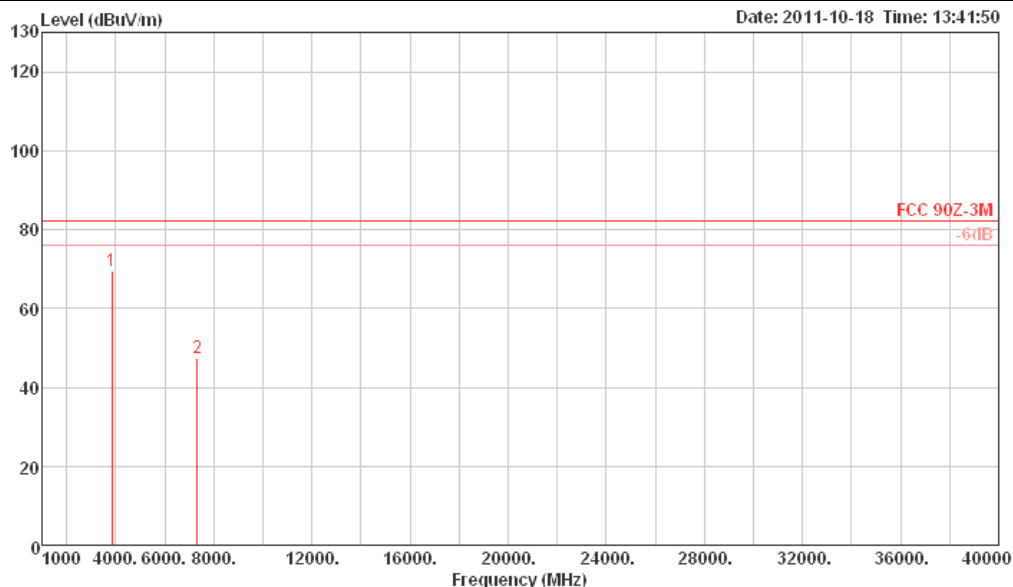
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-5 | F2 | V |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|--------|--------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark |
| | | | | | | dB | dB/m | dB | |
| 1 | 3843.35 | 69.54 | 82.20 | -12.66 | 69.24 | 3.36 | 32.14 | 35.20 | Peak |
| 2 | 7316.22 | 47.37 | 82.20 | -34.83 | 40.92 | 5.37 | 36.51 | 35.43 | Peak |

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|-----------|
| | | | | | | | | | Pol/Phase |
| | | | | | | | | | |

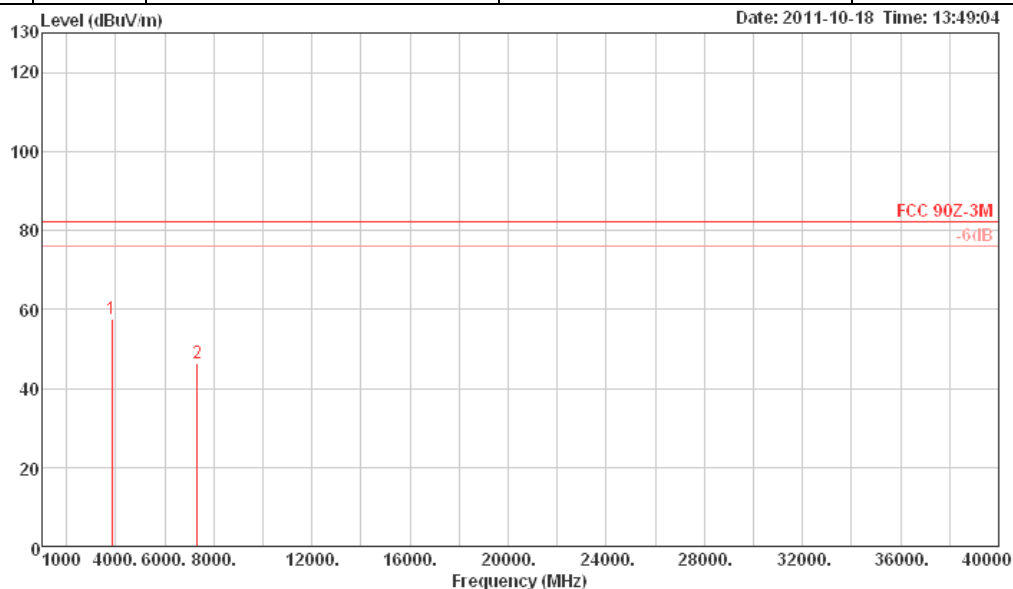
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-5 | F2 | H |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|-------|--------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | Remark |
| 1 | 3843.40 | 57.53 | 82.20 | -24.67 | 57.23 | 3.36 | 32.14 | 35.20 | Peak |
| 2 | 7316.77 | 46.19 | 82.20 | -36.01 | 39.74 | 5.37 | 36.51 | 35.43 | Peak |

HORIZONTAL
HORIZONTAL

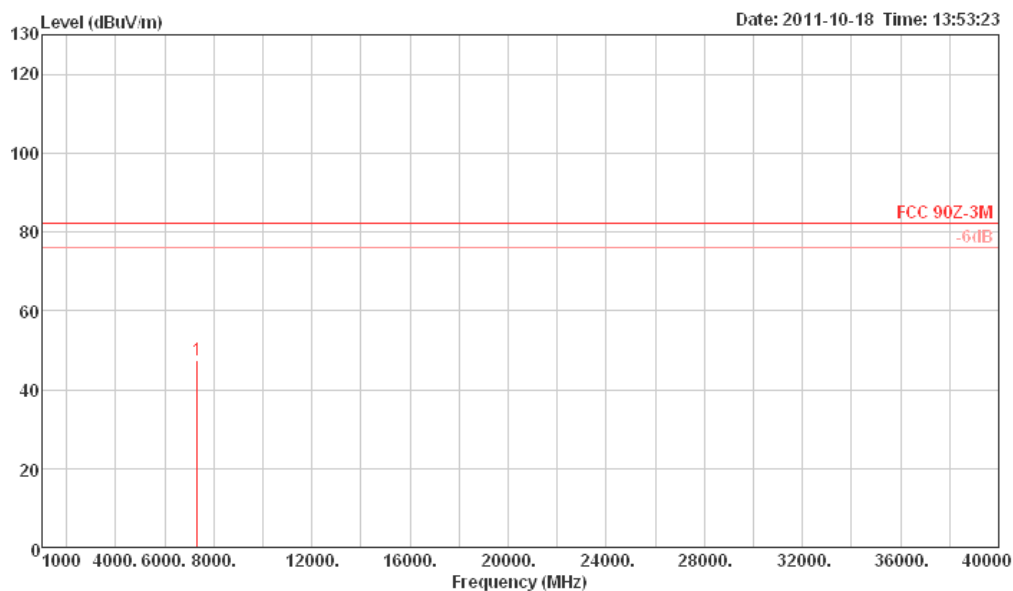
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-5 | F3 | V |



| | Freq | Level | Limit Line | Over Limit | Read Level | CableAntenna Loss Factor | Preamp Factor | Remark | Pol/Phase |
|---|---------|--------|---------------|---------------|---------------|-----------------------------|------------------|------------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | |
| 1 | 7341.84 | 47.45 | 82.20 | -34.75 | 40.95 | 5.38 | 36.56 | 35.44 Peak | VERTICAL |

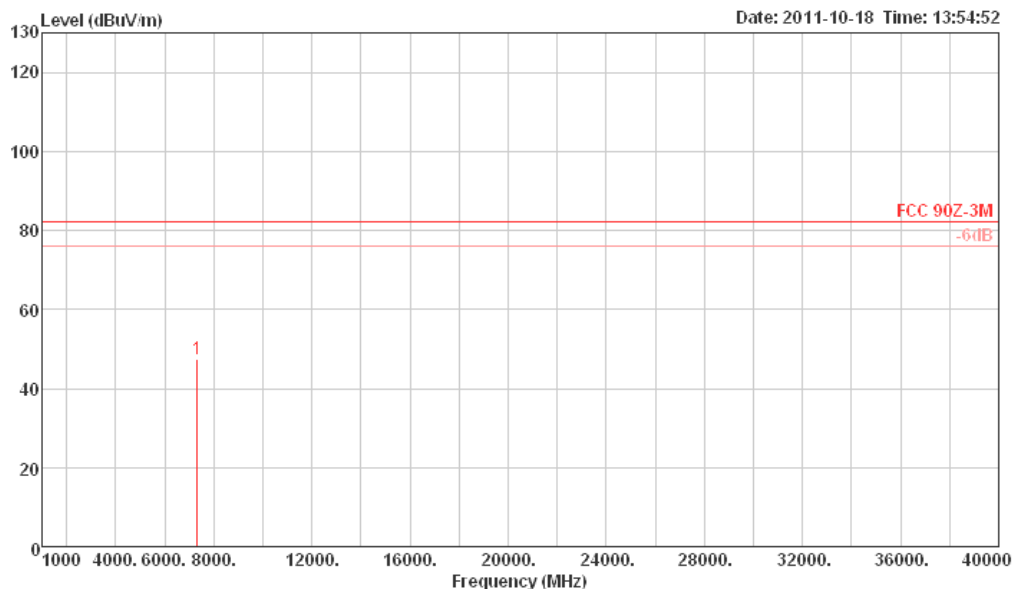
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-5 | F3 | H |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|--------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark |
| | | | | | | dB | dB/m | dB | |
| 1 | 7337.96 | 47.60 | 82.20 | -34.60 | 41.13 | 5.38 | 36.53 | 35.44 | Peak |
| | | | | | | | | | HORIZONTAL |

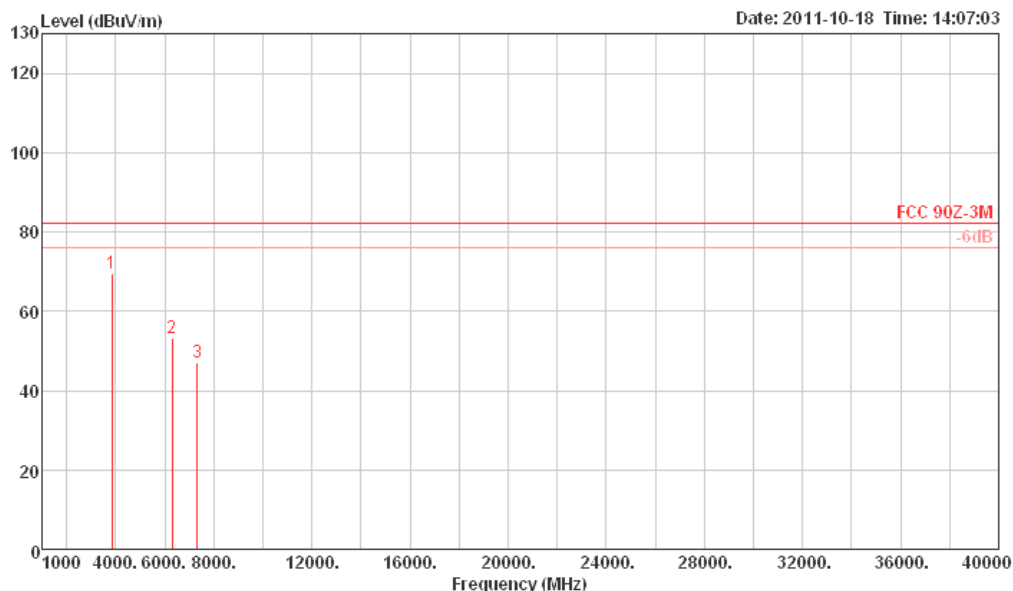
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-10 | F1 | V |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|--------|--------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark |
| | | | | | | dB | dB/m | dB | |
| 1 | 3843.32 | 69.48 | 82.20 | -12.72 | 69.18 | 3.36 | 32.14 | 35.20 | Peak |
| 2 | 6319.82 | 53.15 | 82.20 | -29.05 | 48.70 | 4.68 | 35.03 | 35.26 | Peak |
| 3 | 7318.29 | 46.92 | 82.20 | -35.28 | 40.47 | 5.37 | 36.51 | 35.43 | Peak |

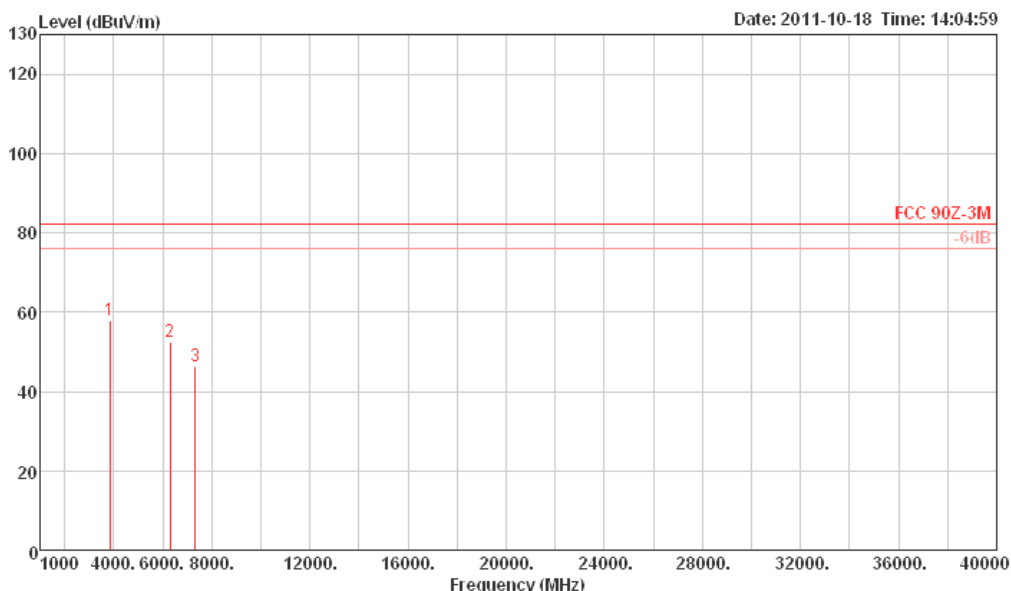
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-10 | F1 | H |



| | Freq | Level | Limit | Over | Read | Cable | Antenna | Preamp | | |
|---|---------|--------|--------|--------|-------|-------|---------|--------|--------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | Remark | Pol/Phase |
| 1 | 3843.32 | 57.89 | 82.20 | -24.31 | 57.59 | 3.36 | 32.14 | 35.20 | Peak | HORIZONTAL |
| 2 | 6319.82 | 52.33 | 82.20 | -29.87 | 47.88 | 4.68 | 35.03 | 35.26 | Peak | HORIZONTAL |
| 3 | 7319.23 | 46.38 | 82.20 | -35.82 | 39.93 | 5.37 | 36.51 | 35.43 | Peak | HORIZONTAL |

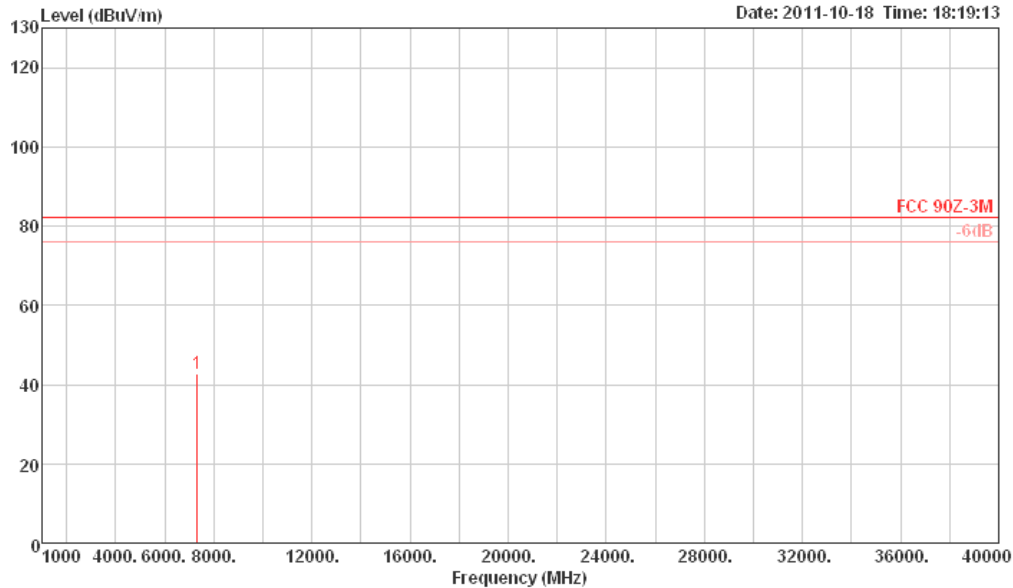
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-10 | F2 | V |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|------------|-----------|
| | MHz | dBuV/m | dBuV/m | Limit | Level | Loss Factor | Factor | Remark | Pol/Phase |
| | | | | dB | dBuV | dB | dB/m | dB | |
| 1 | 7324.83 | 42.82 | 82.20 | -39.38 | 36.35 | 5.37 | 36.53 | 35.43 Peak | VERTICAL |

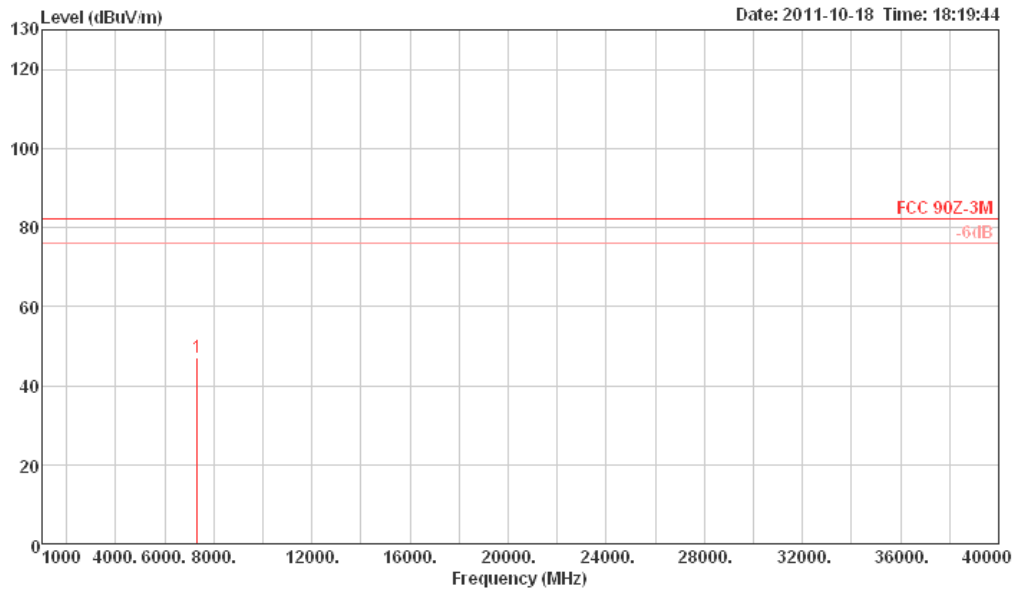
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-10 | F2 | H |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|--------|------------|
| | MHz | dBuV/m | dBuV/m | Limit | Level | Loss | Factor | Factor | Remark |
| | | | | dB | dBuV | dB | dB/m | dB | |
| 1 | 7324.70 | 47.22 | 82.20 | -34.98 | 40.75 | 5.37 | 36.53 | 35.43 | Peak |
| | | | | | | | | | HORIZONTAL |

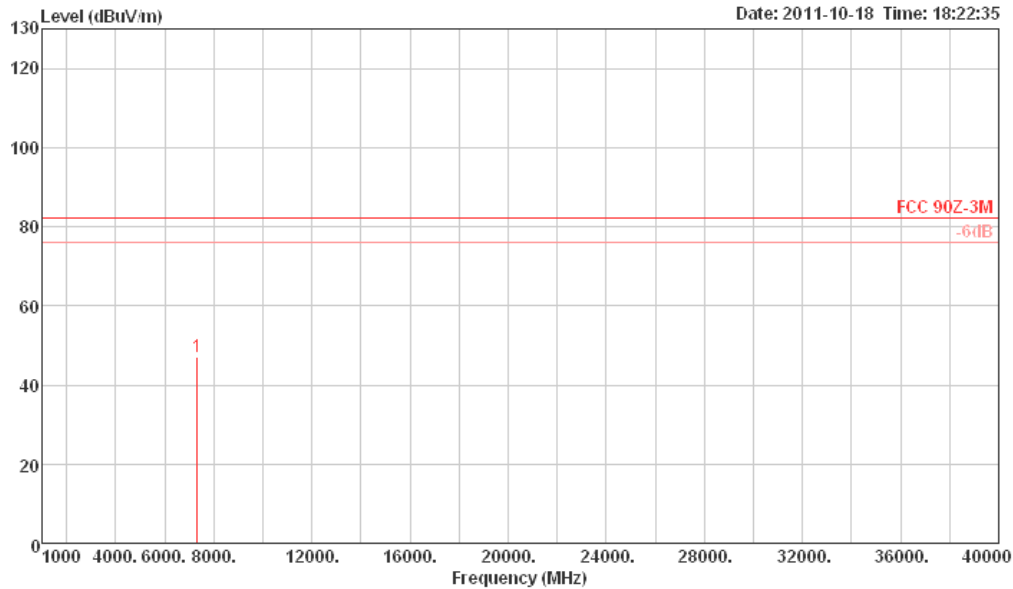
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-10 | F3 | V |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|--------|---------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark |
| | | | | | | dB | dB/m | dB | |
| 1 | 7326.92 | 47.03 | 82.20 | -35.17 | 40.56 | 5.37 | 36.53 | 35.43 | Peak VERTICAL |

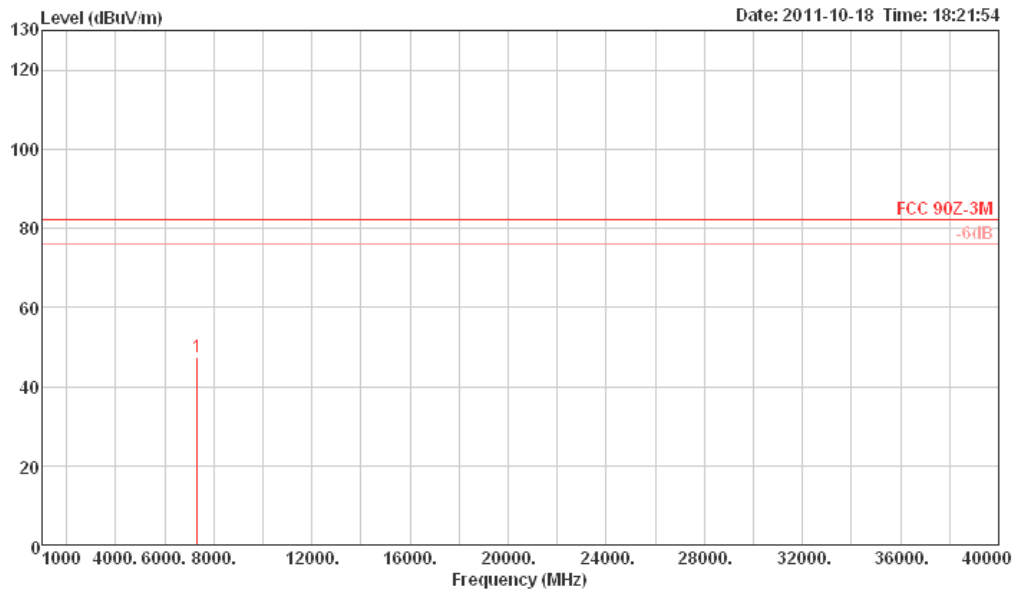
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-10 | F3 | H |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|--------|--------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | Loss | Factor | Factor | Remark |
| | | | | | | dB | dB/m | dB | |
| 1 | 7335.06 | 47.55 | 82.20 | -34.65 | 41.09 | 5.37 | 36.53 | 35.44 | Peak |

HORIZONTAL

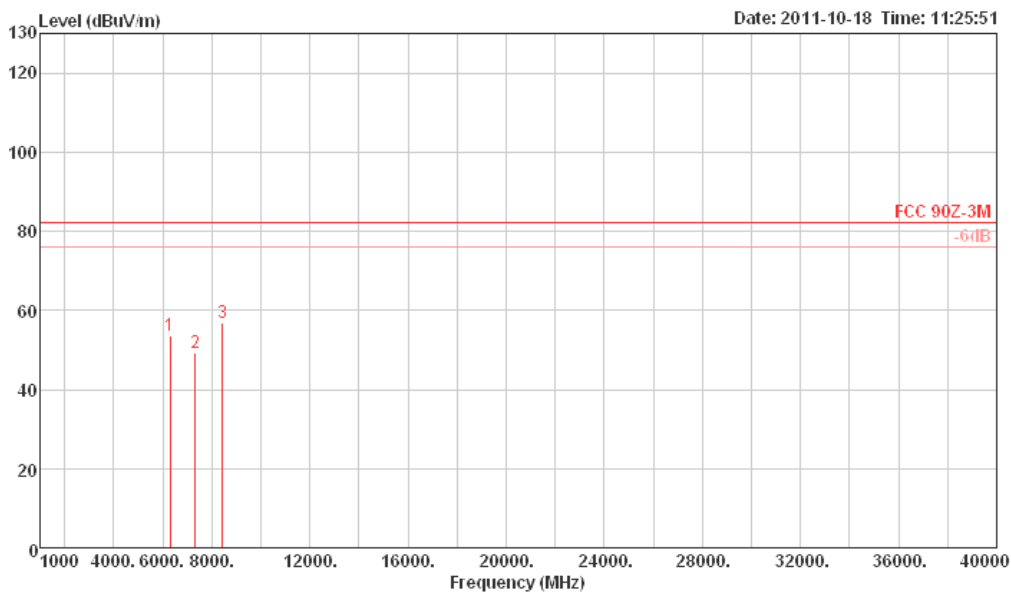
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-20 | F2 | V |



| | Freq | Level | Limit | Over | Read | Cable | Antenna | Preamp | | |
|---|---------|--------|--------|--------|-------|-------|---------|--------|--------|-----------|
| | MHz | dBuV/m | dBuV/m | Limit | Level | Loss | Factor | Factor | Remark | Pol/Phase |
| | | | | dB | dBuV | dB | dB/m | dB | | |
| 1 | 6319.83 | 53.65 | 82.20 | -28.55 | 49.20 | 4.68 | 35.03 | 35.26 | Peak | VERTICAL |
| 2 | 7327.72 | 49.35 | 82.20 | -32.85 | 42.88 | 5.37 | 36.53 | 35.43 | Peak | VERTICAL |
| 3 | 8426.38 | 56.84 | 82.20 | -25.36 | 48.73 | 6.18 | 37.43 | 35.50 | Peak | VERTICAL |

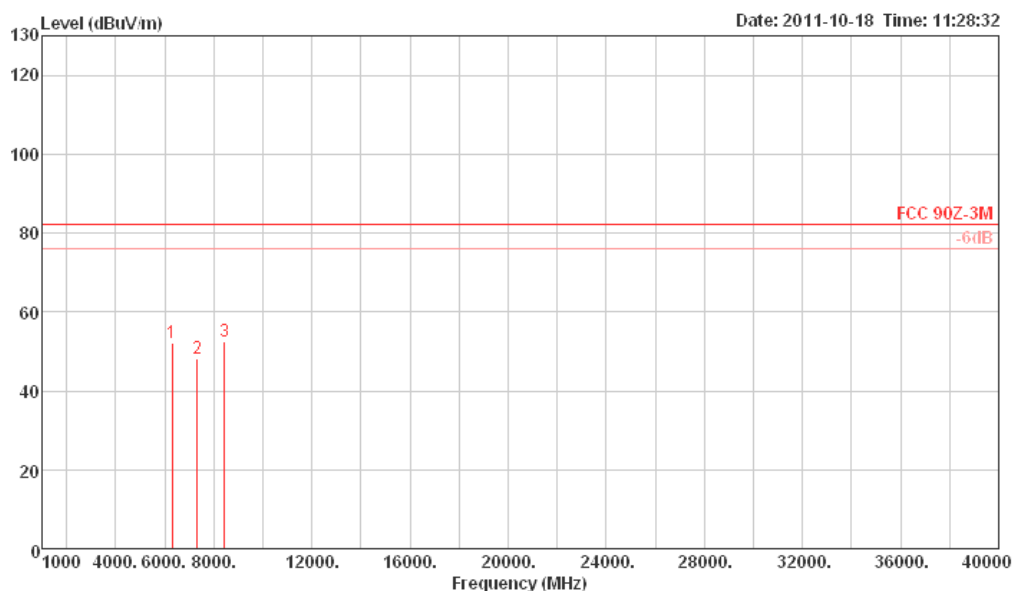
Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| Ant. No. | Power Setting | Modulation Abbreviations | Test Frequencies (FX) | Polarization |
|----------|---------------|--------------------------|-----------------------|--------------|
| 1 | 1 | OFDM-2TX-20 | F2 | H |



| | Freq | Level | Limit | Over | Read | CableAntenna | Preamp | | |
|---|---------|--------|--------|--------|-------|--------------|--------|--------|--------|
| | MHz | dBuV/m | dBuV/m | Limit | Level | Loss | Factor | Factor | Remark |
| | | | | dB | dBuV | dB | dB/m | dB | |
| 1 | 6319.75 | 52.10 | 82.20 | -30.10 | 47.65 | 4.68 | 35.03 | 35.26 | Peak |
| 2 | 7324.80 | 48.29 | 82.20 | -33.91 | 41.82 | 5.37 | 36.53 | 35.43 | Peak |
| 3 | 8426.40 | 52.39 | 82.20 | -29.81 | 44.28 | 6.18 | 37.43 | 35.50 | Peak |

HORIZONTAL

HORIZONTAL

HORIZONTAL

Note 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.

Note 2: "N/F" means Nothing Found (No spurious emissions were detected.)

Note 3: Receive antenna of polarization: H (Horizontal), V (Vertical)

3.5 Transmitter Conducted Spurious Emissions

3.5.1 Limit of Transmitter Conducted Spurious Emissions

| Transmitter Conducted Spurious Emissions |
|---|
| <p>The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB (-13dBm). Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.</p> |
| <p>NOTE: For the applicable limit, see FCC 90.1323</p> |

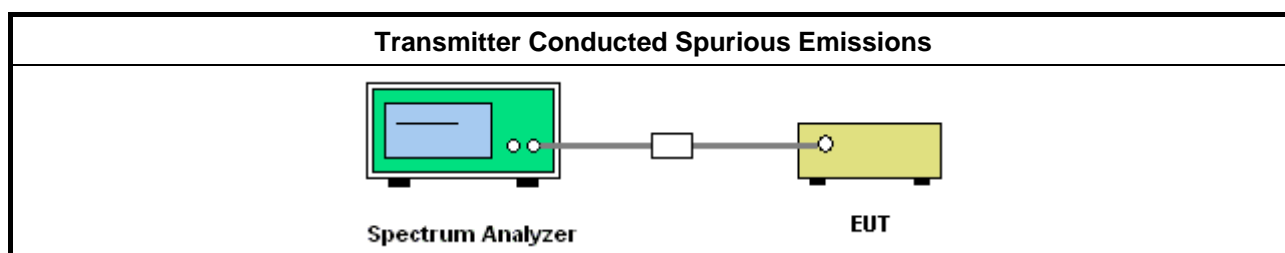
3.5.2 Measuring Instruments

Refer test equipment and calibration data list in test report clause 5.

3.5.3 Test Procedures

| |
|--|
| Method of measurement: |
| <input checked="" type="checkbox"/> Refer as ANSI/TIA-603-D-2010, clause 3.2.13 for conducted measurement. |
| <input checked="" type="checkbox"/> Refer as FCC KDB 662911, spurious emission measurements is absolute limits. Spurious emissions must be tested against absolute limits using techniques (1) or (2). (1) Measure and sum the spectra across the transmitter outputs. (2) Measure and add $10 \log (N)$ dB. <div style="margin-left: 20px;"> <input type="checkbox"/> If using techniques (1), then measure and sum the spectra across the transmitter outputs. </div> <input checked="" type="checkbox"/> If using techniques (2) and N transmitter outputs, then spurious emissions limits on each individual output. Measure and add $10 \log (N)$ dB. |
| <input checked="" type="checkbox"/> In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB) $B = A + 10 \log (BW_{ref} / BW_{measured})$ <div style="margin-left: 20px;"> • A is the value at the narrower measurement bandwidth; • B is the value referred to the reference bandwidth; </div> |

3.5.4 Test Setup



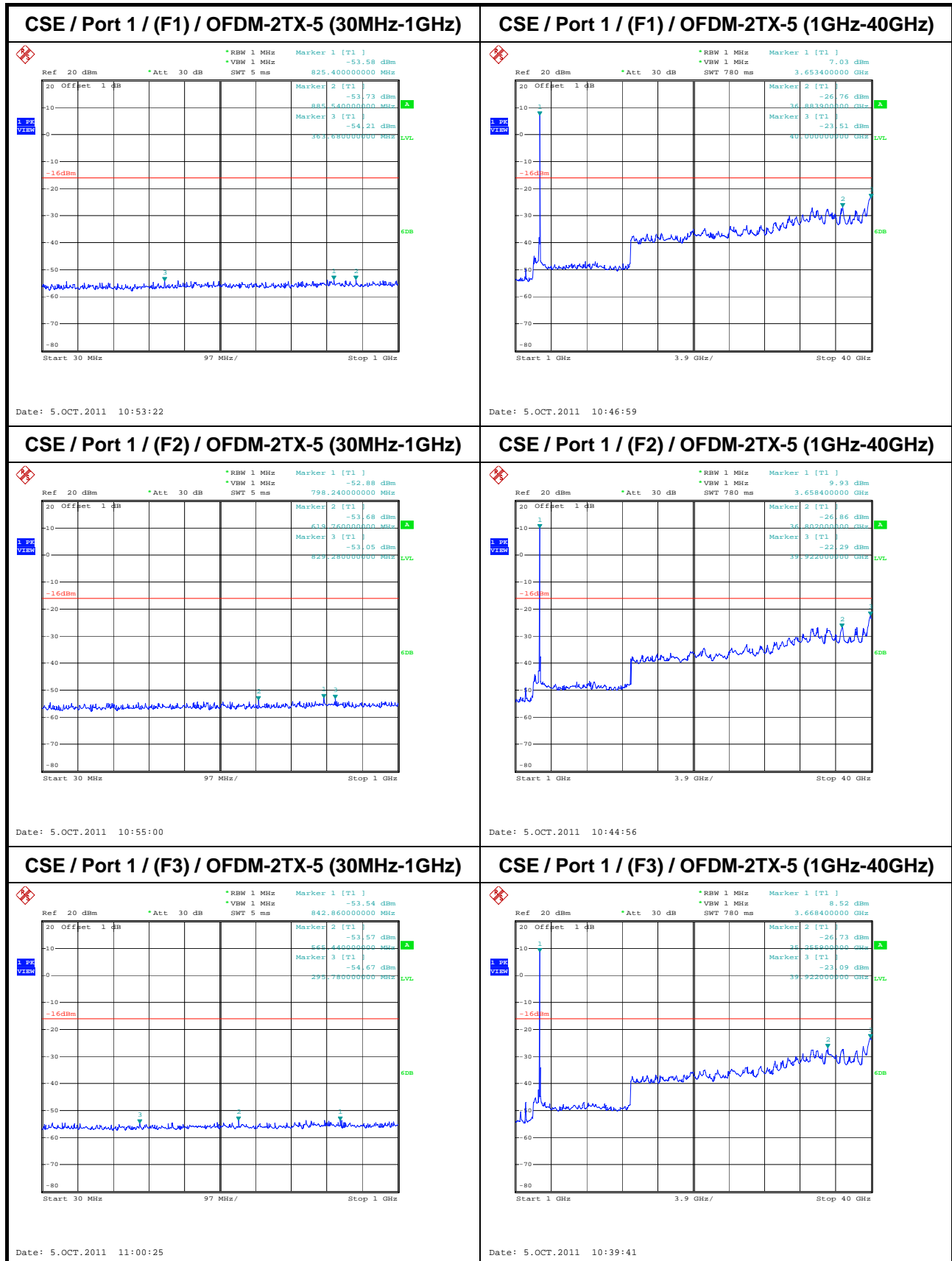
3.5.5 Test Result of Transmitter Conducted Spurious Emissions

| Transmitter Conducted Spurious Emissions - Power Setting 1 (Ant No. 1) | | | | | | | | | |
|--|-----------------|------------------------------------|--------|--------|--------|-------|----------------------------|------------------------------------|-------------|
| Worst Case Mode Abbreviations | Test Freq. (FX) | Conducted Spurious Emissions (dBm) | | | | | RBW Conversion Factor (dB) | Each Individual Output Factor (dB) | Limit (dBm) |
| | | Port 1 | Port 2 | Port 3 | Port 4 | Total | | | |
| OFDM-2TX-5 | F1 | -53.58 | -53.64 | N/A | N/A | N/A | N/A | 3.00 | -16 |
| OFDM-2TX-5 | F2 | -53.05 | -53.36 | N/A | N/A | N/A | N/A | 3.00 | -16 |
| OFDM-2TX-5 | F3 | -53.54 | -52.75 | N/A | N/A | N/A | N/A | 3.00 | -16 |
| OFDM-2TX-10 | F1 | -53.35 | -53.64 | N/A | N/A | N/A | N/A | 3.00 | -16 |
| OFDM-2TX-10 | F2 | -53.30 | -53.25 | N/A | N/A | N/A | N/A | 3.00 | -16 |
| OFDM-2TX-10 | F3 | -53.76 | -53.67 | N/A | N/A | N/A | N/A | 3.00 | -16 |
| OFDM-2TX-20 | F2 | -54.18 | -53.87 | N/A | N/A | N/A | N/A | 3.00 | -16 |
| Test Result | | Complied | | | | | | | |
| Note 1: antenna no., directional gain and power setting define in test report clause 1.1.2 and 2.3. | | | | | | | | | |
| Note 2: worst case mode abbreviations and test frequency define in test report clause 2.1 and 2.2. | | | | | | | | | |
| Note 3: worst case RF conducted test define in test report clause 2.4. | | | | | | | | | |
| Note 4: EUT have 2 transmitter outputs (port 1 - port 2). | | | | | | | | | |
| Note 5: Using techniques (2) and 2 transmitter outputs, then spurious emissions limits on each individual output = -16 dBm [-13 dBm – 10 log (2)]. | | | | | | | | | |

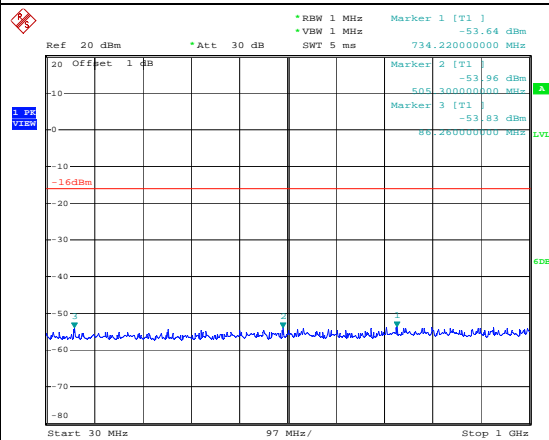
3.5.6 Test Result of Transmitter Bandedge Emissions

| Transmitter Bandedge Emissions - Power Setting 1 (Ant No. 1) | | | | | | | | | |
|---|-----------------|--------------------------|--------|--------|--------|-------|----------------------------|------------------------------------|-------------|
| Worst Case Mode Abbreviations | Test Freq. (FX) | Bandedge Emissions (dBm) | | | | | RBW Conversion Factor (dB) | Each Individual Output Factor (dB) | Limit (dBm) |
| | | Port 1 | Port 2 | Port 3 | Port 4 | Total | | | |
| OFDM-2TX-5 | F1 | -26.11 | -26.28 | N/A | N/A | N/A | 10 | 3.00 | -26 |
| OFDM-2TX-5 | F3 | -37.95 | -38.91 | N/A | N/A | N/A | 10 | 3.00 | -26 |
| OFDM-2TX-10 | F1 | -26.58 | -32.14 | N/A | N/A | N/A | 10 | 3.00 | -26 |
| OFDM-2TX-10 | F3 | -26.28 | -30.64 | N/A | N/A | N/A | 10 | 3.00 | -26 |
| OFDM-2TX-20 | F2 | -26.49 | -31.35 | N/A | N/A | N/A | 10 | 3.00 | -26 |
| OFDM-2TX-20 | F2 | -26.22 | -29.15 | N/A | N/A | N/A | 10 | 3.00 | -26 |
| Test Result | | Complied | | | | | | | |
| Note 1: antenna no., directional gain and power setting define in test report clause 1.1.2 and 2.3. | | | | | | | | | |
| Note 2: worst case mode abbreviations and test frequency define in test report clause 2.1 and 2.2. | | | | | | | | | |
| Note 3: worst case RF conducted test define in test report clause 2.4. | | | | | | | | | |
| Note 4: EUT have 2 transmitter outputs (port 1 - port 2). | | | | | | | | | |
| Note 5: Using techniques (2) and 2 transmitter outputs, then spurious emissions limits on each individual output = -16 dBm [-13 dBm – 10 log (2)]. Then -16dBm in 1 MHz (corrected by 10 log (100 kHz/1 MHz)) yields -26dBm in 100 kHz. | | | | | | | | | |

3.5.7 Transmitter Conducted Spurious Emissions Plots for Power Setting 1 (Ant.1)

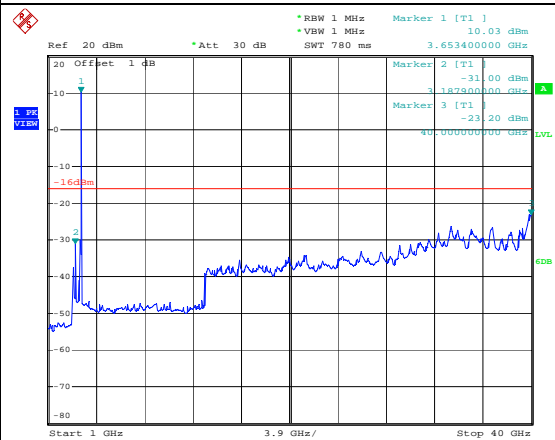


CSE / Port 2 / (F1) / OFDM-2TX-5 (30MHz-1GHz)



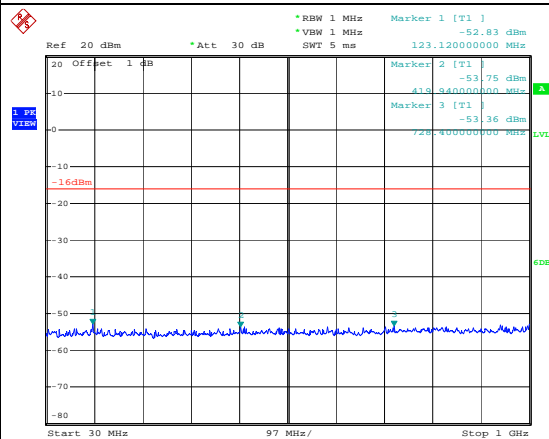
Date: 5.OCT.2011 10:51:36

CSE / Port 2 / (F1) / OFDM-2TX-5 (1GHz-40GHz)



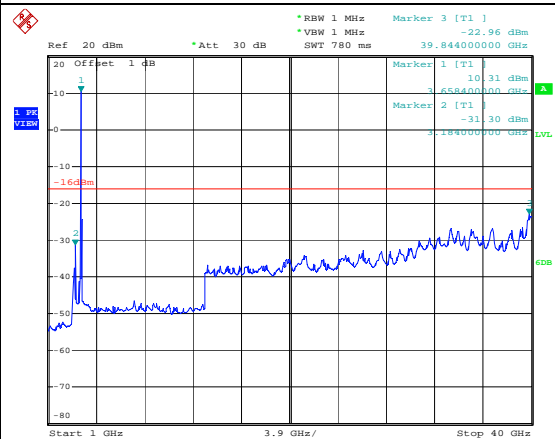
Date: 5.OCT.2011 10:49:12

CSE / Port 2 / (F2) / OFDM-2TX-5 (30MHz-1GHz)



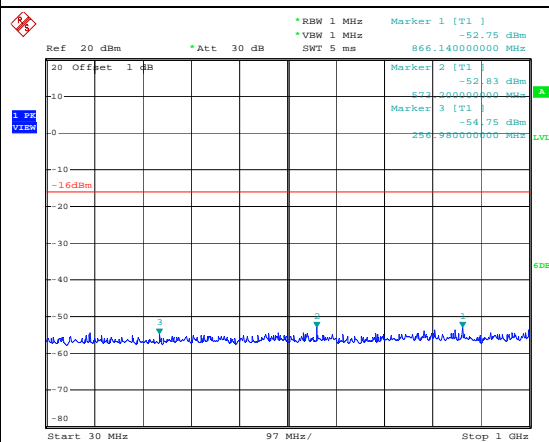
Date: 5.OCT.2011 10:57:48

CSE / Port 2 / (F2) / OFDM-2TX-5 (1GHz-40GHz)



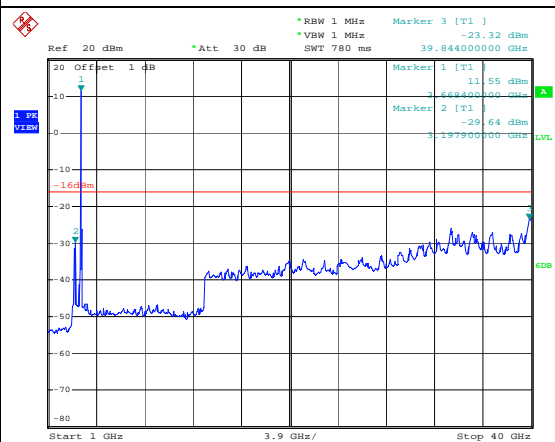
Date: 5.OCT.2011 10:43:24

CSE / Port 2 / (F3) / OFDM-2TX-5 (30MHz-1GHz)



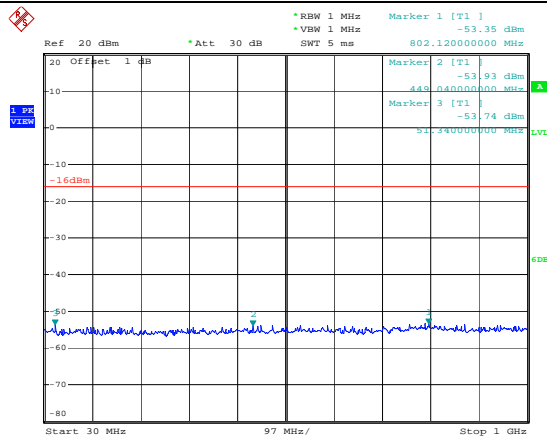
Date: 5.OCT.2011 10:59:06

CSE / Port 2 / (F3) / OFDM-2TX-5 (1GHz-40GHz)



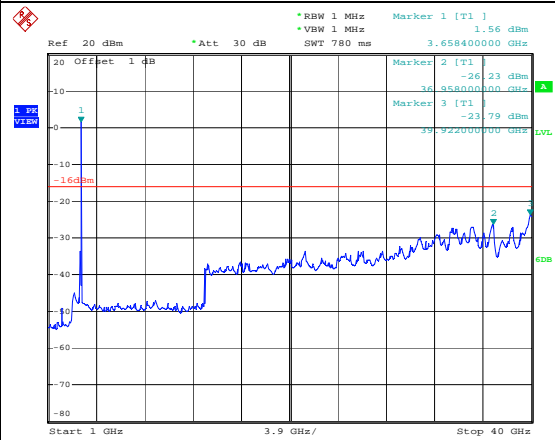
Date: 5.OCT.2011 10:41:37

CSE / Port 1 / (F1) / OFDM-2TX-10 (30MHz-1GHz)



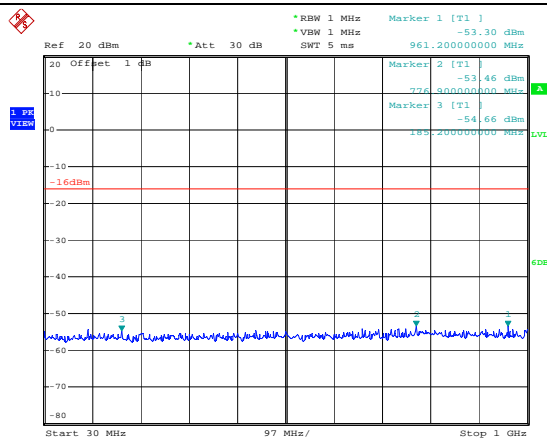
Date: 5.OCT.2011 11:05:32

CSE / Port 1 / (F1) / OFDM-2TX-10 (1GHz-40GHz)



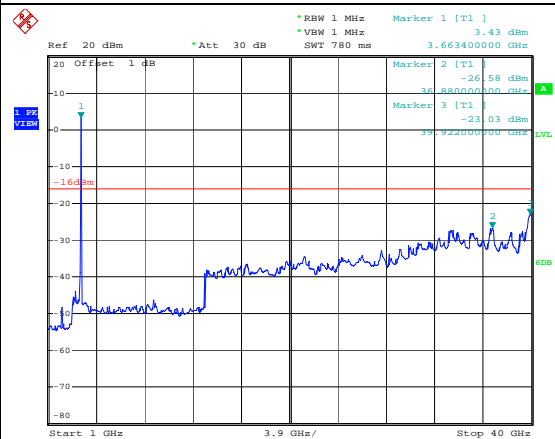
Date: 5.OCT.2011 11:08:03

CSE / Port 1 / (F2) / OFDM-2TX-10 (30MHz-1GHz)



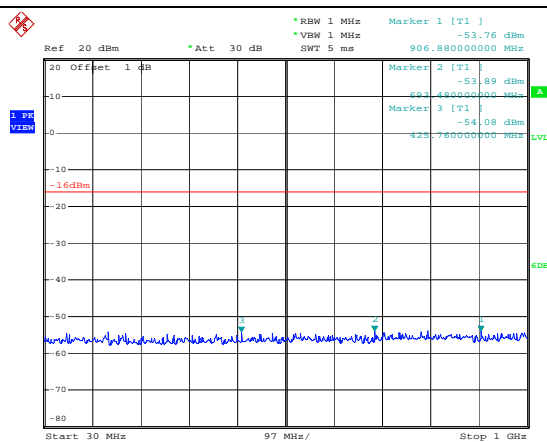
Date: 5.OCT.2011 11:17:15

CSE / Port 1 / (F2) / OFDM-2TX-10 (1GHz-40GHz)



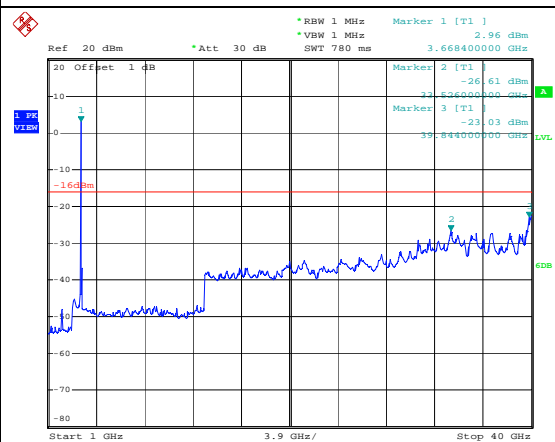
Date: 5.OCT.2011 11:18:20

CSE / Port 1 / (F3) / OFDM-2TX-10 (30MHz-1GHz)



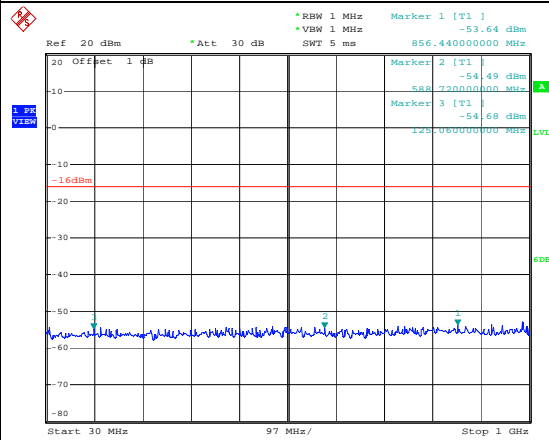
Date: 5.OCT.2011 11:21:45

CSE / Port 1 / (F3) / OFDM-2TX-10 (1GHz-40GHz)



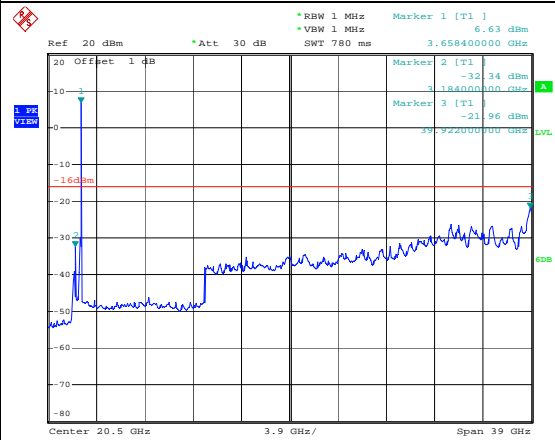
Date: 5.OCT.2011 11:20:56

CSE / Port 2 / (F1) / OFDM-2TX-10 (30MHz-1GHz)



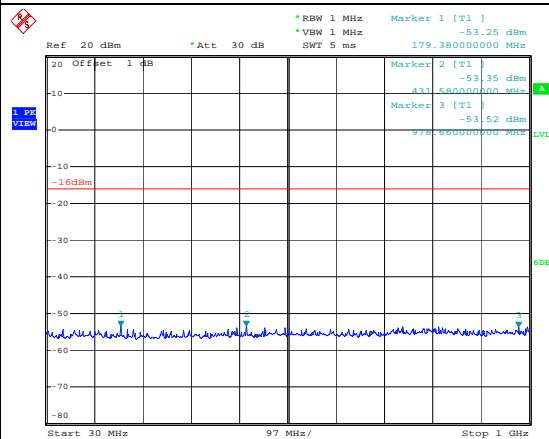
Date: 5.OCT.2011 11:13:03

CSE / Port 2 / (F1) / OFDM-2TX-10 (1GHz-40GHz)



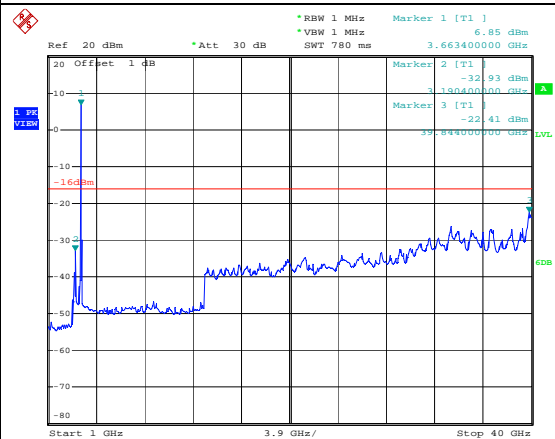
Date: 5.OCT.2011 11:12:04

CSE / Port 2 / (F2) / OFDM-2TX-10 (30MHz-1GHz)



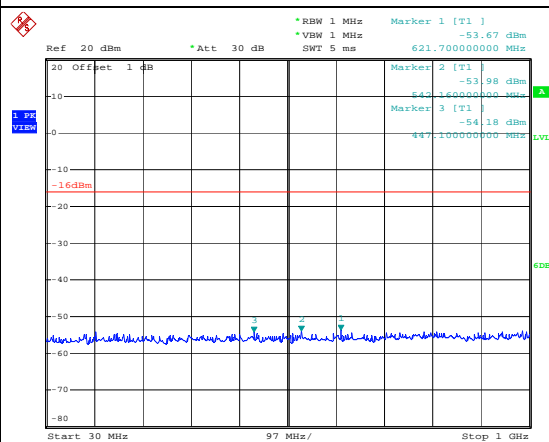
Date: 5.OCT.2011 11:15:45

CSE / Port 2 / (F2) / OFDM-2TX-10 (1GHz-40GHz)



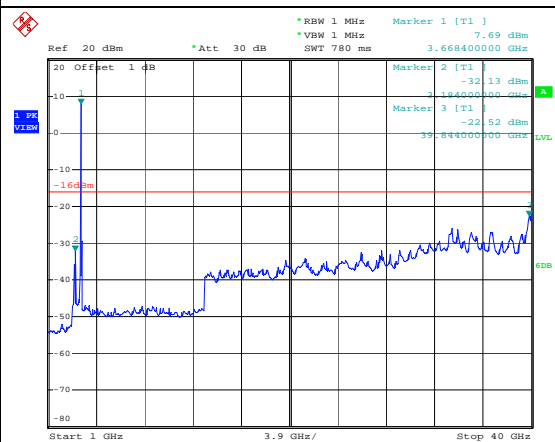
Date: 5.OCT.2011 11:14:22

CSE / Port 2 / (F3) / OFDM-2TX-10 (30MHz-1GHz)



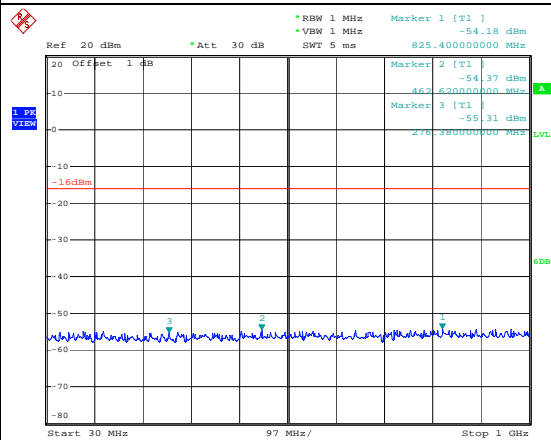
Date: 5.OCT.2011 11:23:14

CSE / Port 2 / (F3) / OFDM-2TX-10 (1GHz-40GHz)

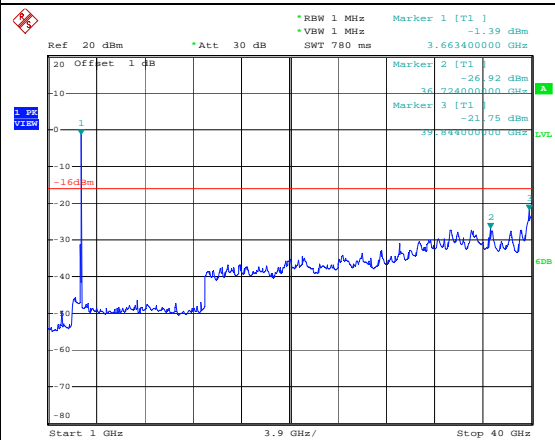


Date: 5.OCT.2011 11:24:32

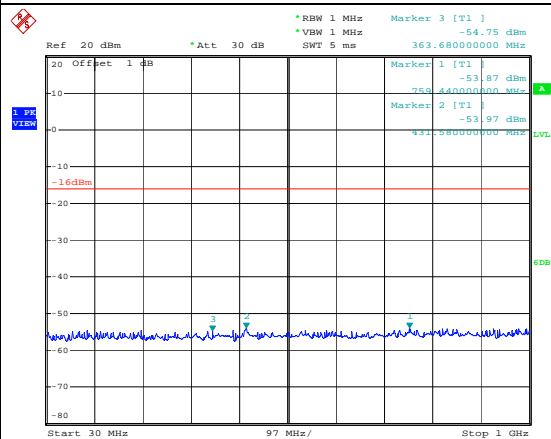
CSE / Port 1 / (F2) / OFDM-2TX-20 (30MHz-1GHz)



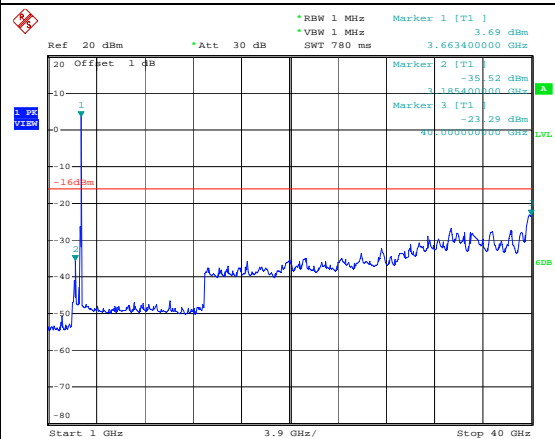
CSE / Port 1 / (F2) / OFDM-2TX-20 (1GHz-40GHz)



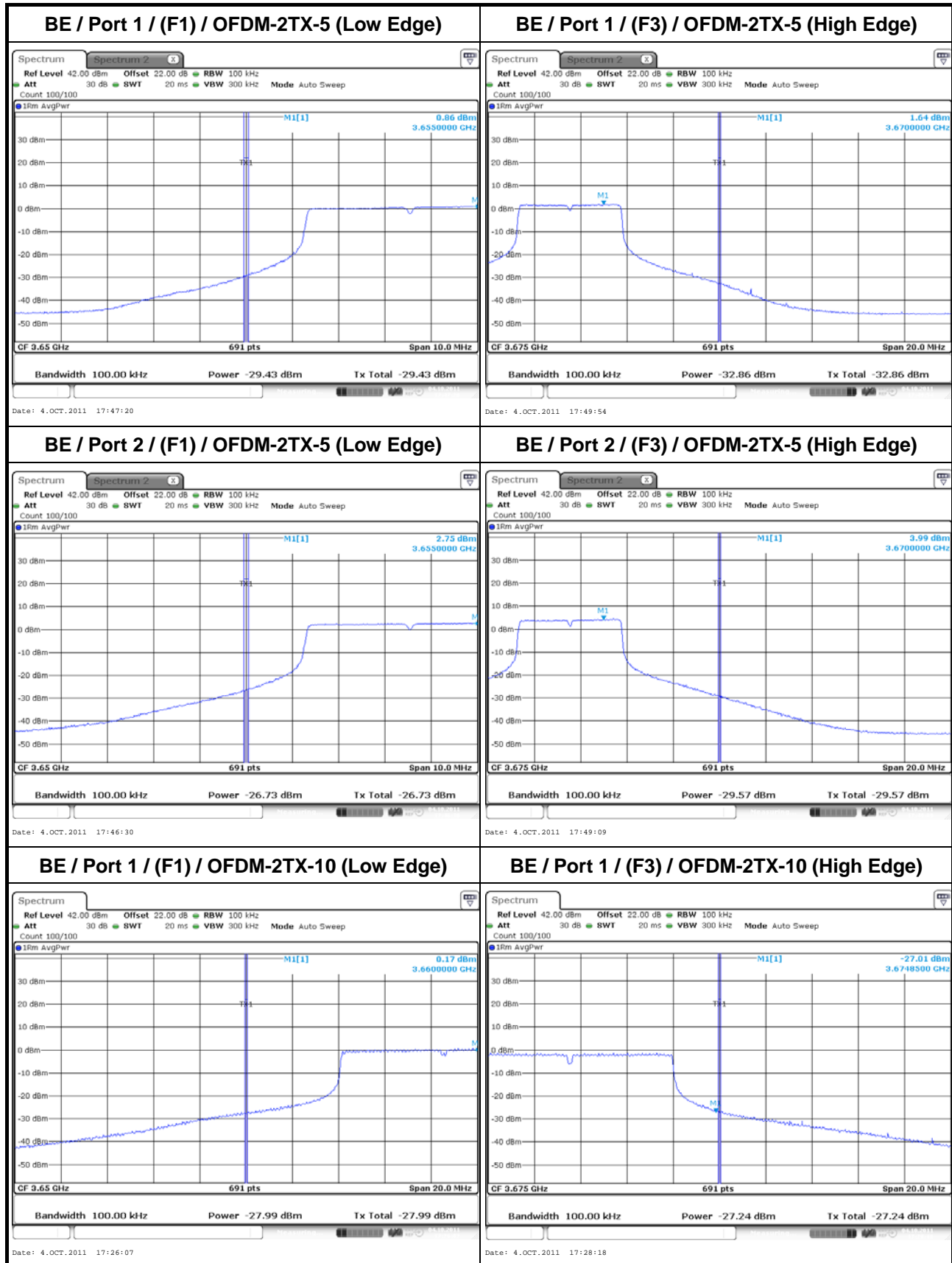
CSE / Port 2 / (F2) / OFDM-2TX-20 (30MHz-1GHz)



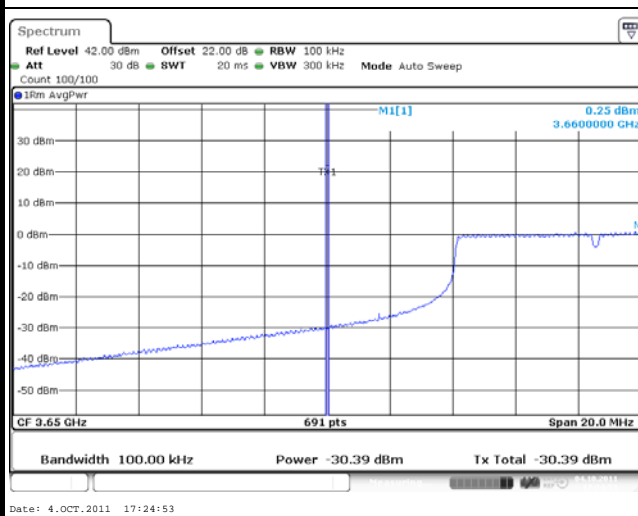
CSE / Port 2 / (F2) / OFDM-2TX-20 (1GHz-40GHz)



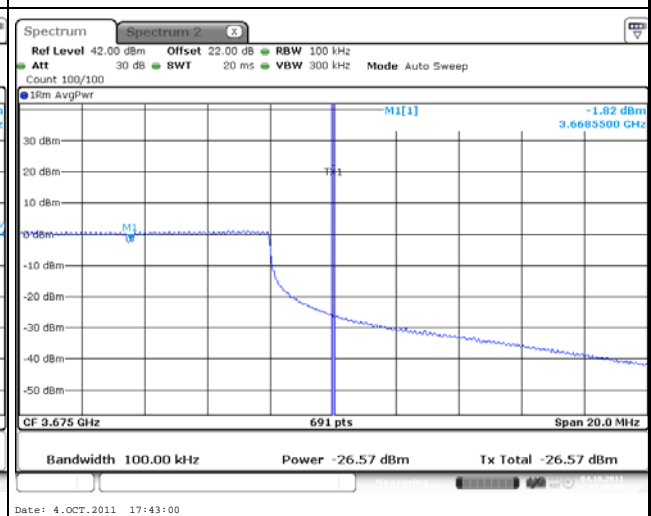
3.5.8 Transmitter Bandedge Emissions Plots for Power Setting 1 (Ant.1)



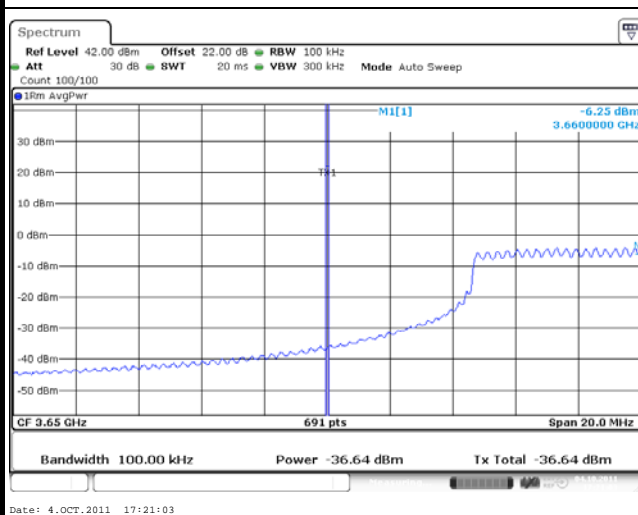
BE / Port 2 / (F1) / OFDM-2TX-10 (Low Edge)



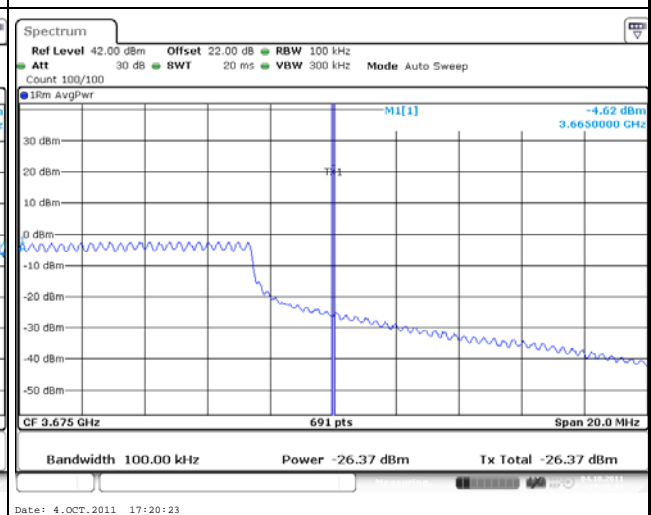
BE / Port 2 / (F3) / OFDM-2TX-10 (High Edge)



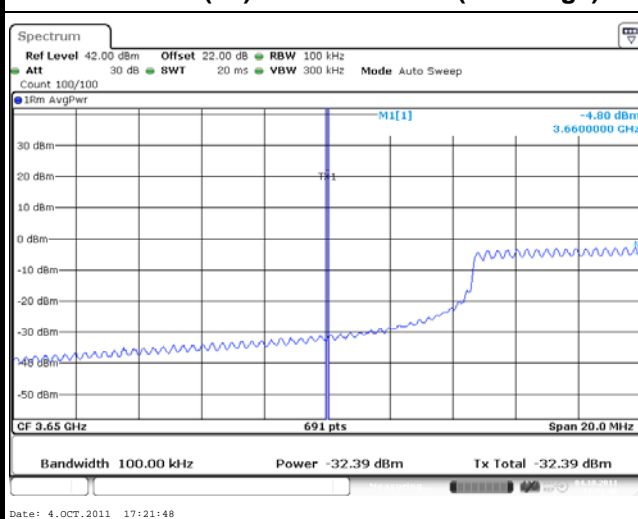
BE / Port 1 / (F2) / OFDM-2TX-20 (Low Edge)



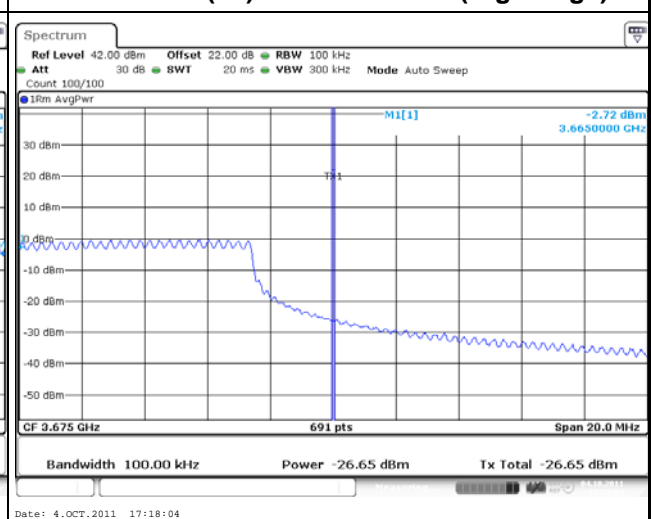
BE / Port 1 / (F2) / OFDM-2TX-20 (High Edge)



BE / Port 2 / (F2) / OFDM-2TX-20 (Low Edge)



BE / Port 2 / (F2) / OFDM-2TX-20 (High Edge)



3.6 Spectrum Mask Emissions

3.6.1 Limit of Spectrum Mask Emissions

| Spectrum Mask Emissions (Mask B) | |
|---|--|
| Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows: | |
| (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB. | |
| (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB. | |
| (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB. | |
| Note: For the applicable limit, see FCC 90.210 | |

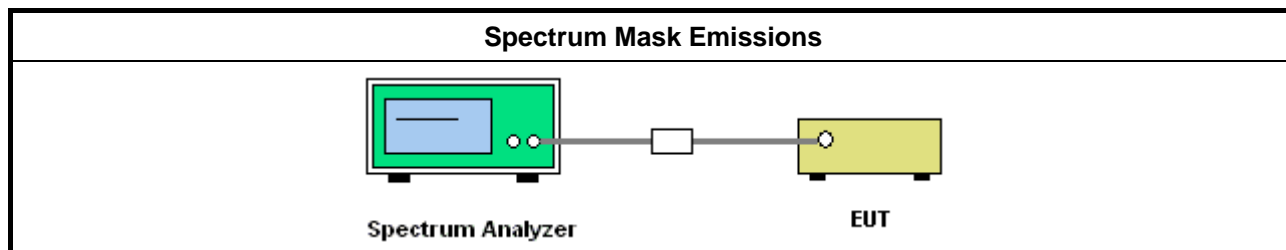
3.6.2 Measuring Instruments

Refer test equipment and calibration data list in test report clause 5.

3.6.3 Test Procedures

| | |
|-------------------------------------|---|
| Method of measurement: | |
| <input checked="" type="checkbox"/> | Refer as ANSI/TIA-603-D-2010, clause 3.2.11 for sideband measurement. |
| <input type="checkbox"/> | Refer as FCC KDB 662911, emission mask measurements is absolute limits. Emission mask must be tested against absolute limits using techniques (1) or (2). (1) Measure and sum the spectra across the transmitter outputs. (2) Measure and add $10 \log (N)$ dB. <ul style="list-style-type: none"> <input type="checkbox"/> If using techniques (1), then measure and sum the spectra across the transmitter outputs. <input type="checkbox"/> If using techniques (2) and N transmitter outputs, then emission mask limits on each individual output. Measure and add $10 \log (N)$ dB. |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 662911, emission mask measurements is relative emission limits. When testing emission mask against relative emission limits, tests may be performed on each output individually without summing or adding $10 \log (N)$ if the measurements are made relative to the in-band emissions on the individual outputs. |
| <input type="checkbox"/> | In case a narrower measurement bandwidth was used, the following conversion formula has to be applied: (e.g. if reference bandwidth 1 MHz and measurement bandwidth 100 kHz, then measurement bandwidth conversion factor is 10 dB) $B = A + 10 \log (BW_{ref} / BW_{measured})$ <ul style="list-style-type: none"> • A is the value at the narrower measurement bandwidth; • B is the value referred to the reference bandwidth; |

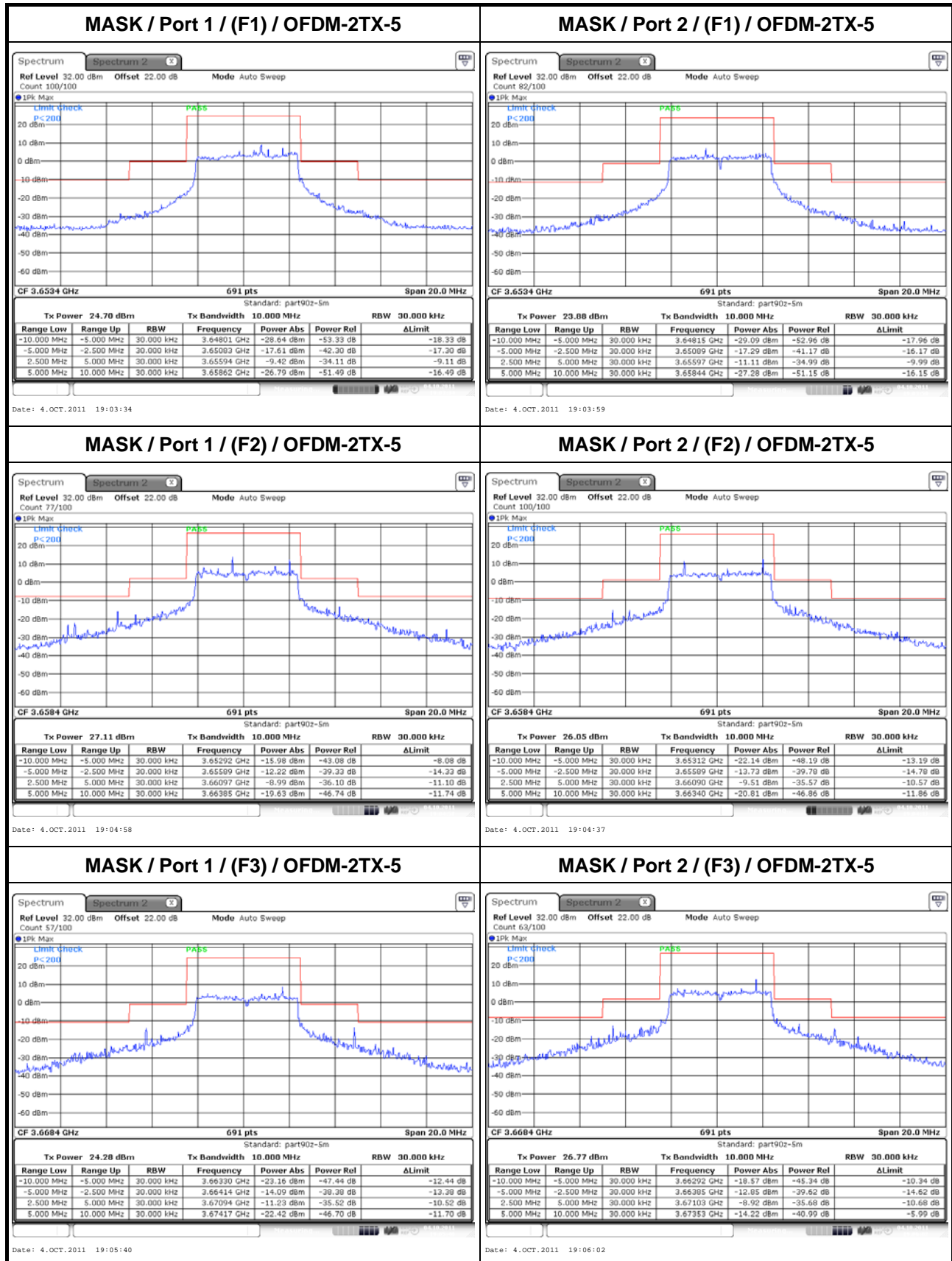
3.6.4 Test Setup



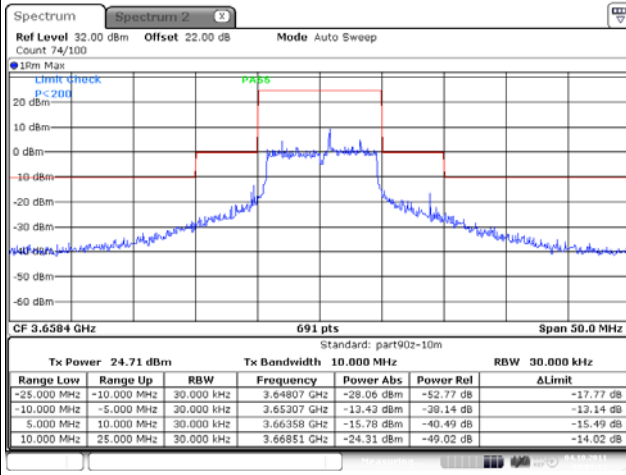
3.6.5 Test Result of Spectrum Mask Emissions

| Spectrum Mask Emissions - Power Setting 1 (Ant No. 1) | | | | | | | | | |
|--|-----------------|-------------------------|--------|--------|--------|-------|----------------------------|------------------------------------|--------------------|
| Worst Case Mode Abbreviations | Test Freq. (FX) | Spectrum Mask Emissions | | | | | RBW Conversion Factor (dB) | Each Individual Output Factor (dB) | Limit (FCC 90.210) |
| | | Port 1 | Port 2 | Port 3 | Port 4 | Total | | | |
| OFDM-2TX-5 | F1 | Pass | Pass | N/A | N/A | N/A | N/A | N/A | B |
| OFDM-2TX-5 | F2 | Pass | Pass | N/A | N/A | N/A | N/A | N/A | B |
| OFDM-2TX-5 | F3 | Pass | Pass | N/A | N/A | N/A | N/A | N/A | B |
| OFDM-2TX-10 | F1 | Pass | Pass | N/A | N/A | N/A | N/A | N/A | B |
| OFDM-2TX-10 | F2 | Pass | Pass | N/A | N/A | N/A | N/A | N/A | B |
| OFDM-2TX-10 | F3 | Pass | Pass | N/A | N/A | N/A | N/A | N/A | B |
| OFDM-2TX-20 | F2 | Pass | Pass | N/A | N/A | N/A | N/A | N/A | B |
| Test Result | | Complied | | | | | | | |
| <p>Note 1: antenna no., directional gain and power setting define in test report clause 1.1.2 and 2.3.</p> <p>Note 2: worst case mode abbreviations and test frequency define in test report clause 2.1 and 2.2.</p> <p>Note 3: worst case RF conducted test define in test report clause 2.4.</p> <p>Note 4: EUT have 2 transmitter outputs (port 1 - port 2).</p> <p>Note 5: Emission mask measurements is relative emission limits. When testing emission mask against relative emission limits, tests may be performed on each output individually without summing or adding 10 log (N).</p> | | | | | | | | | |

3.6.6 Spectrum Mask Emissions Plots for Power Setting 1 (Ant.1)

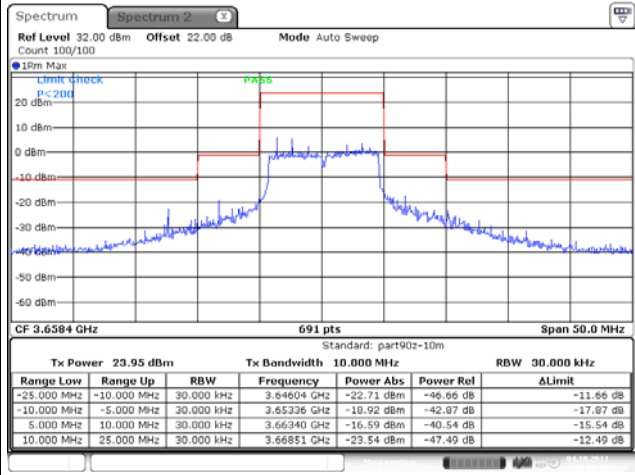


MASK / Port 1 / (F1) / OFDM-2TX-10



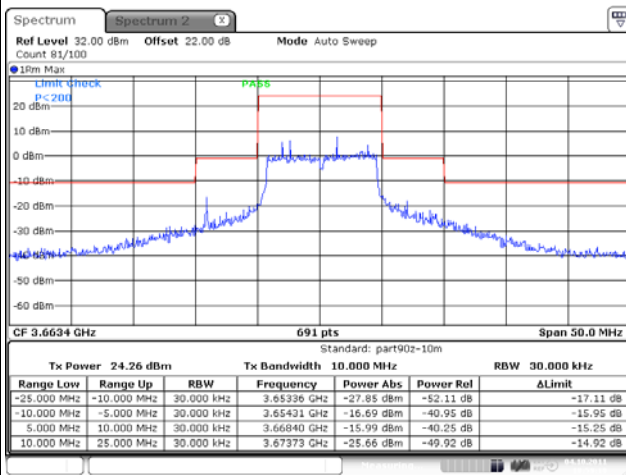
Date: 4.OCT.2011 19:01:12

MASK / Port 2 / (F1) / OFDM-2TX-10



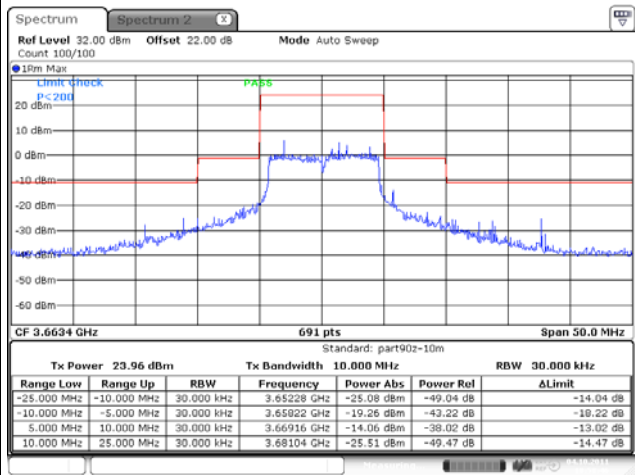
Date: 4.OCT.2011 19:00:10

MASK / Port 1 / (F2) / OFDM-2TX-10



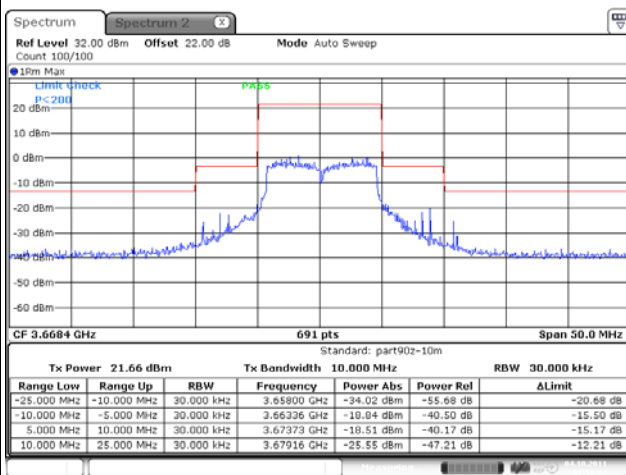
Date: 4.OCT.2011 18:59:19

MASK / Port 2 / (F2) / OFDM-2TX-10



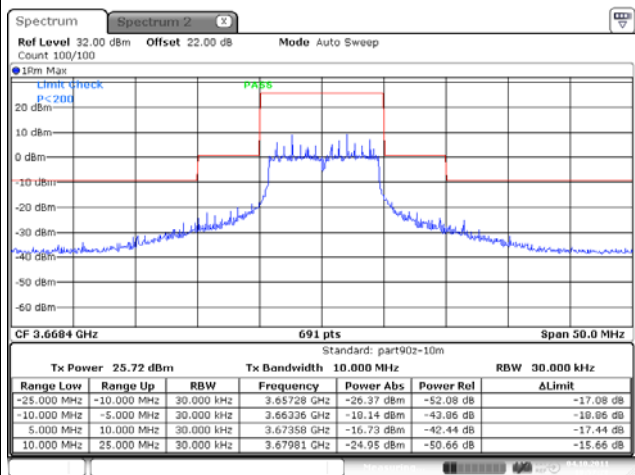
Date: 4.OCT.2011 18:58:46

MASK / Port 1 / (F3) / OFDM-2TX-10

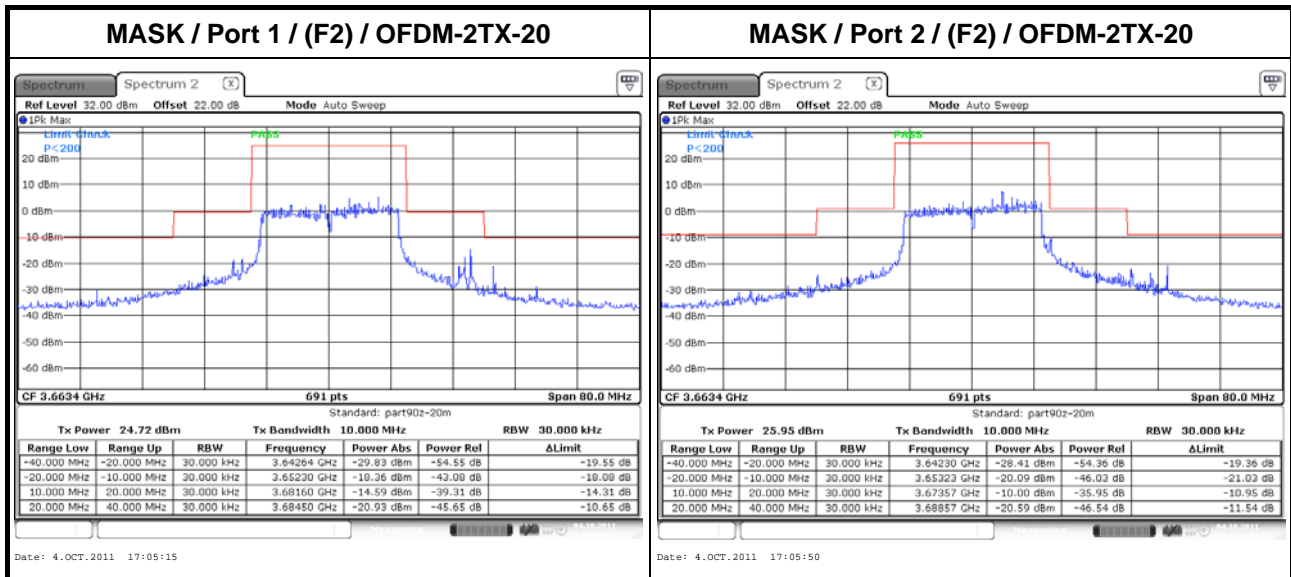


Date: 4.OCT.2011 18:58:12

MASK / Port 2 / (F3) / OFDM-2TX-10



Date: 4.OCT.2011 18:57:28



3.7 Frequency Tolerance

3.7.1 Limit of Frequency Tolerance

| Frequency Tolerance | Limit |
|---|--|
| Refer as FCC 90.213 | To be specified in the station authorization |
| Note: These measurements shall also be performed at normal and extreme test conditions. | |

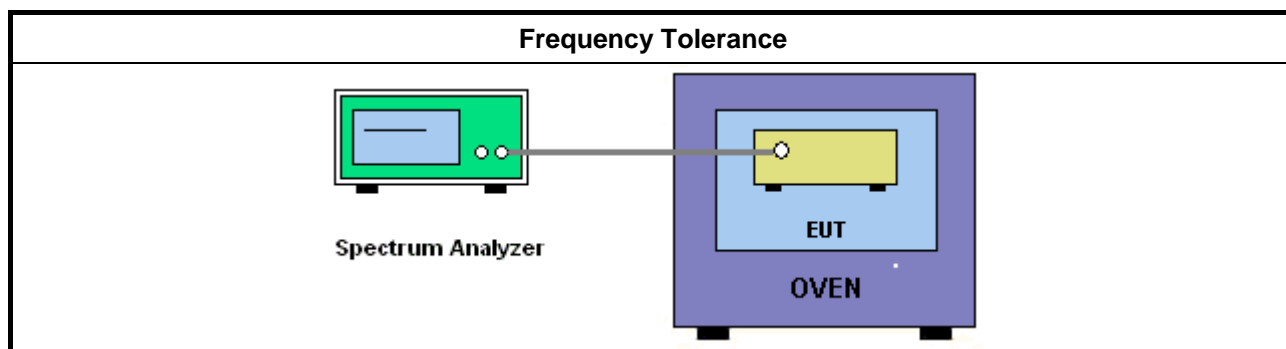
3.7.2 Measuring Instruments

Refer test equipment and calibration data list in test report clause 5.

3.7.3 Test Procedures

Method of measurement: Refer as ANSI/TIA-603-D-2010, clause 3.2.2.

3.7.4 Test Setup



3.7.5 Frequency Tolerance with Varying Supply Voltage

| Temperature vs. Frequency Tolerance | | |
|---|---------------|--|
| Test Date | Oct. 05, 2011 | |
| Test Frequency | | F2 |
| Transmit Time (min) | | 10 |
| Refer Frequency (MHz) | | 3663.4 |
| 20 °C | Vnom | 3663.4053 |
| 20 °C | Vmin | 3663.4053 |
| 20 °C | Vmax | 3663.4053 |
| Maximum Frequency Tolerance (ppm) | | 1.45 |
| Frequency Tolerance limit | | To be specified in the station authorization |
| Complied Limit | | Complied |
| Test Date | | Oct. 05, 2011 |
| Note: EUT operational condition (normal and extreme) refer as test report clause 1.1.4. | | |

3.7.6 Frequency Tolerance with Respect to Ambient Temperature

| Temperature vs. Frequency Tolerance | | |
|---|---------------|--|
| Test Date | Oct. 05, 2011 | |
| Test Frequency | | F2 |
| Transmit Time (min) | | 10 |
| Refer Frequency (MHz) | | 3663.4 |
| 50 °C | Vnom | 3663.4066 |
| 40 °C | Vnom | 3663.4186 |
| 30 °C | Vnom | 3663.4216 |
| 20 °C | Vnom | 3663.4198 |
| 10 °C | Vnom | 3663.4120 |
| 0 °C | Vnom | 3663.4053 |
| -10 °C | Vnom | 3663.3964 |
| -20 °C | Vnom | 3663.3892 |
| -30 °C | Vnom | 3663.3856 |
| Maximum Frequency Tolerance (ppm) | | 5.90 |
| Frequency Tolerance limit | | To be specified in the station authorization |
| Complied Limit | | Complied |
| Note: EUT operational condition (normal and extreme) refer as test report clause 1.1.4. | | |

4 Maximum Permissible Exposure

4.1 Maximum Permissible Exposure

4.1.1 Limit of Maximum Permissible Exposure

| Limits for Occupational / Controlled Exposure | | | | |
|---|-----------------------------------|-----------------------------------|--|--|
| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm ²) | Averaging Time E ² , H ² or S (minutes) |
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842 / f | 4.89 / f | (900 / f)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | | | F/300 | 6 |
| 1500-100,000 | | | 5 | 6 |
| Limits for General Population / Uncontrolled Exposure | | | | |
| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) (mW/ cm ²) | Averaging Time E ² , H ² or S (minutes) |
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | | | F/1500 | 30 |
| 1500-100,000 | | | 1.0 | 30 |
| Note 1: f = frequency in MHz ; *Plane-wave equivalent power density | | | | |
| Note 2: For the applicable limit, see FCC 1.1310 | | | | |

4.1.2 MPE Calculation Method

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

E = Electric field (V/m)

G = EUT Antenna numeric gain (numeric)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

$$\text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

P = RF output power (W)

d = Separation distance between radiator and human body (m)

4.1.3 Result of Maximum Permissible Exposure

| Maximum Permissible Exposure - Power Setting 1 (Ant No. 1) | | | | | | | |
|---|--------------------|----------------------------------|--------------------|------------------------|--|---|--|
| Worst Case Mode Abbreviations | Test Freq. (FX) | Total Cond. Power (dBm) | Dir. Gain (dBi) | EIRP Power (dBm) | User and EUT Min. Distance (cm) | Power Density (mW/cm ²) | Power Density Limit (mW/cm ²) |
| OFDM-2TX-5 | F1 | 20.44 | 15.01 | 35.45 | 20 | 0.6982 | 1 |
| OFDM-2TX-5 | F2 | 20.02 | 15.01 | 35.03 | 20 | 0.6338 | 1 |
| OFDM-2TX-5 | F3 | 20.01 | 15.01 | 35.02 | 20 | 0.6323 | 1 |
| OFDM-2TX-10 | F1 | 20.88 | 15.01 | 35.89 | 20 | 0.7726 | 1 |
| OFDM-2TX-10 | F2 | 20.69 | 15.01 | 35.70 | 20 | 0.7395 | 1 |
| OFDM-2TX-10 | F3 | 19.73 | 15.01 | 34.74 | 20 | 0.5929 | 1 |
| OFDM-2TX-20 | F2 | 20.63 | 15.01 | 35.64 | 20 | 0.7294 | 1 |
| Test Result | | | | | | Complied | |
| Note 1: antenna no., directional gain and power setting define in test report clause 1.1.2 and 2.3. | | | | | | | |
| Note 2: worst case mode abbreviations and test frequency define in test report clause 2.1 and 2.2. | | | | | | | |
| Note 3: worst case RF conducted test define in test report clause 2.4. | | | | | | | |
| Note 4: EUT have 2 transmitter outputs (port 1 - port 2). | | | | | | | |

5 Test Equipment and Calibration Data

| Instrument | Manufacturer | Model No. | Serial No. | Spec. | Calibration Date | Calibration Until | Remark |
|--------------------------|--------------|------------------|-------------|------------------|------------------|-------------------|-----------------------|
| EMI Test Receiver | R&S | ESCS 30 | 100377 | 9kHz ~ 2.75GHz | Sep. 14, 2011 | Sep. 14, 2012 | Conduction (CO01-CB) |
| LISN | F.C.C. | FCC-LISN-50-16-2 | 04083 | 150kHz ~ 100MHz | Oct. 28, 2010 | Oct. 28, 2011 | Conduction (CO01-CB) |
| V- LISN | Schwarzbeck | NSLK 8127 | 8127-478 | 9K ~ 30MHz | Nov. 16, 2010 | Nov. 16, 2011 | Conduction (CO01-CB) |
| PULSE LIMITER | R&S | ESH3-Z2 | 100430 | 9K~30MHz | Jan. 04, 2011 | Jan. 04, 2012 | Conduction (CO01-CB) |
| COND Cable | - | Cable | - | 0.15MHz~30M Hz | Dec. 04, 2010 | Dec. 04, 2011 | Conduction (CO01-CB) |
| BILOG ANTENNA | Schaffner | CBL6112D | 22021 | 20MHz ~ 2GHz | Oct. 17, 2010 | Oct. 17, 2011 | Radiation (03CH01-CB) |
| Horn Antenna | EMCO | 3115 | 00075790 | 750MHz~18GHz | Nov. 22, 2010 | Nov. 22, 2011 | Radiation (03CH01-CB) |
| Horn Antenna | SCHWARZBEAK | BBHA 9170 | BBHA9170252 | 15GHz ~ 40GHz | Oct. 08, 2010 | Oct. 08, 2011 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8447D | 2944A10991 | 0.1MHz ~ 1.3GHz | Nov. 17, 2010 | Nov. 17, 2011 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8449B | 3008A02310 | 1GHz ~ 26.5GHz | Nov. 23, 2010 | Nov. 23, 2011 | Radiation (03CH01-CB) |
| Pre-Amplifier | WM | TF-130N-R1 | 923365 | 26.5GHz ~ 40GHz | Jul. 29, 2011 | Jul. 29, 2012 | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSP | 100304 | 9kHz ~ 40GHz | Nov. 22, 2010 | Nov. 22, 2011 | Radiation (03CH01-CB) |
| EMI Test Receiver | R&S | ESCS 30 | 100355 | 9kHz ~ 2.75GHz | Mar. 22, 2011 | Mar. 22, 2012 | Radiation (03CH01-CB) |
| Loop Antenna | Teseq | HLA 6120 | 24155 | 9 kHz - 30 MHz | Sep. 09, 2010* | Sep. 09, 2012* | Radiation (03CH01-CB) |
| Turn Table | INN CO | CO 2000 | N/A | 0 ~ 360 degree | N/A | N/A | Radiation (03CH01-CB) |
| Antenna Mast | INN CO | CO2000 | N/A | 1 m - 4 m | N/A | N/A | Radiation (03CH01-CB) |
| RF Cable-low | Woken | Low Cable-1 | N/A | 30 MHz - 1 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-1 | N/A | 1 GHz - 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-2 | N/A | 1 GHz - 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-3 | N/A | 1 GHz - 40 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-4 | N/A | 1 GHz - 40 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSP30 | 100023 | 9KHz~30GHz | Mar. 15, 2011 | Mar. 15, 2012 | Conducted (TH01-CB) |
| Spectrum analyzer | R&S | FSV30 | 101026 | 9KHz~30GHz | Jul. 27, 2011 | Jul. 27, 2012 | Conducted (TH01-CB) |
| EPM-P Series Power Meter | Agilent | E4416A | GB41291199 | 50MHz - 18GHz | Sep. 09, 2011 | Sep. 09, 2012 | Conducted (TH01-CB) |
| Peak an Avg Power Sensor | Agilent | E9327A | US40442088 | 50MHz - 18GHz | Sep. 09, 2011 | Sep. 09, 2012 | Conducted (TH01-CB) |
| Thermo-Hygro Meter | N/A | HC 520 | #1 | 15~70 degree | Nov. 02, 2010 | Nov. 02, 2011 | Conducted (TH01-CB) |
| RF Power Divider | HP | 11636A | 00306 | 2GHz ~ 18GHz | N/A | N/A | Conducted (TH01-CB) |
| RF Power Splitter | Anaren | 44100 | 1839 | 2GHz ~ 18GHz | N/A | N/A | Conducted (TH01-CB) |

| Instrument | Manufacturer | Model No. | Serial No. | Spec. | Calibration Date | Calibration Until | Remark |
|-------------------|--------------|---------------|------------|------------------|------------------|-------------------|---------------------|
| RF Power Splitter | Anaren | 42100 | 17930 | 2GHz ~ 18GHz | N/A | N/A | Conducted (TH01-CB) |
| RF Cable-high | Woken | High Cable-7 | - | 1 GHz – 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Conducted (TH01-CB) |
| RF Cable-high | Woken | High Cable-8 | - | 1 GHz – 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Conducted (TH01-CB) |
| RF Cable-high | Woken | High Cable-9 | - | 1 GHz – 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Conducted (TH01-CB) |
| RF Cable-high | Woken | High Cable-10 | - | 1 GHz – 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Conducted (TH01-CB) |
| RF Cable-high | Woken | High Cable-11 | - | 1 GHz – 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Conducted (TH01-CB) |
| RF Cable-high | Woken | High Cable-12 | - | 1 GHz – 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Conducted (TH01-CB) |
| RF Cable-high | Woken | High Cable-13 | - | 1 GHz – 26.5 GHz | Nov. 17, 2010 | Nov. 17, 2011 | Conducted (TH01-CB) |
| Power Sensor | Anritsu | MA2411B | 0917223 | 300MHz~40GHz | Sep. 13, 2011 | Sep. 13, 2010 | Conducted (TH01-CB) |
| Power Meter | Anritsu | ML2495A | 1035008 | 300MHz~40GHz | Sep. 08, 2011 | Sep. 08, 2012 | Conducted (TH01-CB) |

6 Certification of TAF Accreditation



Certificate No. : L1190-110702

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Road, Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

| | |
|---------------------------------------|--|
| Accreditation Criteria | : ISO/IEC 17025:2005 |
| Accreditation Number | : 1190 |
| Originally Accredited | : December 15, 2003 |
| Effective Period | : January 10, 2010 to January 09, 2013 |
| Accredited Scope | : Testing Field, see described in the Appendix |
| Specific Accreditation Program | : Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities |



Jay-San Chen
President, Taiwan Accreditation Foundation
Date : July 02, 2011

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The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix