



## **Co-location Report**

# 1 TEST RESULT

## 1.1 Transmitter Radiated Unwanted Emissions

### 1.1.1 Transmitter Radiated Unwanted Emissions Limit

| Restricted Band Emissions Limit |                       |                         |                      |
|---------------------------------|-----------------------|-------------------------|----------------------|
| Frequency Range (MHz)           | Field Strength (uV/m) | Field Strength (dBuV/m) | Measure Distance (m) |
| 0.009~0.490                     | 2400/F(kHz)           | 48.5 - 13.8             | 300                  |
| 0.490~1.705                     | 24000/F(kHz)          | 33.8 - 23               | 30                   |
| 1.705~30.0                      | 30                    | 29                      | 30                   |
| 30~88                           | 100                   | 40                      | 3                    |
| 88~216                          | 150                   | 43.5                    | 3                    |
| 216~960                         | 200                   | 46                      | 3                    |
| Above 960                       | 500                   | 54                      | 3                    |

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

| Un-restricted Band Emissions Limit |            |
|------------------------------------|------------|
| RF output power procedure          | Limit (dB) |
| Peak output power procedure        | 20         |
| Average output power procedure     | 30         |

Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level.

Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.

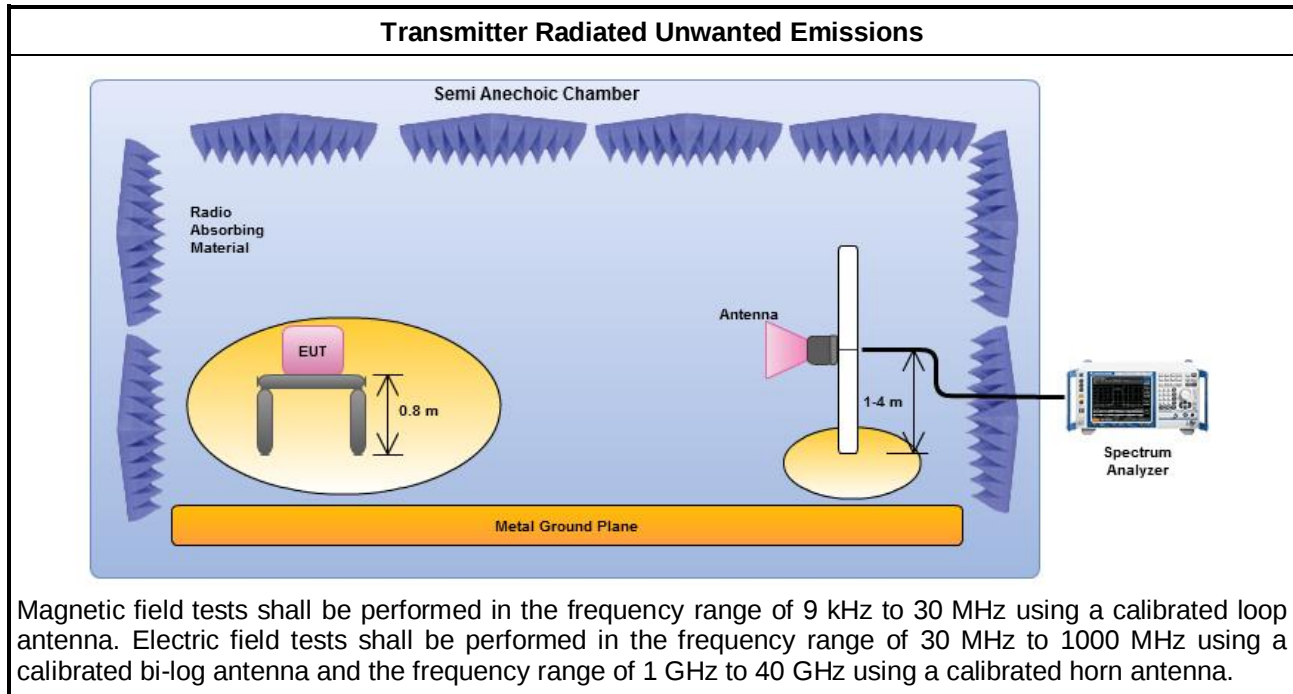
### 1.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

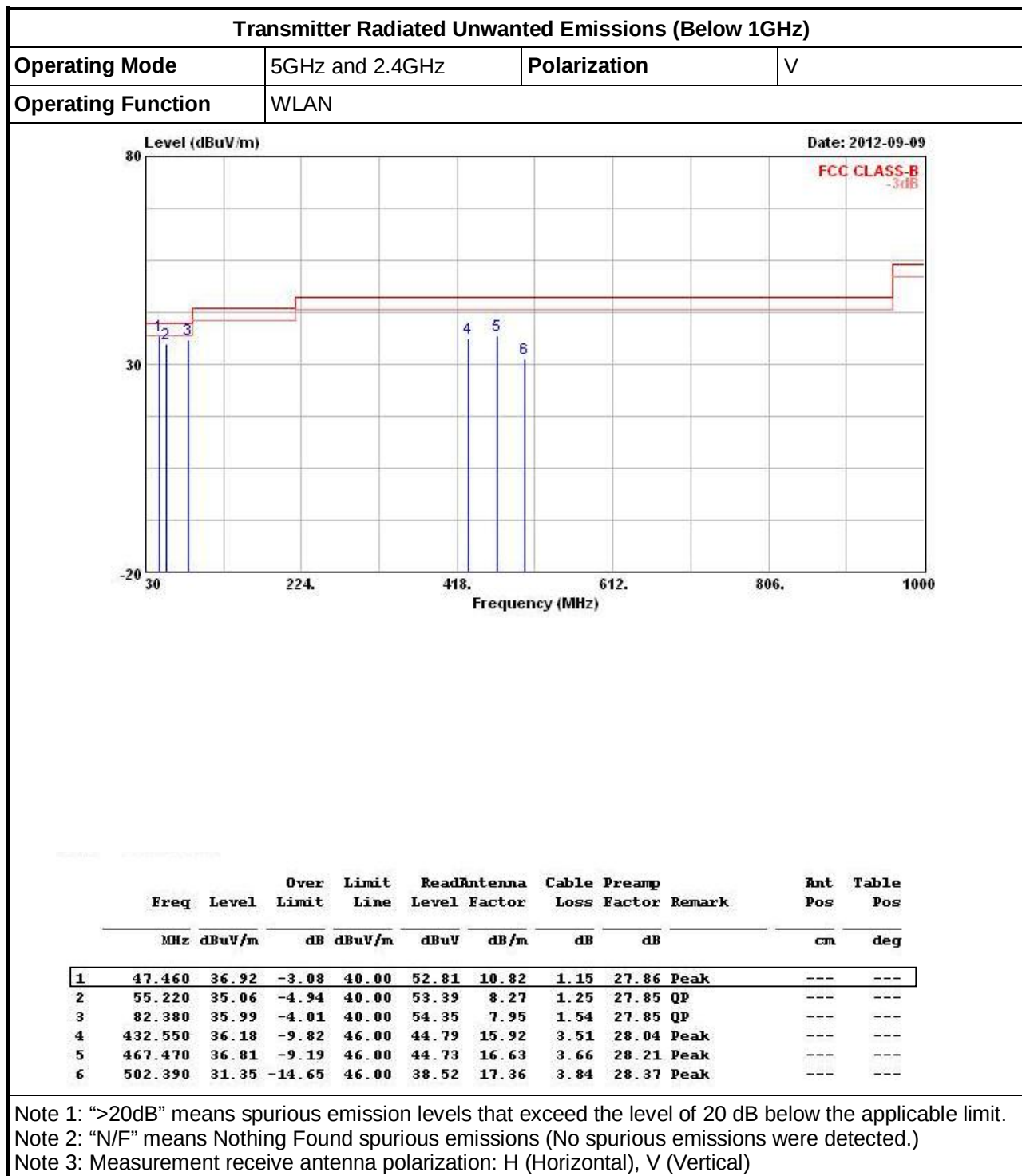
**1.1.3 Test Procedures**

| Test Method                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements). |
| <input checked="" type="checkbox"/> | Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.                                                                                                                                                                                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | Measurements in the frequency range above 18 GHz - 25GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.                                                                                                                                                                                                                                                                                                                           |
| <input checked="" type="checkbox"/> | The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | For the transmitter unwanted emissions shall be measured using following options below:                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 5.4.1 for unwanted emissions into non-restricted bands.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 5.4.2 for unwanted emissions into restricted bands.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 5.4.2.2.1 Option 1 (Power Averaging).                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <input type="checkbox"/>            | Refer as FCC KDB 558074, clause 5.4.2.2.2 Option 2 (Trace Averaging).                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW) – Duty cycle $\geq$ 98%.                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | Refer as FCC KDB 558074, clause 5.4.2.1.1 measurement procedure peak limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <input type="checkbox"/>            | Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <input checked="" type="checkbox"/> | For radiated measurement.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <input checked="" type="checkbox"/> | Refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

### 1.1.4 Test Setup

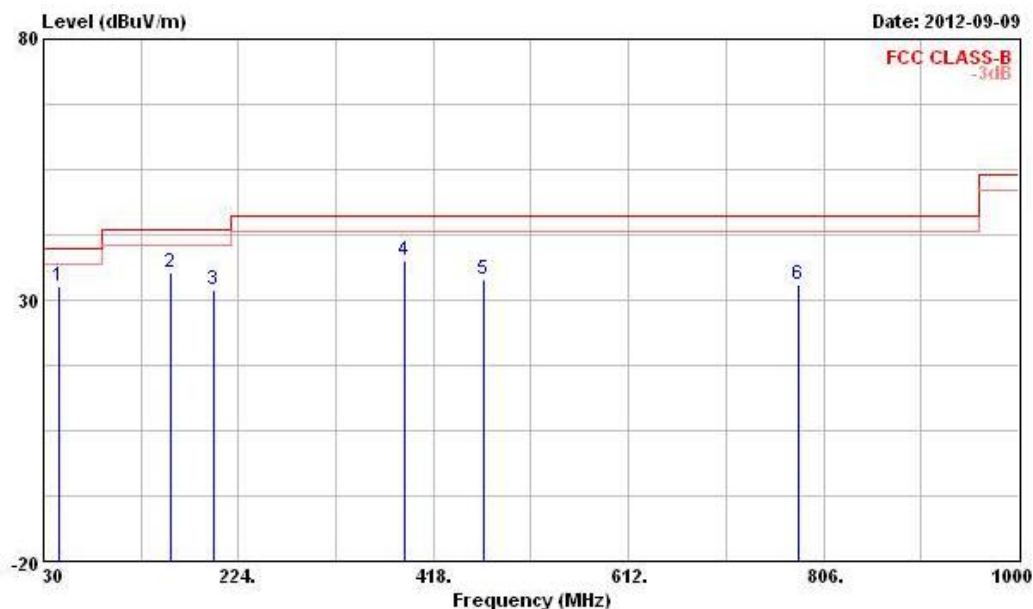


## T Transmitter Radiated Unwanted Emissions (Below 1GHz)



## Transmitter Radiated Unwanted Emissions (Below 1GHz)

|                    |                 |              |   |
|--------------------|-----------------|--------------|---|
| Operating Mode     | 5GHz and 2.4GHz | Polarization | H |
| Operating Function | WLAN            |              |   |

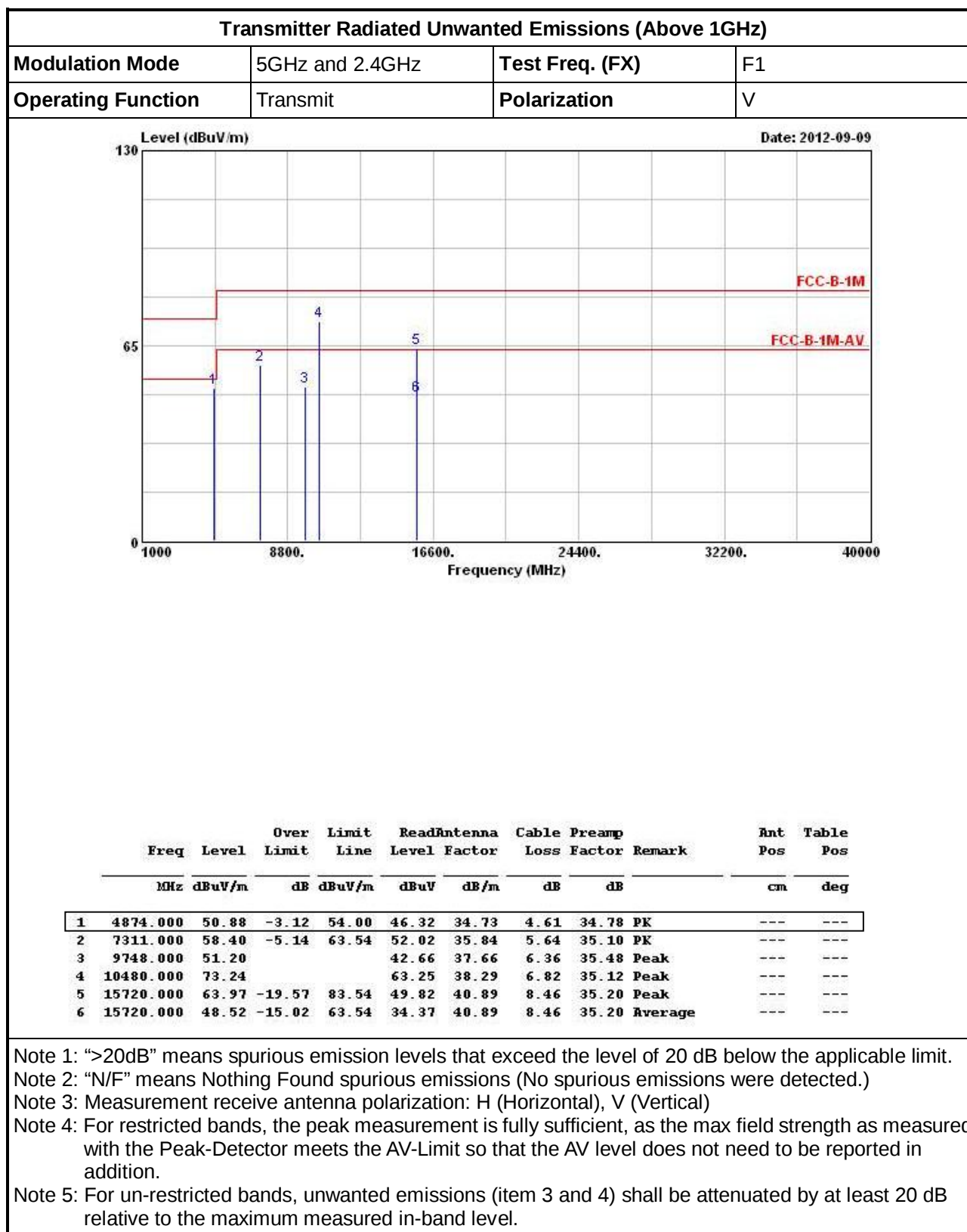


|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|---------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|---------|-----------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |        | cm      | deg       |
| 1 | 44.550  | 32.60  | -7.40      | 40.00      | 47.36             | 12.02          | 1.10       | 27.88         | Peak   | ---     | ---       |
| 2 | 156.100 | 35.14  | -8.36      | 43.50      | 50.04             | 10.64          | 2.06       | 27.60         | Peak   | ---     | ---       |
| 3 | 198.780 | 32.09  | -11.41     | 43.50      | 45.81             | 11.28          | 2.42       | 27.42         | Peak   | ---     | ---       |
| 4 | 389.870 | 37.66  | -8.34      | 46.00      | 47.00             | 15.10          | 3.36       | 27.80         | Peak   | ---     | ---       |
| 5 | 467.470 | 33.83  | -12.17     | 46.00      | 41.75             | 16.63          | 3.66       | 28.21         | Peak   | ---     | ---       |
| 6 | 781.750 | 32.80  | -13.20     | 46.00      | 35.97             | 20.01          | 4.82       | 28.00         | Peak   | ---     | ---       |

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

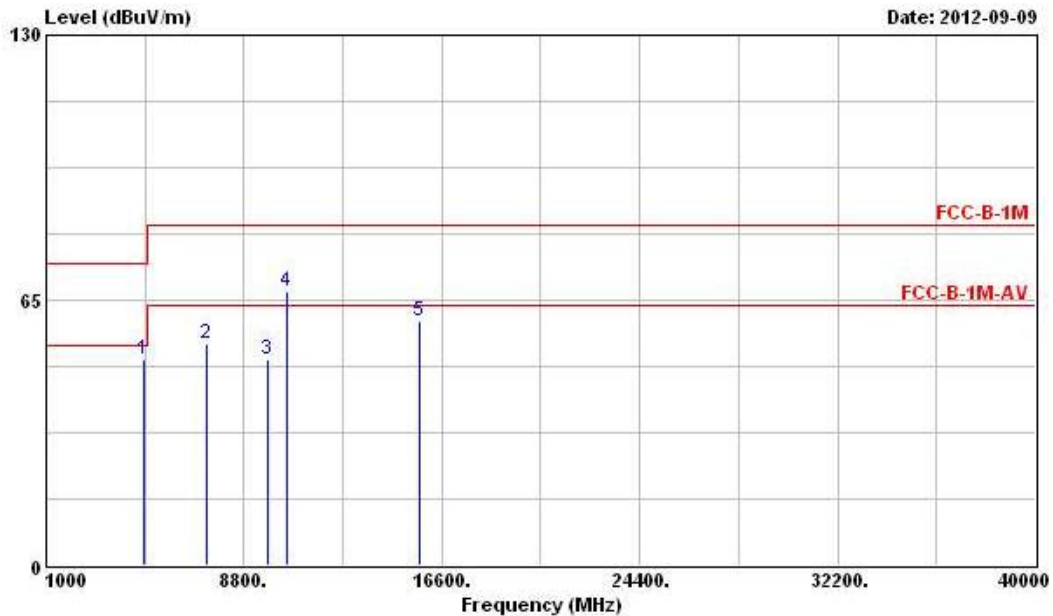
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

**1.1.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11B-20M**


## Transmitter Radiated Unwanted Emissions (Above 1GHz)

|                    |                 |                 |    |
|--------------------|-----------------|-----------------|----|
| Modulation Mode    | 5GHz and 2.4GHz | Test Freq. (FX) | F1 |
| Operating Function | Transmit        | Polarization    | H  |



|   | Freq      | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|---------|-----------|
|   | MHz       | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |        | cm      | deg       |
| 1 | 4874.000  | 50.35  | -3.65      | 54.00      | 45.79             | 34.73          | 4.61       | 34.78         | PK     | ---     | ---       |
| 2 | 7311.000  | 54.38  | -9.16      | 63.54      | 48.00             | 35.84          | 5.64       | 35.10         | PK     | ---     | ---       |
| 3 | 9748.000  | 50.60  |            |            | 42.06             | 37.66          | 6.36       | 35.48         | Peak   | ---     | ---       |
| 4 | 10480.000 | 67.23  |            |            | 57.24             | 38.29          | 6.82       | 35.12         | Peak   | ---     | ---       |
| 5 | 15720.000 | 59.87  | -3.67      | 63.54      | 45.72             | 40.89          | 8.46       | 35.20         | PK     | ---     | ---       |

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

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

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Note 4: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 5: For un-restricted bands, unwanted emissions (item 3 and 4) shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

## 2 TEST EQUIPMENT AND CALIBRATION DATA

| Instrument               | Manufacturer   | Model No.   | Serial No.  | Characteristics    | Calibration Date | Remark                |
|--------------------------|----------------|-------------|-------------|--------------------|------------------|-----------------------|
| Spectrum Analyzer        | R&S            | FSP40       | 100004      | 9kHz ~ 40GHz       | Feb. 01, 2012    | Radiation (03CH02-HY) |
| 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M      | 03CH02-HY   | 30MHz ~ 1GHz<br>3m | May 10, 2012     | Radiation (03CH02-HY) |
| Amplifier                | Agilent        | 8447D       | 2944A11146  | 100kHz ~ 1.3GHz    | Jul. 23, 2012    | Radiation (03CH02-HY) |
| Amplifier                | Agilent        | 8449B       | 3008A02373  | 1GHz ~ 26.5GHz     | Aug. 10, 2012    | Radiation (03CH02-HY) |
| Horn Antenna             | ETS-LINDGREN   | 3117        | 00091920    | 1GHz ~ 18GHz       | Nov. 15, 2011    | Radiation (03CH02-HY) |
| Horn Antenna             | SCHWARZBECK    | BBHA9170    | BBHA9170154 | 15GHz ~ 40GHz      | Jan.13, 2012     | Radiation (03CH02-HY) |
| RF Cable-R03m            | Jye Bao        | RG142       | CB021       | 30MHz ~ 1GHz       | Nov. 11, 2011    | Radiation (03CH02-HY) |
| RF Cable-high            | SUHNER         | SUCOFLEX106 | 03CH02-HY   | 1GHz ~ 40GHz       | Mar. 06, 2012    | Radiation (03CH02-HY) |
| Bilog Antenna            | SCHAFFNER      | CBL61128    | 2723        | 30MHz ~ 2GHz       | Oct. 22, 2011    | Radiation (03CH02-HY) |
| Turn Table               | HD             | DS 420      | 420/649/00  | 0~ 360 degree      | N/A              | Radiation (03CH02-HY) |
| Antenna Mast             | HD             | MA 240      | 240/559/00  | 1 ~ 4 m            | N/A              | Radiation (03CH02-HY) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument   | Manufacturer | Model No.     | Serial No.  | Characteristics | Calibration Date | Remark                |
|--------------|--------------|---------------|-------------|-----------------|------------------|-----------------------|
| Amplifier    | MITEQ        | AMF-6F-260400 | 9121372     | 26.5GHz ~ 40GHz | Apr. 19, 2011    | Radiation (03CH02-HY) |
| Loop Antenna | R&S          | HFH2-Z2       | 860004/0001 | 9 kHz - 30 MHz  | Jul. 03, 2012*   | Radiation (03CH02-HY) |

Note: Calibration Interval of instruments listed above is two year.