



# Test Report

## FCC Part 15.247

## Industry Canada RSS210

**DTS Devices operating in range 2400-2483.5MHz**

**Model #: Communicator 1000C**

**Wireless Matrix  
Unit 1A –3751 North Fraser Way,  
Burnaby, BC V5J 5G4  
Canada**

**FCC ID: P5IC1K02  
IC ID: 1478A-C1K02**

**TEST REPORT #: EMC\_WIREL\_016\_09001\_15\_247  
DATE: 2009-03-17**



**Bluetooth Qualification  
Test Facility  
(BQTF)**



**FCC listed:  
A2LA  
accredited**

**IC recognized #  
3462B**

**CETECOM Inc.**

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Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

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**1 Assessment**

The following is in compliance with the applicable criteria specified in FCC rules Part 15.247 of the Code of Federal Regulations.

Company	Description	Model #
Wireless Matrix	Mobile AVL Router	Communicator 1000C

This report is reviewed by:

**Peter Mu**

**2009-03-17 EMC & Radio (EMC Project Engineer)**

<b>Date</b>	<b>Section</b>	<b>Name</b>	<b>Signature</b>
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This report is prepared by:

**Josie Sabado**

**2009-03-17 EMC & Radio (EMC Project Engineer)**

<b>Date</b>	<b>Section</b>	<b>Name</b>	<b>Signature</b>
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The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

**2 Administrative Data**

**2.1 Identification of the Testing Laboratory Issuing the EMC Test Report**

Company Name:	<b>CETECOM Inc.</b>
Department:	<b>EMC</b>
Address:	<b>411 Dixon Landing Road Milpitas, CA 95035 U.S.A.</b>
Telephone:	<b>+1 (408) 586 6200</b>
Fax:	<b>+1 (408) 586 6299</b>
Responsible Test Lab Manager:	<b>Lothar Schmidt</b>
Responsible Project Leader:	<b>Josie Sabado</b>
Date of test:	<b>2009-03-05 to 2009-03-06</b>

**2.2 Identification of the Client**

<b>APPLICANT</b>	
<b>Applicant (Company Name)</b>	<b>Wireless Matrix</b>
<b>Street Address</b>	<b>Sunrise Technology Park 12369-B Sunrise Valley Drive</b>
<b>City/Zip Code</b>	<b>Reston, 20191</b>
<b>Country</b>	<b>USA</b>
<b>Contact Person</b>	<b>Darryl Srucko</b>
<b>Telephone</b>	<b>703-262-4021</b>
<b>Fax</b>	<b>703-262-0380</b>
<b>e-mail</b>	<b>darryl.strucko@wrx-us.com</b>

**2.3 Identification of the Manufacturer**

Same as above applicant.

### 3 Equipment under Test (EUT)

#### 3.1 Specification of the Equipment under Test

EUT	
Marketing Name of EUT (if not same as Model No.):	<b>Communicator 1000C</b>
Description:	<b>Mobile AVL Router</b>
Model No:	<b>Communicator 1000C</b>
FCC ID:	<b>P5IC1K02</b>
IC ID:	<b>1478A-C1K02</b>

Frequency Range:	<b>2400-2483.5MHz</b> <b>Channel 1, 6, 11 for 802.11b/g</b>
Type(s) of Modulation:	<b>OFDM</b>
Antenna Type:	<b>Monopole antenna</b>
Max Output Power:	<b>2400-2483.5MHz 802.11b:</b> <b>Radiated: 23.55dBm (226.5mW) EIRP</b> <b>2400-2483.5MHz 802.11g:</b> <b>Radiated: 25.59dBm (362.2mW) EIRP</b>

#### 3.2 Identification of the Equipment under Test (EUT)

EUT #	TYPE	MANF.	MODEL	SERIAL #
1	EUT	Wireless Matrix	Communicator 1000C	917-002

#### 3.3 Identification of Accessory equipment

No accessory equipment.

#### 4 Subject Of Investigation

All testing was performed on the product referred to in Section 3 as EUT. EUT operates in the band 2400-2483.5MHz in 802.11b/g mode.

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT operating under all operating modes as specified by Wireless Matrix per requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations. The maximization of portable equipment is conducted in accordance with ANSI C63.4

#### 5 Radiated Measurements

##### 5.1 Maximum Peak Output Power § 15.247 (b)(1) (Radiated)

##### 5.1.1 Limits

FCC15.247 (b) (1): 4W (36dBm), with antenna gain < 6dBi.

RSS-210 A8.4 (4): 4W (36dBm)

##### 5.1.2 Results:

EIRP is calculated as  $EIRP = \text{Conducted Peak Power (dBm)} + \text{Peak Antenna Gain (dBi)}$

EIRP 802.11 b/g Mode:

TEST CONDITIONS $T_{nom}(23)^{\circ}C, V_{nom}VDC$	Channel Frequency	EIRP (dBm)	EIRP (mW)	Verdict
2400-2483.5MHz (802.11b)	2412	<b>18.54</b>	<b>71.45</b>	PASS
	2437	<b>23.55</b>	<b>226.99</b>	PASS
	2462	<b>21.51</b>	<b>141.58</b>	PASS
2400-2483.5MHz (802.11g)	2412	<b>22.24</b>	<b>167.49</b>	PASS
	2437	<b>25.59</b>	<b>362.24</b>	PASS
	2462	<b>25.58</b>	<b>361.41</b>	PASS

## 5.2 Restricted Band Edge Compliance §15.247/15.205

### 5.2.1 Limits

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

**\*PEAK LIMIT= 74dBuV/m**

**\*AVG. LIMIT= 54dBuV/m**

### Notes:

1. Radiated emissions are maximized by rotating the EUT 360° at 0.5 meter height increments between 1 and 4 meters.
2. Measurements were performed with the EUT in X, Y and Z orientations with the measurement antenna in both horizontal and vertical polarity. The plots below show the results of the worst case orientation and polarity.



### 5.2.2 802.11b

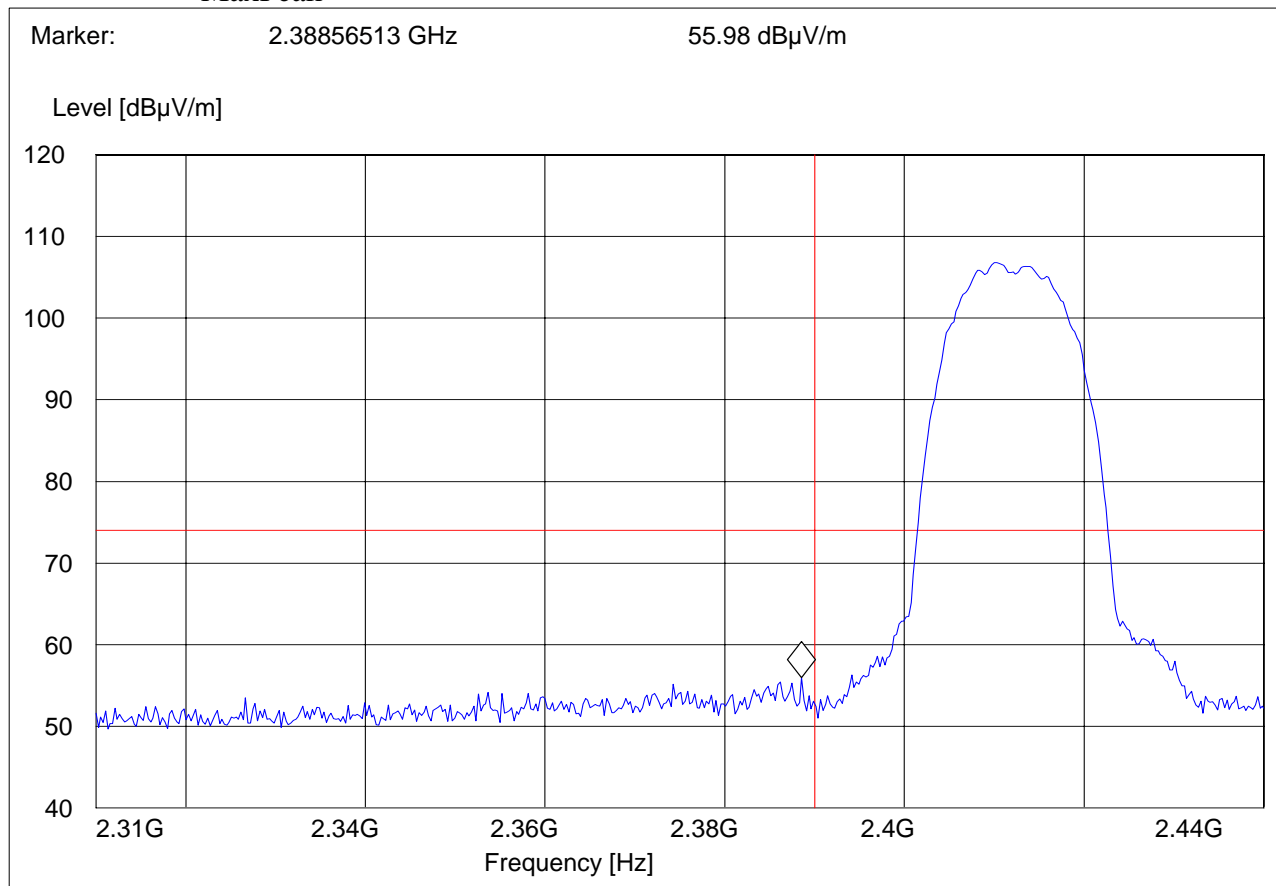
#### Lower band edge PEAK

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11b; Ch.1  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

#### *SWEEP TABLE: "FCC15.247 LBE\_PK"*

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

MaxPeak

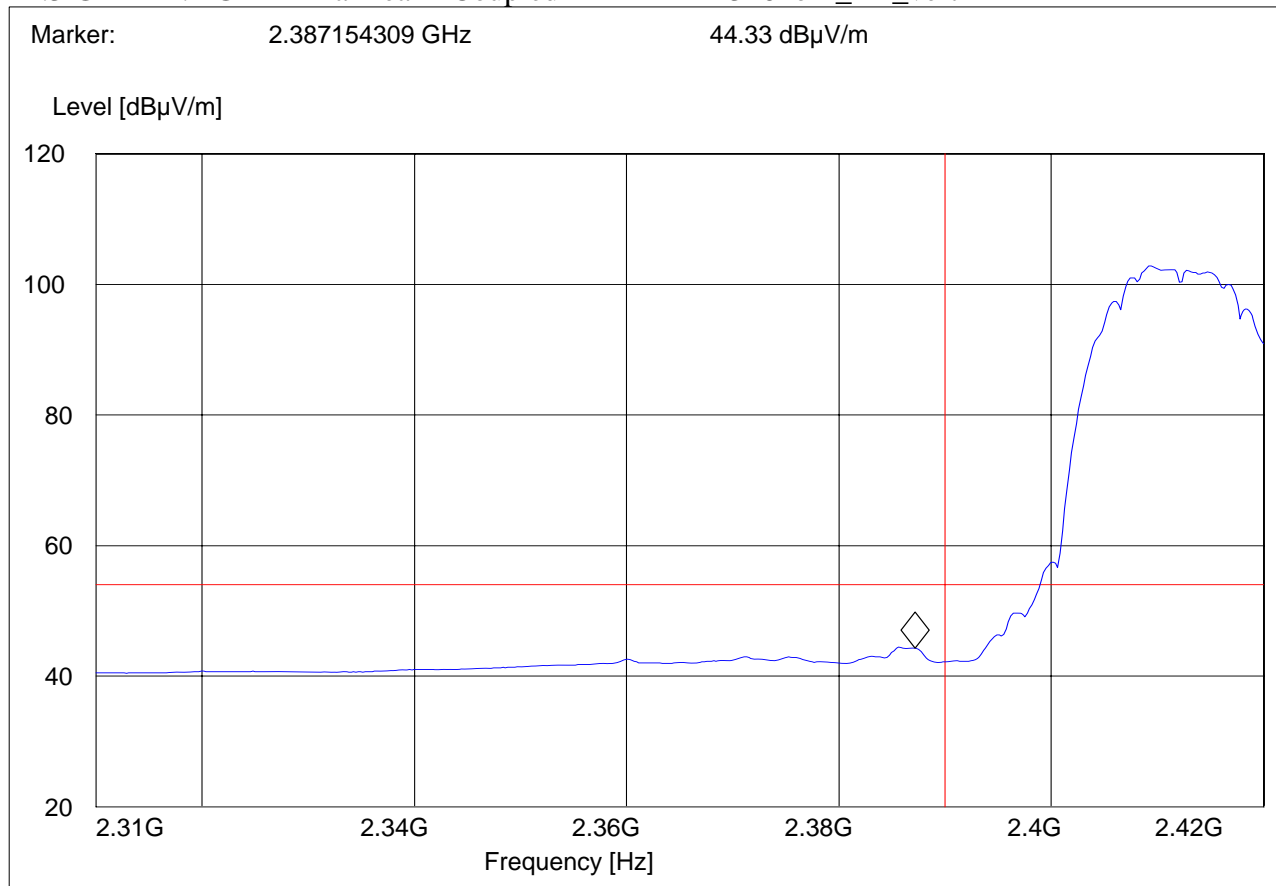


### Lower band edge Average

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11b; Ch.1  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

### SWEEP TABLE: "FCC15.247 LBE\_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

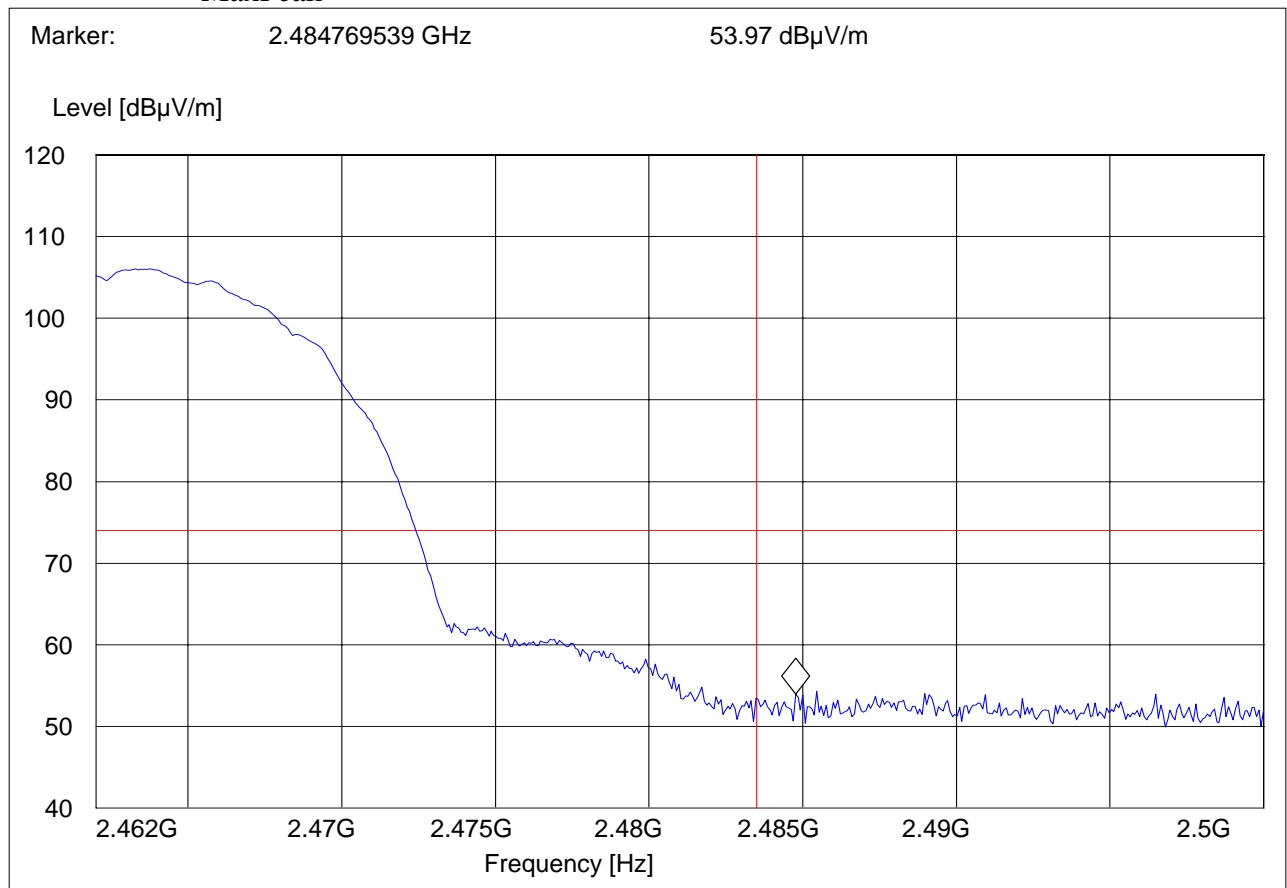


### High band edge PEAK

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11b; Ch.11  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

### SWEEP TABLE: "FCC15.247 HBE\_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert
		MaxPeak			

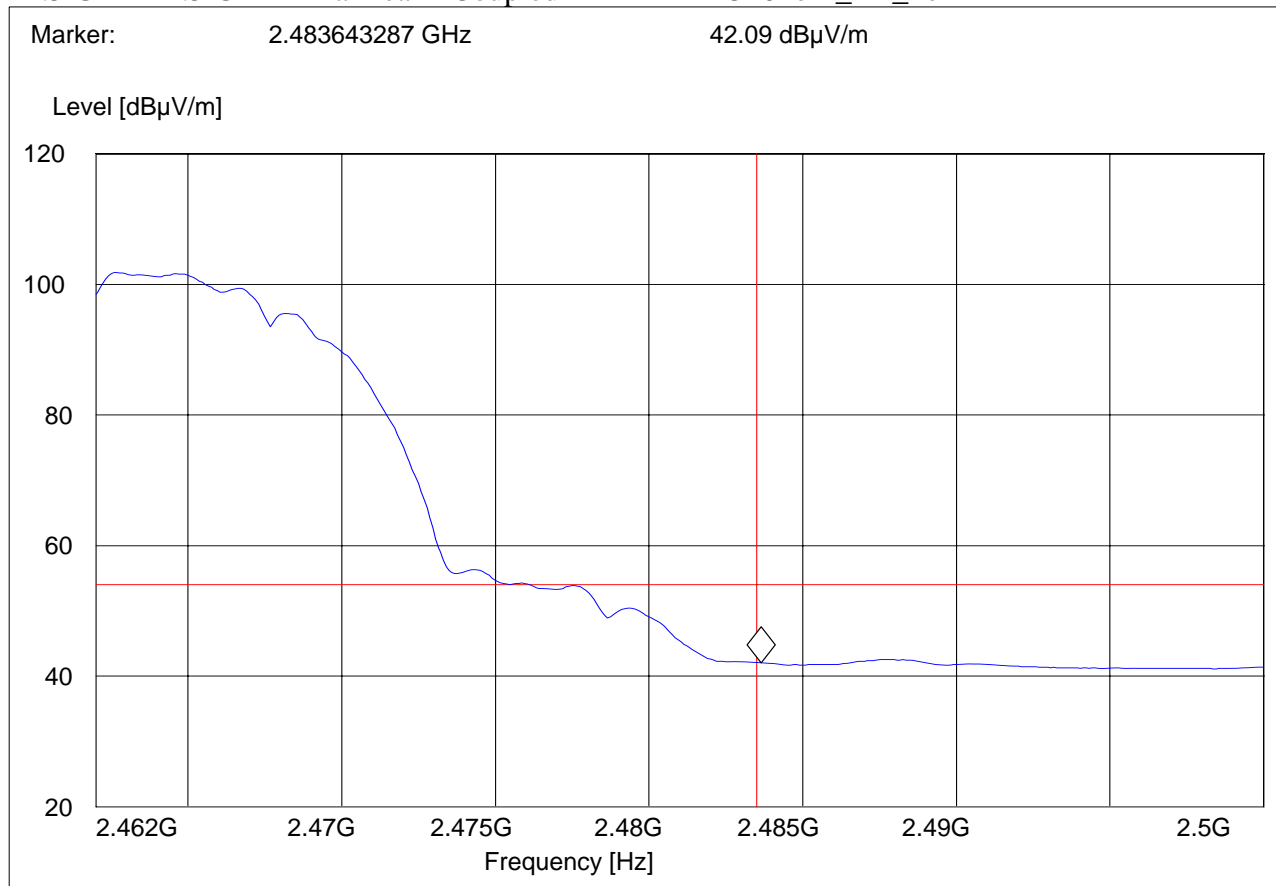


### High band edge Average

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11b; Ch.11  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

### SWEEP TABLE: "FCC15.247 HBE\_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



### 5.2.3 802.11g

#### Lower band edge PEAK

EUT: Communicator (CDMA version)

Customer:: Wireless Matrix

Test Mode: 802.11g; Ch.1

ANT Orientation: H

EUT Orientation: H

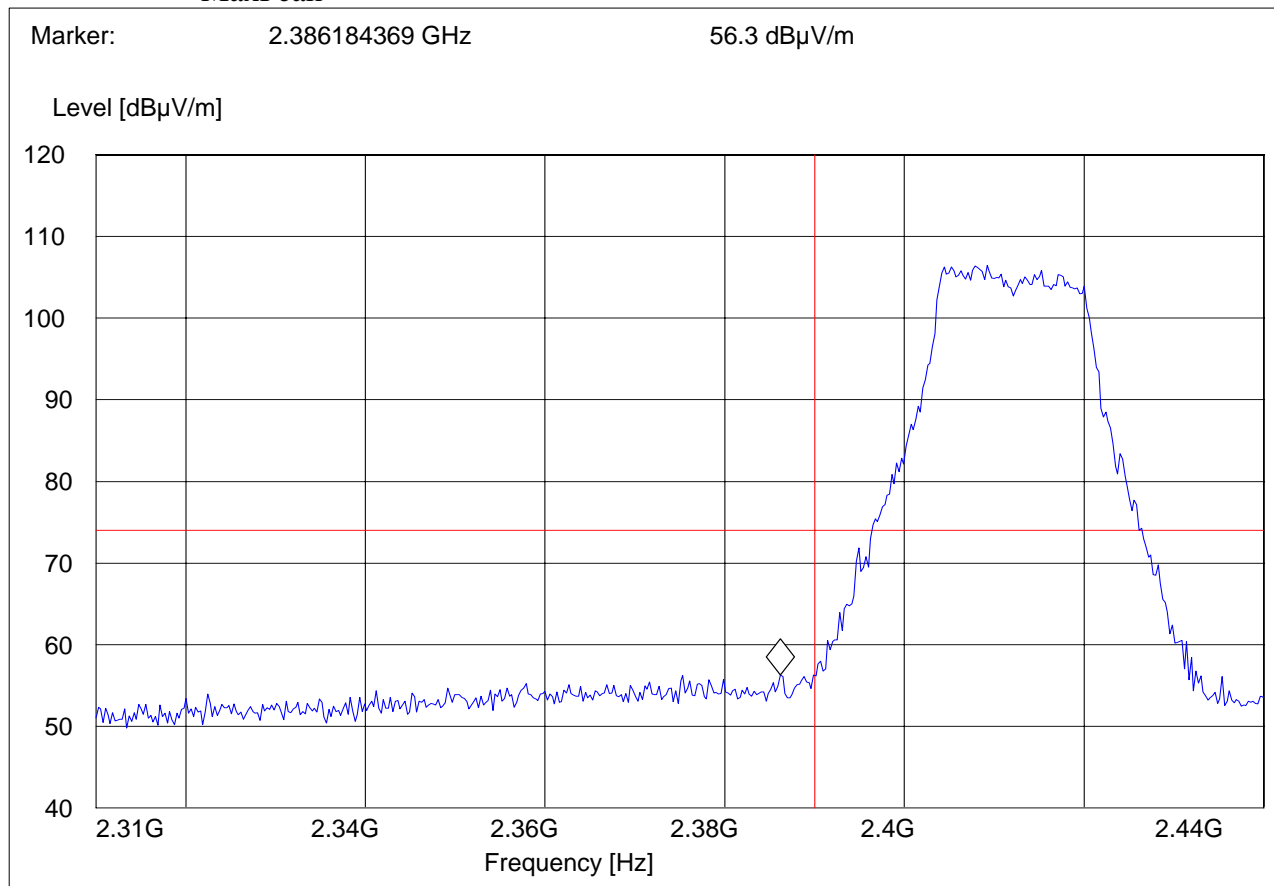
Test Engineer: Chris

Voltage: Car Battery

Comments:

#### *SWEEP TABLE: "FCC15.247 LBE\_PK"*

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert
MaxPeak					

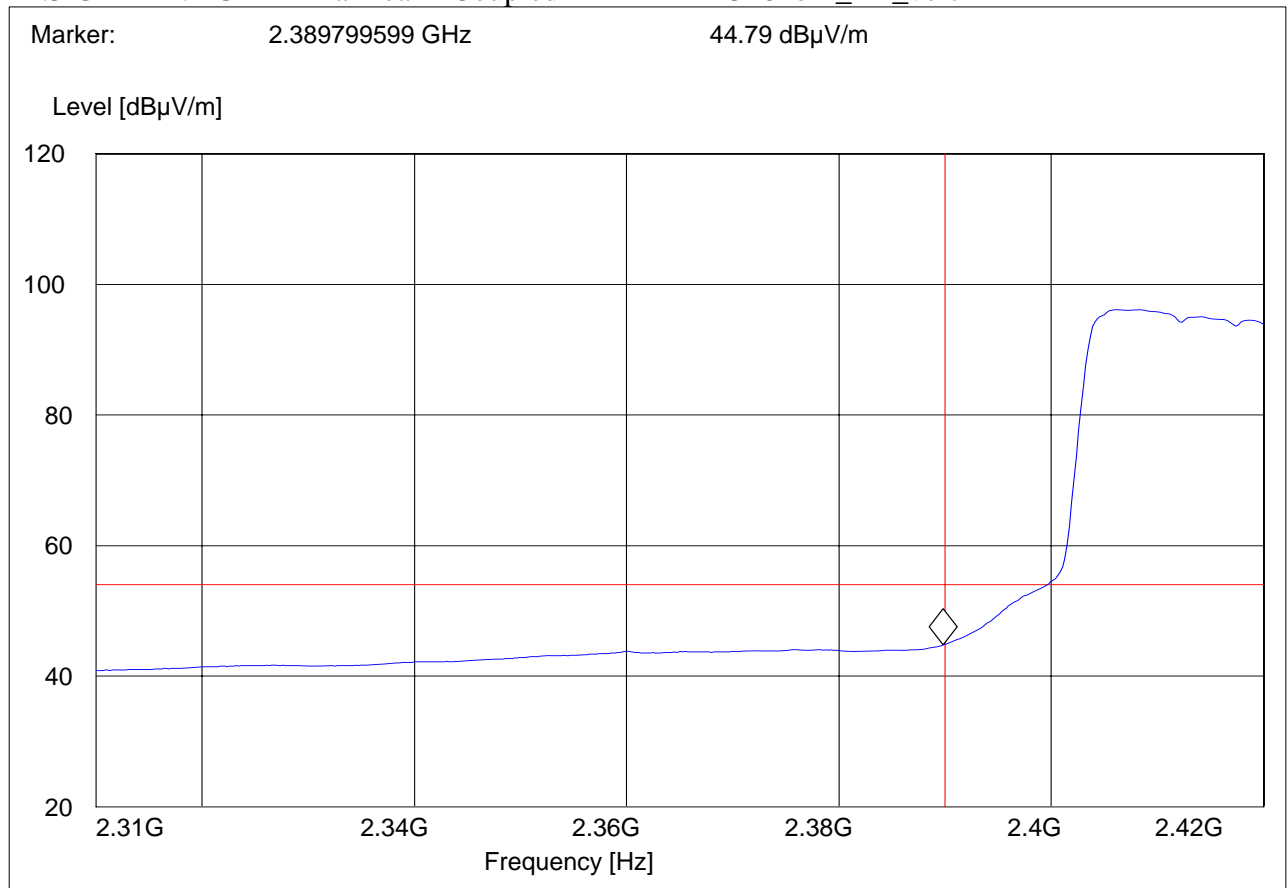


**Lower band edge Average**

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11g; Ch.1  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

***SWEEP TABLE: "FCC15.247 LBE\_AVG"***

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

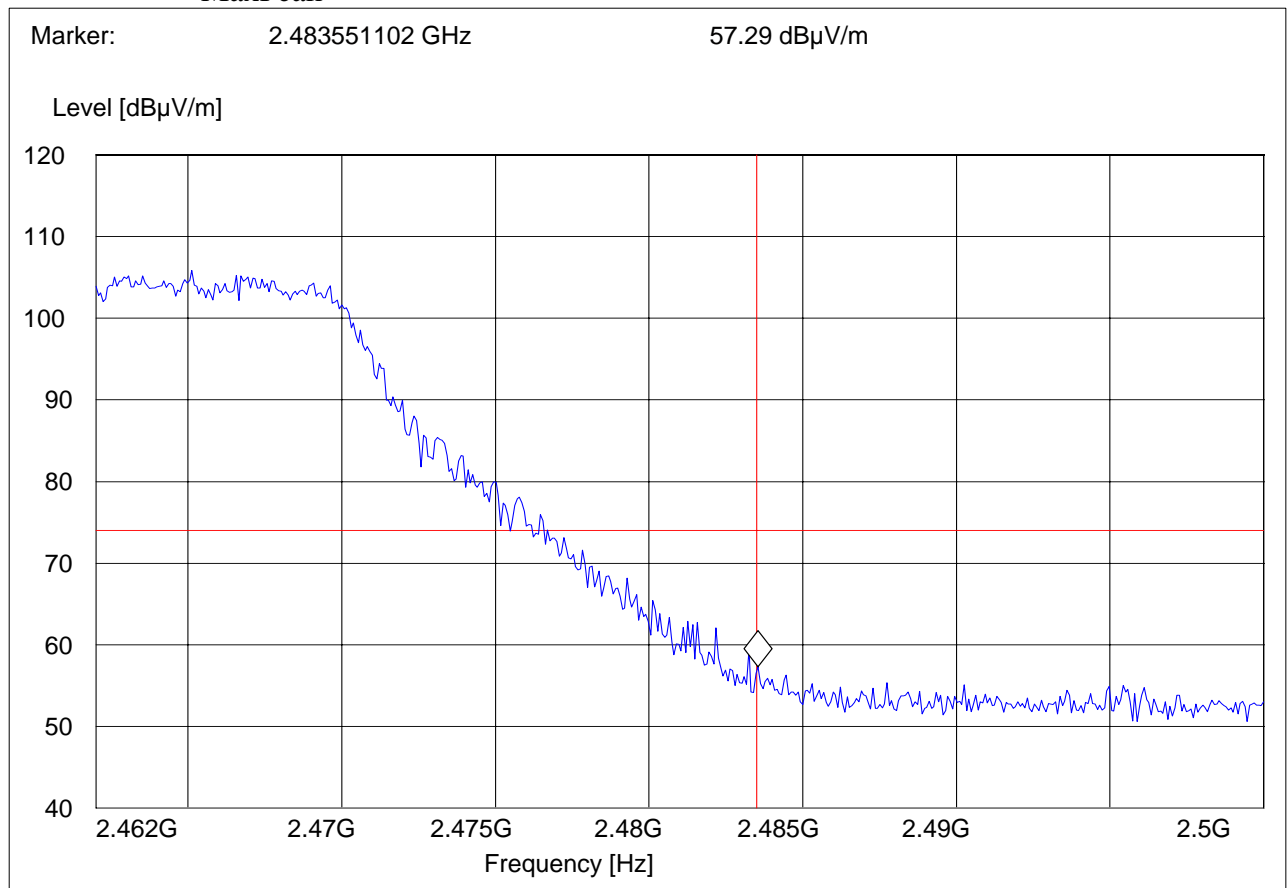


### High band edge PEAK

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11g; Ch.11  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

### SWEEP TABLE: "FCC15.247 HBE\_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert
		MaxPeak			

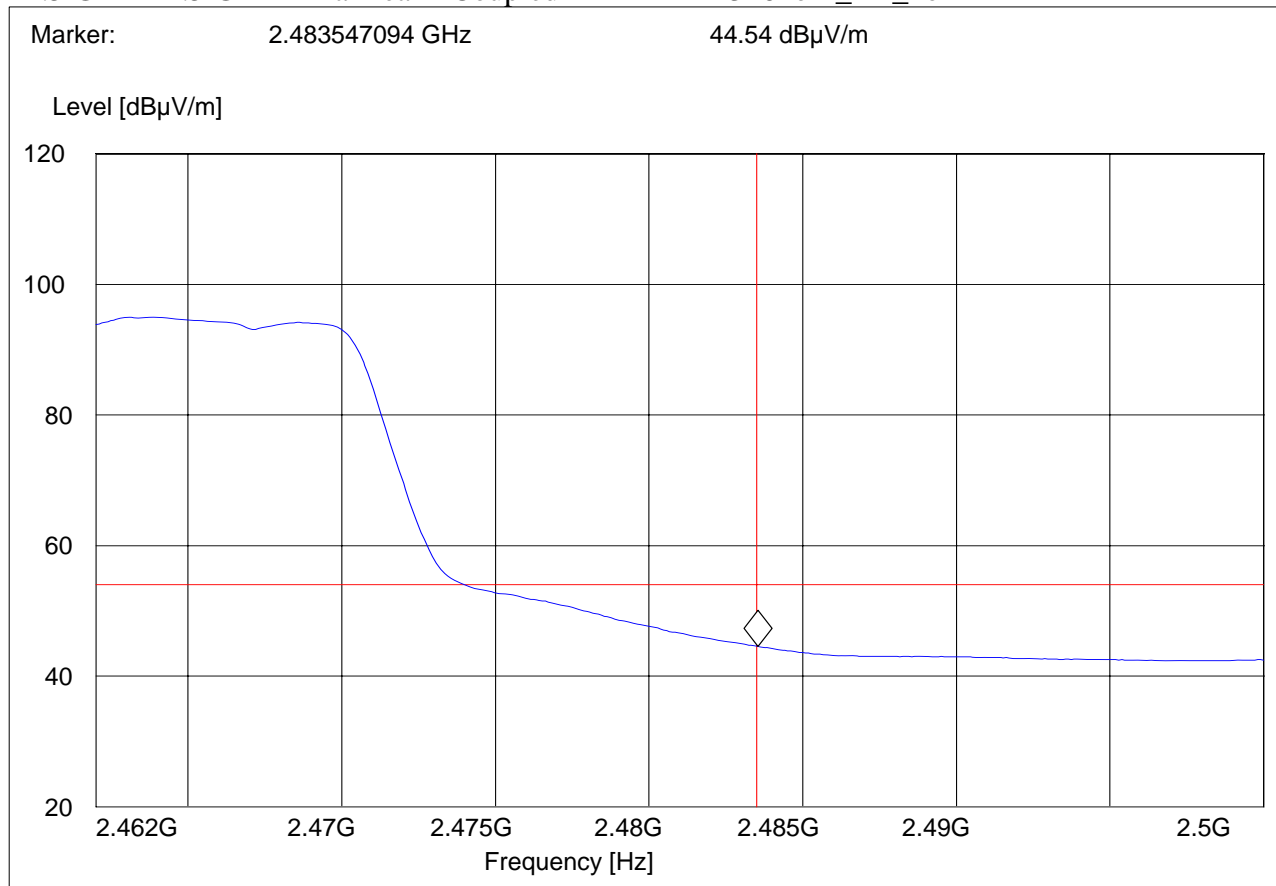


**High band edge Average**

EUT: Communicator (CDMA version)  
 Customer:: Wireless Matrix  
 Test Mode: 802.11g; Ch.11  
 ANT Orientation: H  
 EUT Orientation: H  
 Test Engineer: Chris  
 Voltage: Car Battery  
 Comments:

***SWEEP TABLE: "FCC15.247 HBE\_AVG"***

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz





### 5.3 Transmitter Spurious Emission § 15.247/15.205/15.209

#### 5.3.1 Limits

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

\*PEAK LIMIT= 74dBuV/m

\*AVG. LIMIT= 54dBuV/m

**Notes:**

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements are done in peak mode using an average limit , unless specified with the plots.
3. Radiated emissions are maximized by rotating the EUT 360° at 0.5 meter height increments between 1 and 4 meters.
4. Measurements were performed with the EUT in X, Y and Z orientations with the measurement antenna in both horizontal and vertical polarity. The plots below show the results of the worst case orientation and polarity

#### Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels

### 5.3.2 RESULTS 802.11b/g MODE

Emissions reported here are worse cases emissions for all operation modes.

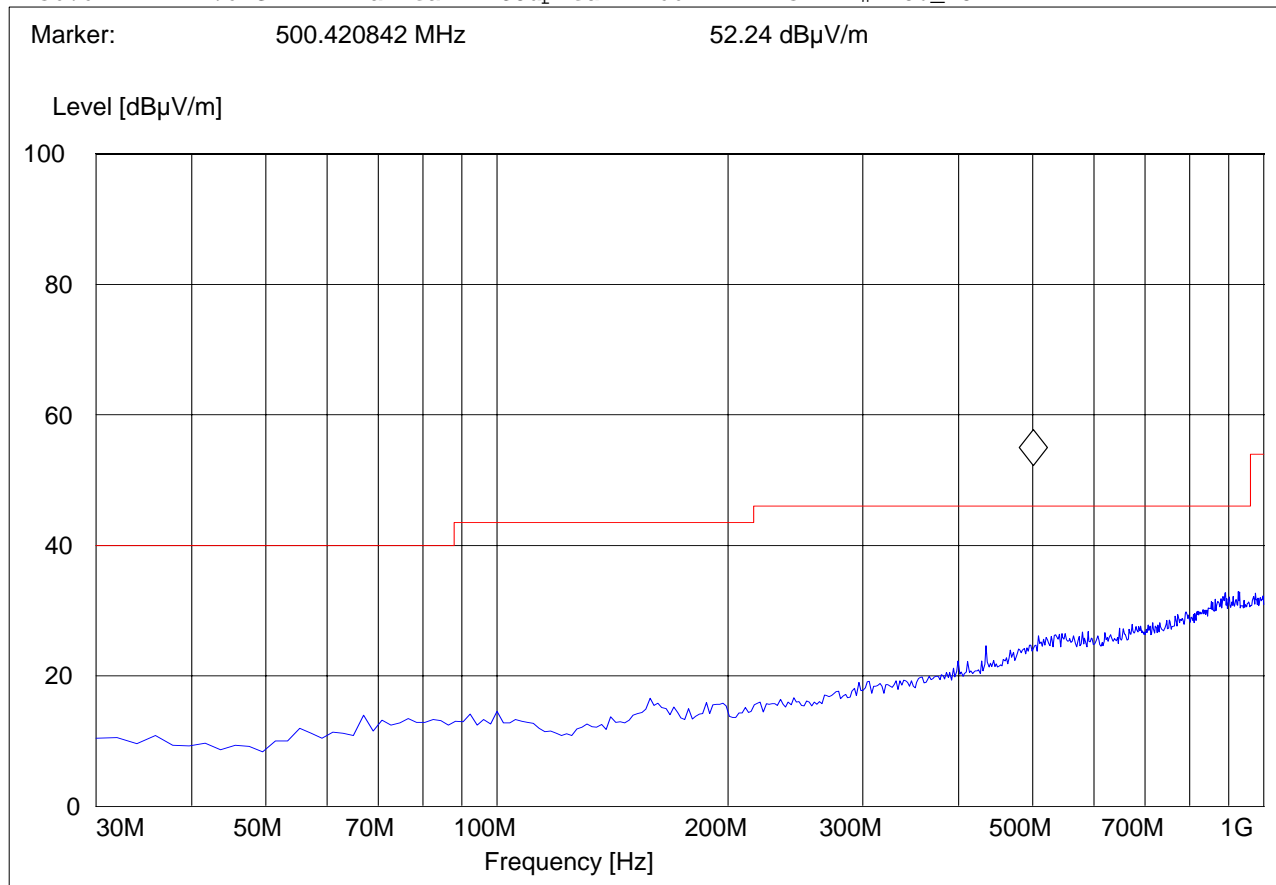
#### 30MHz – 1GHz, Antenna: Vertical

Note: This plot is valid for low, mid, high channels (worst-case plot).

EUT: Communicator (CDMA version)  
 Customer:: Wireless Matrix  
 Test Mode: 802.11g  
 ANT Orientation: V  
 EUT Orientation: H  
 Test Engineer: Chris  
 Voltage: Car Battery  
 Comments:

**SWEEP TABLE: "FCC15.247\_30M-1G\_Horz"**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



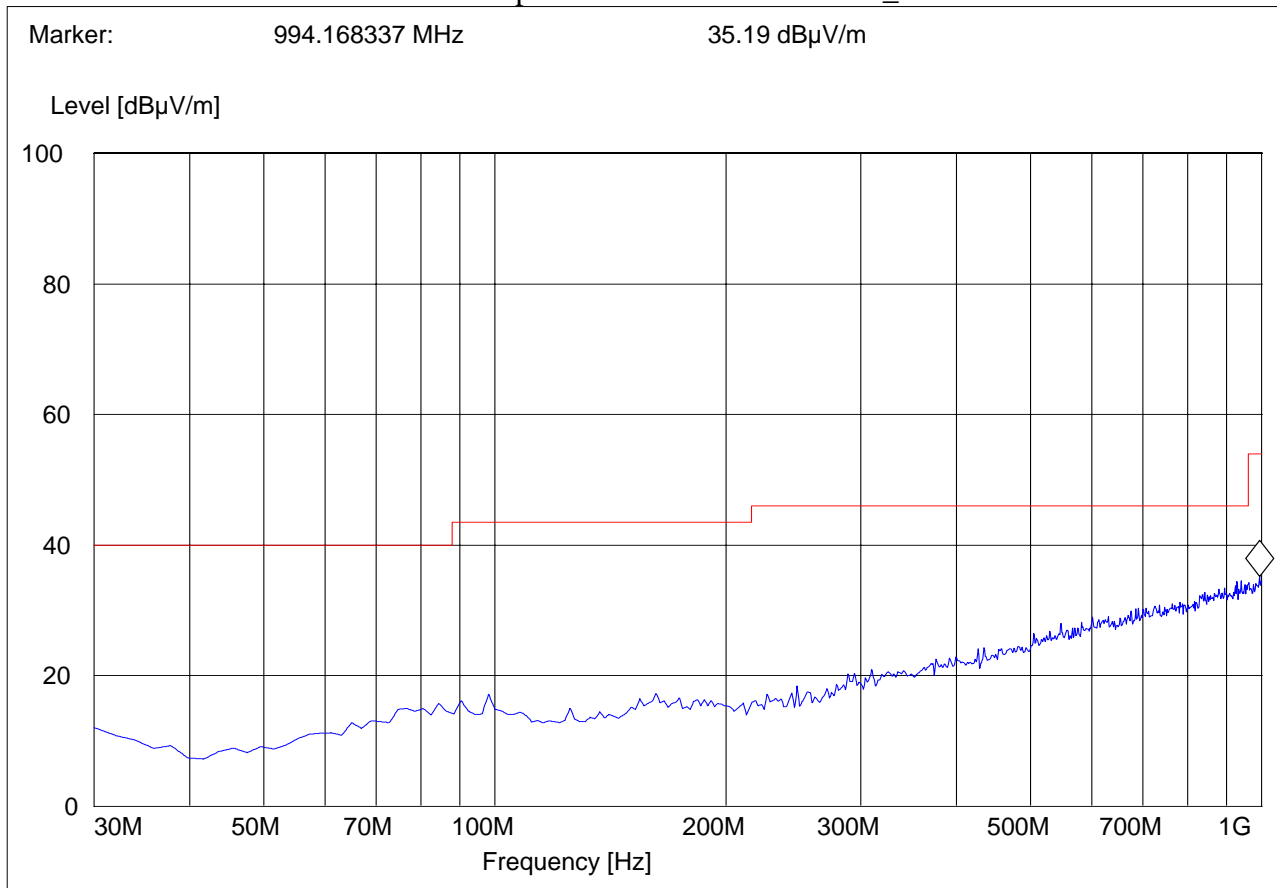
**30MHz – 1GHz, Antenna: Horizontal**

Note: This plot is valid for low, mid, high channels (worst-case plot).

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11g  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

***SWEEP TABLE: "FCC15.247\_30M-1G\_Hor"***

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



**1-3GHz (2422MHz)**

Note: The peak above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

EUT: Communicator (CDMA version)

Customer:: Wireless Matrix

Test Mode: 802.11g; Ch.1

ANT Orientation: H

EUT Orientation: H

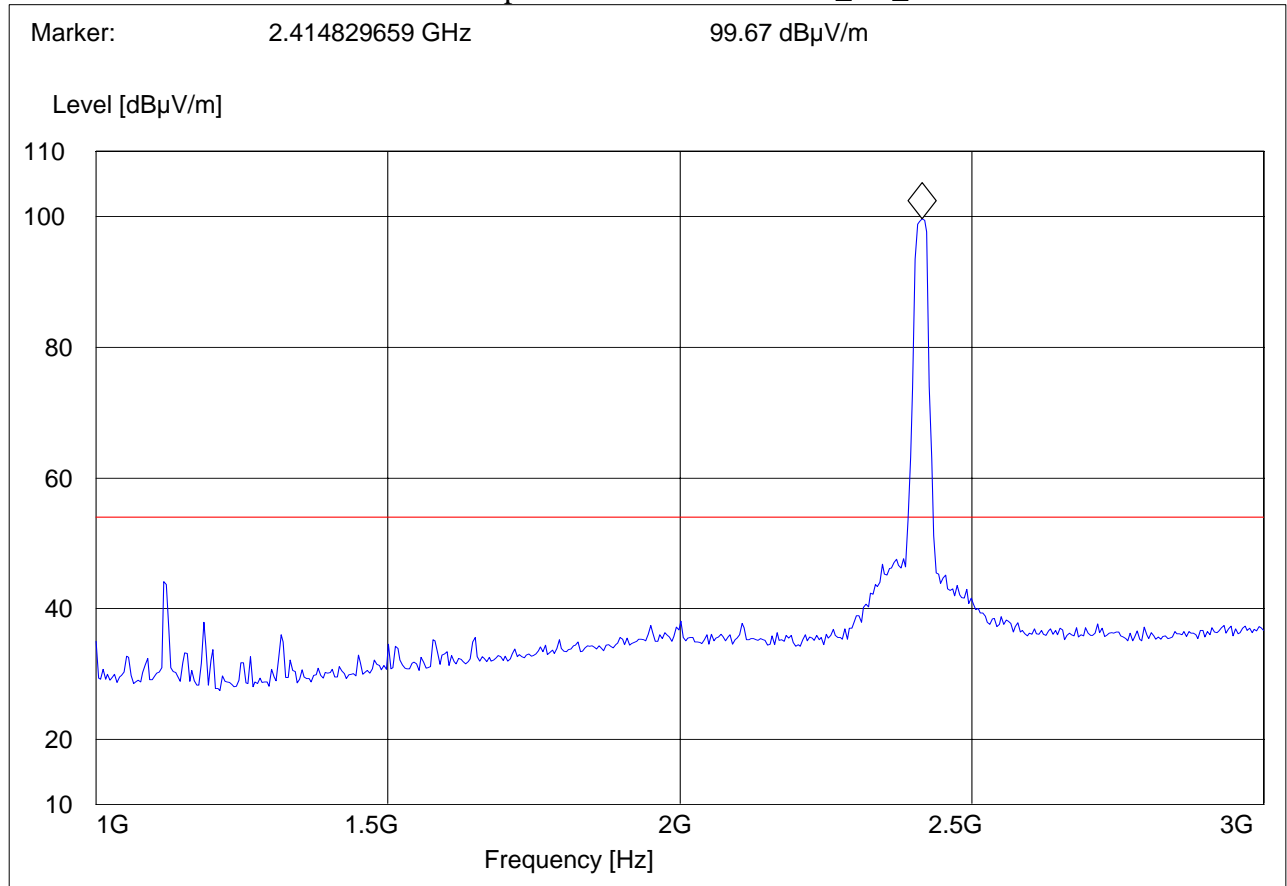
Test Engineer: Chris

Voltage: Car Battery

Comments:

***SWEEP TABLE: "FCC15.247\_1-3G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



**1-3GHz (2437MHz)**

Note: The peak above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

EUT: Communicator (CDMA version)

Customer:: Wireless Matrix

Test Mode: 802.11g; Ch.6

ANT Orientation: H

EUT Orientation: H

Test Engineer: Chris

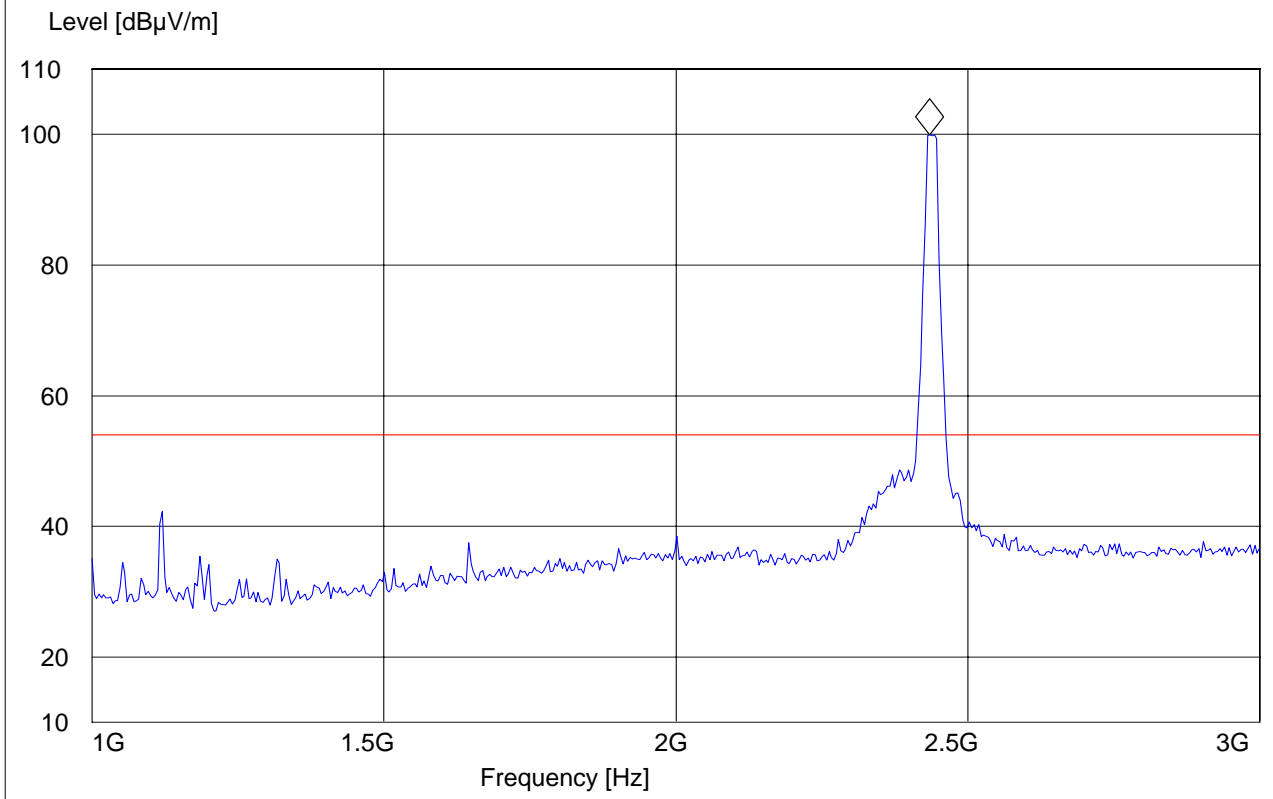
Voltage: Car Battery

Comments:

***SWEEP TABLE: "FCC15.247\_1-3G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

Marker: 2.434869739 GHz 99.98 dBμV/m



**1-3GHz (2452MHz)**

Note: The peak above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

EUT: Communicator (CDMA version)

Customer:: Wireless Matrix

Test Mode: 802.11g; Ch.11

ANT Orientation: H

EUT Orientation: H

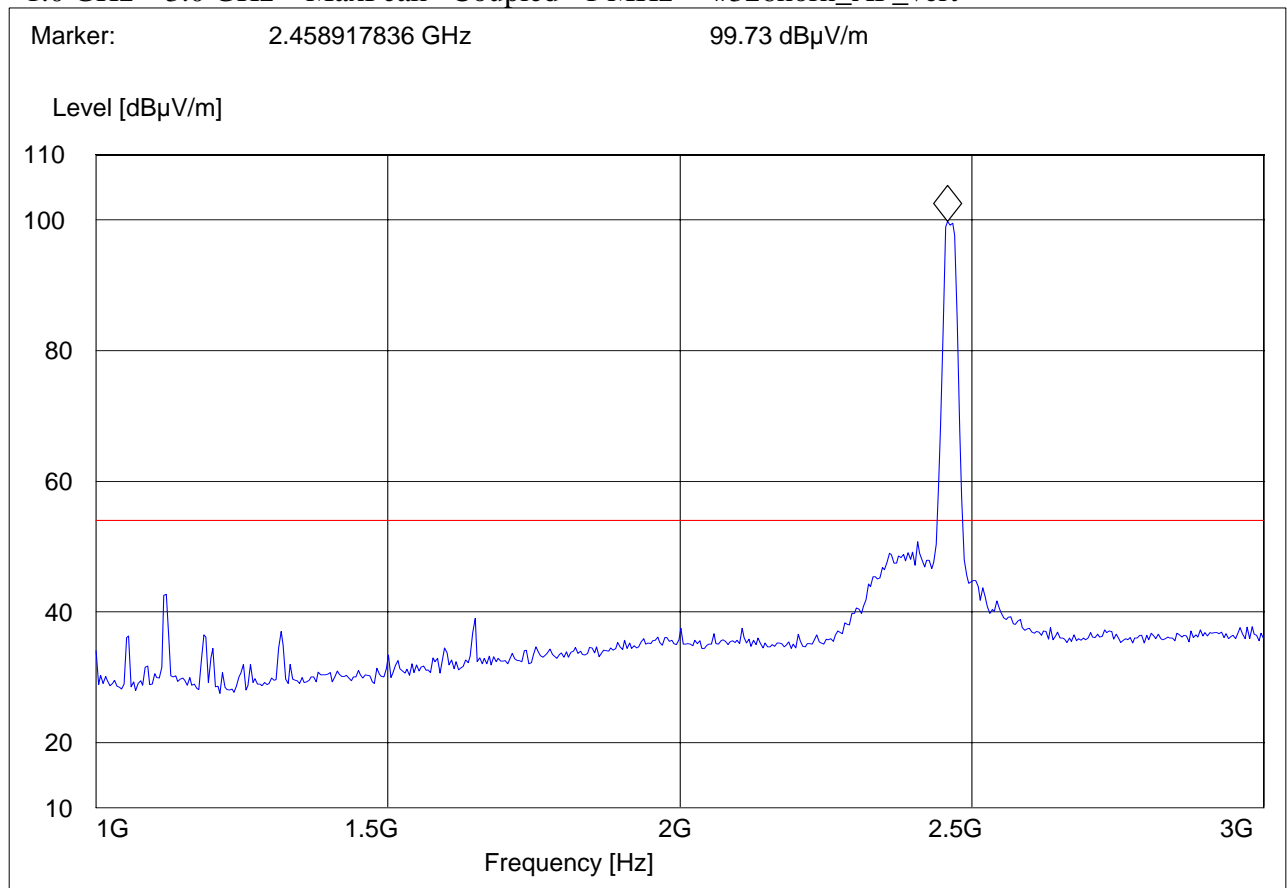
Test Engineer: Chris

Voltage: Car Battery

Comments:

***SWEEP TABLE: "FCC15.247\_1-3G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



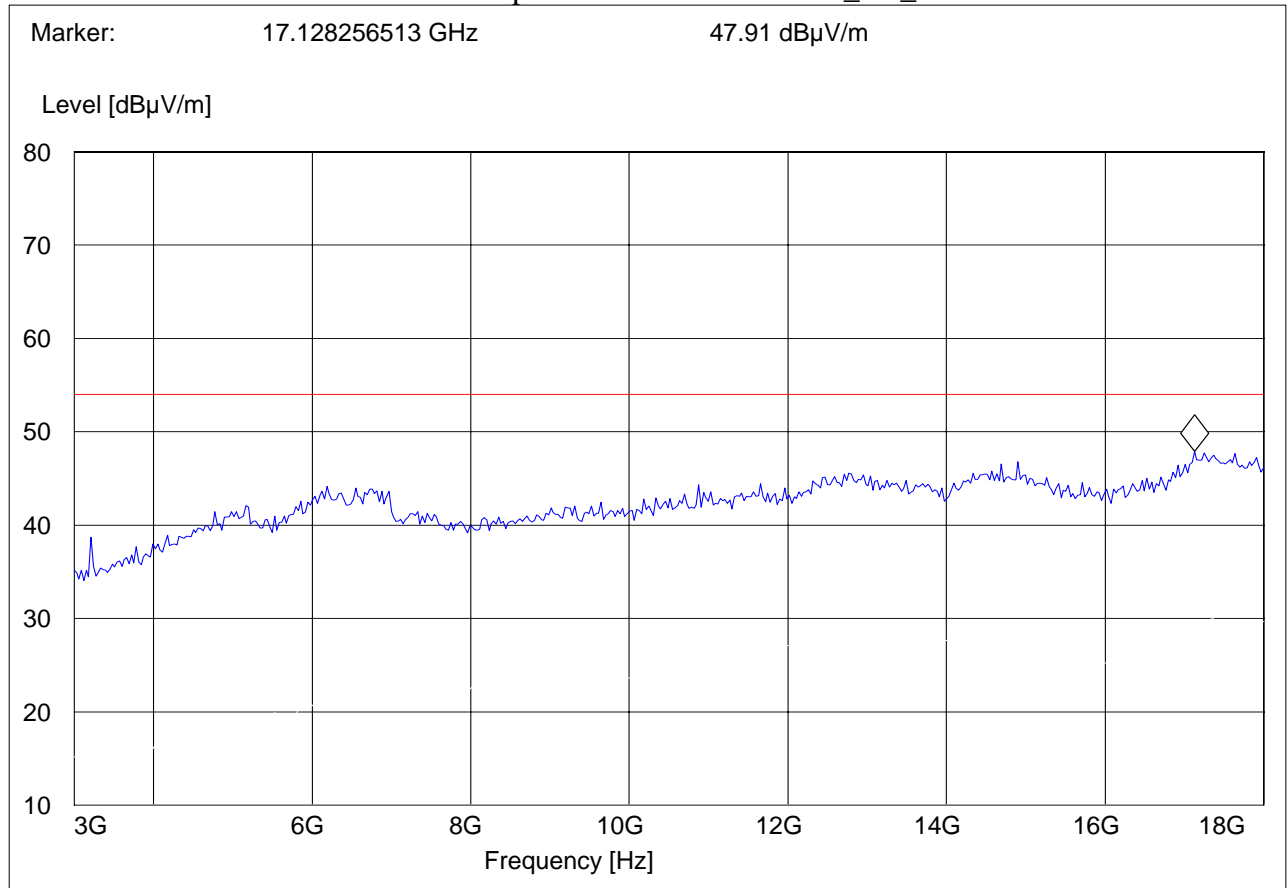
**3-18GHz (2422MHz)**

Note: Peak Reading vs. Average limit

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11g; Ch.1  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

***SWEEP TABLE: "FCC15.247\_3-18G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



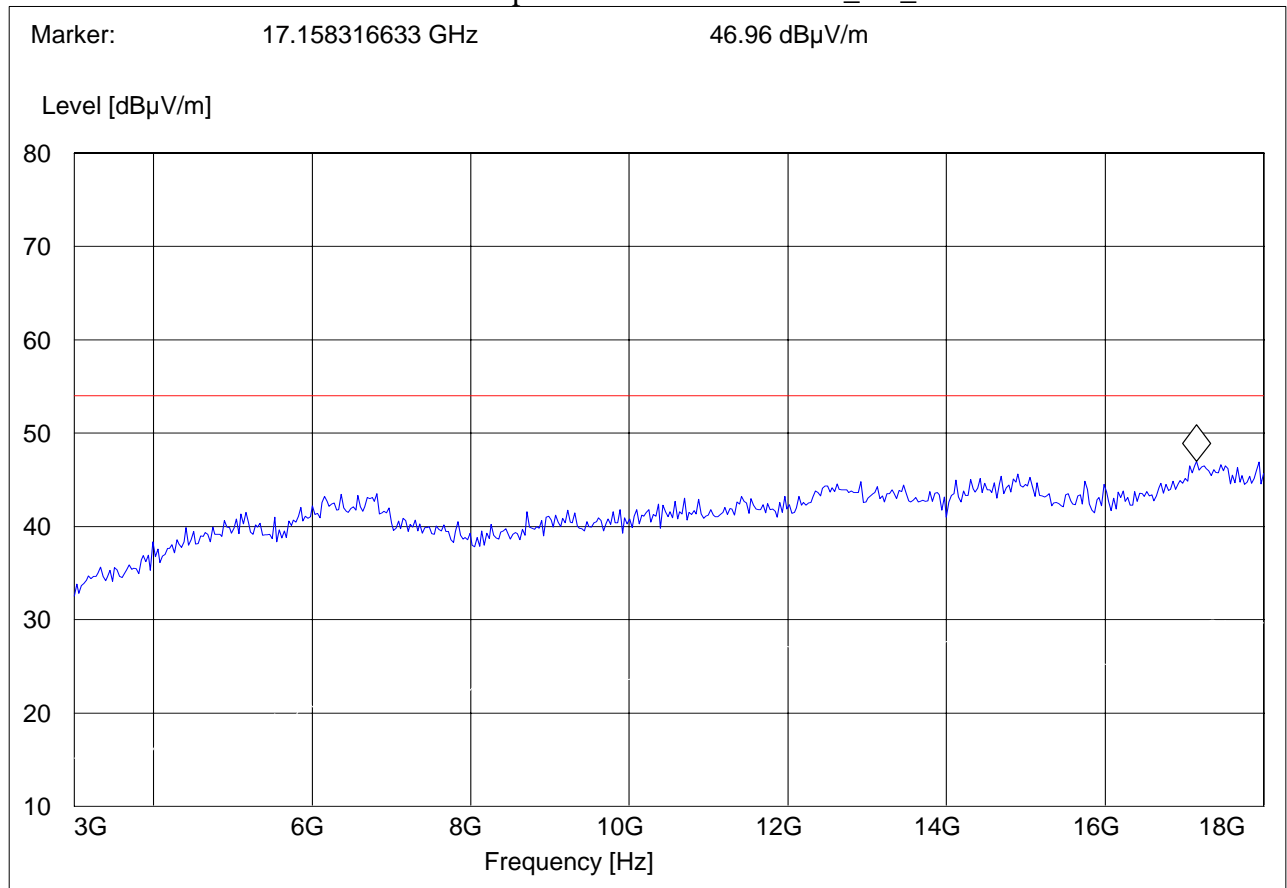
**3-18GHz (2437MHz)**

Note: Peak Reading vs. Average limit

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11g; Ch.6  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

**SWEEP TABLE: "FCC15.247\_3-18G"**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert





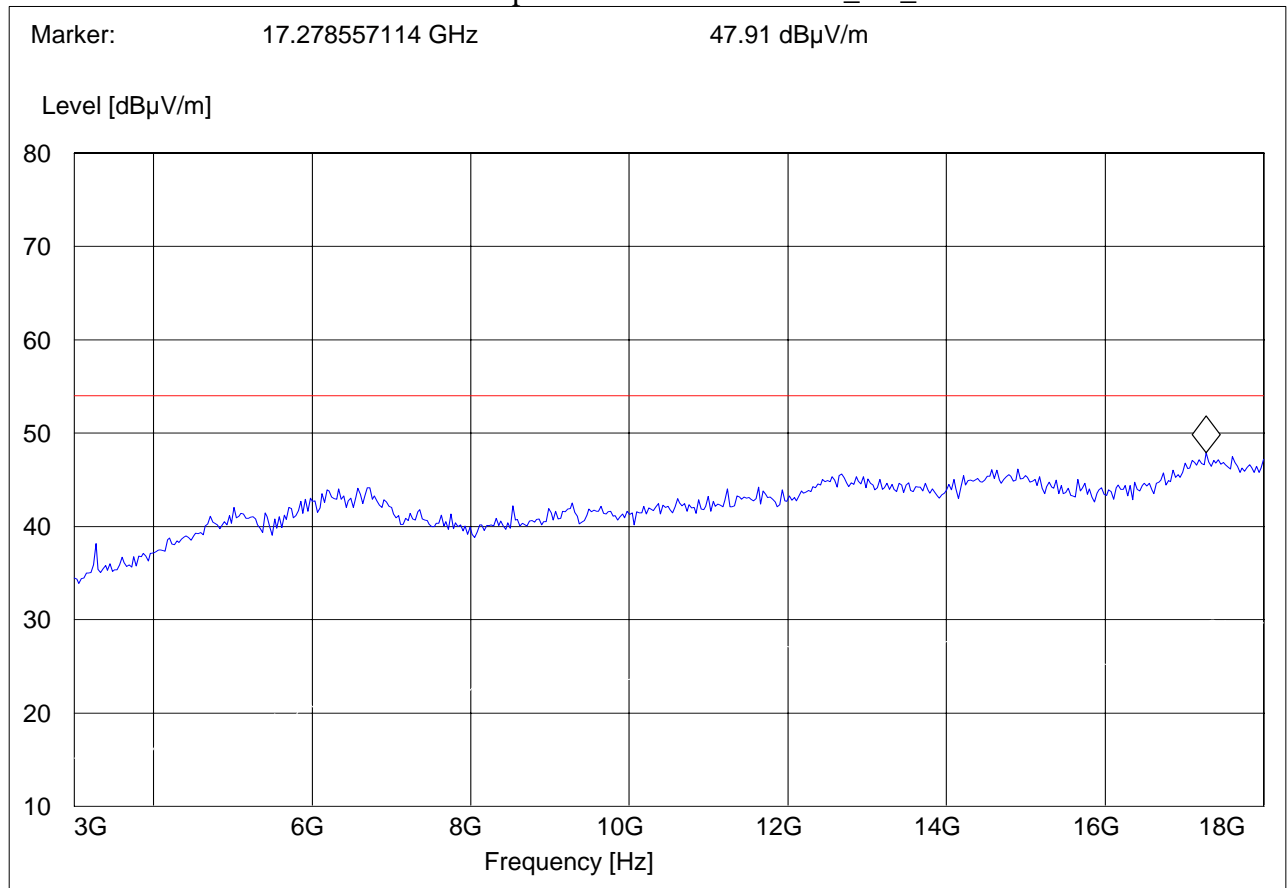
**3-18GHz (2452MHz)**

Note: Peak Reading vs. Average limit

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: 802.11g; Ch.11  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

**SWEEP TABLE: "FCC15.247\_3-18G"**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



**18-26.5GHz**

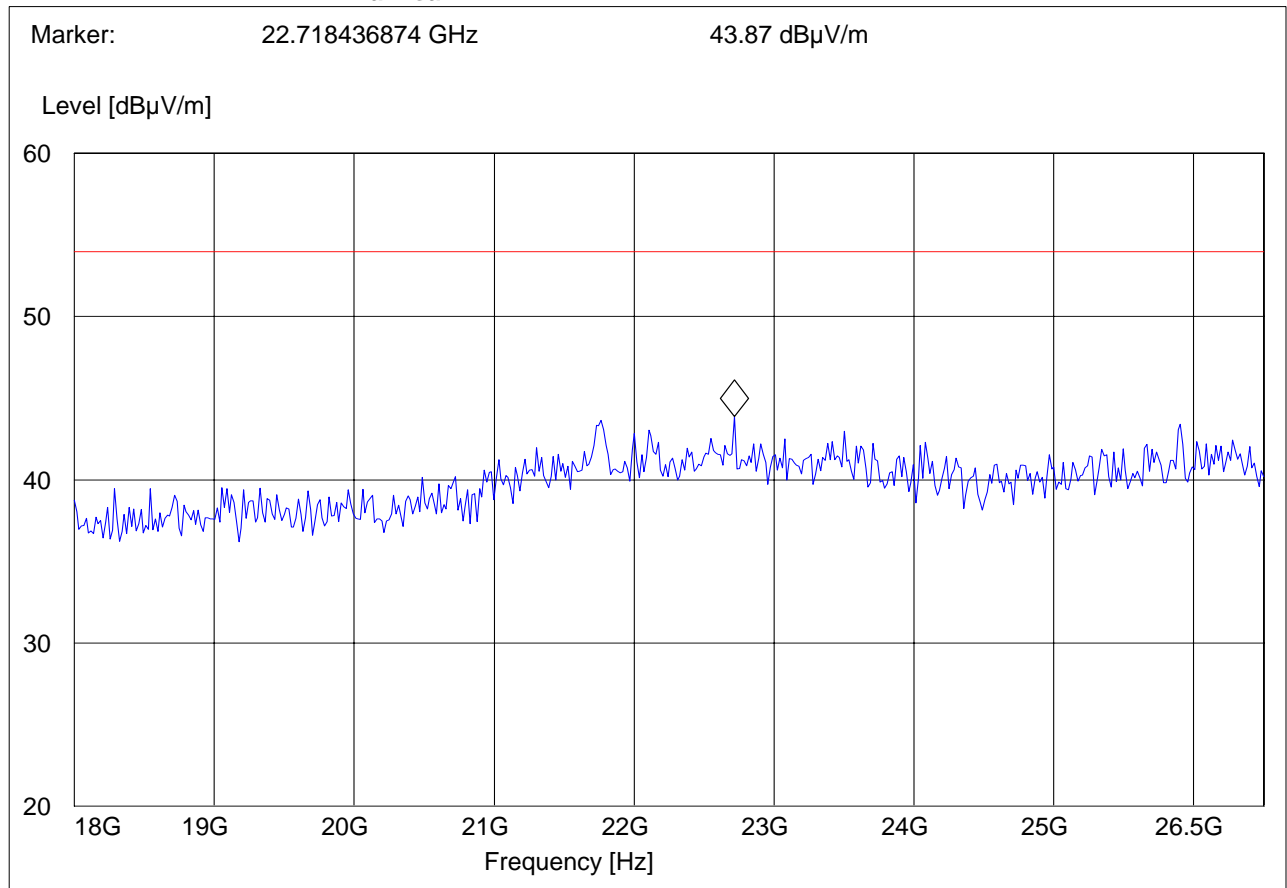
Note: This plot is valid for low, mid, high channels (worst-case plot).

Note: Peak Reading vs. Average limit

EUT: Communicator (CDMA version)  
 Customer:: Wireless Matrix  
 Test Mode: 802.11g  
 ANT Orientation: H  
 EUT Orientation: H  
 Test Engineer: Chris  
 Voltage: Car Battery  
 Comments:

***SWEEP TABLE: "FCC15.247\_18-26.5G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	100 kHz	Horn # 3116_18-40G
		MaxPeak			



## 5.4 Receiver Spurious Emission § 15.209/RSS210

### 5.4.1 Limits

Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

**NOTE:**

1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 25 GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements are done in peak mode using an average limit unless specified with the plots.
3. There are no measurable emissions up to 18GHz in Rx mode.
4. Receiver spurious emissions reported here are the worse case emissions for all receiver modes and between two receiving chains.

### 5.4.2 RESULTS

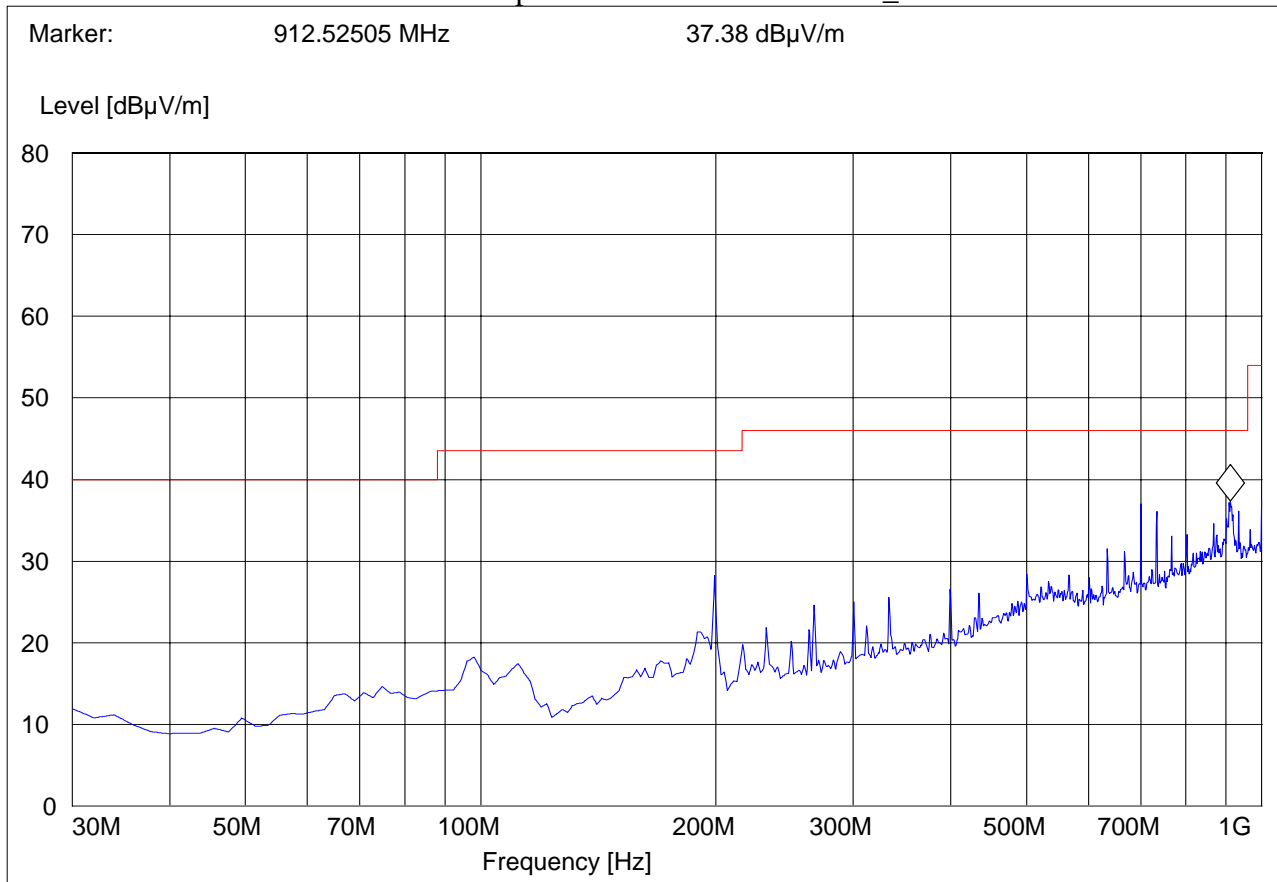
#### 30MHz – 1GHz, Antenna: Vertical

Note: This plot is valid for low, mid, high channels (worst-case plot).

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: RX  
ANT Orientation: V  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

#### *SWEEP TABLE: "FCC15.247\_30M-1G\_Ver"*

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



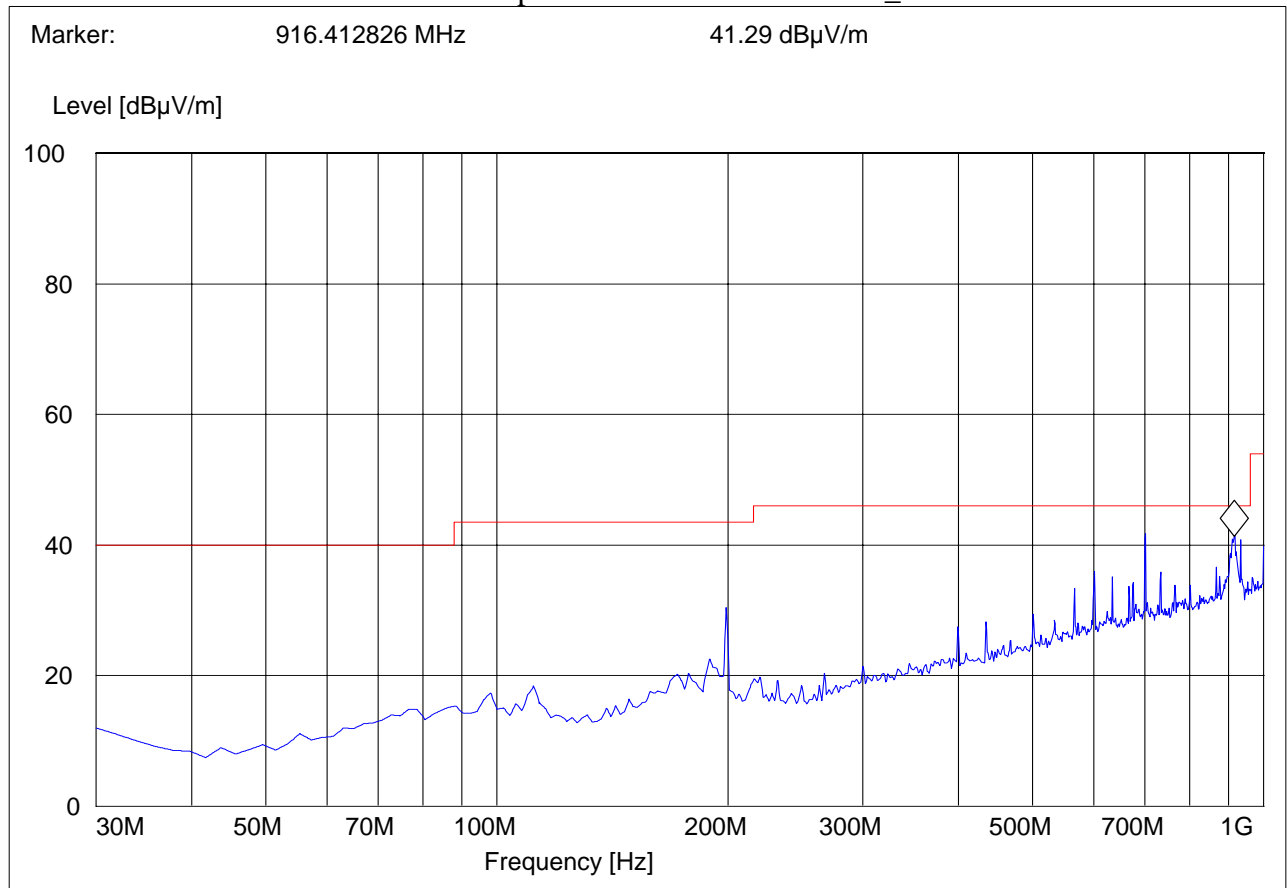
**30MHz – 1GHz, Antenna: Horizontal**

Note: This plot is valid for low, mid, high channels (worst-case plot).

EUT: Communicator (CDMA version)  
Customer:: Wireless Matrix  
Test Mode: RX  
ANT Orientation: H  
EUT Orientation: H  
Test Engineer: Chris  
Voltage: Car Battery  
Comments:

**SWEEP TABLE: "FCC15.247\_30M-1G\_Hor"**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



### 1-18GHz

Note: Peak Reading vs. Average limit

EUT / Description: Communicator (CDMA version)

Customer: Wireless Matrix

Operation Mode: Rx

ANT Orientation: : V

EUT Orientation:: H

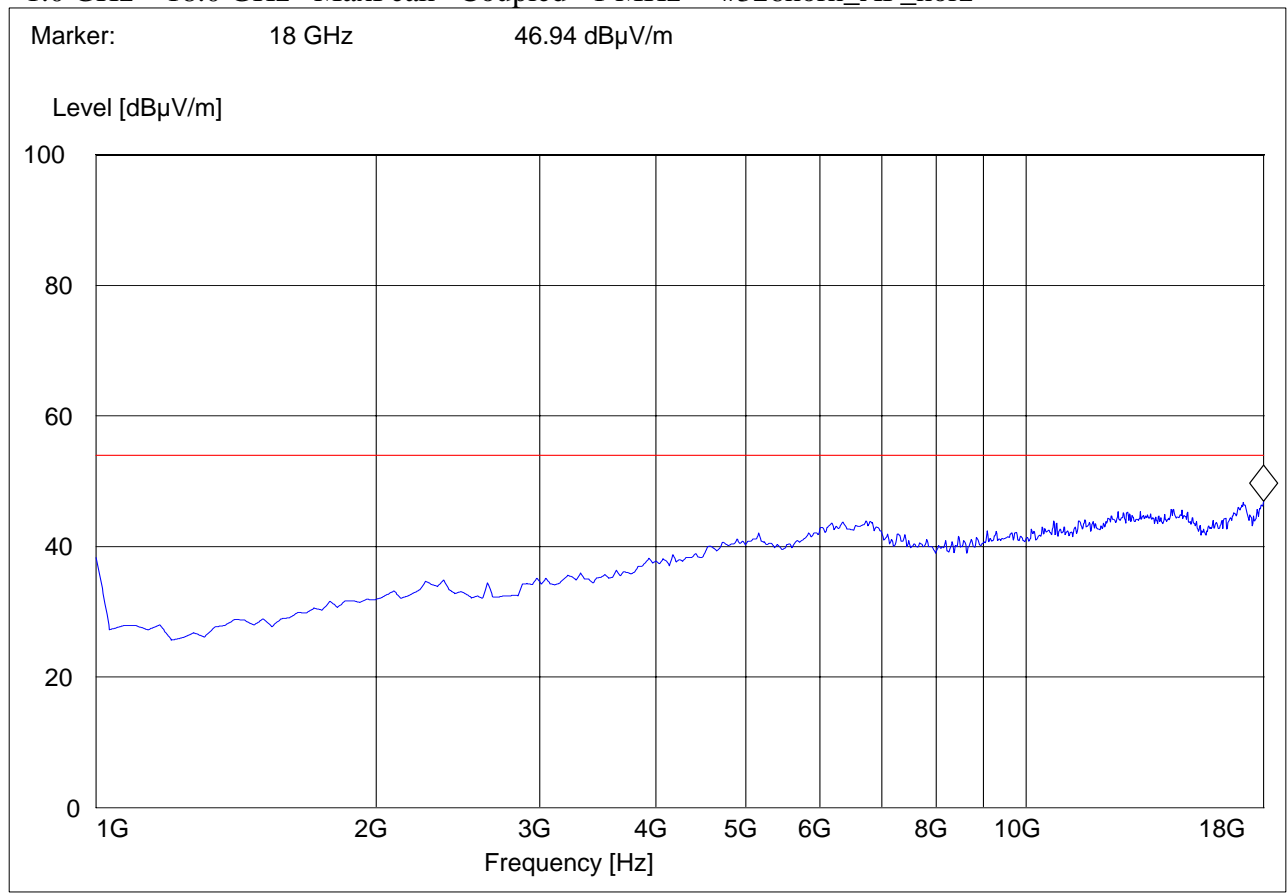
Test Engineer: Chris

Voltage: Car Battery

Comments::

### *SWEEP TABLE: "FCC15.247\_1-18G"*

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



**6 Conducted Measurements**

**6.1 6dB bandwidth and 99% bandwidth.**

**6.1.1 Limit**

FCC15.247(a)(2) Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

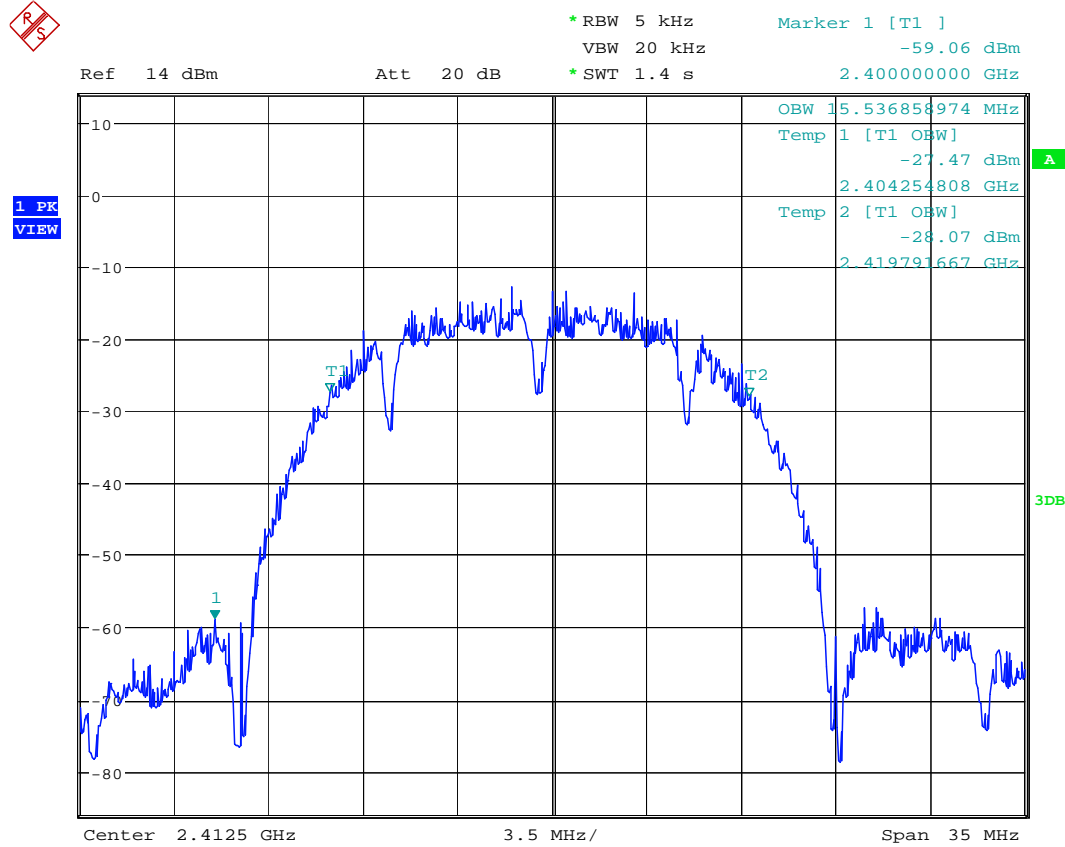
RSS210 A8.2 (a): The minimum 6 dB bandwidth shall be at least 500 kHz.

**6.1.2 Measurement Result:**

**6 dB bandwidth tests not conducted. The EUT integrates an FCC approved module. 6 dB bandwidth measurements are referenced from the original report for the module.**

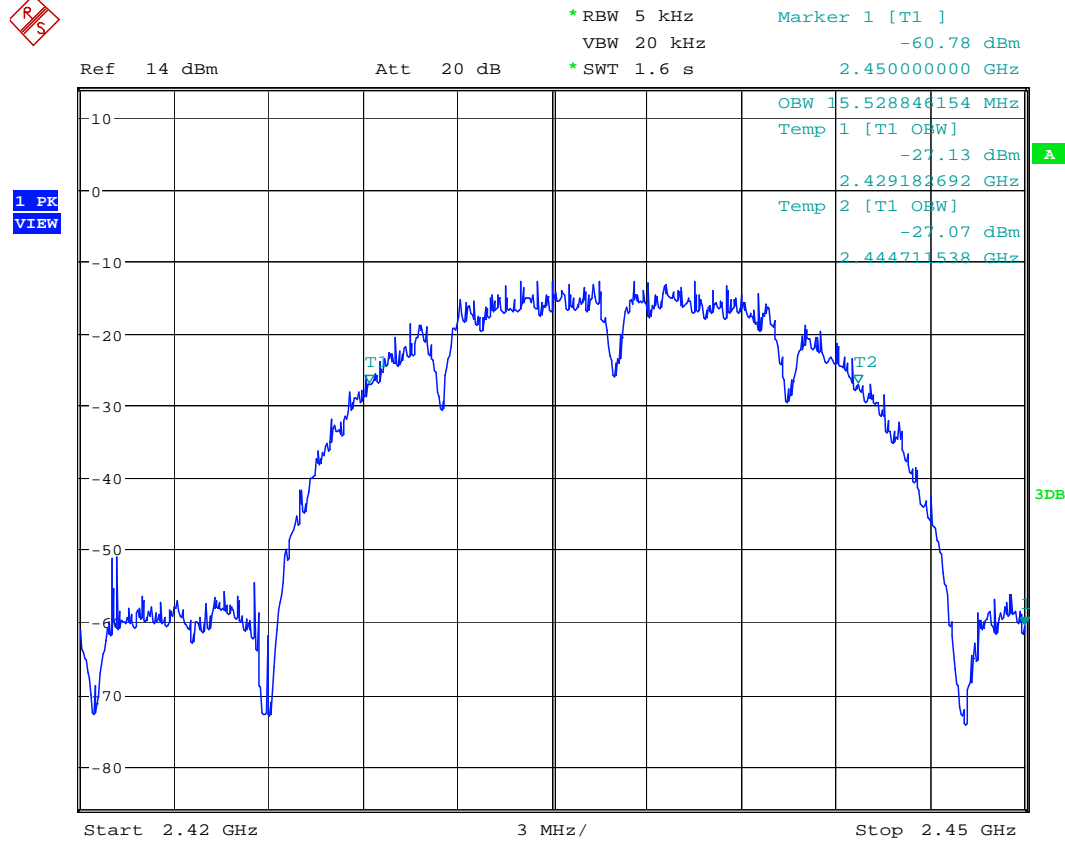
	<b>Channel Frequency (MHz)</b>	<b>20dB/99% Bandwidth (MHz)</b>
<b>2400-2483.5 MHz (802.11 b)</b>	2412	15.54
	2437	15.53
	2462	15.51
<b>2400-2483.5 MHz (802.11 g)</b>	2412	16.51
	2437	16.59
	2462	16.51

### 6.1.3 Plots: 802.11 b, Channel 1





### 802.11 b, Channel 6



### 802.11 b, Channel 11

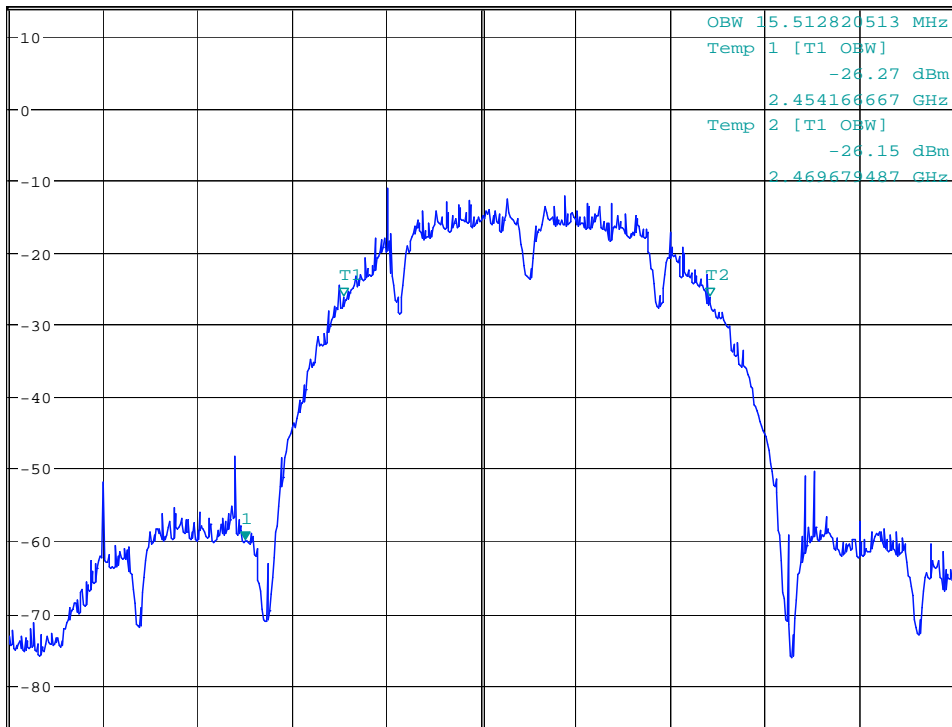


\*RBW 5 kHz      Marker 1 [T1 ]  
VBW 20 kHz      -60.05 dBm  
\*SWT 1.6 s      2.450000000 GHz

Ref 14 dBm

Att 20 dB

1 PK  
VIEW



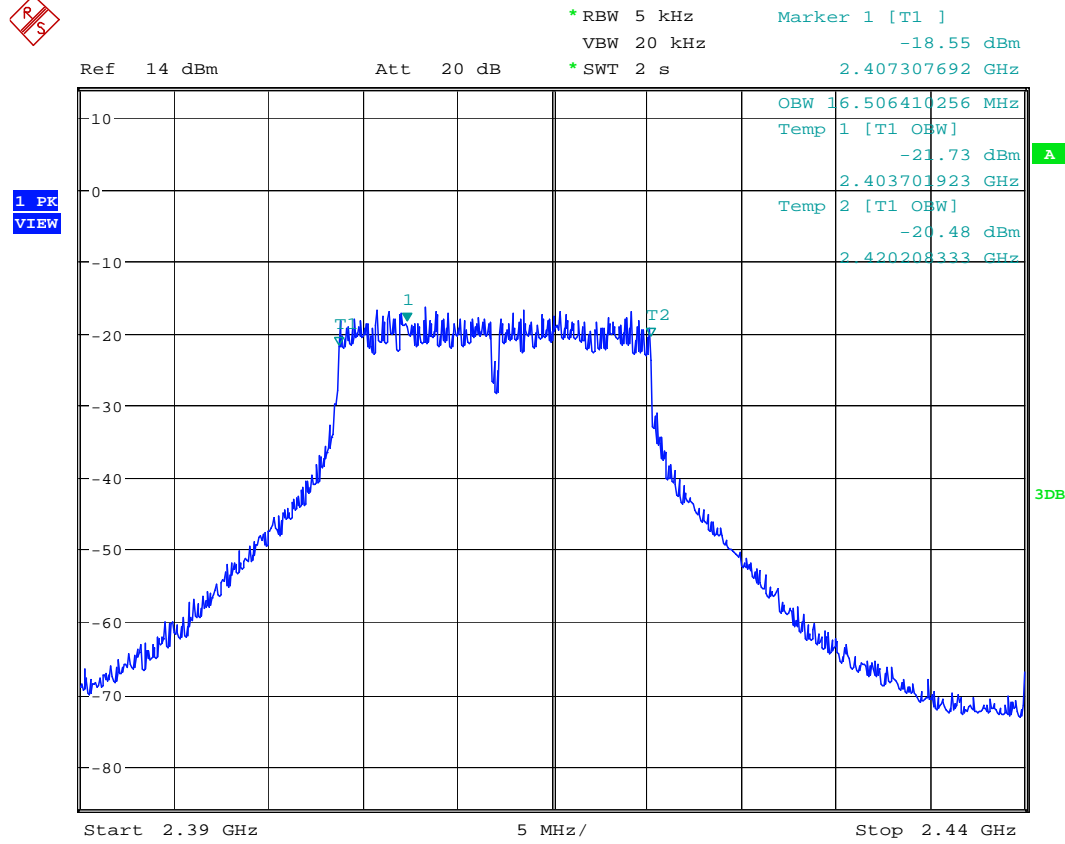
OBW 1	5.512820513 MHz
Temp 1 [T1 OBW]	-26.27 dBm
	2.454166667 GHz
Temp 2 [T1 OBW]	-26.15 dBm
	2.469679487 GHz

Center 2.46 GHz

4 MHz/

Span 40 MHz

### 802.11 g, Channel 1



### 802.11 g, Channel 6

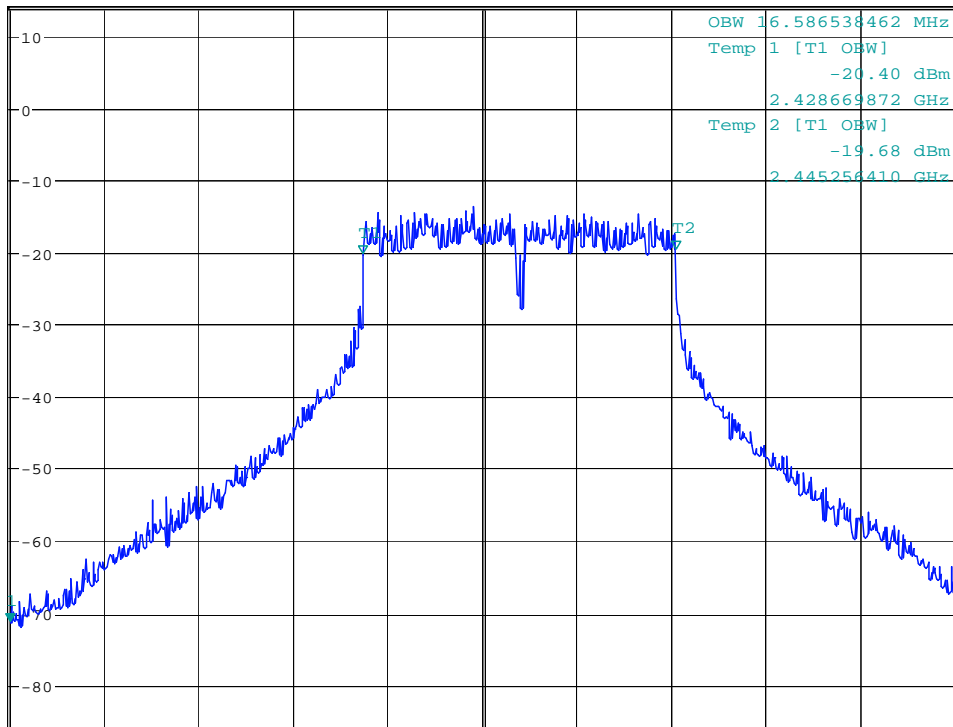


\*RBW 5 kHz      Marker 1 [T1 ]  
VBW 20 kHz      -71.36 dBm  
\*SWT 2 s      2.410000000 GHz

Ref 14 dBm

Att 20 dB

1 PK  
VIEW



OBW 1	6.586538462 MHz
Temp 1 [T1 OBW]	-20.40 dBm
	2.428669872 GHz
Temp 2 [T1 OBW]	-19.68 dBm
	2.445256410 GHz

Start 2.41 GHz

5 MHz/

Stop 2.46 GHz

### 802.11 g, Channel 11

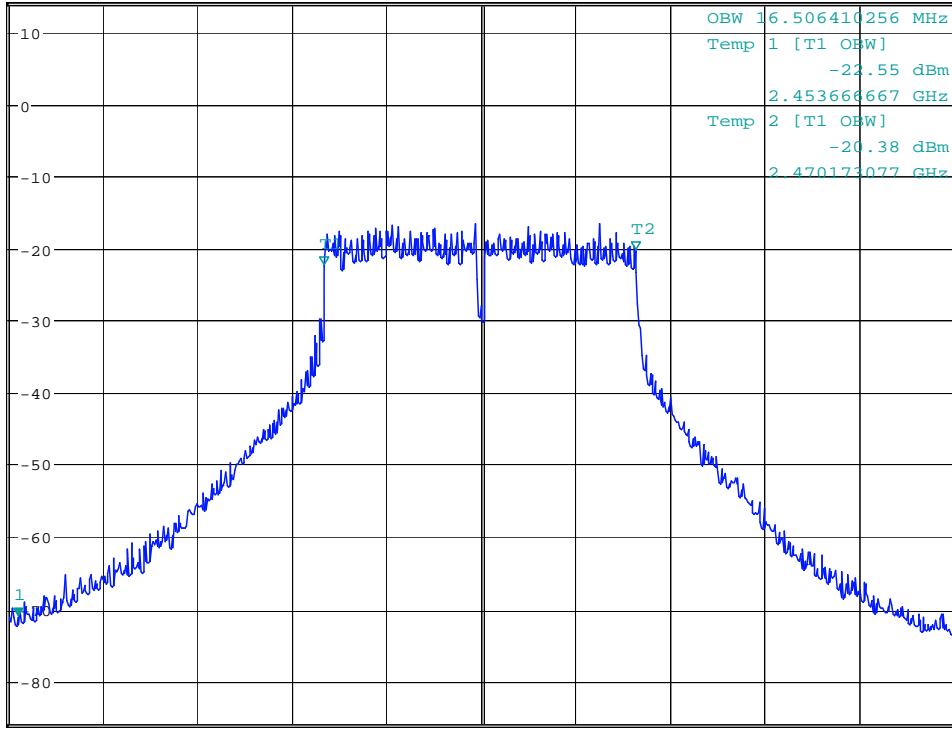


\*RBW 5 kHz      Marker 1 [T1 ]  
VBW 20 kHz      -71.12 dBm  
\*SWT 2 s      2.437500000 GHz

Ref 14 dBm

Att 20 dB

1 PK  
VIEW



Center 2.462 GHz

5 MHz/

Span 50 MHz

## 6.2 Conducted Power Measurement

### 6.2.1 Limit

FCC15.247 (b)(3): For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt

RSS210 A8.4(4): For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4 W.

### 6.2.2 Results

**Test Not conducted. The EUT integrates an FCC approved module. All conducted measurements are referenced from the original report for the module.**

## 6.3 Power Spectral Density

### 6.3.1 Limit

FCC 15.247 (e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 6.3.2 Results

**Test Not conducted. The EUT integrates an FCC approved module. All conducted measurements are referenced from the original report for the module.**

## **6.4 Conducted Spurious Emission**

### **6.4.1 Limit**

§15.247(d) & RSS-210 (A8.5): -30dBc

### **6.4.2 Results:**

**Test not conducted. The EUT integrates an FCC approved module. All conducted measurements are referenced from the original report for the module.**

**6.5 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207**

**6.5.1 LIMITS**

**Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)**

§15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

**Limit**

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

\* Decreases with logarithm of the frequency

**ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz**

Note: AC Line Conducted Emission reported here are the worse cases among all operating modes.

**6.5.2 RESULT:**

Test not applicable for devices powered by battery according to §15.107 (d).



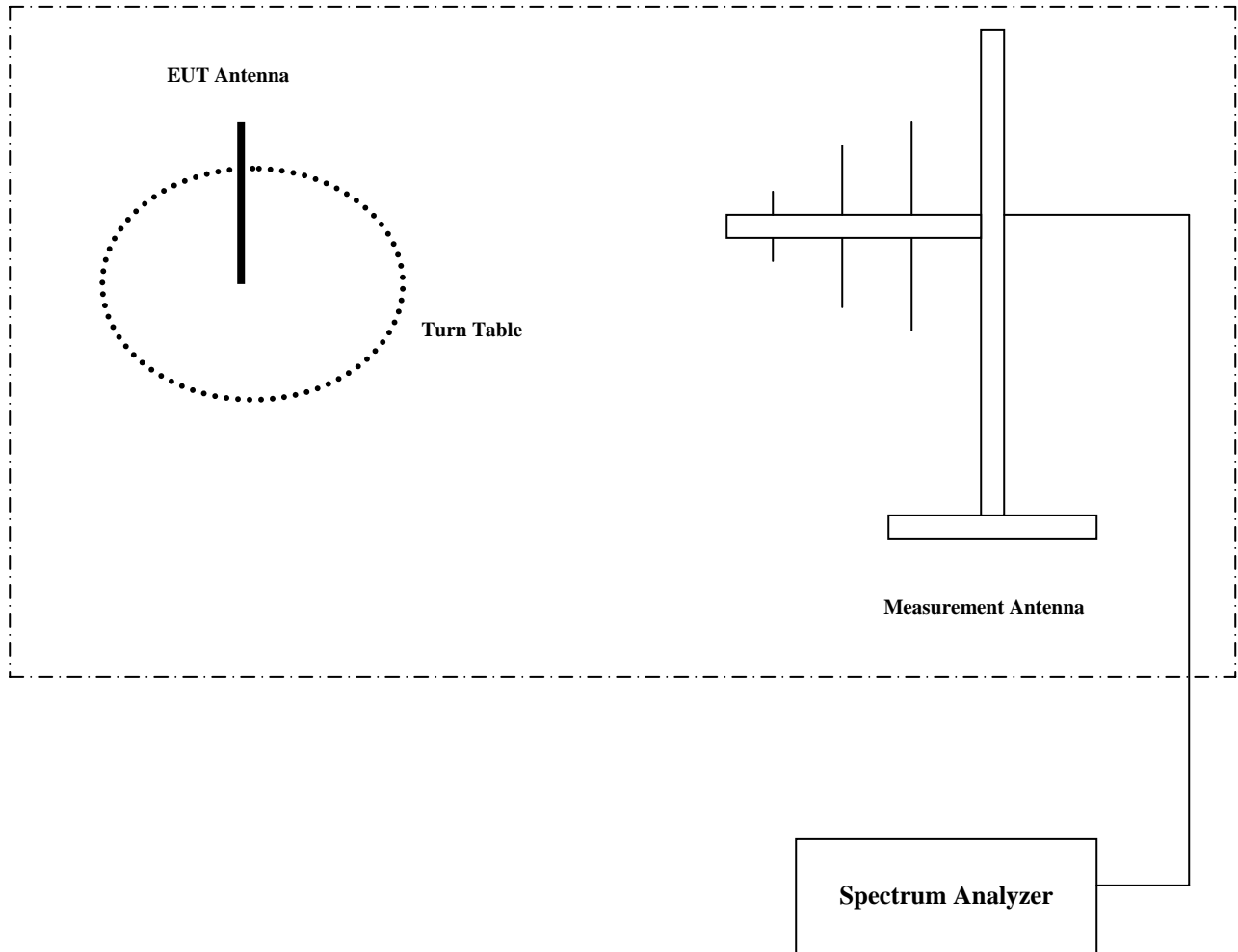
**TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

<b>No</b>	<b>Instrument/Ancillary</b>	<b>Type</b>	<b>Manufacturer</b>	<b>Serial No.</b>	<b>Cal Due</b>	<b>Interval</b>
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2009	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2009	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2009	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2009	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2009	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2009	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2009	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2009	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2009	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2009	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2009	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2009	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2009	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2009	2 years

**7 BLOCK DIAGRAMS**

**Radiated Testing**

**ANECHOIC CHAMBER**



Test Report #: EMC\_WIREL\_016\_09001\_15\_247



Date of Report: 2009-03-17

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## 8 Revision History

2009-03-17: First Issue