



**FCC 47 CFR PART 15 SUBPART C &
INDUSTRY CANADA RSS-210
(Class II Permissive Change)**

TEST REPORT

For

IEEE 802.11 a/b/g/n Wireless LAN and Bluetooth Combo LGA Module

Model: AW-AM691NF

Trade Name: Lenovo

Issued to

**AzureWave Technologies, Inc.
8F, No. 94, Baozhong Rd., Xindian, Taiwan 231**

Issued by

**Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
<http://www.ccsrf.com>
service@ccsrf.com**

Issued Date: October 14, 2013



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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	October 14, 2013	Initial Issue	ALL	Kelly Cheng



TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION.....	4
2. EUT DESCRIPTION	5
3. TEST METHODOLOGY	6
3.1 EUT CONFIGURATION	6
3.2 EUT EXERCISE.....	6
3.3 GENERAL TEST PROCEDURES.....	6
3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS.....	7
3.5 DESCRIPTION OF TEST MODES	8
4. INSTRUMENT CALIBRATION.....	9
4.1 MEASURING INSTRUMENT CALIBRATION	9
4.2 MEASUREMENT EQUIPMENT USED	9
4.3 MEASUREMENT UNCERTAINTY	10
5. FACILITIES AND ACCREDITATIONS	11
5.1 FACILITIES	11
5.2 EQUIPMENT.....	11
5.3 TABLE OF ACCREDITATIONS AND LISTINGS.....	12
6. SETUP OF EQUIPMENT UNDER TEST	13
6.1 SETUP CONFIGURATION OF EUT.....	13
6.2 SUPPORT EQUIPMENT	13
7. FCC PART 15.247 REQUIREMENTS & RSS 210 REQUIREMENTS	14
7.1 BAND EDGES MEASUREMENT	14
7.2 SPURIOUS EMISSIONS	25
APPENDIX II PHOTOGRAPHS OF TEST SETUP.....	36
APPENDIX 1 - PHOTOGRAPHS OF EUT	



1. TEST RESULT CERTIFICATION

Applicant: AzureWave Technologies, Inc.
1601,SAKAI,ATSUGI-SHI,KANAGAWA,243-8533 JAPAN

Manufacturer: AzureWave Technologies, Inc.
1601,SAKAI,ATSUGI-SHI,KANAGAWA,243-8533 JAPAN

Equipment Under Test: Wireless LAN ,Bluetooth Combo Module

Trade Name: Lenovo

Model: AW-AM691NF

Date of Test: October 11 ~ 12, 2013

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C Industry Canada RSS-210 Issue 8 Annex 8 Industry Canada RSS-GEN Issue 3	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.4: 2009** and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements set forth in the above standards. The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Reviewed by:

Miller Lee
Section Manager
Compliance Certification Services Inc.

Angel Cheng
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	Wireless LAN ,Bluetooth Combo Module
Trade Name	Lenovo
Model Number	AW-AM691NF
Model Discrepancy	N/A
Received Date	August 11, 2013
Power Supply	Powered by host device
Frequency Range	2402 ~ 2480 MHz
Transmit Power	8.017mW
Modulation Technique	GFSK for 1Mbps; $\pi/4$ -DQPSK for 2Mbps; 8DPSK for 3Mbps
Number of Channels	79 Channels
Antenna Specification	<p>1. Jiengtai Corporation P/N: JT1301209Y0311 (Main) / Gain: 0.78 dBi JT1301209Y1511 (Aux) / Gain: -0.44 dBi</p> <p>2. Hua Chen Technology Co., Ltd P/N: DC33001FK00 (Main) / Gain: -1.04 dBi DC33001FK10 (Aux) / Gain: -5.82 dBi</p> <p>3. Smart Approach Co.,Ltd P/N: SE-ECJH0-001 (Main) / Gain: -0.56 dBi SE-ECJH0-002 (Aux) / Gain: -0.57 dBi</p>
Antenna Designation	PIFA Antenna
Class II Permissive Change	<p>(1) The product AW-AM691NF will be installed in the following models of Table PC(Model: Miix 2 8)</p> <p>(2) Added of the Antenna(Trademark: Smart Approach / Model: Tx1 Antenna: SE-ECJH0-001, Tx2 Antenna: SE-ECJH0-002)</p>

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC&IC ID: **TLZ-AM691NF** & **6100A-AM691NF** filing to comply with FCC Part 15C, Section 15.207, 15.209 and IC RSS-210 & RSS-GEN.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4: 2009 and FCC CFR 47 Part 15.207, 15.209, 15.247 and DA00-705.

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-Gen, IC RSS-102, and ANSI C63.4.

This submittal(s) (test report) is intended for IC Certification with Industry Canada RSS-210.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-Gen, IC RSS-102, and ANSI C63.4: 2009.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4: 2009.



3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(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
¹ 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 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



3.5 DESCRIPTION OF TEST MODES

The EUT (model: AW-AM691NF) had been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

Channel Low (2402MHz), Mid (2441MHz) and High (2480MHz) with 1Mbps & 3Mbps data rate was chosen for full testing.

During the preliminary test, GFSK, $\pi/4$ -QPSK & 8DPSK with DH1 were pre-tested and found that 8DPSK emits the highest output power. Then the tests were carried on with DH1 compare to DH3 & DH5 and found that 8DPSK with DH5 emit the highest output power, and therefore had been tested under operating condition.

Following channels were selected for the radiated emission testing only as listed below:

Tested Channel	Modulation Type	Packet Type	Date Rate	Axis
Low, Mid, High	GFSK	DH 5	1	Z
Low, Mid, High	8DPSK	DH 5	3	Z



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.

Wugu 966 Chamber A				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	10/31/2014
EMI Test Receiver	R&S	ESCI	100064	02/15/2014
Pre-Amplifier	Mini-Circults	ZFL-1000LN	SF350700823	01/11/2014
Pre-Amplifier	MITEQ	AFS44-00102650-42-10P-44	1415367	11/17/2014
Bilog Antenna	Sunol Sciences	JB3	A030105	10/01/2014
Horn Antenna	EMCO	3117	00055165	01/11/2014
Horn Antenna	EMCO	3116	00026370	10/10/2014
Loop Antenna	EMCO	6502	8905/2356	06/09/2014
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R
Site NSA	CCS	N/A	N/A	12/24/2013
Test S/W	EZ-EMC (CCS-3A1RE)			



4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN,
R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.




Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
	N/A						

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



7. FCC PART 15.247 REQUIREMENTS & RSS 210 REQUIREMENTS

7.1 BAND EDGES MEASUREMENT

LIMIT

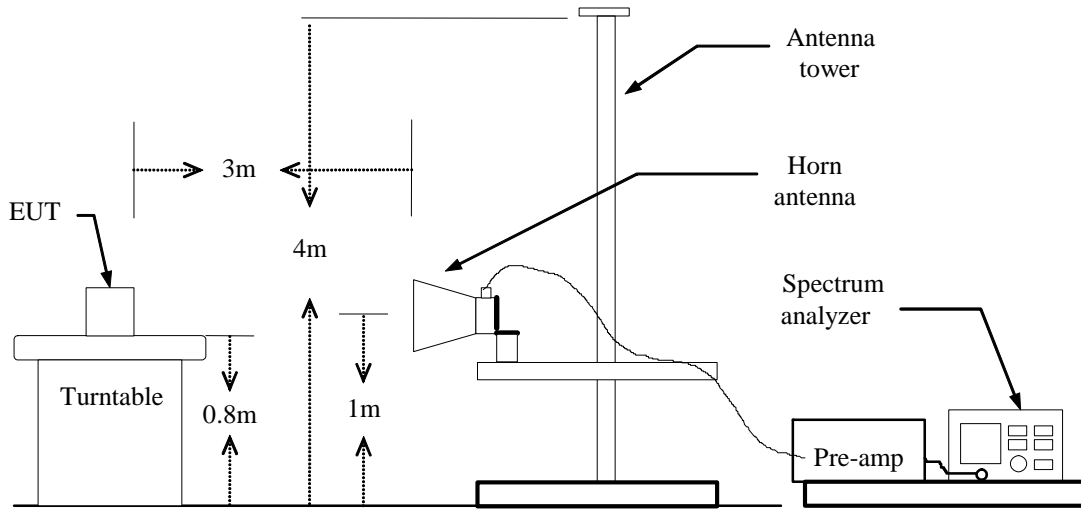
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to RSS-210 §A8.5, in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required. In addition, radiated emissions which fall in the restricted bands of Table 1 must also comply with the radiated emission limits specified in Tables 2 and 3.

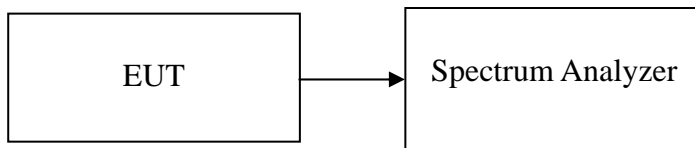


Test Configuration

For Radiated



For Conducted





TEST PROCEDURE

For Radiated

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / VBW=300Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

For Conducted

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 300 kHz. The video bandwidth is set to 300 kHz.

TEST RESULTS

Refer to attach spectrum analyzer data chart.



For GFSK / DH5

Band Edges (CH Low)

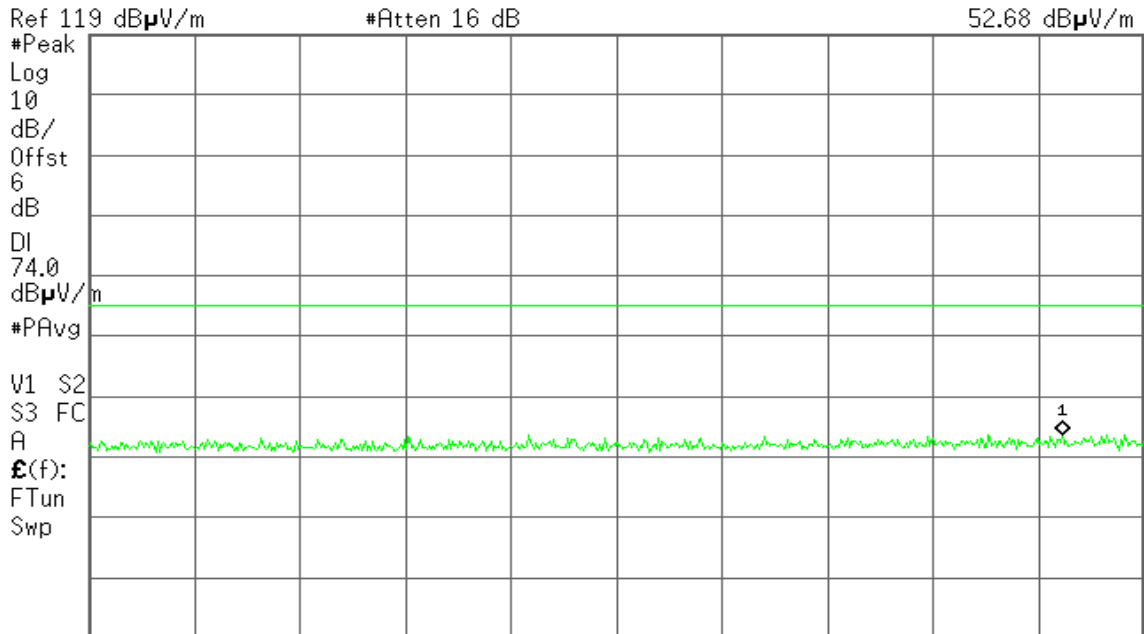
Detector mode: Peak

Polarity: Vertical

Agilent

R T

Mkr1 2.383 87 GHz
52.68 dBµV/m



Start 2.310 00 GHz Stop 2.390 00 GHz
#Res BW 1 MHz #VBW 3 MHz #Sweep 100 ms (601 pts)

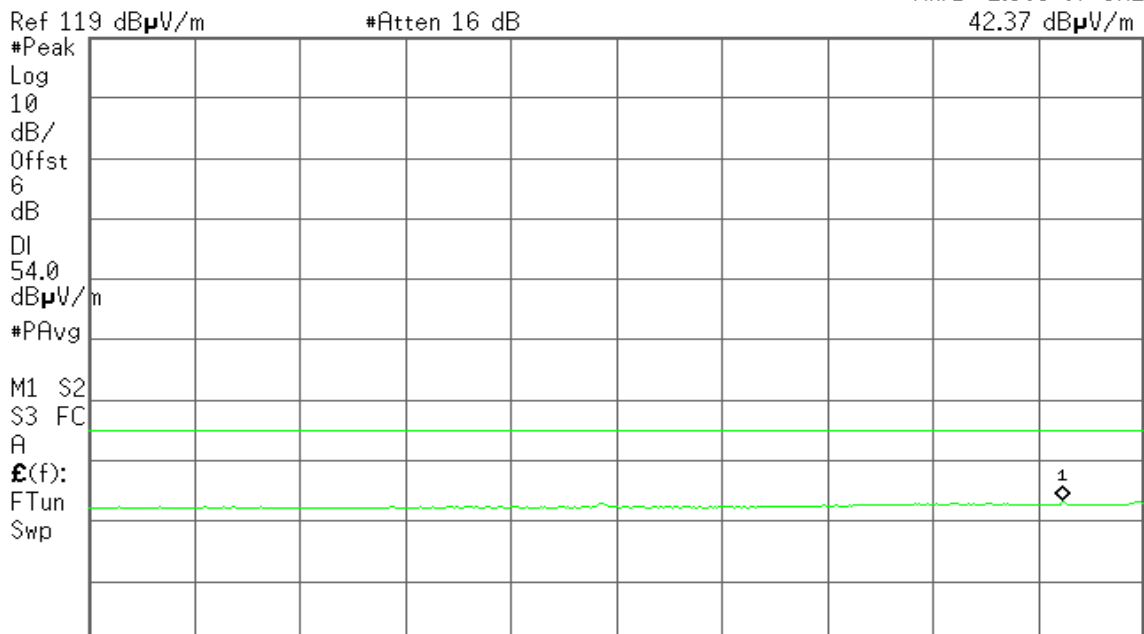
Detector mode: Peak

Polarity: Horizontal

Agilent

R T

Mkr1 2.383 87 GHz
42.37 dBµV/m



Start 2.310 00 GHz Stop 2.390 00 GHz
#Res BW 1 MHz #VBW 300 Hz Sweep 208 ms (601 pts)



Detector mode: Peak

Polarity: Horizontal

Agilent

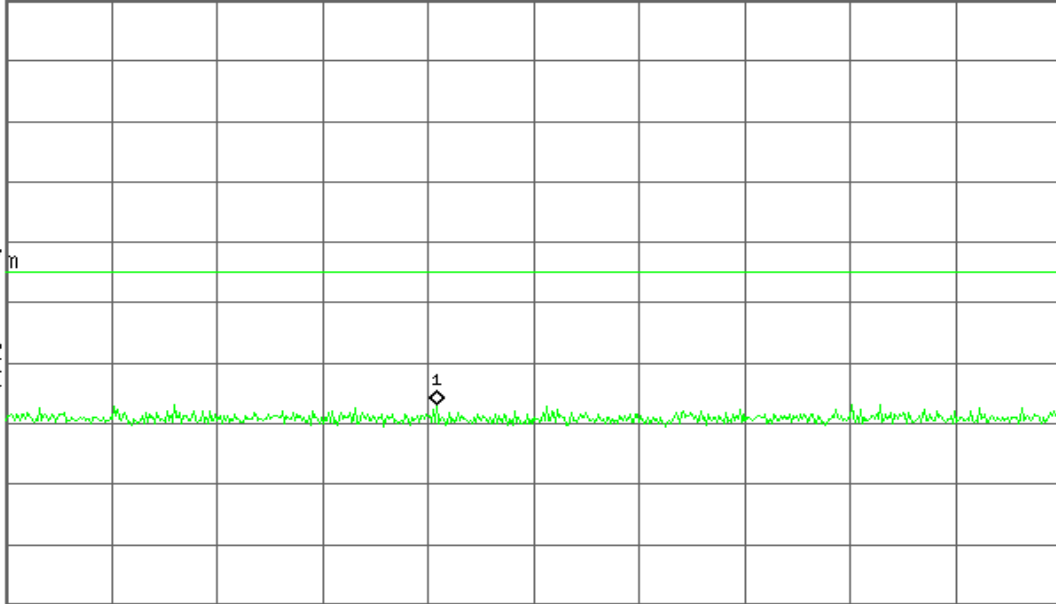
R T

Mkr1 2.342 67 GHz
52.23 dBµV/m

Ref 119 dBµV/m

#Atten 16 dB

#Peak
Log
10
dB/
Offst
6
dB
DI
74.0
dBµV/m
#PAvg
V1 S2
S3 FC
A
£(f):
FTun
Swp



Start 2.310 00 GHz

Stop 2.390 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

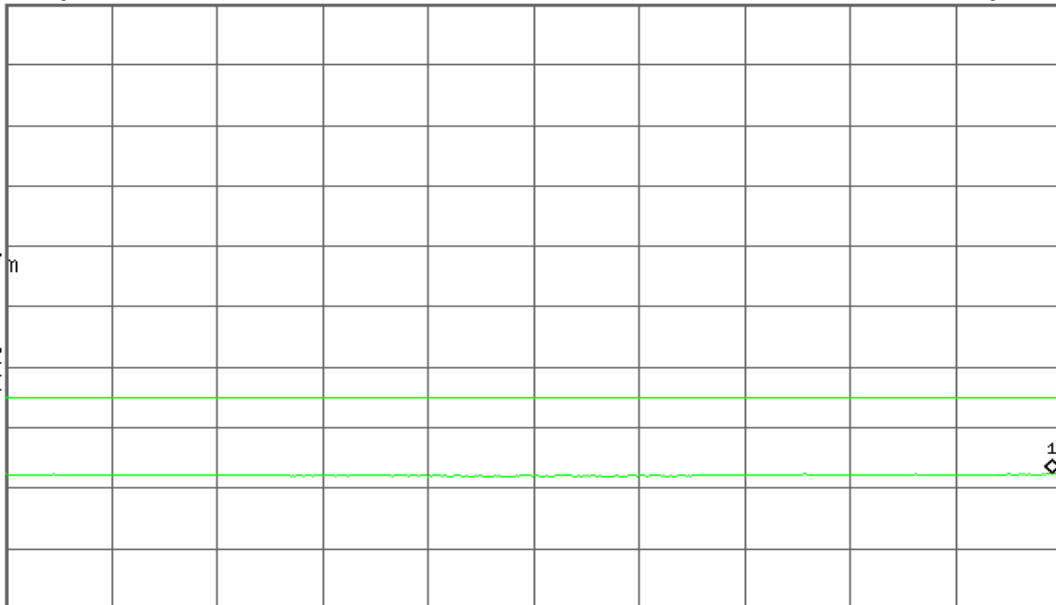
R T

Mkr1 2.389 33 GHz
41.52 dBµV/m

Ref 119 dBµV/m

#Atten 16 dB

#Peak
Log
10
dB/
Offst
6
dB
DI
54.0
dBµV/m
#PAvg
M1 S2
S3 FC
A
£(f):
FTun
Swp



Start 2.310 00 GHz

Stop 2.390 00 GHz

#Res BW 1 MHz

#VBW 300 Hz

Sweep 208 ms (601 pts)



Band Edges (CH High)

Detector mode: Peak

Polarity: Vertical

Agilent

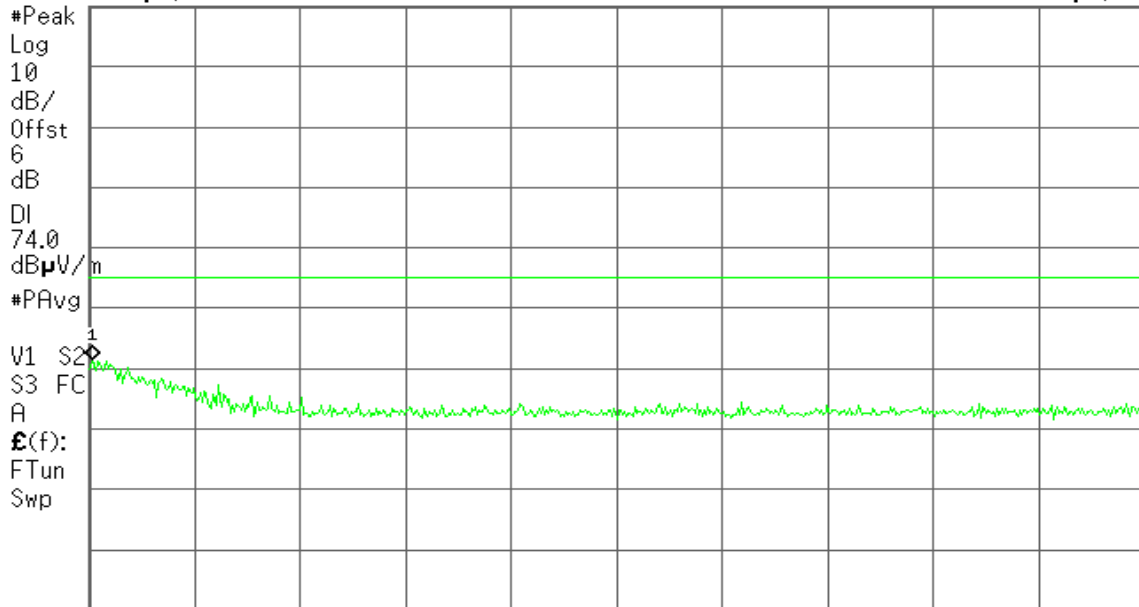
R T

Mkr1 2.483 56 GHz

60.60 dB μ V/m

Ref 119 dB μ V/m

#Atten 16 dB



Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

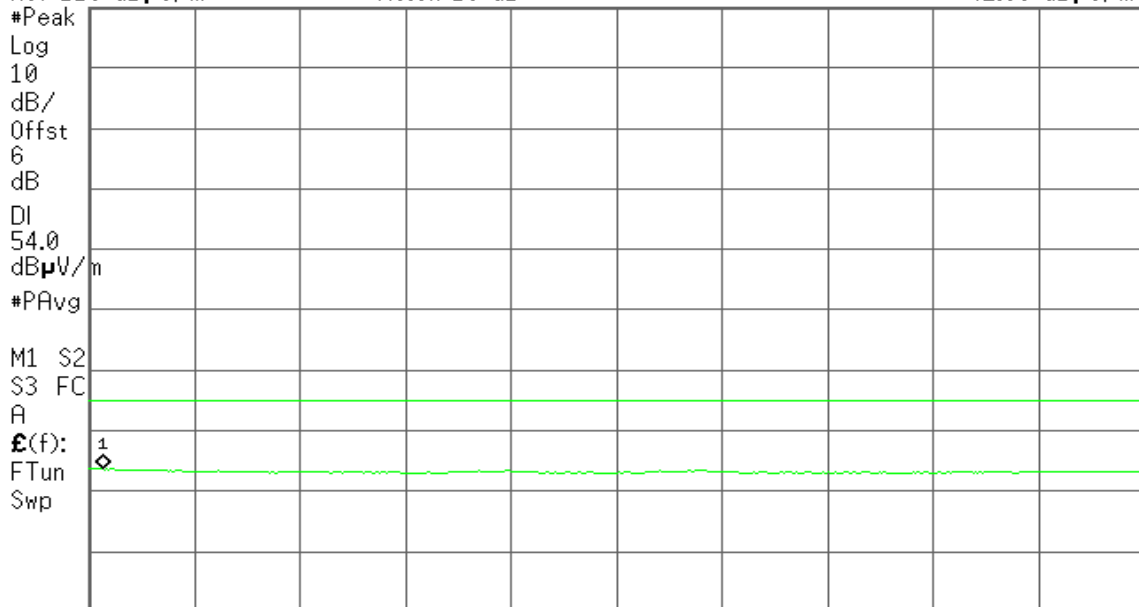
R T

Mkr1 2.483 72 GHz

42.66 dB μ V/m

Ref 119 dB μ V/m

#Atten 16 dB



Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 300 Hz

Stop 2.500 00 GHz

Sweep 42.92 ms (601 pts)



Detector mode: Peak

Polarity: Horizontal

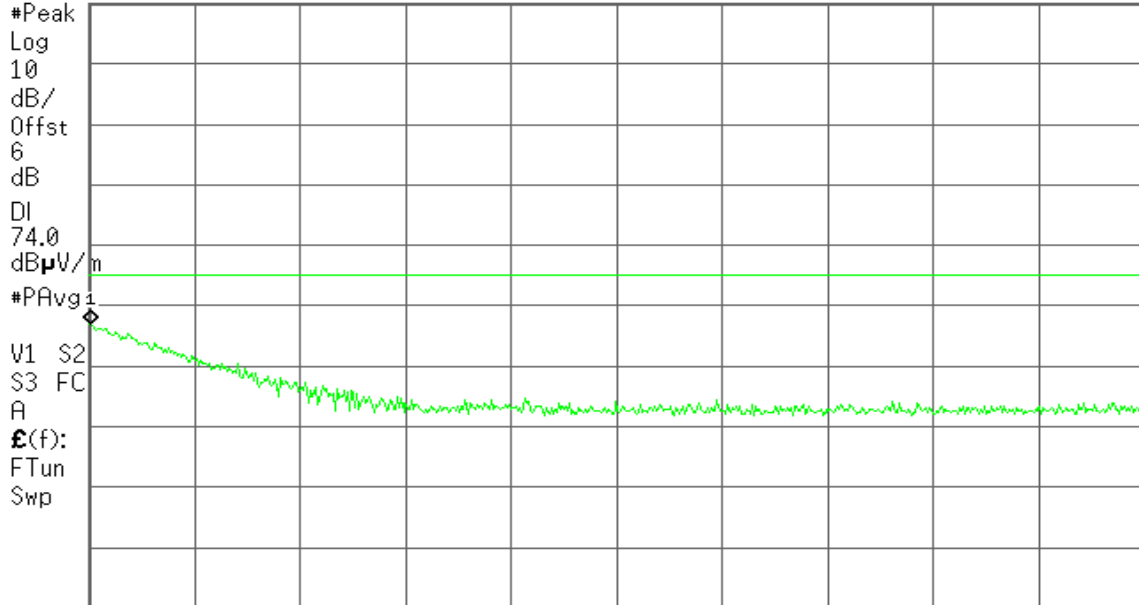
Agilent

R T

Mkr1 2.483 53 GHz
66.03 dBμV/m

Ref 119 dBμV/m

#Atten 16 dB



Start 2.483 50 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

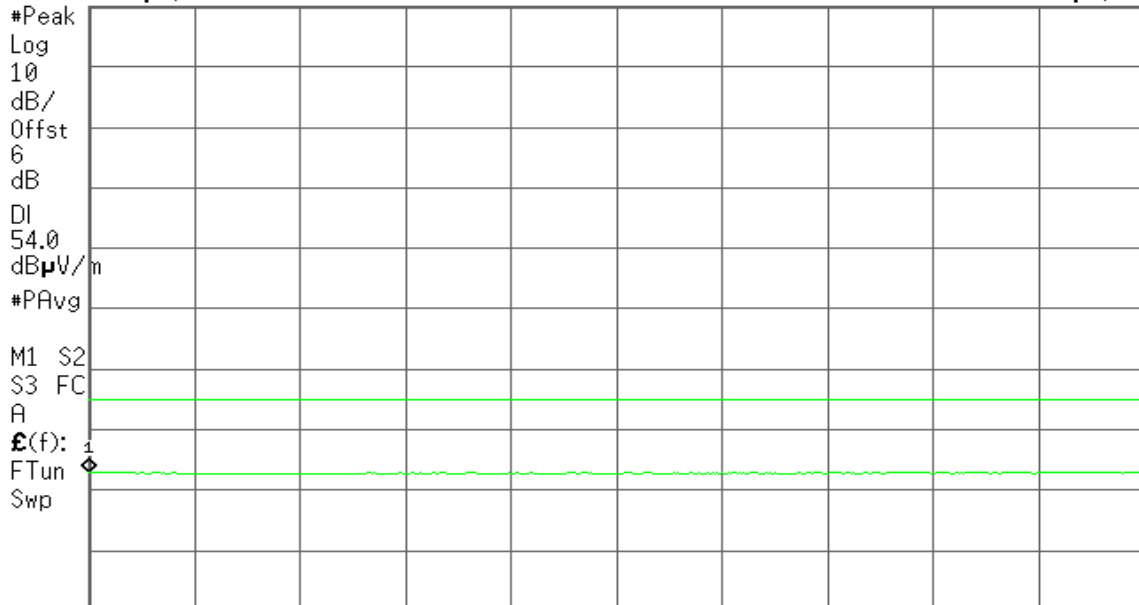
Agilent

R T

Mkr1 2.483 50 GHz
42.02 dBμV/m

Ref 119 dBμV/m

#Atten 16 dB



Start 2.483 50 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 300 Hz

Sweep 42.92 ms (601 pts)



For 8DPSK / DH5

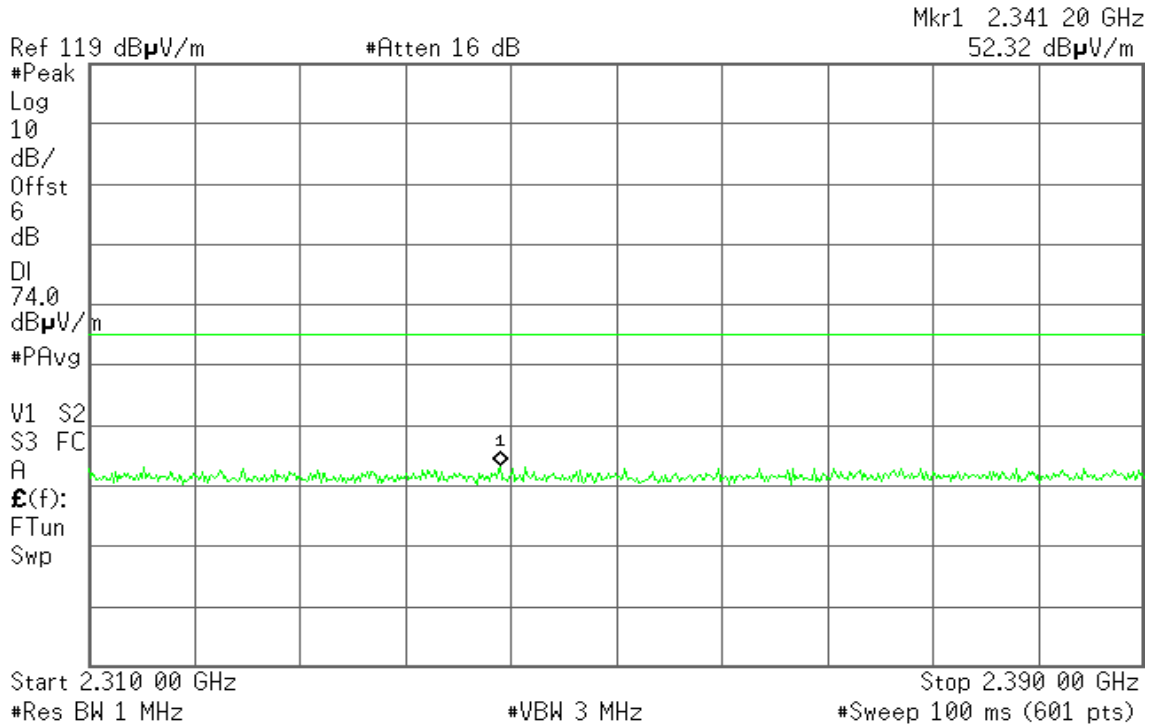
Band Edges (CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent

R T

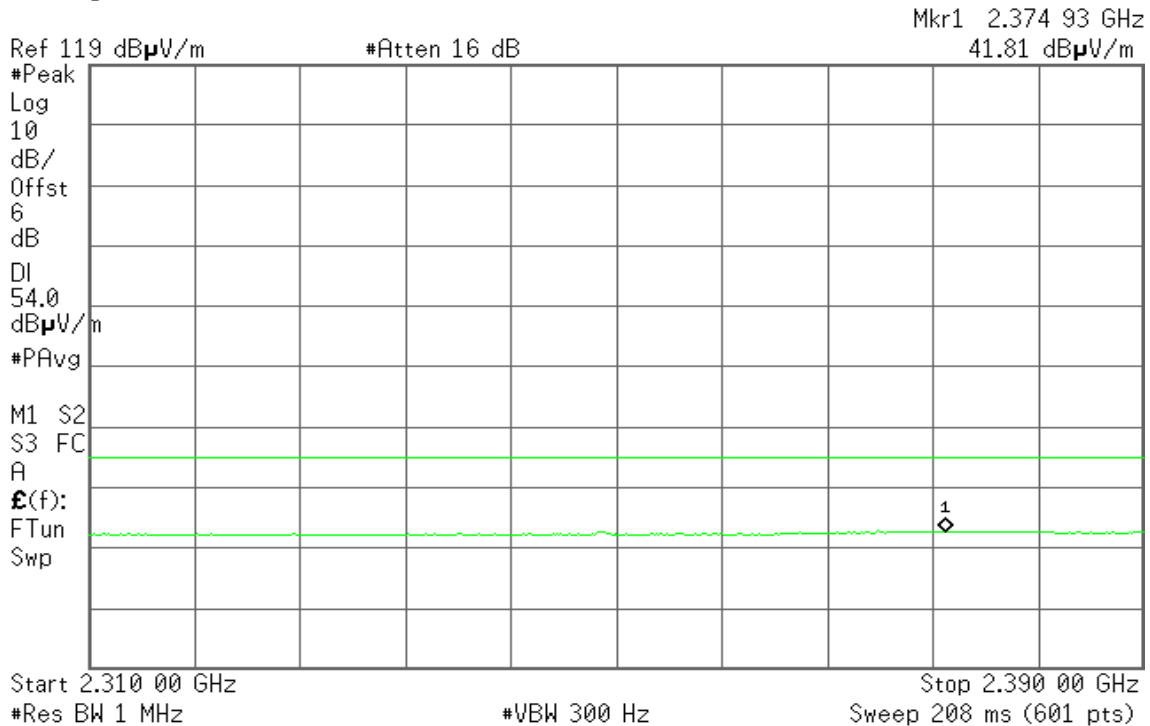


Detector mode: Average

Polarity: Horizontal

Agilent

R T





Detector mode: Peak

Polarity: Horizontal

Agilent

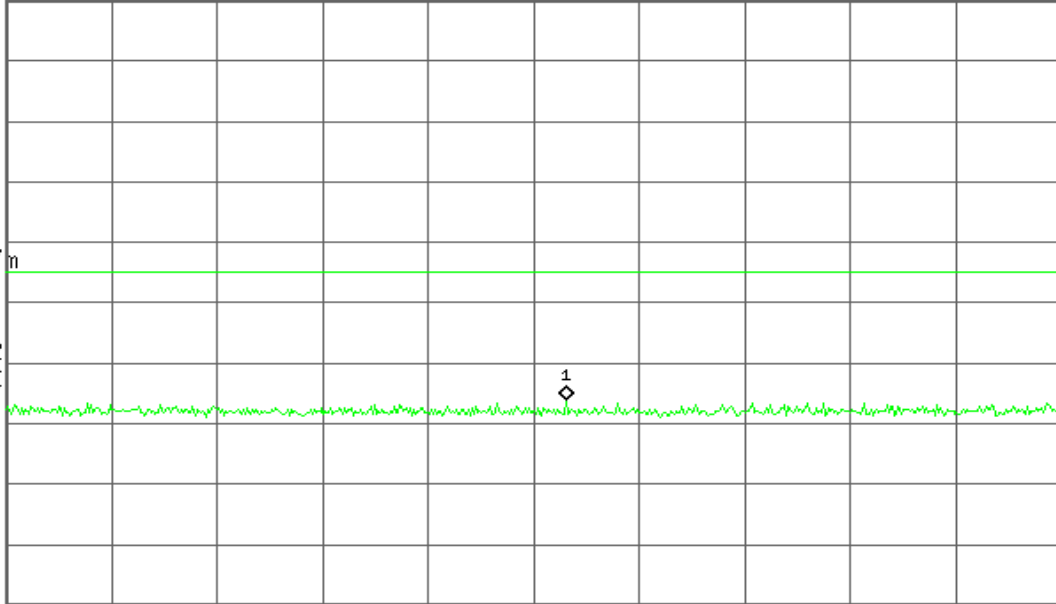
R T

Mkr1 2.352 53 GHz
52.81 dBµV/m

Ref 119 dBµV/m

#Atten 16 dB

#Peak
Log
10
dB/
Offst
6
dB
DI
74.0
dBµV/m
#PAvg
V1 S2
S3 FC
A
£(f):
FTun
Swp



Start 2.310 00 GHz

Stop 2.390 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

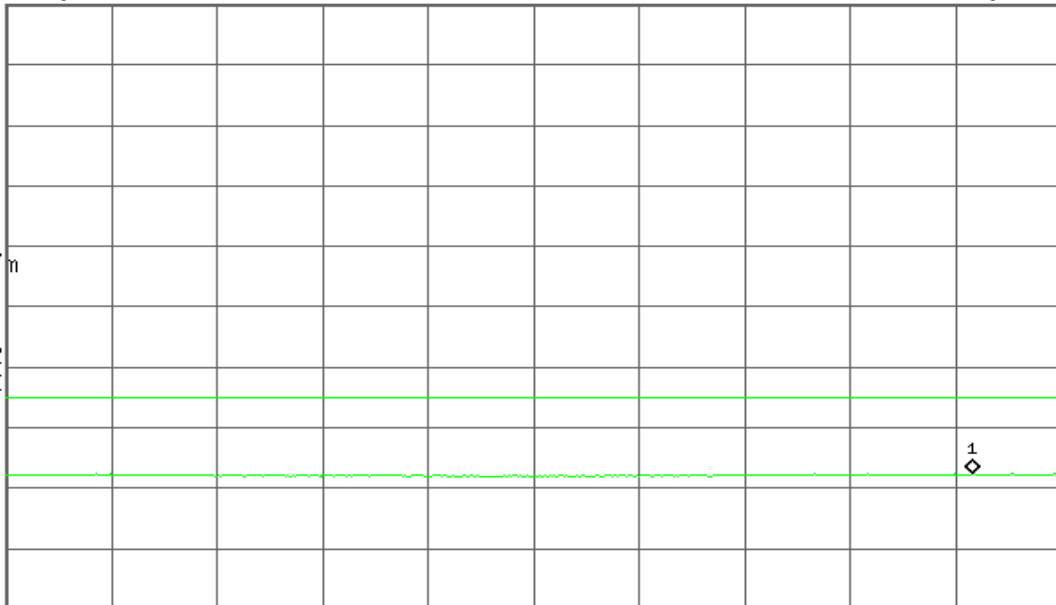
R T

Mkr1 2.383 33 GHz
41.39 dBµV/m

Ref 119 dBµV/m

#Atten 16 dB

#Peak
Log
10
dB/
Offst
6
dB
DI
54.0
dBµV/m
#PAvg
M1 S2
S3 FC
A
£(f):
FTun
Swp



Start 2.310 00 GHz

Stop 2.390 00 GHz

#Res BW 1 MHz

#VBW 300 Hz

Sweep 208 ms (601 pts)



Band Edges (CH High)

Detector mode: Peak

Polarity: Vertical

Agilent

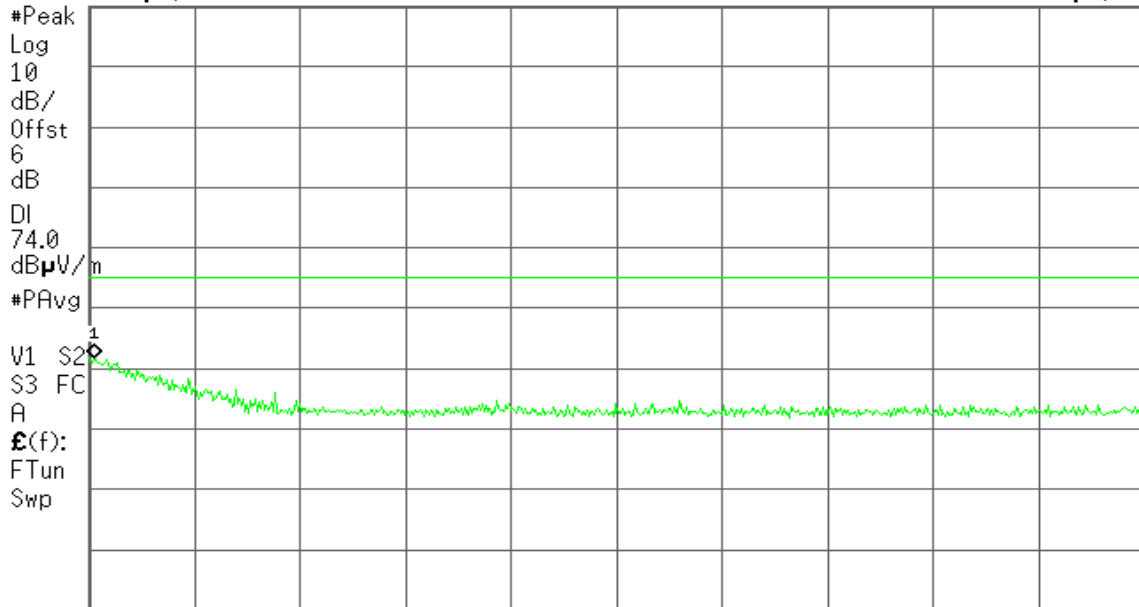
R T

Mkr1 2.483 58 GHz

60.83 dB μ V/m

Ref 119 dB μ V/m

#Atten 16 dB



Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 3 MHz

Stop 2.500 00 GHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

Agilent

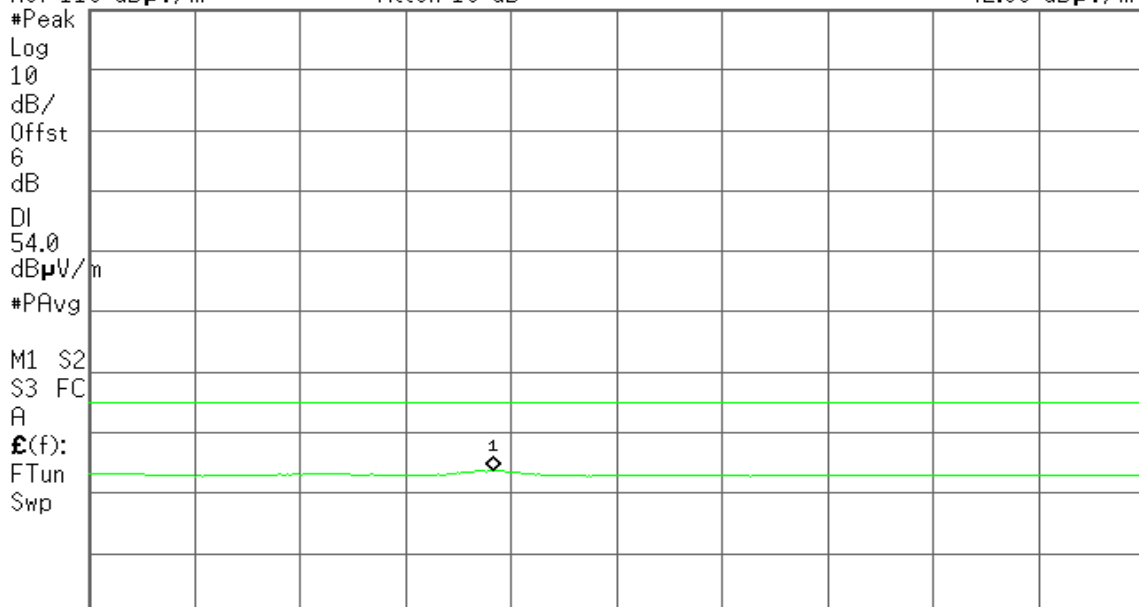
R T

Mkr1 2.489 82 GHz

42.80 dB μ V/m

Ref 119 dB μ V/m

#Atten 16 dB



Start 2.483 50 GHz

#Res BW 1 MHz

#VBW 300 Hz

Stop 2.500 00 GHz

Sweep 42.92 ms (601 pts)



Detector mode: Peak

Polarity: Horizontal

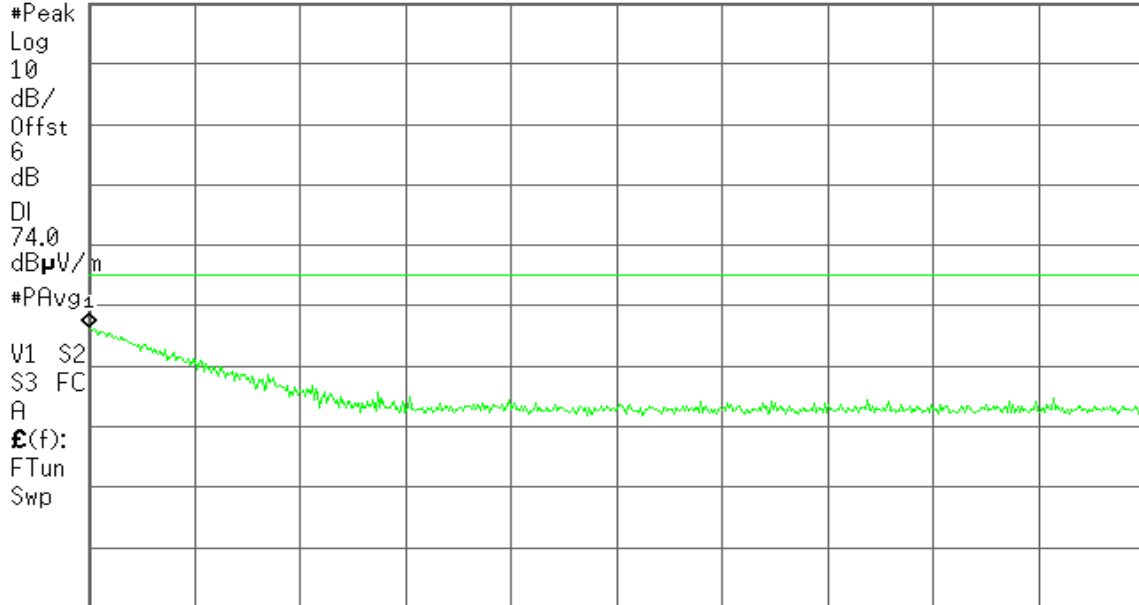
Agilent

R T

Mkr1 2.483 50 GHz
65.48 dBμV/m

Ref 119 dBμV/m

#Atten 16 dB



Start 2.483 50 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms (601 pts)

Detector mode: Average

Polarity: Horizontal

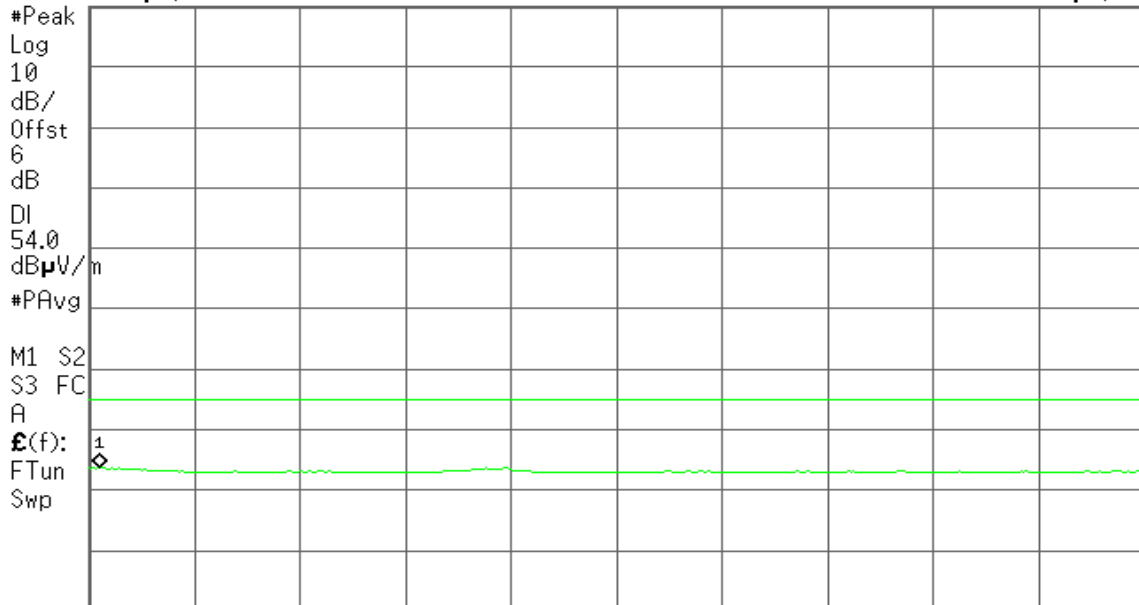
Agilent

R T

Mkr1 2.483 66 GHz
42.69 dBμV/m

Ref 119 dBμV/m

#Atten 16 dB



Start 2.483 50 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 300 Hz

Sweep 42.92 ms (601 pts)



7.2 SPURIOUS EMISSIONS

7.2.1 Radiated Emissions

LIMIT

All spurious emissions shall comply with the limits of §15.209(a) and RSS-Gen Table 2 & Table 5.

RSS-Gen Table 2 & Table 5: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz ^(Note)

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: *Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 7.2.7.

Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

RSS-Gen Table 6: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

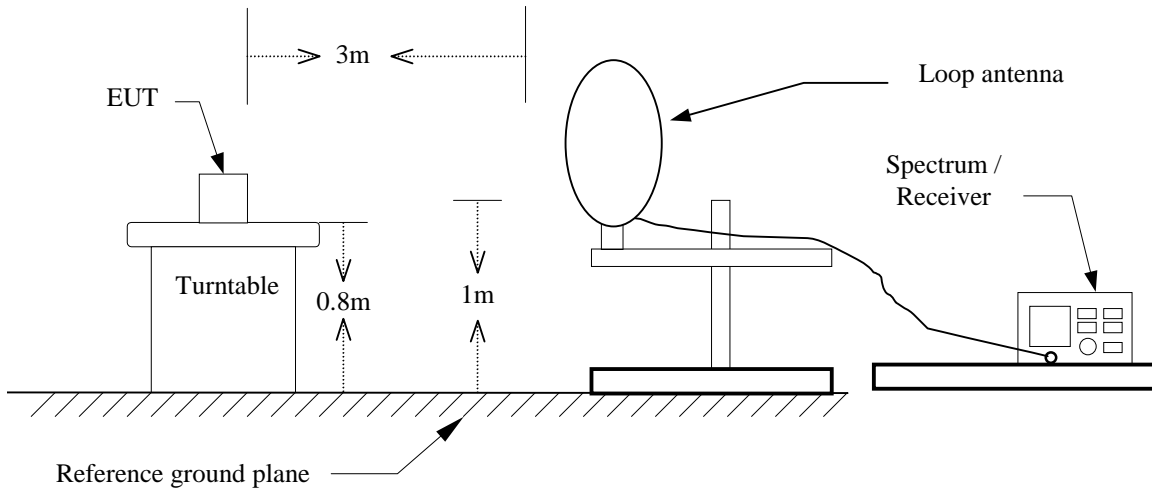
Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	3000
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

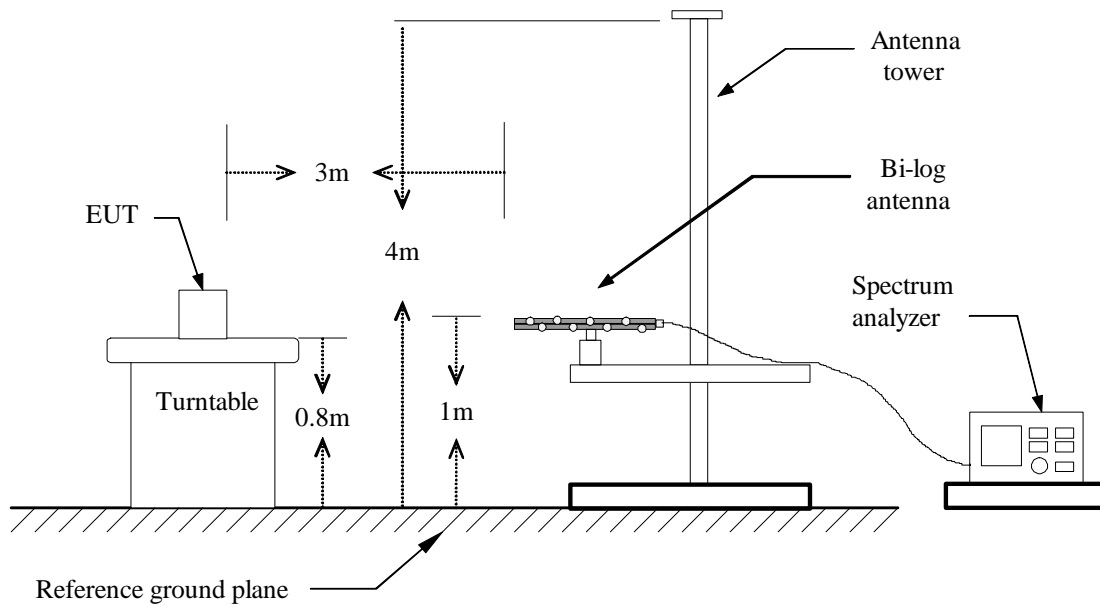


Test Configuration

9kHz ~ 30MHz

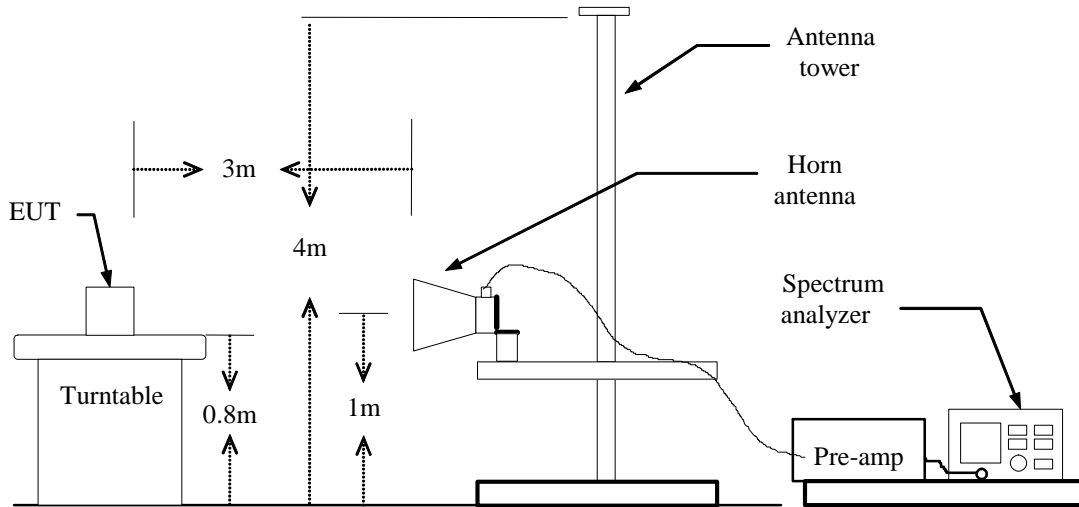


30MHz ~ 1GHz





Above 1 GHz





TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
Below 1GHz:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

**Below 1 GHz**

Operation Mode: Normal Link **Test Date:** October 12, 2013
Temperature: 27°C **Tested by:** Rex Huang
Humidity: 53 % RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
31.6167	61.21	-21.64	39.57	40.00	-0.43	QP	V
72.0333	68.94	-33.47	35.47	40.00	-4.53	QP	V
138.3167	60.04	-28.59	31.45	43.50	-12.05	peak	V
241.7833	65.11	-29.78	35.33	46.00	-10.67	peak	V
621.7000	53.12	-21.71	31.41	46.00	-14.59	peak	V
830.2500	50.25	-18.51	31.74	46.00	-14.26	peak	V
33.2333	52.64	-22.83	29.81	40.00	-10.19	peak	H
73.6500	60.76	-33.56	27.20	40.00	-12.80	peak	H
120.5333	62.05	-28.26	33.79	43.50	-9.71	peak	H
138.3167	63.52	-28.59	34.93	43.50	-8.57	peak	H
241.7833	74.09	-29.78	44.31	46.00	-1.69	QP	H
830.2500	57.47	-18.51	38.96	46.00	-7.04	peak	H

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. $Margin (dB) = Remark\ result (dBuV/m) - Quasi-peak\ limit (dBuV/m)$.



Above 1 GHz

Operation Mode: TX / GFSK / DH5 / CH Low

Test Date: October 11, 2013

Temperature: 27°C

Tested by: Rex Huang

Humidity: 53 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2143.333	51.61	-0.71	50.90	74.00	-23.10	peak	V
4808.333	42.23	5.39	47.62	74.00	-26.38	peak	V
N/A							
2320.000	51.86	-0.17	51.69	74.00	-22.31	peak	H
4800.000	42.12	5.38	47.50	74.00	-26.50	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit .
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



Operation Mode: TX / GFSK / DH5 / CH Mid

Test Date: October 11, 2013

Temperature: 27°C

Tested by: Rex Huang

Humidity: 53 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2186.667	52.19	-0.57	51.62	74.00	-22.38	peak	V
N/A							
2290.000	51.76	-0.23	51.53	74.00	-22.47	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $Margin (dB) = Remark\ result (dBuV/m) - Average\ limit (dBuV/m).$



Operation Mode: TX / GFSK / DH5 / CH High

Test Date: October 11, 2013

Temperature: 26°C

Tested by: Rex Huang

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2323.333	51.93	-0.17	51.76	74.00	-22.24	peak	V
N/A							
2140.000	51.48	-0.72	50.76	74.00	-23.24	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



Operation Mode: TX / 8DPSK / DH5 / CH Low

Test Date: October 11, 2013

Temperature: 26°C

Tested by: Rex Huang

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2326.667	51.89	-0.16	51.73	74.00	-22.27	peak	V
N/A							
2293.333	51.57	-0.22	51.35	74.00	-22.65	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



Operation Mode: TX / 8DPSK / DH5 / CH Mid

Test Date: October 11, 2013

Temperature: 26°C

Tested by: Rex Huang

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2256.667	51.76	-0.34	51.42	74.00	-22.58	peak	V
N/A							
2320.000	52.01	-0.17	51.84	74.00	-22.16	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



Operation Mode: TX / 8DPSK / DH5 / CH High

Test Date: October 11, 2013

Temperature: 26°C

Tested by: Rex Huang

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
2416.667	52.35	0.07	52.42	74.00	-21.58	peak	V
N/A							
2300.000	51.65	-0.20	51.45	74.00	-22.55	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).