ZTE Corporation FCC ID: Q78-ZXMBW-R9100

FCC PART 27
MEASUREMENT AND TEST REPORT

For

ZTE Corporation

ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen,
Guangdong, China 518057

FCC ID: Q78-ZXMBW-R9100
July 15, 2008

This Report Concerns: ☒ Original Report	**Equipment Type:** ZXMBW R9100

Test Engineer:	Liu Rui
Report No.:	RSZ06111000
Test Date:	May 08-July 10, 2008
Reviewed By:	Hu Qinghua
Prepared By:	ZTE Corporation.

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Note: The test report is specially limited to the above company and this particular sample only. It may not be duplicated without prior written consent of ZTE Corporation. This report must not be used by the client to claim product certification 、approval 、or endorsement by any agency of the US Government.

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2 GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The ZTE Corporation's product, model number: ZXMBW R9100 or the "EUT" as referred to in this report is a ZXMBW R9100 Remote Radio Unit (2X4) . The EUT is measured approximately 320 mm × 370 mm ×160 mm (W × D × H), input voltage: -48V.

* The test data gathered are from production sample, serial number: 0806132

Objective

This Type approval report is prepared on behalf of ZTE Corporation in accordance with Part 2、Part 15、Part 27 of the Federal Communication Commissions rules.
Related Submittal(s)/Grant(s)
No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:
Part 27 Wireless Communication Services
Applicable Standards: TIA EIA 137-A, TIA EIA 97-D, TIA/EIA 603-B, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

Test Facility

The Test site used by ZTE Corporation to collect test data is located in the ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China，Tel: +86-755-26770000，Fax: +86-755-26771999. Test site at ZTE Corporation has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 0009043175. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.
External I/O Cable

Cable Description	Length (M)	From/Port	To

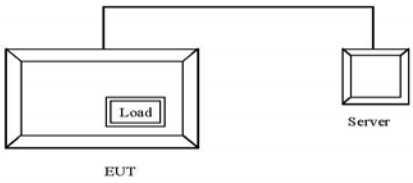
Unshielded Undetachable AC Power Cable	3.0	EUT	AC POWER

3 SYSTEM TEST CONFIGURATION

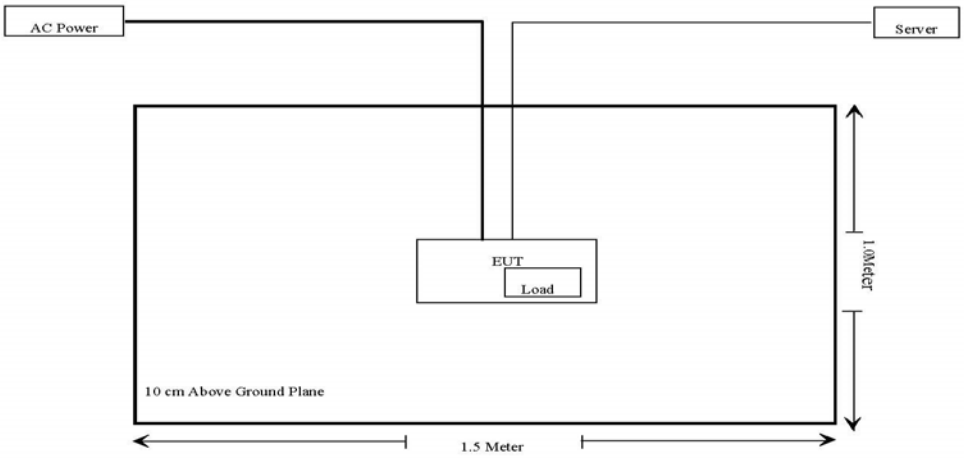
Description of Test Configuration

Equipment Modifications
ZTE Corporation has not done any modification on the EUT.

Configuration of Test Setup



Block Diagram of Test Setup



4 SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1046&t27.5(h)	Conducted POWER	Compliant
§2.1047	Modulation characteristic	Compliant
§2.1053	Spurious Radiated Emissions	Compliant
§2.1046&t27.5(h)	EFFECTIVE RADIATED POWER	Compliant
§2.1051, §27.53	Spurious Emissions AT Antenna Terminals	Compliant
§2.1049	Occupied Bandwidth	Compliant
§27.53	Band Edge	Compliant
§ 2.1055 (a) § 2.1055 (d) § 27.54	Frequency stability	Compliant

5 §2.1046, §27.5(h) - CONDUCTED POWER

Applicable Standard

According to FCC §2.1046&27.5(h), the conducted power must not exceed 2000 Watts.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020	MY48010663	2008-5-2	2009-5-2
JFW	JFW 40dB Attenuator	50HF-40-SMA	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation. External attenuation Loss is 40dB, Cable Loss is about 2dB
Test Data Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

The testing was performed by Liu Rui on May 08-July 10, 2008

Test Result: Pass

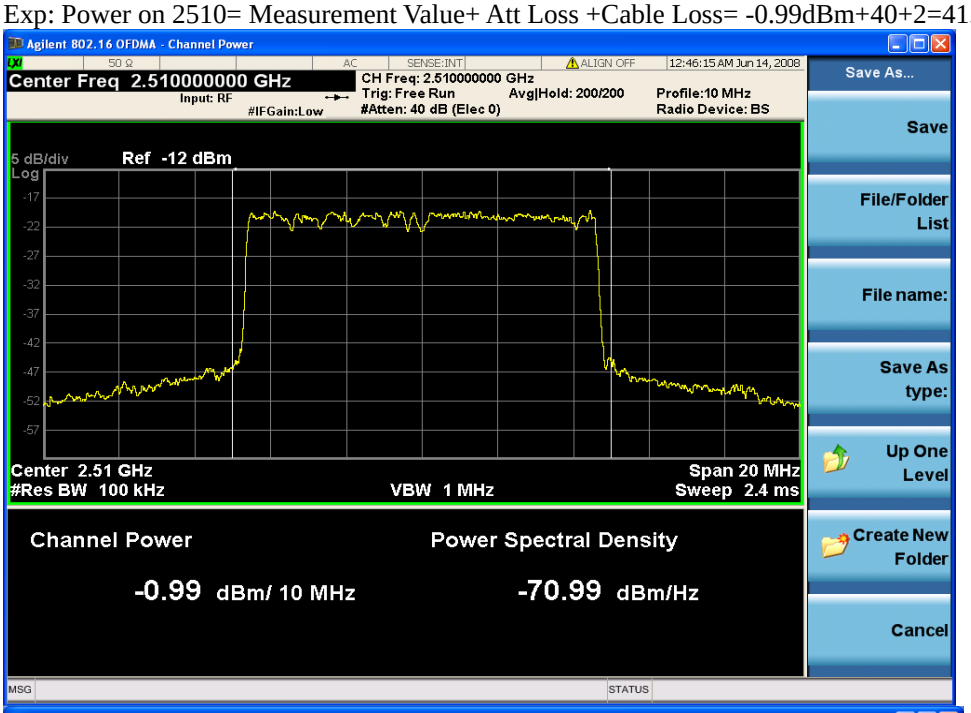
Test Mode: Transmitting WiMAX

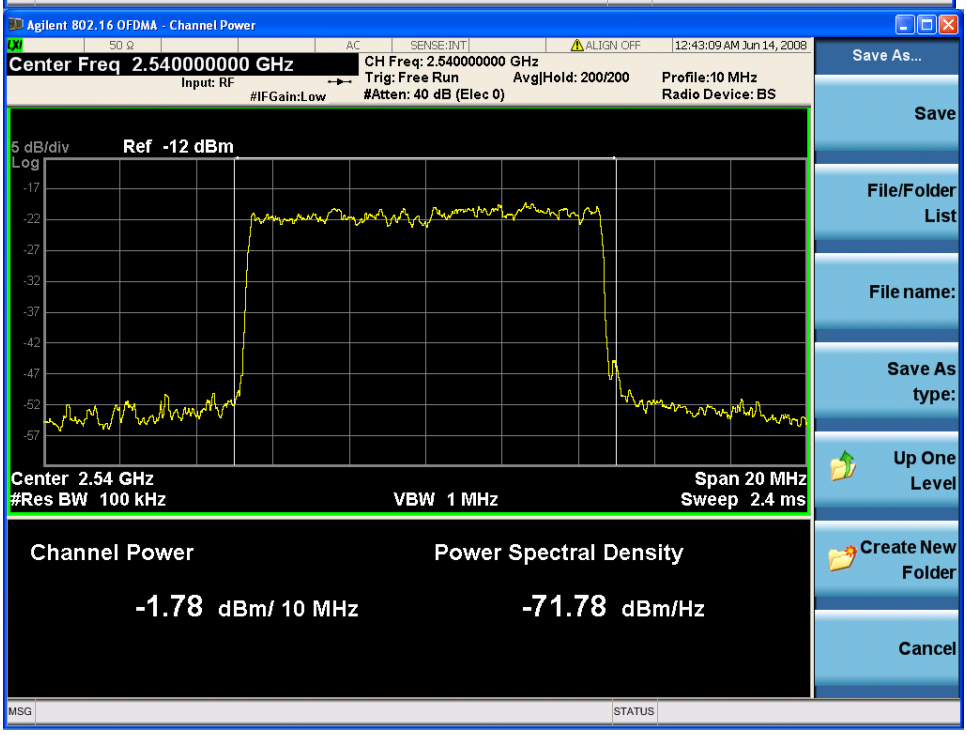
Test Data:

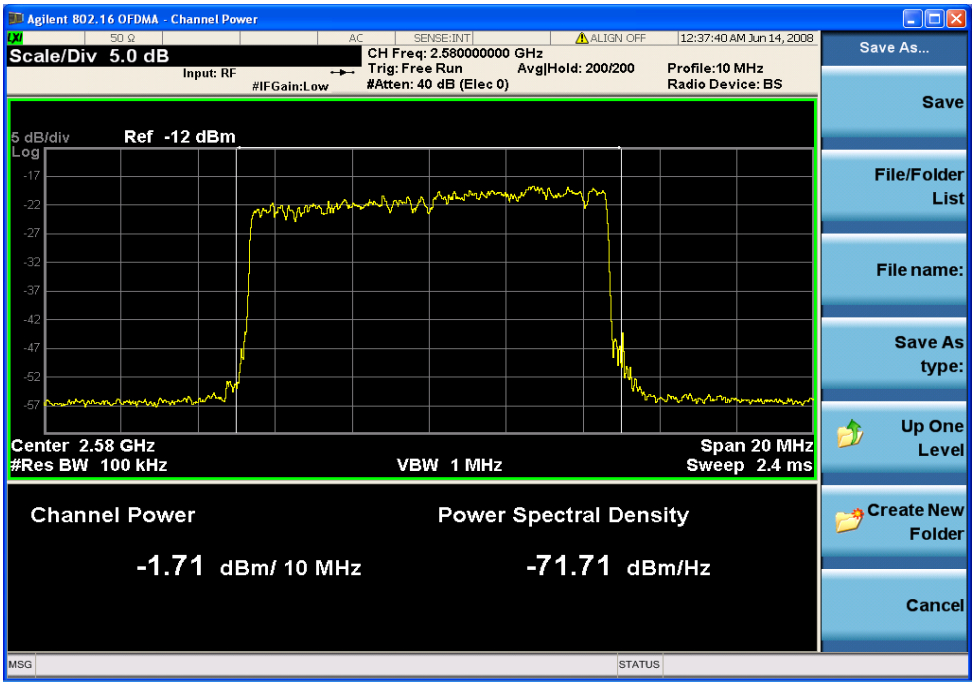
Frequency (MHz)	Total Power in dBm	Total Power in W	Limit in W
2510	41.01		2000
2540	40.22		2000

2580	40.29		2000

Exp: Power on 2510= Measurement Value+ Att Loss +Cable Loss= -0.99dBm+40+2=41.01dBm






Agilent 802.16 OFDMA - Channel Power
50 Ω
AC
SENSE:INT
ALIGN OFF
12:37:40 AM Jun 14, 2008
Scale/Div 5.0 dB
Input: RF
#IFGain:Low
CH Freq: 2.580000000 GHz
Trig: Free Run
Avg|Hold: 200/200
#Atten: 40 dB (Elec 0)
Profile:10 MHz
Radio Device: BS
5 dB/div
Log
Ref -12 dBm
-17
-22
-27
-32
-37
-42
-47
-52
-57
Center 2.58 GHz
#Res BW 100 kHz
VBW 1 MHz
Span 20 MHz
Sweep 2.4 ms
Channel Power
-1.71 dBm/ 10 MHz
Power Spectral Density
-71.71 dBm/Hz
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel
MSG
STATUS

6 §2.1047-MODULATION HARACTERISTIC

Applicable Standard Requirement: §2.1047.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020	MY48010663	2008-5-2	2009-5-2
JFW	JFW 40dB Attenuator	50HF-40-SMA	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

Test Procedure

WiMAX digital mode is used by EUT.
Test Data Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

The testing was performed by Liu Rui on May 08-July 10, 2008

Test Result: Pass

Test Mode: Transmitting/WiMAX

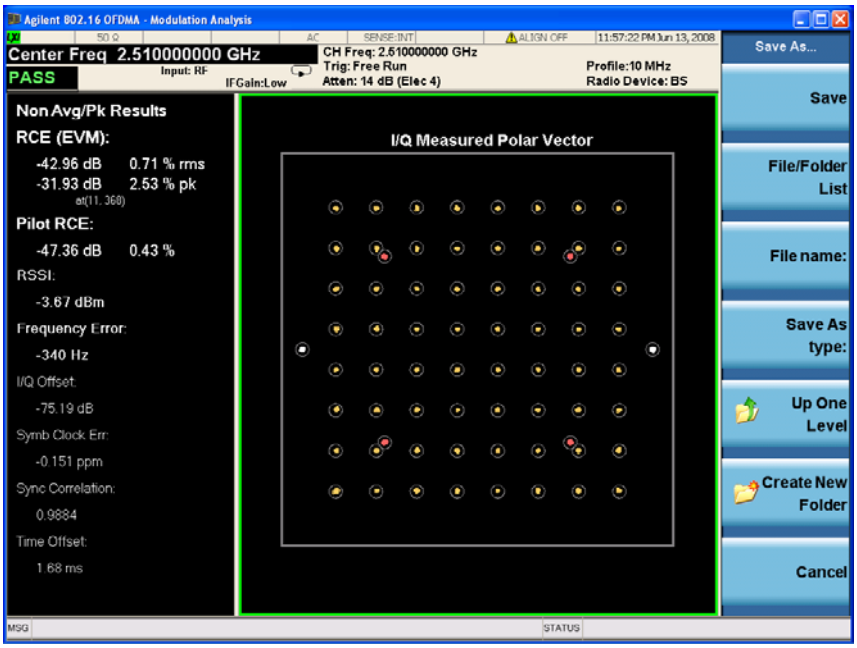
Frequency (MHz)	EVM(dB)	Result
2510	-42.96	Pass
2540	-43.16	Pass
2580	-41.71	Pass

Test Limit

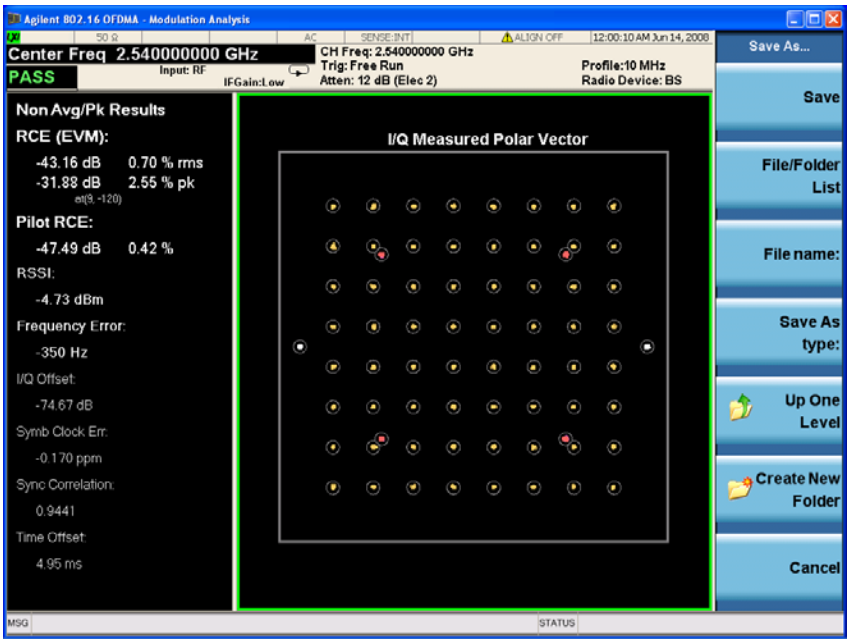
Test Step	Modulation & Coding	Maximum Rel. Constel. Error, dB
1	QPSK-3/4	-20
2	16QAM-3/4	-25
3	64QAM-3/4	-32

Test Data:

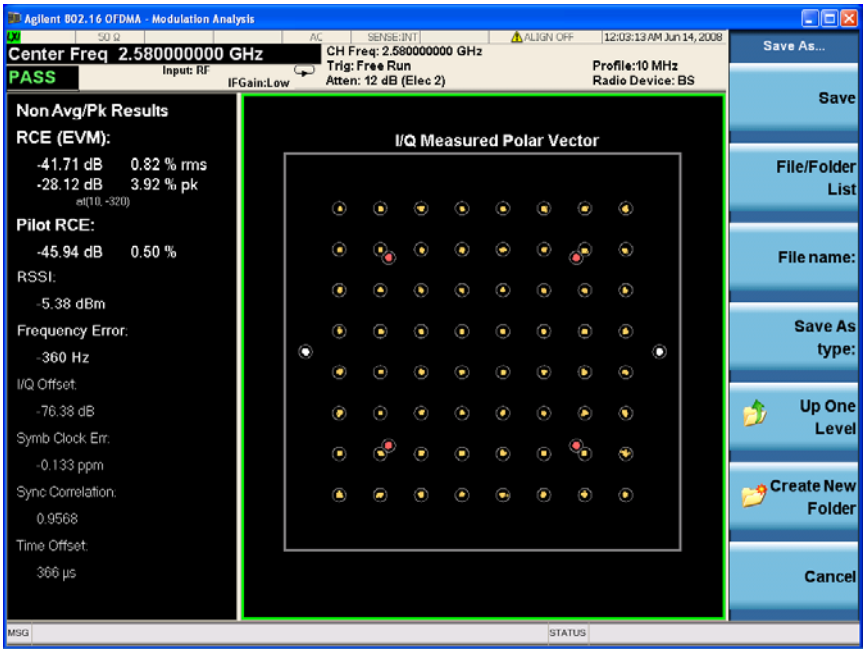
2510M



2540M



2580M


Agilent 802.16 OFDMA - Modulation Analysis
50 Ω
AC
SENSE:INT
ALIGN OFF
12:03:13 AM Jun 14, 2008
Center Freq 2.580000000 GHz
PASS
Input: RF
IFGain:Low
CH Freq: 2.580000000 GHz
Trig: Free Run
Atten: 12 dB (Elec 2)
Profile:10 MHz
Radio Device: BS
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel
Non Avg/Pk Results
RCE (EVM):
-41.71 dB 0.82 % rms
-28.12 dB 3.92 % pk
at(10, -320)
Pilot RCE:
-45.94 dB 0.50 %
RSSI:
-5.38 dBm
Frequency Error:
-360 Hz
I/Q Offset:
-76.38 dB
Symb Clock Err:
-0.133 ppm
Sync Correlation:
0.9568
Time Offset:
366 µs
I/Q Measured Polar Vector
MSG
STATUS

7 §2.1053-SPURIOUS RADIATED EMISSIONS

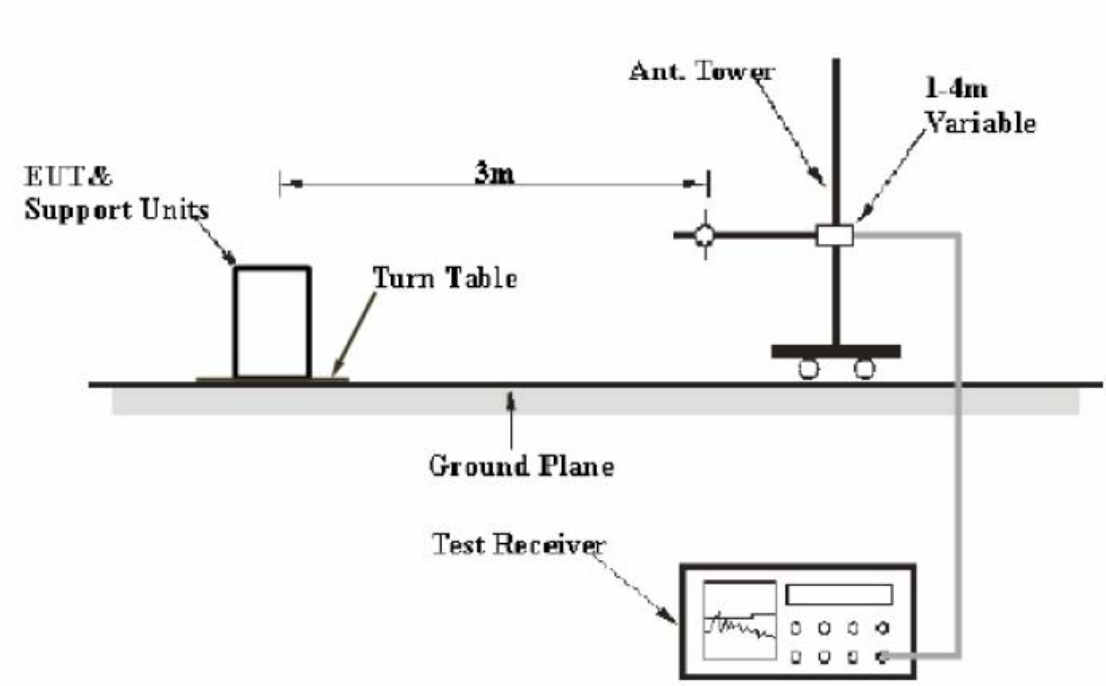
Applicable Standard Requirements: CFR 47, §2.1053

Test Equipment List and Details

Item	Equipment	Manufacturer	Mode	Serial	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESI26	100058	2007-10-16	1 Year
2	Ultra Broadband Antenna	R&S	HL562	100022	2006-3-6	3 Years
3	Double-Ridged Waveguide Horn Antenna	R&S	HF906	100032	2007-10-10	3 Years
4	Anechoic Chamber	Albatross	3m Site	N/A	2007-7-15	3 Year
5	Cable Set	R&S	RE Cable	N/A	2007-8-17	1Year
6	Cable set II	R&S	Substitution Tx Cable	N/A	2007-8-17	1Year
7	Cable set III	R&S	Hi-freq RX Antenna Cable	N/A	2007-8-17	1Year
8	Software	R&S	ES-K1	N/A	N/A	N/A
9	Double-Ridged Waveguide Horn Antenna	R&S	HF906	100013	2007-1-31	3 Years
10	VHF-UHF Broad band Antenna	SCHWARZBECK	VUBA 9117	SB3174	2007-11-17	3 Years
11	Signal Generator	R&S	SMR20	100098	2007-12-17	1Year

Measurement Uncertainty
All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.
Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiated emissions measurement at the EMC lab of ZTE Corp. is 2dB.

EUT Setup



The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with the TIA/EIA 603-B. The specification used was the FCC 15.109 limits.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.
The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.
The frequency range up to teeth harmonic of the fundamental frequency was investigated.
Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.
Spurious emissions in dB =10 1g (TXpwr in Watts/0.001)-the absolute level
Spurious attenuation limit in dB =43+10 Log10 (power out in Watts)

Test Results Summary: PASS

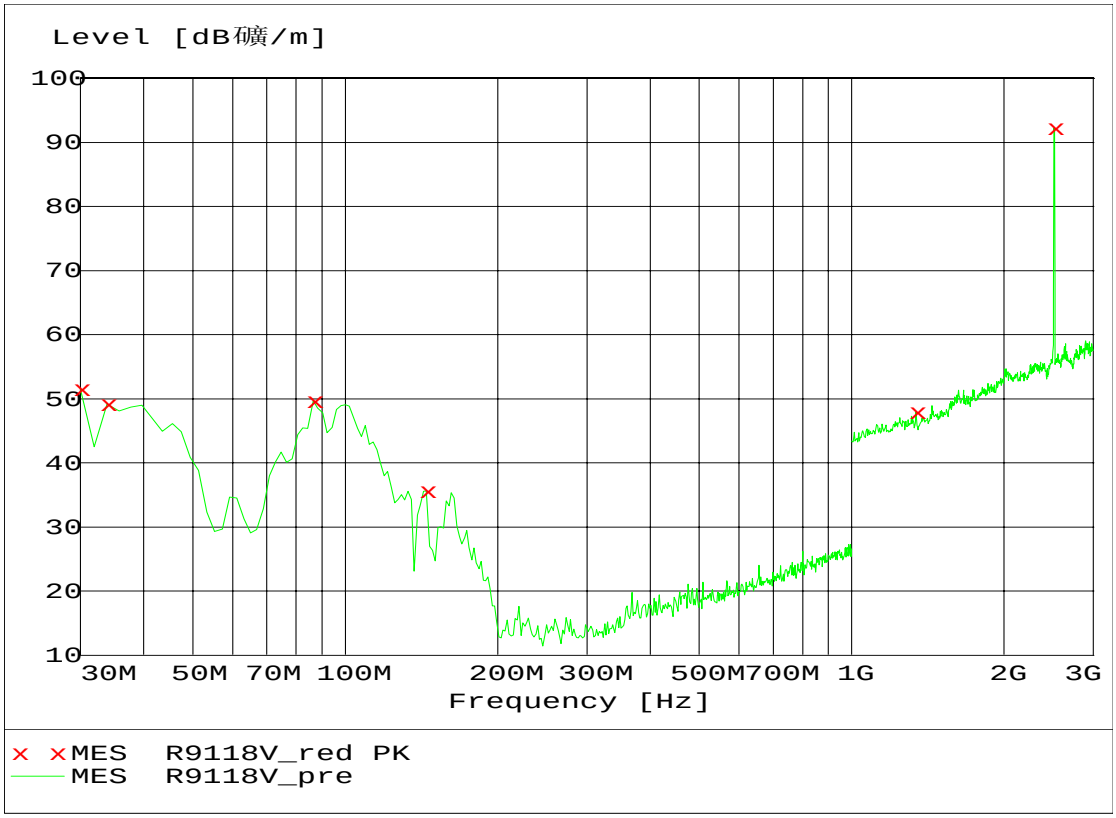
34.81dB at 18202.405MHz Centre Frequency at 2580MHz

Test Data

At 2510MHz

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 30MHz~3GHz for Vertical
Start of Test: 2008-6-28 / 14:52:27

MEASUREMENT RESULT: "R910030-3GV1_red PK"



MEASUREMENT RESULT: "R910030-3GV1_red PK"

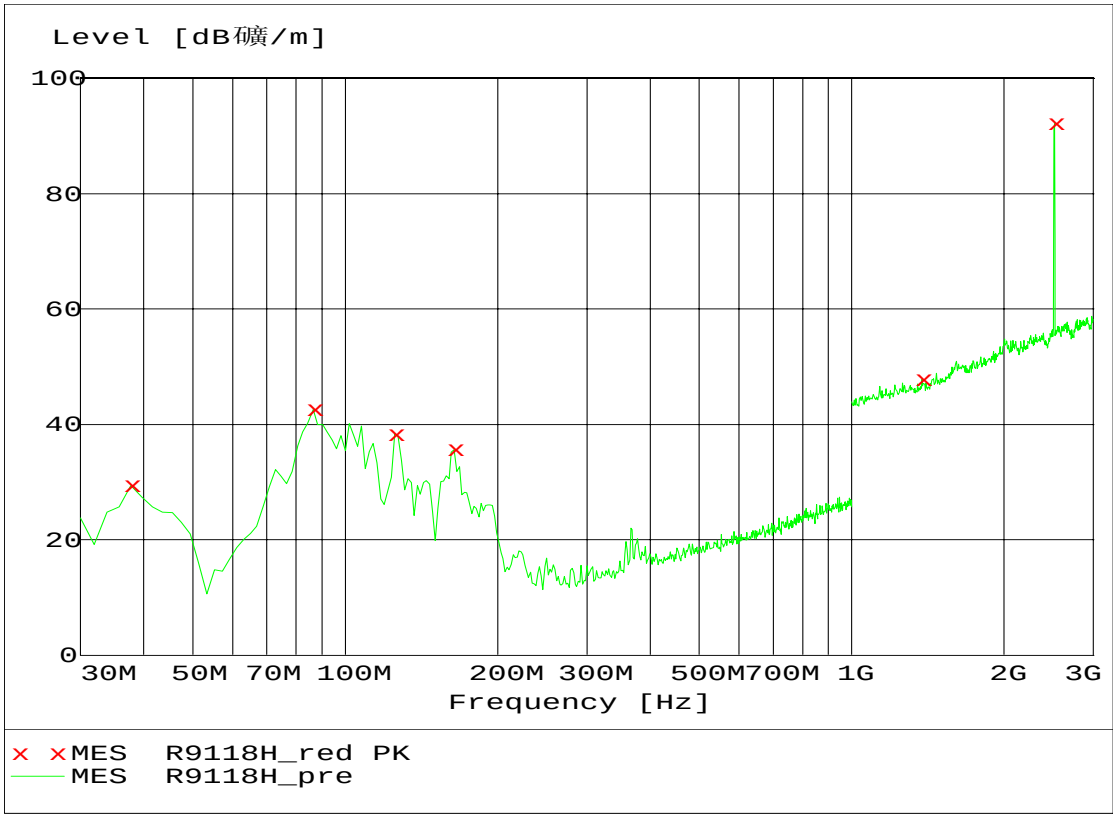
2008-6-28 15:27

Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp(dBm)	Margin (dB)
30	51.46	-8.92	0.3	-43.49	-54.86	-13	41.86
33.887776	49.18	-9.9	0.3	-42.03	-54.38	-13	41.38
86.372745	49.66	-27.72	0.8	-19.65	-50.32	-13	37.32
144.68938	35.69	-50.26	1	-7.29	-60.7	-13	47.7
1340.6814	47.93	-55.86	3.1	4.25	-56.86	-13	43.86

TEST

Electric Field Strength
EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 30MHz~3GHz for Horizontal
Start of Test: 2008-6-28 15:26

MEASUREMENT RESULT: "R910030-3GH3_red PK"



MEASUREMENT RESULT: "R910030-3GH3_red PK"

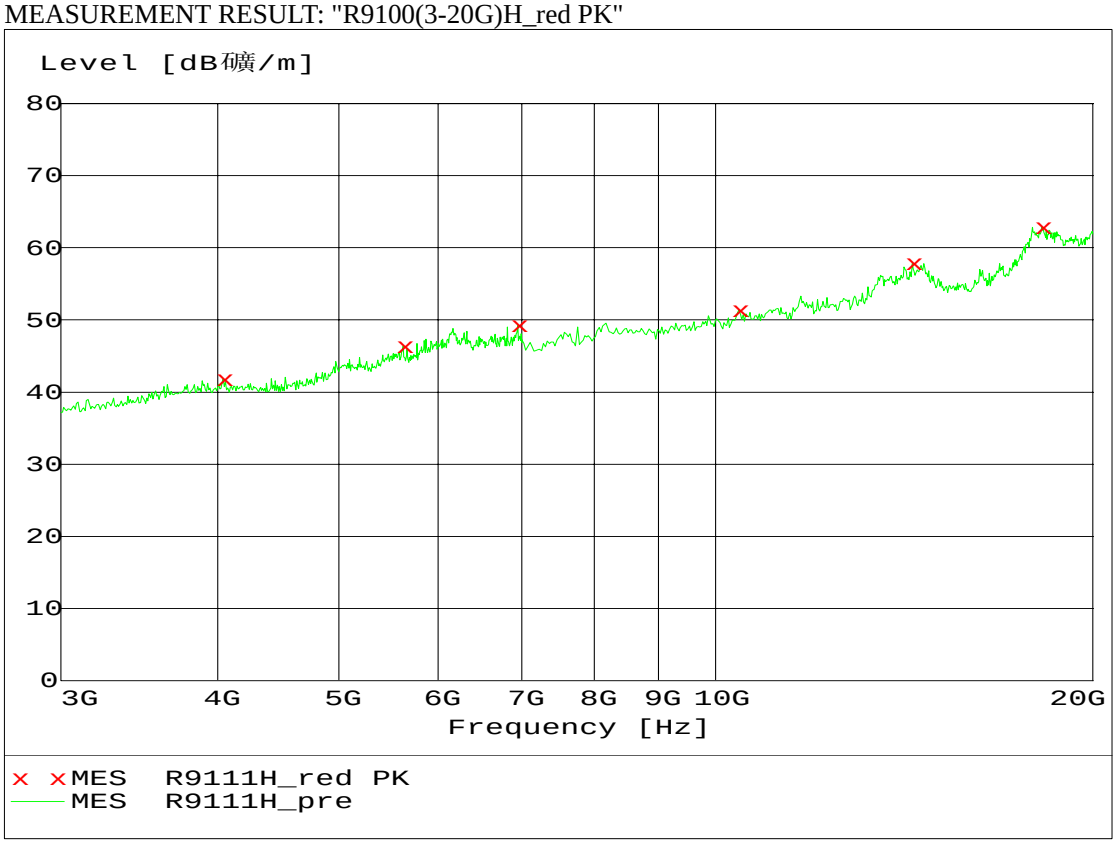
Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp (dBm)	Margin (dB)
37.775551	29.4	-23.34	0.5	-38.98	-64.97	-13	51.97
86.372745	42.57	-37.74	0.8	-19.65	-60.34	-13	47.34
125.2505	38.42	-47.74	0.8	-10.46	-61.15	-13	48.15
164.12826	35.61	-60.22	1.1	-3.84	-67.31	-13	54.31
1376.7535	47.84	-58.26	3.1	4.25	-59.26	-13	46.26
37.775551	29.4	-23.34	0.5	-38.98	-64.97	-13	51.97

TEST
Electric Field Strength

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication

Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 3GHz~20GHz for Horizontal
Start of Test: 2008-6-28 11:13

MEASUREMENT RESULT: "R9100(3-20G)H_red PK"

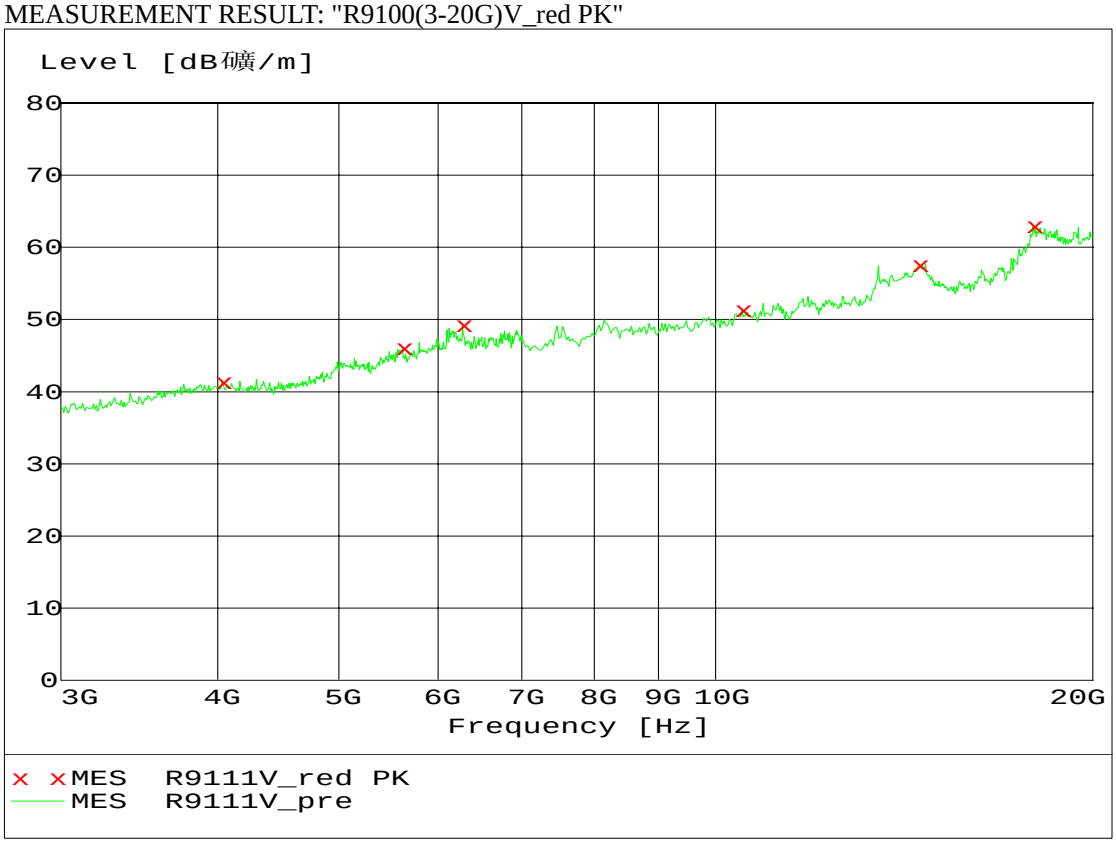


MEASUREMENT RESULT: "R9100(3-20G)H_red PK"

Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limiterp (dBm)	Margin (dB)
4042.0842	41.82	-62.83	5.3	7.95	-62.33	-13	49.33
5629.2585	46.43	-52.18	6.5	9.05	-51.78	-13	38.78
6951.9038	49.23	-56.19	7.3	9.25	-56.39	-13	43.39
10438.878	51.39	-57.55	9.1	11.35	-57.45	-13	44.45
14346.693	57.78	-47.54	10.8	9.65	-50.84	-13	37.84
18202.405	62.88	-41.22	12.2	6.45	-49.12	-13	36.12

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 3GHz~20GHz for Vertical
Start of Test: 2008-6-28 11:08

MEASUREMENT RESULT: "R9100(3-20G)V_red PK"



MEASUREMENT RESULT: "R9100(3-20G)V_red PK"

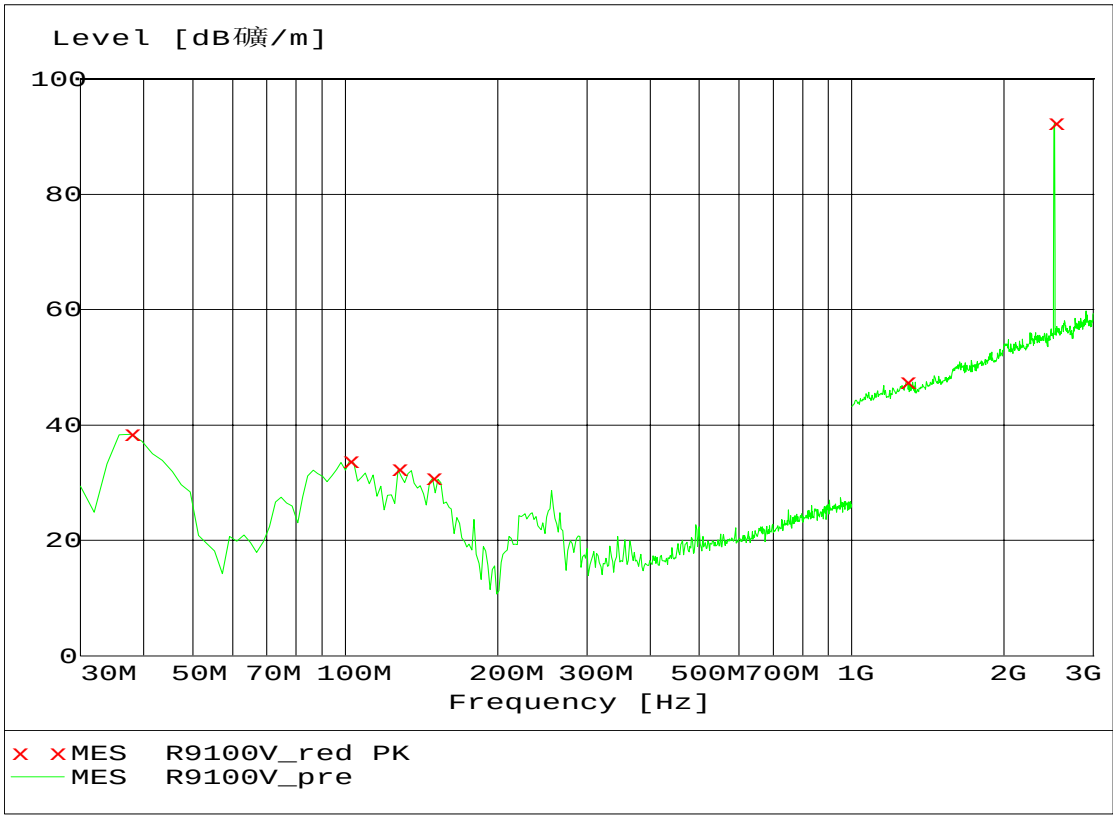
Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp(dBm)	Margin (dB)
4034.0681	41.3	-64.79	5.3	7.95	-64.29	-13	51.29
5621.2425	46.08	-60.55	6.5	9.05	-60.15	-13	47.15
6278.5571	49.2	-60.09	6.9	9.05	-60.09	-13	47.09
10490.982	51.26	-56.97	9.1	11.35	-56.87	-13	43.87

14529.058	57.6	-55.65	11	9.15	-59.65	-13	46.65
17915.832	62.9	-48.03	12.2	8.95	-53.43	-13	40.43

At 2540MHz

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 30MHz~3GHz for Vertical
Start of Test: 2008-6-28 / 14:52:27

MEASUREMENT RESULT: "R910030-3GV1_red PK"



MEASUREMENT RESULT: "R910030-3GV1_red PK"

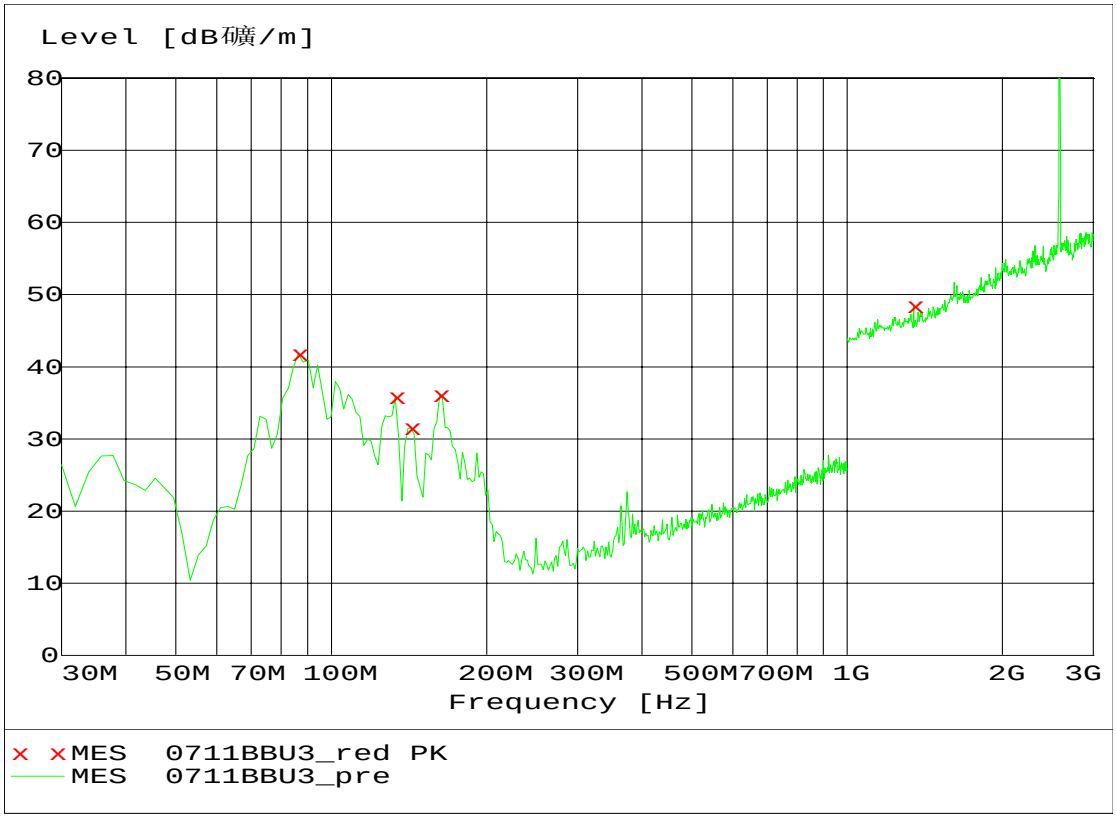
2008-6-28 15:27

Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp(dBm)	Margin (dB)
37.775551	38.41	-25.45	0.5	-38.98	-67.08	-13	54.08
101.92385	33.69	-47.17	0.8	-15.53	-65.65	-13	52.65
127.19439	32.27	-54.73	0.8	-10.46	-68.14	-13	55.14
148.57715	30.8	-55.15	1	-6.46	-64.76	-13	51.76
1284.5691	47.47	-61.36	3	4.25	-62.26	-13	49.26

TEST

Electric Field Strength
EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 30MHz~3GHz for Horizontal
Start of Test: 2008-6-28 15:26

MEASUREMENT RESULT: "R910030-3GH3_red PK"



MEASUREMENT RESULT: "R910030-3GH3_red PK"

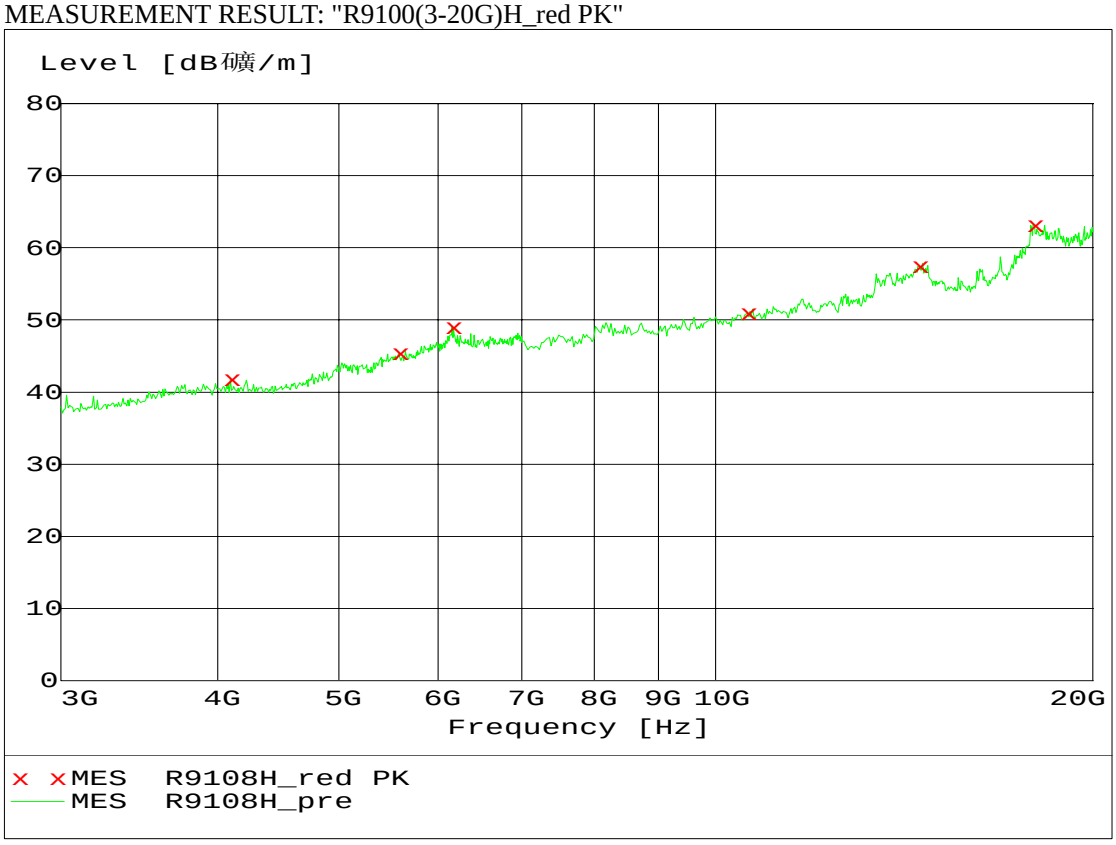
Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp (dBm)	Margin (dB)
123.30661	34.85	-51.31	0.8	-11.33	-65.59	-13	52.59
138.85772	34.35	-57.69	1	-8.42	-69.26	-13	56.26
152.46493	32.64	-59.4	1	-5.7	-68.25	-13	55.25
267.15431	30.11	-69.02	1.3	1.26	-71.21	-13	58.21
1328.6573	47.91	-58.24	3.1	4.25	-59.24	-13	46.24
123.30661	34.85	-51.31	0.8	-11.33	-65.59	-13	52.59

TEST
Electric Field Strength

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication

Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 3GHz~20GHz for Horizontal
Start of Test: 2008-6-28 11:13

MEASUREMENT RESULT: "R9100(3-20G)H_red PK"

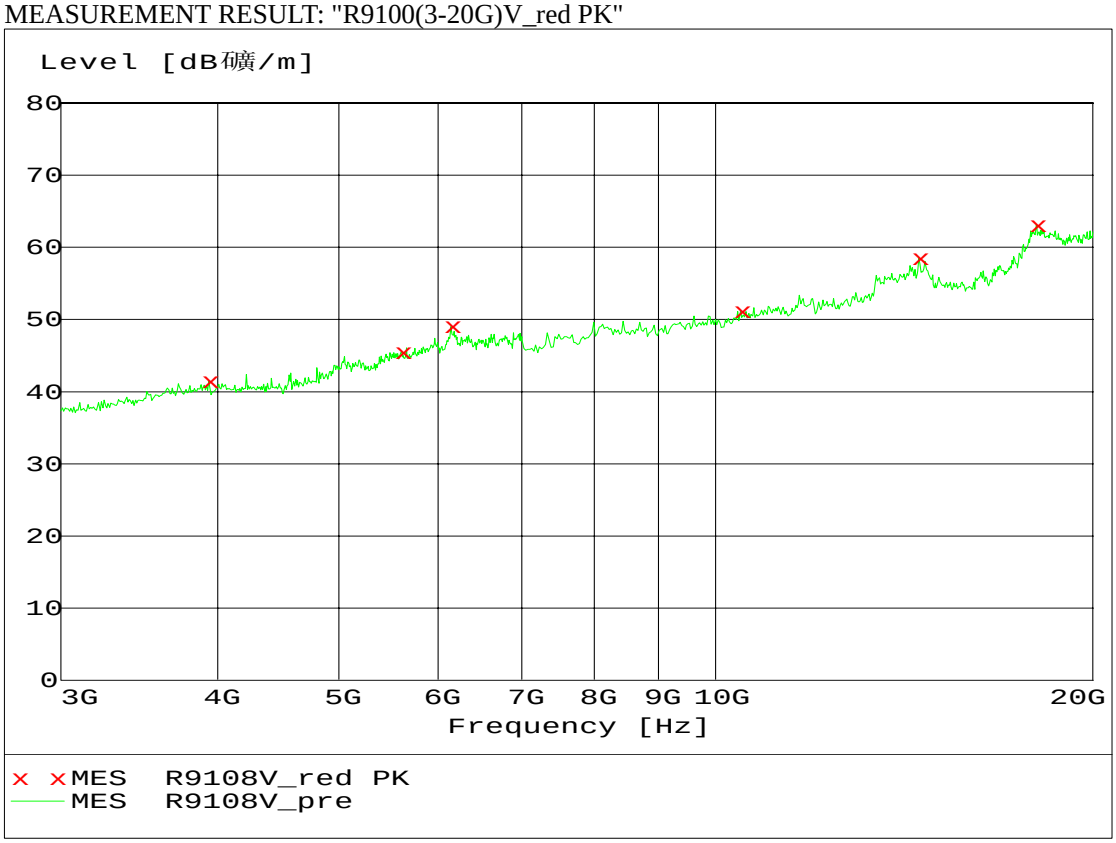


MEASUREMENT RESULT: "R9100(3-20G)H_red PK"

Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limiterp (dBm)	Margin (dB)
4098.1964	41.78	-62.87	5.4	7.95	-62.47	-13	49.47
5581.1623	45.39	-53.22	6.4	9.05	-52.72	-13	39.72
6158.3166	49.04	-54.35	6.9	9.05	-54.35	-13	41.35
10595.19	50.89	-58.21	9.1	11.75	-57.71	-13	44.71
14529.058	57.47	-49.78	11	9.15	-53.78	-13	40.78
17941.884	63.2	-43.24	12.2	8.95	-48.64	-13	35.64

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 3GHz~20GHz for Vertical
Start of Test: 2008-6-28 11:08

MEASUREMENT RESULT: "R9100(3-20G)V_red PK"



MEASUREMENT RESULT: "R9100(3-20G)V_red PK"

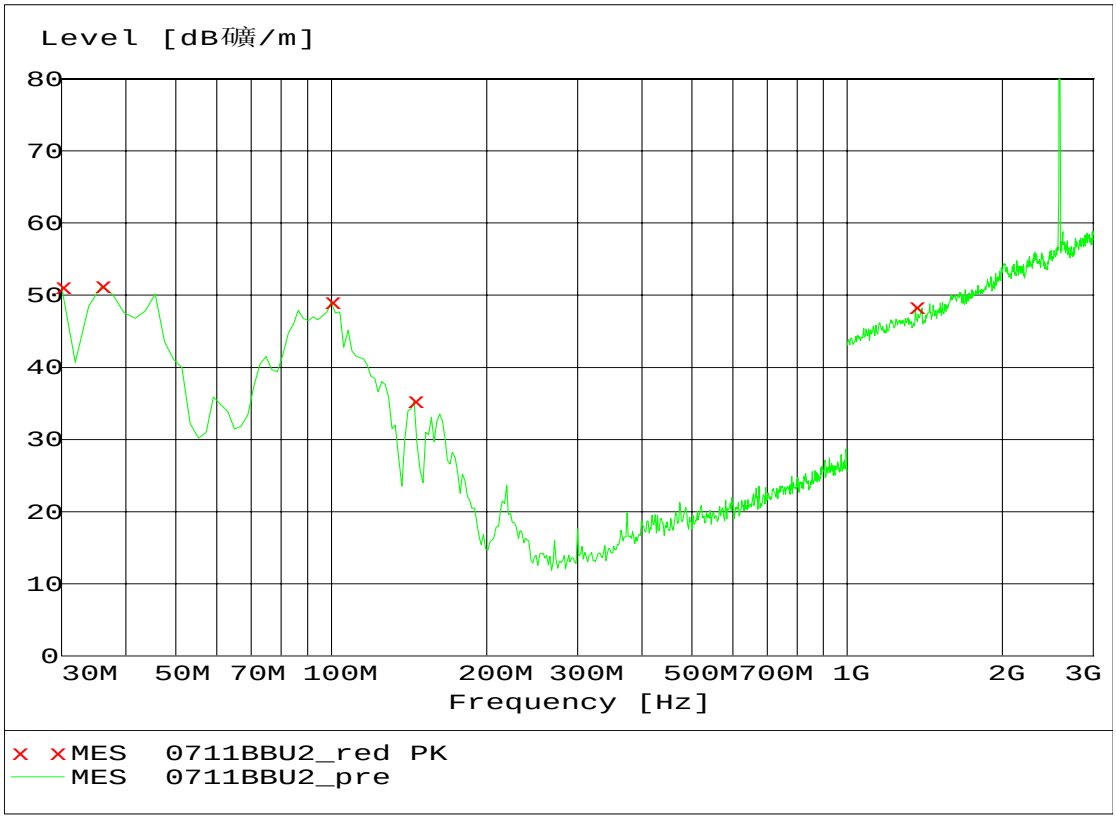
Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp(dBm)	Margin (dB)
3937.8758	41.43	-64.66	5.3	7.75	-64.36	-13	51.36
5613.2265	45.51	-61.12	6.5	9.05	-60.72	-13	47.72
6142.2846	49.03	-58.44	6.8	9.05	-58.34	-13	45.34
10464.93	51.2	-57.03	9.1	11.35	-56.93	-13	43.93

14529.058	58.47	-54.78	11	9.15	-58.78	-13	45.78
18020.04	63.13	-47.8	12.2	6.45	-55.7	-13	42.7

At 2580MHz

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 30MHz~3GHz for Vertical
Start of Test: 2008-6-28 / 14:52:27

MEASUREMENT RESULT: "R910030-3GV1_red PK"



MEASUREMENT RESULT: "R910030-3GV1_red PK"

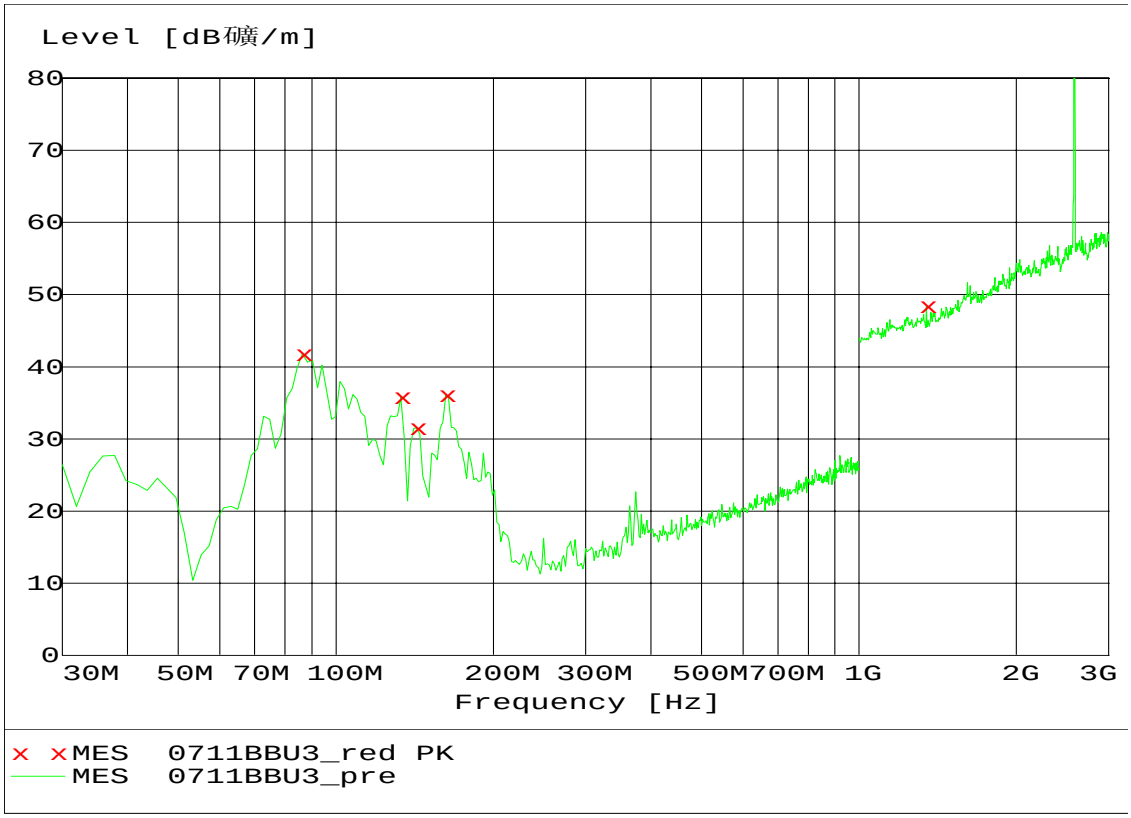
2008-6-28 15:27

Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp(dBm)	Margin (dB)
30	51.13	-9.25	0.3	-43.49	-55.19	-13	42.19
35.831663	51.22	-13.17	0.5	-39.76	-55.58	-13	42.58
99.97996	49.1	-31.76	0.8	-16.61	-51.32	-13	38.32
144.68938	35.25	-50.7	1	-7.29	-61.14	-13	48.14
1356.7134	48.26	-55.53	3.1	4.25	-56.53	-13	43.53

TEST

Electric Field Strength
EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 30MHz~3GHz for Horizontal
Start of Test: 2008-6-28 15:26

MEASUREMENT RESULT: "R910030-3GH3_red PK"



MEASUREMENT RESULT: "R910030-3GH3_red PK"

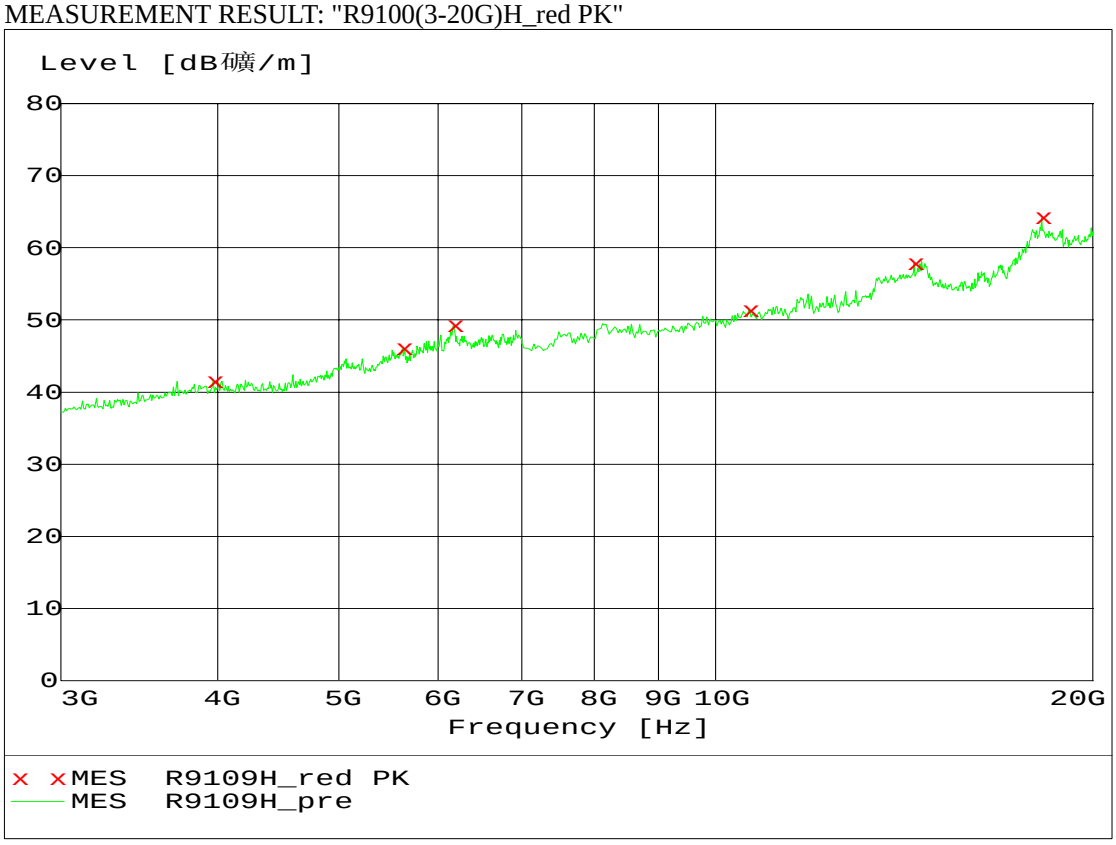
Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp (dBm)	Margin (dB)
86.372745	41.8	-38.51	0.8	-19.65	-61.11	-13	48.11
133.02605	35.72	-50.44	0.8	-9.59	-62.98	-13	49.98
142.74549	31.53	-60.51	1	-7.29	-70.95	-13	57.95
162.18437	36.06	-59.77	1.1	-3.84	-66.86	-13	53.86
1344.6894	48.35	-57.75	3.1	4.25	-58.75	-13	45.75
86.372745	41.8	-38.51	0.8	-19.65	-61.11	-13	48.11

TEST
Electric Field Strength

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication

Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 3GHz~20GHz for Horizontal
Start of Test: 2008-6-28 11:13

MEASUREMENT RESULT: "R9100(3-20G)H_red PK"

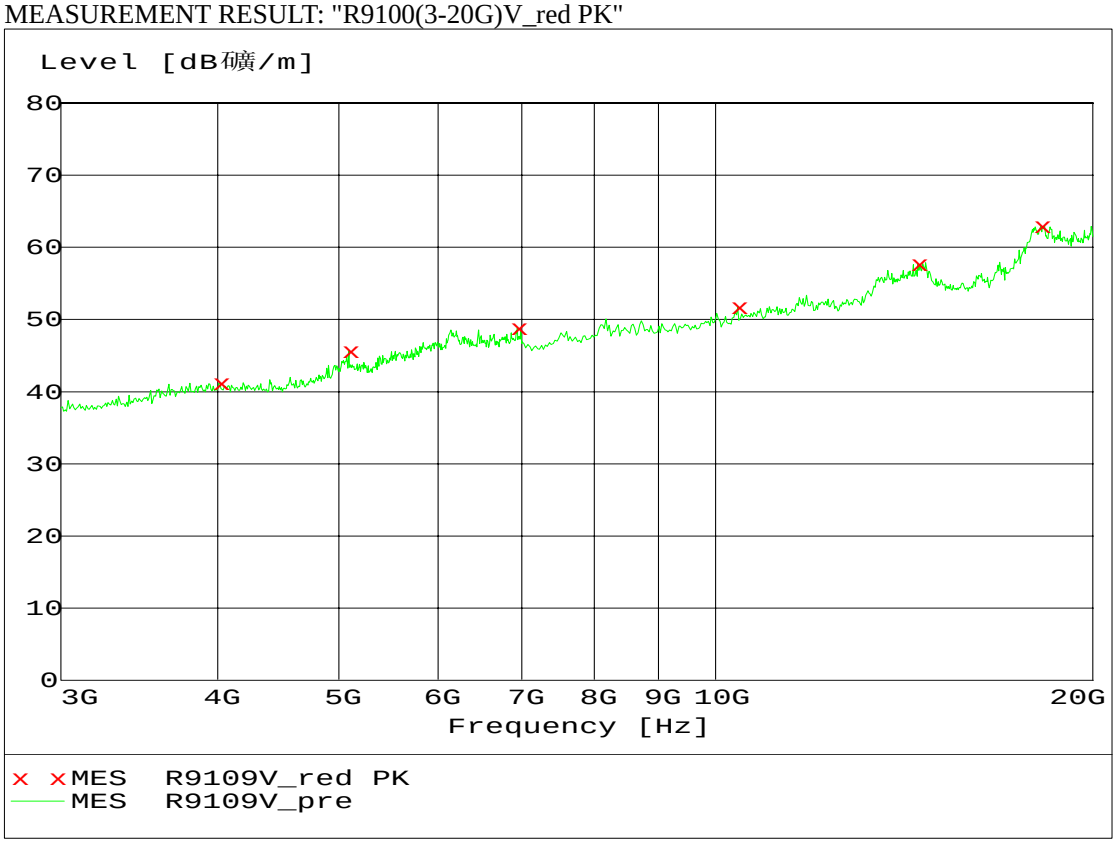


MEASUREMENT RESULT: "R9100(3-20G)H_red PK"

Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limiterp (dBm)	Margin (dB)
3969.9399	41.59	-61.81	5.3	7.75	-61.51	-13	48.51
5621.2425	46.02	-52.59	6.5	9.05	-52.19	-13	39.19
6174.3487	49.25	-54.14	6.9	9.05	-54.14	-13	41.14
10621.242	51.35	-57.75	9.1	11.75	-57.25	-13	44.25
14398.798	57.9	-47.42	10.8	9.65	-50.72	-13	37.72
18202.405	64.19	-39.91	12.2	6.45	-47.81	-13	34.81

EUT: ZXMBW R9100
Manufacturer: ZTE Corporation
Operating Condition: Communication
Test Site: ZTE EMC Lab.
Operator: guan bin
Test Specification: CFR 47
Comment: 3GHz~20GHz for Vertical
Start of Test: 2008-6-28 11:08

MEASUREMENT RESULT: "R9100(3-20G)V_red PK"



MEASUREMENT RESULT: "R9100(3-20G)V_red PK"

Frequency MHz	Field strength dBmV/m	Output power of the signal generator PS (dBm)	Cable loss C (dB)	Isotropic gain of the substitution antenna G (dBi)	Measurement result erp (dBm)	Limit erp(dBm)	Margin (dB)
4018.0361	41.16	-64.93	5.3	7.95	-64.43	-13	51.43
5092.1844	45.69	-60.94	6.1	8.55	-60.64	-13	47.64
6943.8878	48.79	-59.38	7.3	9.25	-59.58	-13	46.58
10412.826	51.68	-56.55	9.1	11.35	-56.45	-13	43.45

14503.006	57.67	-51.85	11	9.15	-55.85	-13	42.85
18176.353	62.93	-47.15	12.2	6.45	-55.05	-13	42.05

Environmental Conditions

Temperature:	26°C
Relative Humidity:	60 %
ATM Pressure:	1009 mbar

The testing was performed by Guan Bin on 2008-6-28

8 §2.1046, §27.5(h) - EFFECTIVE RADIATED POWER

Applicable Standard

According to FCC §2.1046&27.5(h), the EIRP of transmitters and cellular repeaters must not exceed 2000watts.

Test Equipment List and Details

Item	Equipment	Manufacturer	Mode	Serial	Last Cal.	Cal. Interval
1	EMI Test Receiver	R&S	ESI26	100058	2007-10-16	1 Year
2	Ultra Broadband Antenna	R&S	HL562	100022	2007-3-6	3 Years
3	Double-Ridged Waveguide Horn Antenna	R&S	HF906	100032	2007-10-10	3 Years
4	Anechoic Chamber	Albatross	3m Site	N/A	2007-7-15	3 Year
5	Cable Set	R&S	RE Cable	N/A	2007-8-17	1Year
6	Cable set II	R&S	Substitution Tx Cable	N/A	2007-8-17	1Year
7	Cable set III	R&S	Hi-freq RX Antenna Cable	N/A	2007-8-17	1Year
8	Software	R&S	ES-K1	N/A	N/A	N/A
9	Double-Ridged Waveguide Horn Antenna	R&S	HF906	100013	2007-1-31	3 Years
10	VHF-UHF Broad band Antenna	SCHWARZBECK	VUBA 9117	SB3174	2007-11-17	3 Years
11	Signal Generator	R&S	SMR20	100098	2007-12-17	1Year

Test Procedure

On a test site, the EUT shall be placed at 1.5m height on a turn table, and in the position closest to normal use as declared by the applicant.
The test antenna shall be oriented initially for vertical polarization located 3m from EUT to correspond to the frequency of the transmitter.
The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.

The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.
The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
The transmitter shall then the rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
The maximum signal level detected by the measuring receiver shall be noted.
The transmitter shall be replaced by a horn (substitution antenna).
The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
The substitution antenna shall be connected to a calibrated signal generator.
In necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring received, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
The measure of the effective radiated power is the large of the two levels recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

The testing was performed by Guan Bin on 2008-6-4

Test Result: Pass

Test Mode: Transmitting WiMAX

Test Data

Frequency (MHz)	SUBSTITUTION READING （dBm）	SUBSTITUTION ANTENNA GAIN（dB）	SUBSTITUTION CALBE LOSS （dB）	EIRP（dBm）
2510	35.55	8.95	3.3	41.20
2540	34.92	8.95	3.3	40.57
2580	35.13	8.95	3.3	40.78

9 §2.1051, §27.53- SPURIOUS EMISSIONS AT ANTENNA TERMINALS

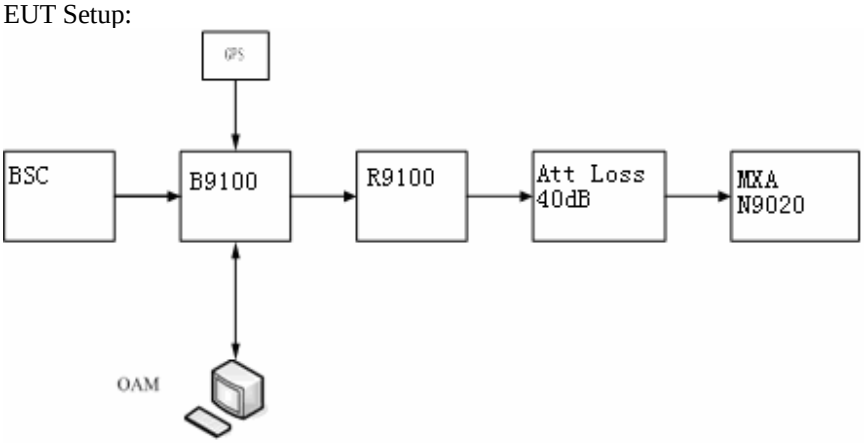
Applicable Standard Requirements: CFR 47§2.1051, §27.53 .
The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in §2.1051.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020	MY48010663	2008-5-2	2009-5-2
JFW	JFW 40dB Attenuator	50HF-40-SMA	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

Test Procedure

EUT Setup:



REMARKS:
1. Conducted level(dBm) = Measurement Value(dBm) + Correction Factor (dB).
2. Correction Factor (dB) = Attenuator loss (dB) + Cable Loss (dB).
3. Attenuator loss (dB)=40dB, Cable Loss (dB)=2dB.

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to

show any out of band emissions up to 10th harmonic.

Test Data Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1009 mbar

The testing was performed by Liu Rui on May 08-July 10,2008

Test Result: Pass

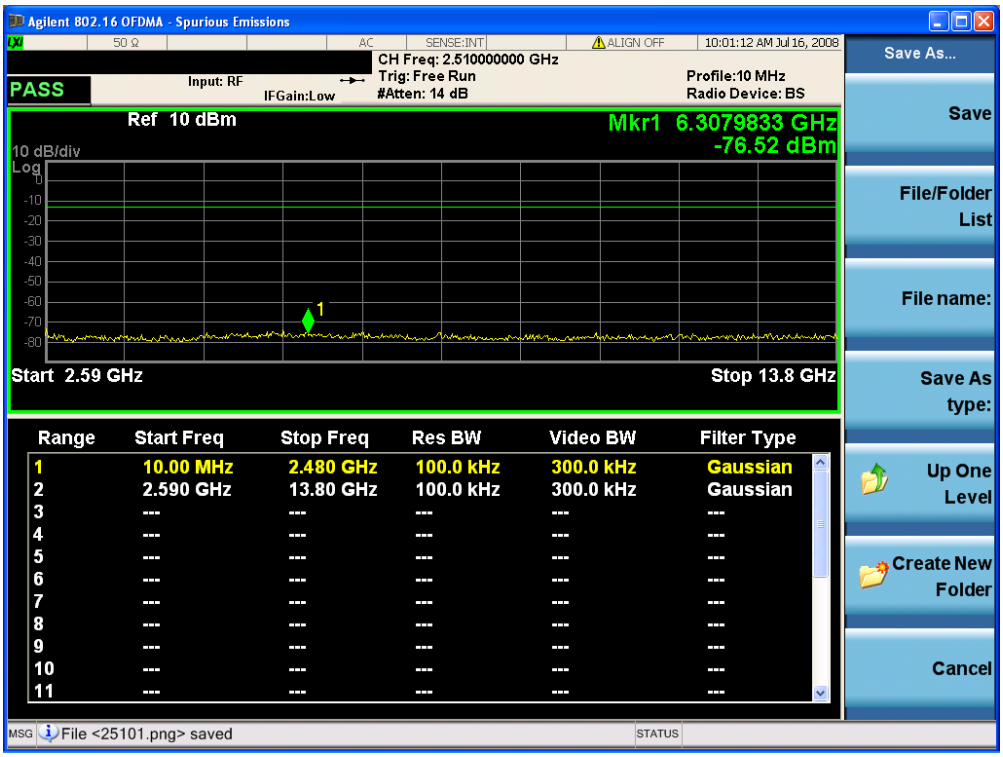
Test Mode: Transmitting WiMAX

Test Data:

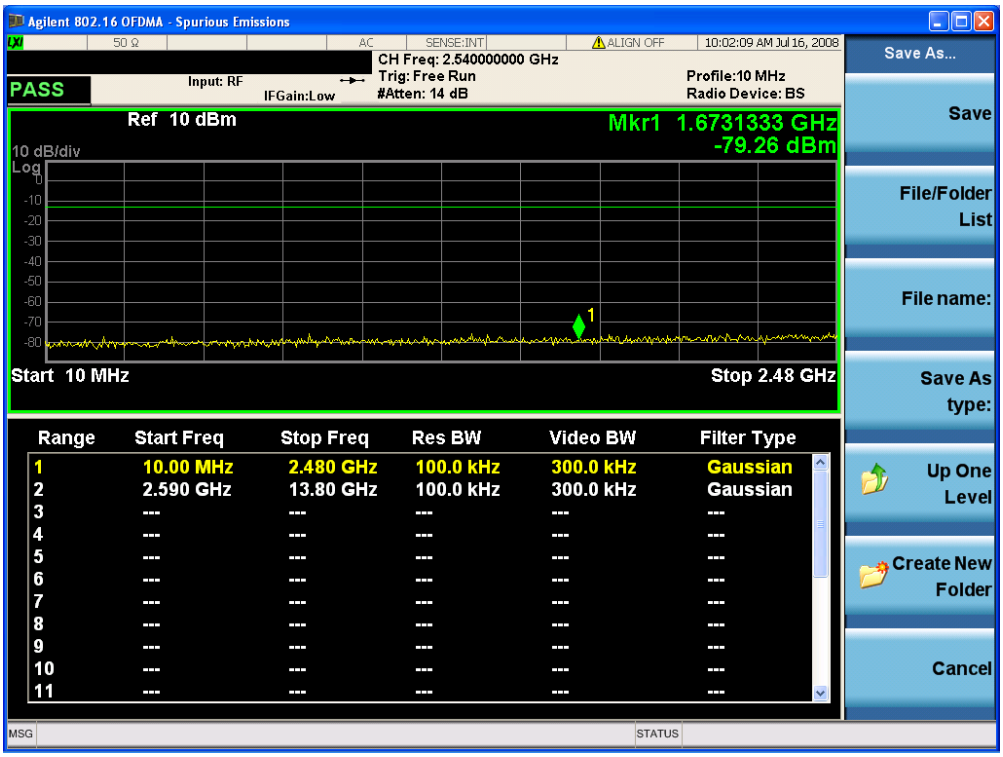
Test Data:

Frequency Range	Frequency Point	Measurement Value(dBm)	Attenuator loss(dB)	Cable Loss(dB)	Limit(dBm)	Margin(dbM)
10M-2480,2590-13.8G	2510M	-76.52	40	2	-13	63.52
10M-2480,2590-13.8G	2540M	-79.26	40	2	-13	66.26
10M-2480,2590-13.8G	2580M	-77.81	40	2	-13	64.81

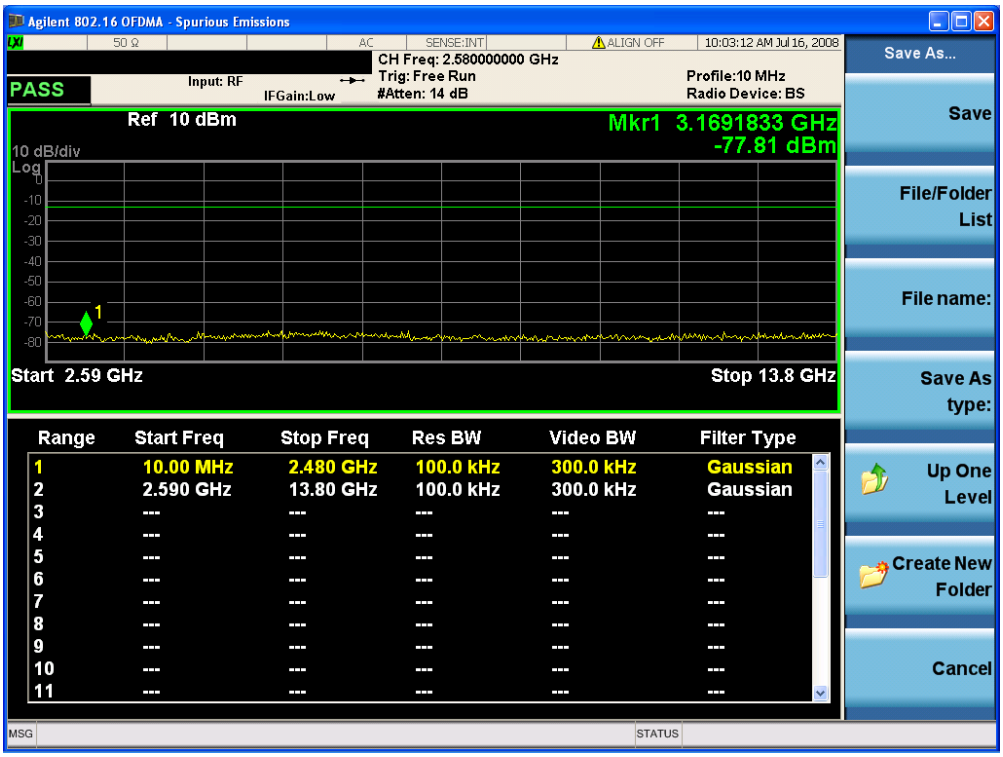
2510M


Agilent 802.16 OFDMA - Spurious Emissions
50 Ω
AC
SENSE:INT
ALIGN OFF
10:01:12 AM Jul 16, 2008
PASS
Input: RF
IFGain:Low
CH Freq: 2.510000000 GHz
Trig: Free Run
#Atten: 14 dB
Profile:10 MHz
Radio Device: BS
Ref 10 dBm
Mkr1 6.3079833 GHz
-76.52 dBm
10 dB/div
Log
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 2.59 GHz
Stop 13.8 GHz
Range Start Freq Stop Freq Res BW Video BW Filter Type
1 10.00 MHz 2.480 GHz 100.0 kHz 300.0 kHz Gaussian
2 2.590 GHz 13.80 GHz 100.0 kHz 300.0 kHz Gaussian
3 --- --- --- --- ---
4 --- --- --- --- ---
5 --- --- --- --- ---
6 --- --- --- --- ---
7 --- --- --- --- ---
8 --- --- --- --- ---
9 --- --- --- --- ---
10 --- --- --- --- ---
11 --- --- --- --- ---
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel
MSG
File <25101.png> saved
STATUS

2540M


Agilent 802.16 OFDMA - Spurious Emissions
50 Ω
AC
SENSE:INT
ALIGN OFF
10:02:09 AM Jul 16, 2008
PASS
Input: RF
IFGain:Low
CH Freq: 2.540000000 GHz
Trig: Free Run
#Atten: 14 dB
Profile:10 MHz
Radio Device: BS
Ref 10 dBm
Mkr1 1.6731333 GHz
-79.26 dBm
10 dB/div
Log
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 10 MHz
Stop 2.48 GHz
Range Start Freq Stop Freq Res BW Video BW Filter Type
1 10.00 MHz 2.480 GHz 100.0 kHz 300.0 kHz Gaussian
2 2.590 GHz 13.80 GHz 100.0 kHz 300.0 kHz Gaussian
3 --- --- --- --- ---
4 --- --- --- --- ---
5 --- --- --- --- ---
6 --- --- --- --- ---
7 --- --- --- --- ---
8 --- --- --- --- ---
9 --- --- --- --- ---
10 --- --- --- --- ---
11 --- --- --- --- ---
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel
MSG
STATUS

2580M


Agilent 802.16 OFDMA - Spurious Emissions
50 Ω
AC
SENSE:INT
ALIGN OFF
10:03:12 AM Jul 16, 2008
PASS
Input: RF
IFGain:Low
CH Freq: 2.580000000 GHz
Trig: Free Run
#Atten: 14 dB
Profile:10 MHz
Radio Device: BS
Ref 10 dBm
Mkr1 3.1691833 GHz
-77.81 dBm
10 dB/div
Log
Start 2.59 GHz
Stop 13.8 GHz
Range Start Freq Stop Freq Res BW Video BW Filter Type
1 10.00 MHz 2.480 GHz 100.0 kHz 300.0 kHz Gaussian
2 2.590 GHz 13.80 GHz 100.0 kHz 300.0 kHz Gaussian
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel
MSG
STATUS

10 §2.1049-OCCUPIED BANDWIDTH

Applicable Standard Requirements: CFR 47, Section 2.1049

Test Equipment List and Details :

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020	MY48010663	2008-5-2	2009-5-2
JFW	JFW 40dB Attenuator	50HF-40-SMA	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

Test Procedure

The RF out of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
The resolution bandwidth of the spectrum analyzer was set at 30 kHz and 99%Power bandwidth was recorded.

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1009mbar

The testing was performed by Liu Rui on June 14, 2008.

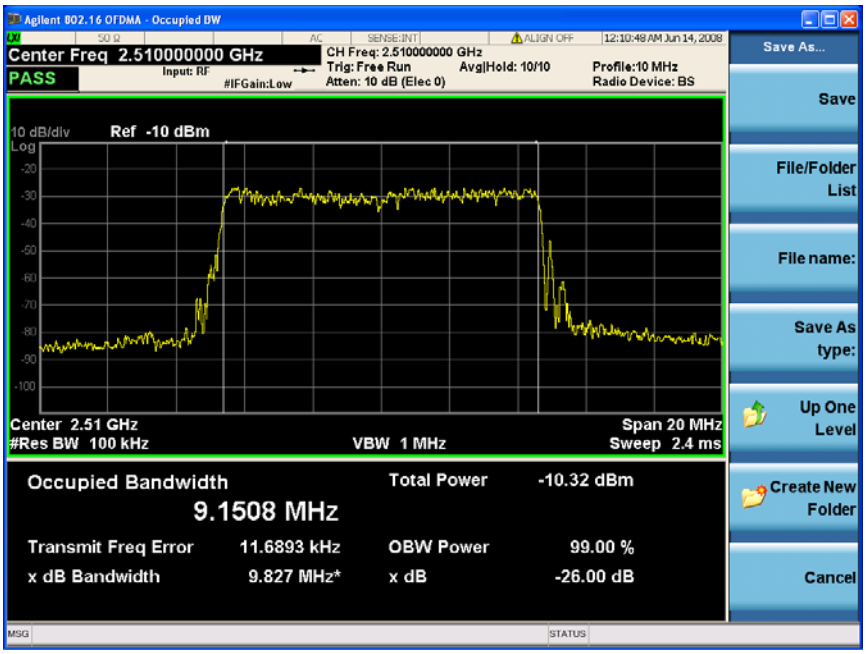
Test Result: Pass

Test Mode: Transmitting WiMAX

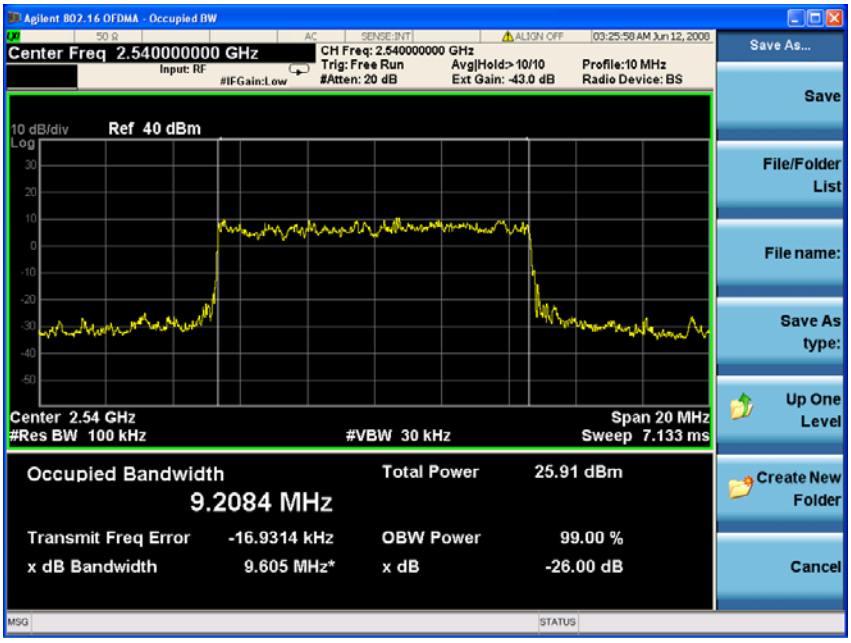
Channel frequency (MHz)	99% Power Bandwidth (MHz)	Limit (MHz)
2510	9.1508	<10
2540	9.2084	<10
2580	9.1974	<10

Test Data

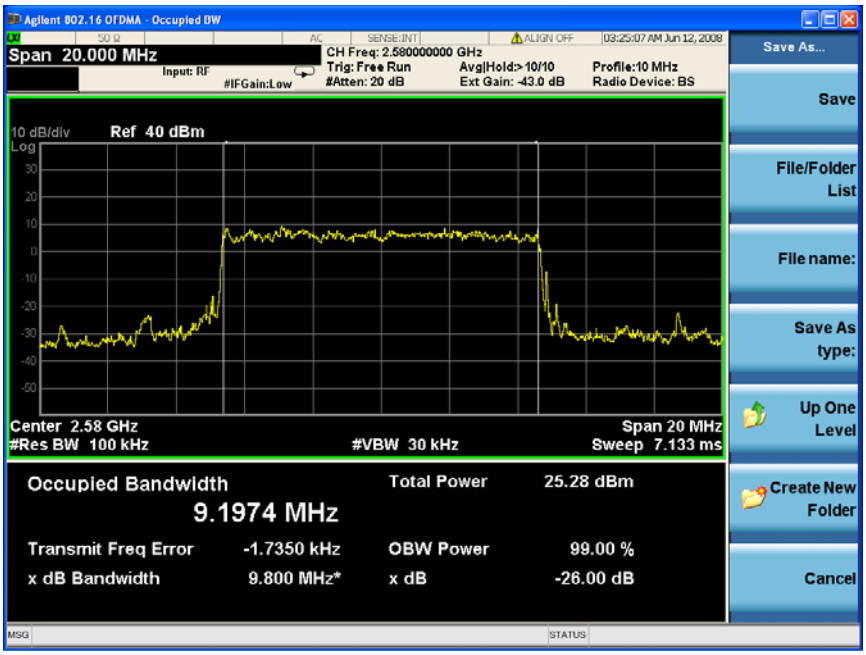
2510M



2540M


Agilent 802.16 OFDMA - Occupied BW
Center Freq 2.540000000 GHz
CH Freq: 2.540000000 GHz
Trig: Free Run
#Atten: 20 dB
Avg|Hold:>10/10
Ext Gain: -43.0 dB
Profile:10 MHz
Radio Device: BS
10 dB/div
Ref 40 dBm
Center 2.54 GHz
#Res BW 100 kHz
#VBW 30 kHz
Span 20 MHz
Sweep 7.133 ms
Occupied Bandwidth
9.2084 MHz
Total Power 25.91 dBm
Transmit Freq Error -16.9314 kHz
OBW Power 99.00 %
x dB Bandwidth 9.605 MHz*
x dB -26.00 dB
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel

2580M


Agilent 802.16 OFDMA - Occupied BW
Span 20.000 MHz
CH Freq: 2.580000000 GHz
Trig: Free Run
#Atten: 20 dB
Avg|Hold:>10/10
Ext Gain: -43.0 dB
Profile:10 MHz
Radio Device: BS
10 dB/div
Ref 40 dBm
Center 2.58 GHz
#Res BW 100 kHz
#VBW 30 kHz
Span 20 MHz
Sweep 7.133 ms
Occupied Bandwidth
9.1974 MHz
Total Power 25.28 dBm
Transmit Freq Error -1.7350 kHz
OBW Power 99.00 %
x dB Bandwidth 9.800 MHz*
x dB -26.00 dB
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel

11 §27.53-BAND EDGES

Applicable Standard

According to §22.917, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (p) by a factor of at least 43 + 10 log (p) dB.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	MXA Series Spectrum Analyzer	N9020	MY48010663	2008-5-2	2009-5-2
JFW	JFW 40dB Attenuator	50HF-40-SMA	N/A	N/A	N/A
Hewlett Packard	Hewlett Packard RF Cable	8120-6192	01428251	N/A	N/A

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.
The center of the spectrum analyzer was set to block edge frequency.

Test Data Environmental Conditions

Temperature:	24 °C
Relative Humidity:	59%
ATM Pressure:	1009mbar

The testing was performed by Liu Rui on May 08-July 10, 2008

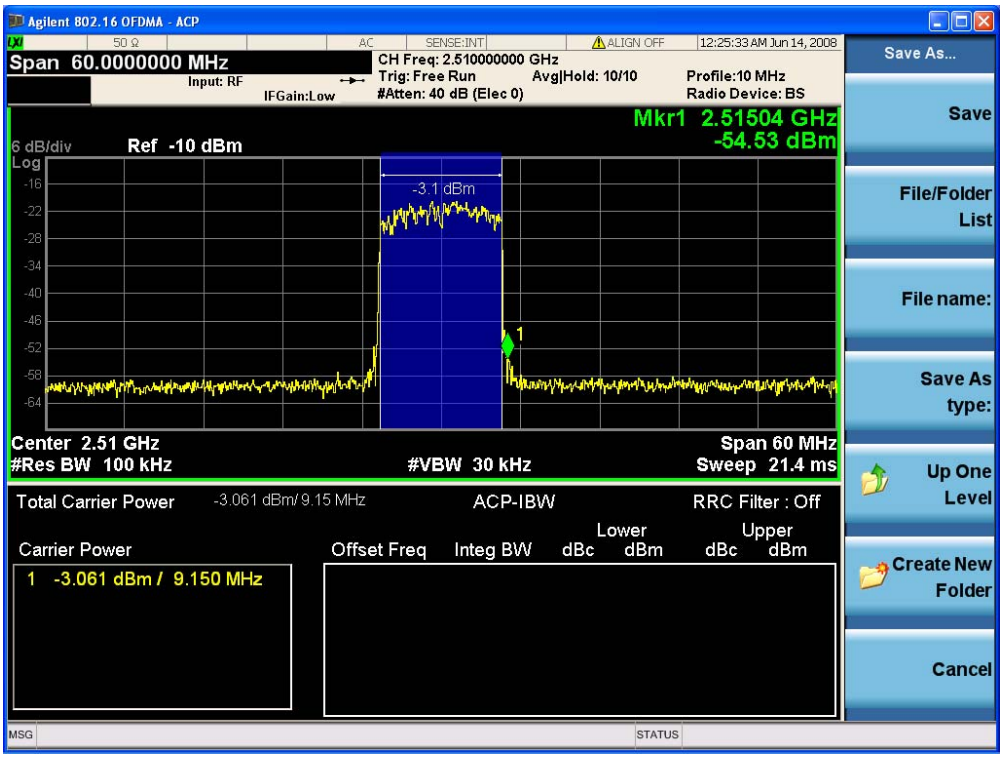
Test Result: Pass

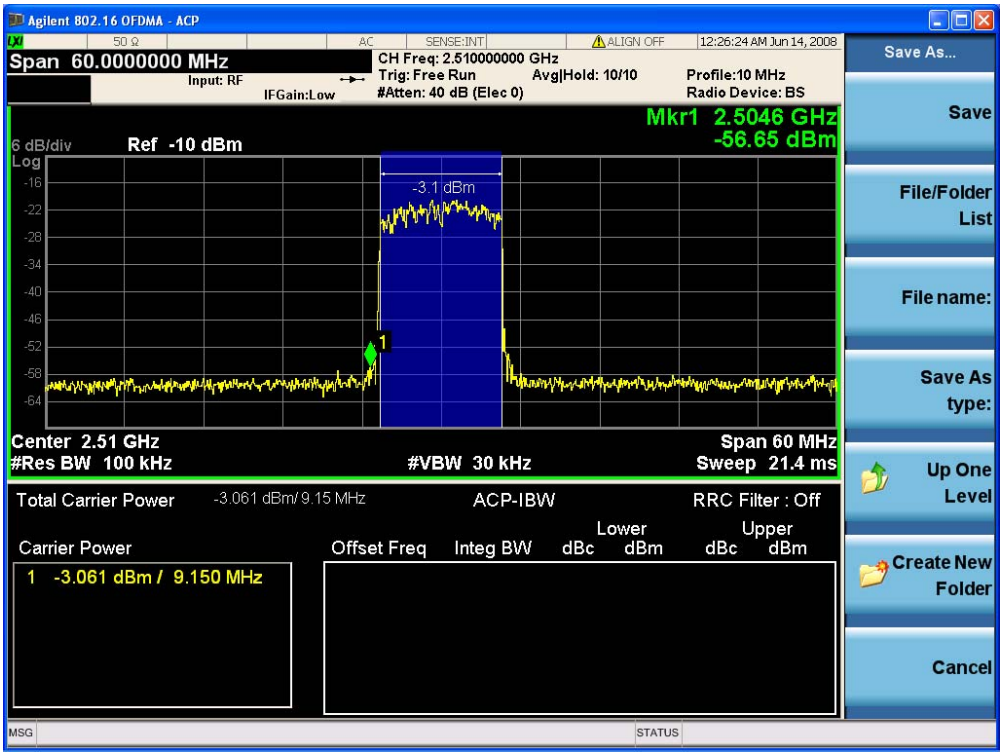
Test Mode: Transmitting WiMAX

Test Data

2510M

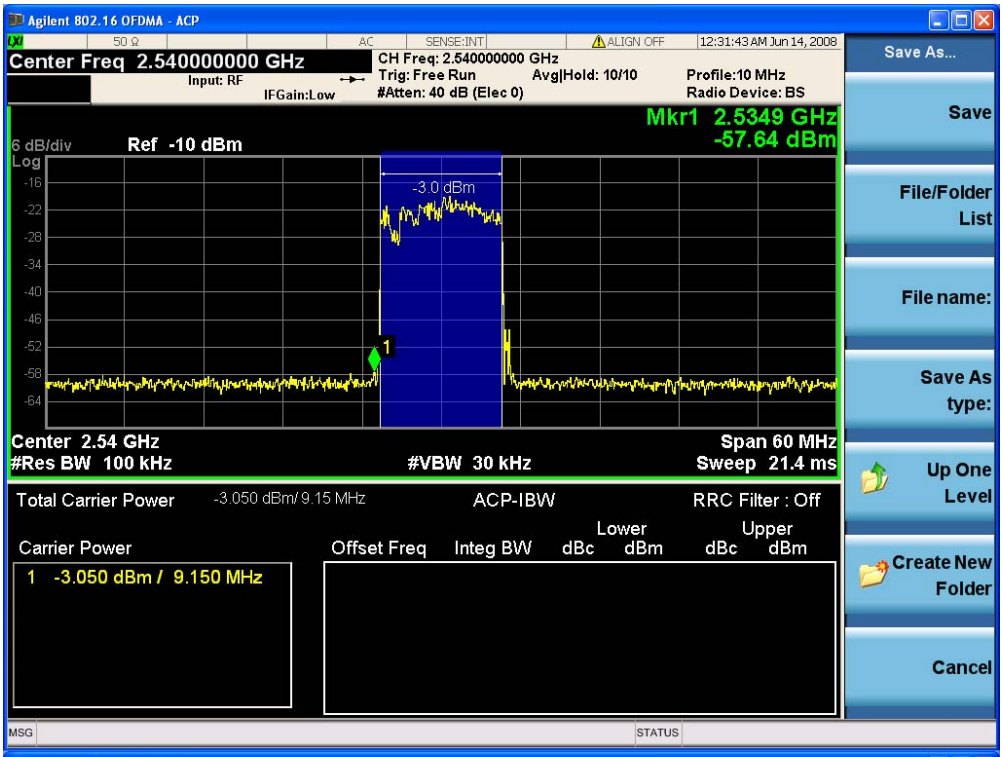
Frequency (MHz)	Emission (dBm)	Limit (dBm)
2515.04	-54.53	-13.00
2504.60	-56.65	-13.00

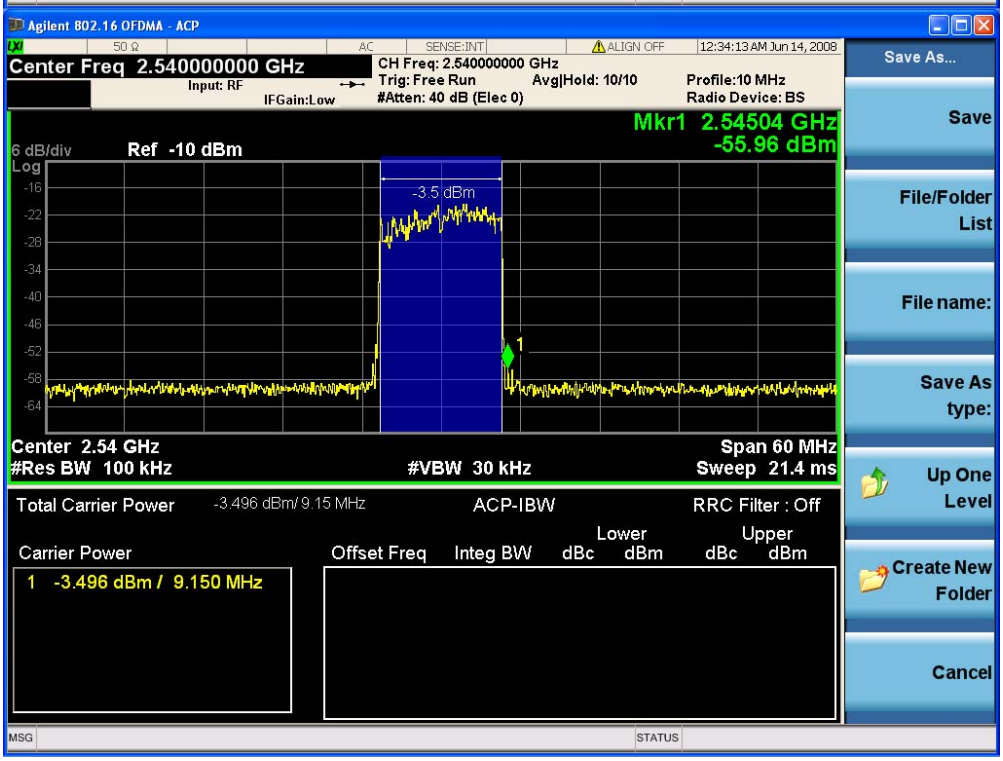




2540M

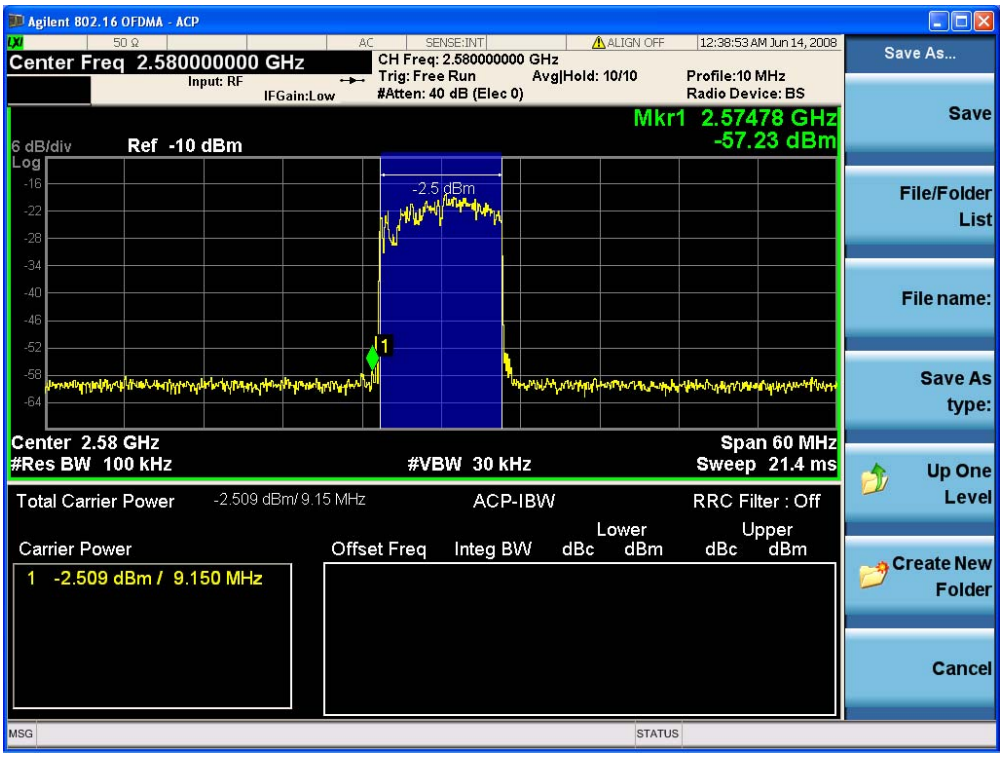
Frequency (MHz)	Emission (dBm)	Limit (dBm)
2553.490	-57.64	-13.00
2554.504	-55.96	-13.00

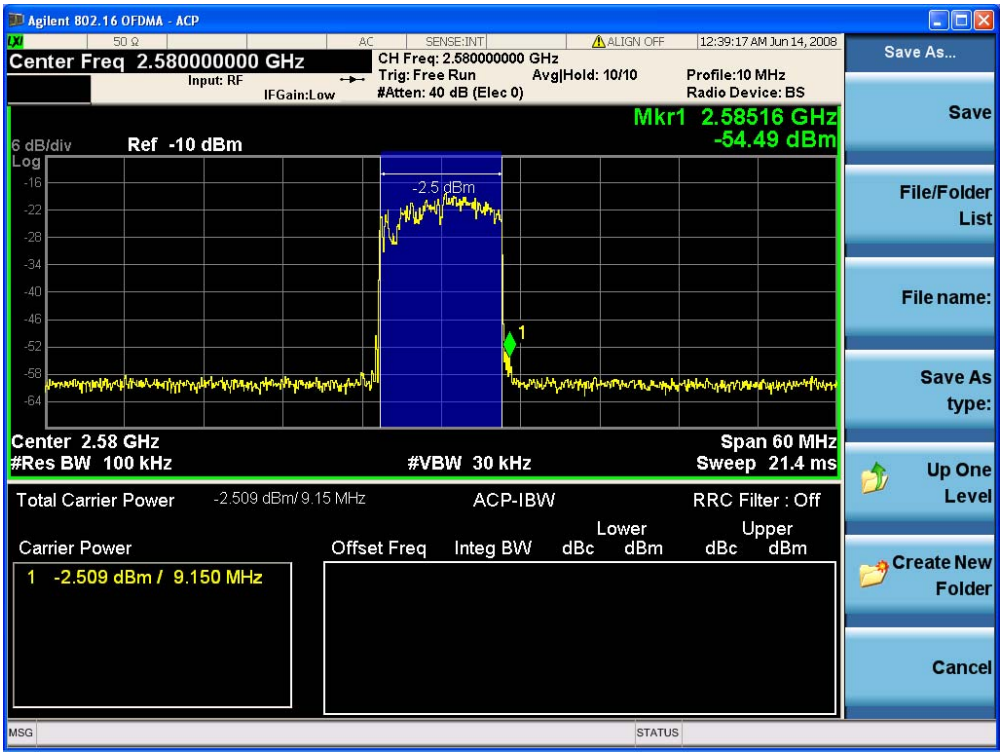

Agilent 802.16 OFDMA - ACP
12:31:43 AM Jun 14, 2008
Center Freq 2.540000000 GHz
Input: RF
IFGain:Low
CH Freq: 2.540000000 GHz
Trig: Free Run
Avg|Hold: 10/10
#Atten: 40 dB (Elec 0)
Profile:10 MHz
Radio Device: BS
Mkr1 2.5349 GHz
-57.64 dBm
6 dB/div
Ref -10 dBm
-3.0 dBm
Center 2.54 GHz
#Res BW 100 kHz
#VBW 30 kHz
Span 60 MHz
Sweep 21.4 ms
Total Carrier Power -3.050 dBm/ 9.15 MHz
ACP-IBW
RRC Filter : Off
Carrier Power
1 -3.050 dBm / 9.150 MHz
Offset Freq Integ BW Lower dBc dBm Upper dBc dBm
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel
MSG
STATUS


Agilent 802.16 OFDMA - ACP
12:34:13 AM Jun 14, 2008
Center Freq 2.540000000 GHz
Input: RF
IFGain:Low
CH Freq: 2.540000000 GHz
Trig: Free Run
Avg|Hold: 10/10
#Atten: 40 dB (Elec 0)
Profile:10 MHz
Radio Device: BS
Mkr1 2.54504 GHz
-55.96 dBm
6 dB/div
Ref -10 dBm
-3.5 dBm
Center 2.54 GHz
#Res BW 100 kHz
#VBW 30 kHz
Span 60 MHz
Sweep 21.4 ms
Total Carrier Power -3.496 dBm/ 9.15 MHz
ACP-IBW
RRC Filter : Off
Carrier Power
1 -3.496 dBm / 9.150 MHz
Offset Freq Integ BW Lower dBc dBm Upper dBc dBm
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel
MSG
STATUS

2580M

Frequency (MHz)	Emission (dBm)	Limit (dBm)
2574.780	-57.23	-13.00
2558.516	-54.49	-13.00




Agilent 802.16 OFDMA - ACP
50 Ω
AC
SENSE:INT
ALIGN OFF
12:39:17 AM Jun 14, 2008
Center Freq 2.580000000 GHz
Input: RF
IFGain:Low
CH Freq: 2.580000000 GHz
Trig: Free Run
Avg|Hold: 10/10
#Atten: 40 dB (Elec 0)
Profile:10 MHz
Radio Device: BS
Mkr1 2.58516 GHz
-54.49 dBm
6 dB/div
Ref -10 dBm
Log
-16
-22
-28
-34
-40
-46
-52
-58
-64
-2.5 dBm
1
Center 2.58 GHz
#Res BW 100 kHz
#VBW 30 kHz
Span 60 MHz
Sweep 21.4 ms
Total Carrier Power
-2.509 dBm/ 9.15 MHz
ACP-IBW
RRC Filter : Off
Carrier Power
1 -2.509 dBm / 9.150 MHz
Offset Freq
Integ BW
Lower
dBc
dBm
Upper
dBc
dBm
Save As...
Save
File/Folder List
File name:
Save As type:
Up One Level
Create New Folder
Cancel
MSG
STATUS

12 §2.1055 (a), §2.1055 (d), §27.54 - FREQUENCY STABILITY

Applicable Standard

Requirements: FCC § 2.1055 (a), Part27.54 following:
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	PSA Spectrum Analyzer	E4445A	MY44300451	2008-3-2	2009-3-2
GZ-ESPEC	Temperature Chamber	GRW-120	00020268	2008-3-8	2009-3-8

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC power supply and the RF output was connected to a f Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The AC leads and RF output cable exited the chamber through an opening made for the purpose.
After the temperature stabilized for approximately 150 minutes, the frequency output was recorded from the counter.
Frequency Stability vs. Voltage: An external variable AC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Data

Environmental Conditions

Temperature:	20° C

Relative Humidity:	49%
ATM Pressure:	1011 mbar

The testing was performed by Liu Rui on June 3-7, 2008.
Test Result: Pass
Test Mode: Transmitting WiMAX

Frequency Stability Versus Temperature

Frequency Stability vs. Temperature				
Temperature ℃	Power Supplied Vac	Frequency Measure Error Hz	Error ppm	Limit 0.02ppm
f=2546MHz				
-40	-48	-7.5625	0.00297	PASS
-30	-48	-10.5415	0.00414	PASS
-20	-48	21.7471	0.00854	PASS
-10	-48	8.2456	0.00323	PASS
0	-48	-11.9542	0.00469	PASS
10	-48	9.5627	0.00375	PASS
20	-48	28.6750	0.01126	PASS
30	-48	34.2864	0.01346	PASS
40	-48	-24.4958	0.00962	PASS
50	-48	-15.4877	0.00608	PASS
55	-48	29.1857	0.01146	PASS

Frequency Stability Versus Voltage

Frequency Stability vs. Voltage				
VoltageVac	Temperature ℃	Frequency Measure	Error ppm	Limit 0.02ppm
f=2546MHz				
150	20	1.5740	0.00061	PASS
180	20	5.2412	0.00205	PASS
210	20	-15.6440	0.00614	PASS
240	20	-24.1435	0.00948	PASS
270	20	12.3875	0.00486	PASS
300	20	5.8495	0.00229	PASS