

FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : WIMAX Modem
BRAND NAME : ZTE
MODEL NAME : IX256
FCC ID : Q78-ZTEIX256
STANDARD : 47 CFR Part 2, 27(M)
CLASSIFICATION : Licensed Non-Broadcast Station Transmitter (TNB)
TX FREQUENCY RANGE : 2498.5 MHz ~ 2687.5 MHz (BW 5MHz)
2501 MHz ~ 2685 MHz (BW 10MHz)
Rx FREQUENCY RANGE : 2498.5 MHz ~ 2687.5 MHz (BW 5MHz)
2501 MHz ~ 2685 MHz (BW 10MHz)
MAX. EIRP POWER : 0.72 W (QPSK, BW 5MHz)
0.62 W (QPSK, BW 10MHz)
0.66 W (16QAM, BW 5MHz)
0.63 W (16QAM, BW 10MHz)
EMISSION DESIGNATOR : 4M48G7D (QPSK, BW 5MHz)
9M12G7D (QPSK, BW 10MHz)
4M48W7D (16QAM, BW 5MHz)
9M12W7D (16QAM, BW 10MHz)

The product was received on Sep. 13, 2010 and completely tested on Sep. 28, 2010. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and 47 CFR FCC Part 27 Subpart M and shown compliance with the applicable technical standards.

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

Reviewed by:



Anderson Chiu / Deputy Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1033 §2.1046 §27.50	Maximum Output Power	< 2 Watts	PASS	-
3.1	§2.1033 §2.1046 §27.50	Band Edge Emissions	< 5.5MHz: -13 dBm ≥5.5MHz: -25 dBm	PASS	-
3.1	§27.50	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.2	§2.1049 §27.53	Emissions Bandwidth	N/A	PASS	-
3.3	§2.1051 §27.53	Conducted Spurious Emissions	$< 55+10\log_{10}(P[\text{Watts}])$	PASS	-
3.4	§2.1053 §27.53	Field Strength of Spurious Radiation	$< 55+10\log_{10}(P[\text{Watts}])$	PASS	Under limit 18.40 dB at 3456 MHz
3.5	§2.1055 §27.54	Frequency Stability for Temperature & Voltage	2.5 ppm	PASS	-



1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	WIMAX Modem
Brand Name	ZTE
Model Name	IX256
FCC ID	Q78-ZTEIX256
Tx Frequency	2496 MHz ~ 2690 MHz
Rx Frequency	2496 MHz ~ 2690 MHz
Channel Bandwidth	5MHz / 10MHz
Maximum Output Power to Antenna	26.53 dBm (QPSK, BW 5MHz) 26.53 dBm (QPSK, BW 10MHz) 26.49 dBm (16QAM, BW 5MHz) 26.56 dBm (16QAM, BW 10MHz)
Maximum EIRP	0.72 W (28.59 dBm) (QPSK, BW 5MHz) 0.62 W (27.92 dBm) (QPSK, BW 10MHz) 0.66 W (28.20 dBm) (16QAM, BW 5MHz) 0.63 W (28.01 dBm) (16QAM, BW 10MHz)
Antenna Type	PCB Antenna
HW Version	fe8A
SW Version	CR_IX256V1.0.0B05
Type of Modulation	Uplink : OFDMA (QPSK / 16QAM)
Type of Emission	4M48G7D (QPSK, BW 5MHz) 9M12G7D (QPSK, BW 10MHz) 4M48W7D (16QAM, BW 5MHz) 9M12W7D (16QAM, BW 10MHz)
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, the test report will be issued separately.
2. This test report recorded only product characteristics and test results of Licensed Non-Broadcast Station Transmitter (TNB).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		FCC / IC Registration No.
	TH02-HY	03CH06-HY	TW1022 / 4086B-1

1.5 Applied Standards

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

- ♦ 47 CFR Part 2, 27(M)
- ♦ ANSI C63.4-2003
- ♦ ANSI TIA-603-C-2004

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	VSG (System Simulator)	Agilent	E4438C	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	Acer	TravelMate 600 series	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.

Test Modes		
Band	Radiated TCs	Conducted TCs
802.16e (Modulation : OFDMA)	<ul style="list-style-type: none"> ■ QPSK, BW 5MHz Link ■ QPSK, BW 10MHz Link ■ 16QAM, BW 5MHz Link ■ 16QAM, BW 10MHz Link 	<ul style="list-style-type: none"> ■ QPSK, BW 5MHz Link ■ QPSK, BW 10MHz Link ■ 16QAM, BW 5MHz Link ■ 16QAM, BW 10MHz Link

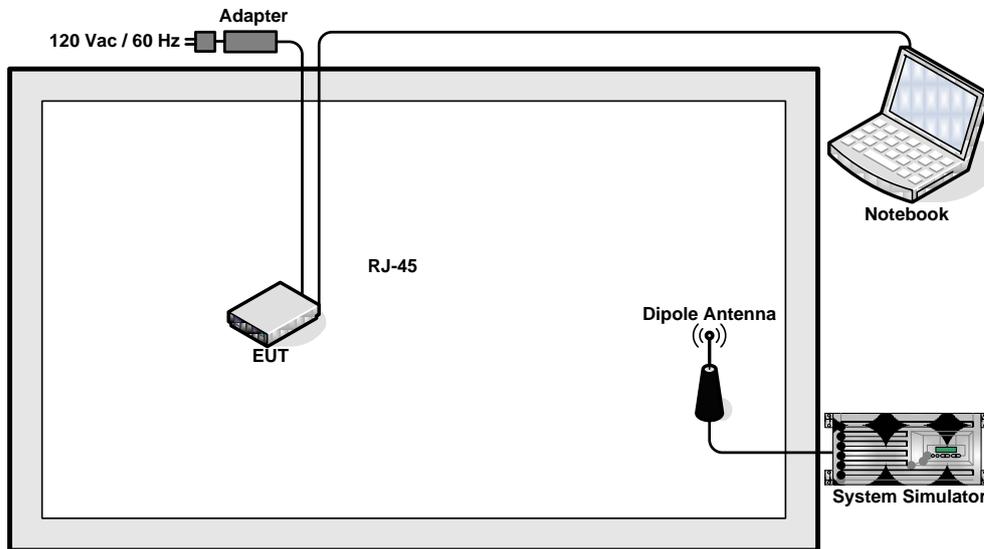
Note: The maximum average power levels are on PUSC and coding rate, 1/2 mode for QPSK, BW 5MHz, QPSK, BW 10MHz, 16QAM, BW 5MHz, and 16QAM, BW 10MHz Link ; only these modes were used for all tests.

The conducted power tables are as follows:

Average Conducted Power (*Unit: dBm)					
Channel	Modulation Type	Zone Type	Coding Rate	Main Antenna	
				5MHz Bandwidth	10MHz Bandwidth
Low	QPSK	PUSC	1/2	26.53	26.06
			3/4	26.41	25.96
Middle	QPSK	PUSC	1/2	26.25	26.53
			3/4	26.20	26.50
High	QPSK	PUSC	1/2	26.46	26.00
			3/4	26.38	26.01
Low	16QAM	PUSC	1/2	26.44	26.21
			3/4	26.29	26.08
Middle	16QAM	PUSC	1/2	26.20	26.56
			3/4	26.18	26.38
High	16QAM	PUSC	1/2	26.49	25.97
			3/4	26.42	25.97

Note: PAR = Peak to Average Ratio

2.2 Connection Diagram of Test System



3 Test Result

3.1 Maximum Output Power, Band Edge, and Effective Isotropic Radiated Power Measurement

3.1.1 Limit

For mobile and other user stations, mobile stations are limited to 2.0 watts EIRP and all user stations are limited to 2.0 watts transmitter output power. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (p) by a factor of mobile digital stations, the attenuation factor shall be not less than $43 + 10 \log (p)$ dB at the channel edge and $55 + 10 \log (p)$ dB at 5.5 MHz from the channel edges.

3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

For Conducted Power and Band Edge Measurement:

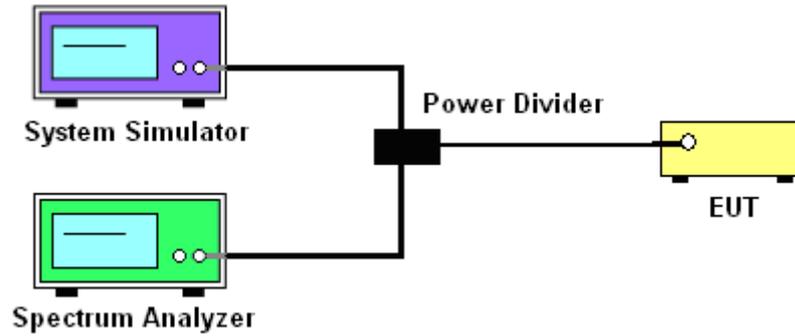
The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

For Effective Isotropic Radiated Power Measurement:

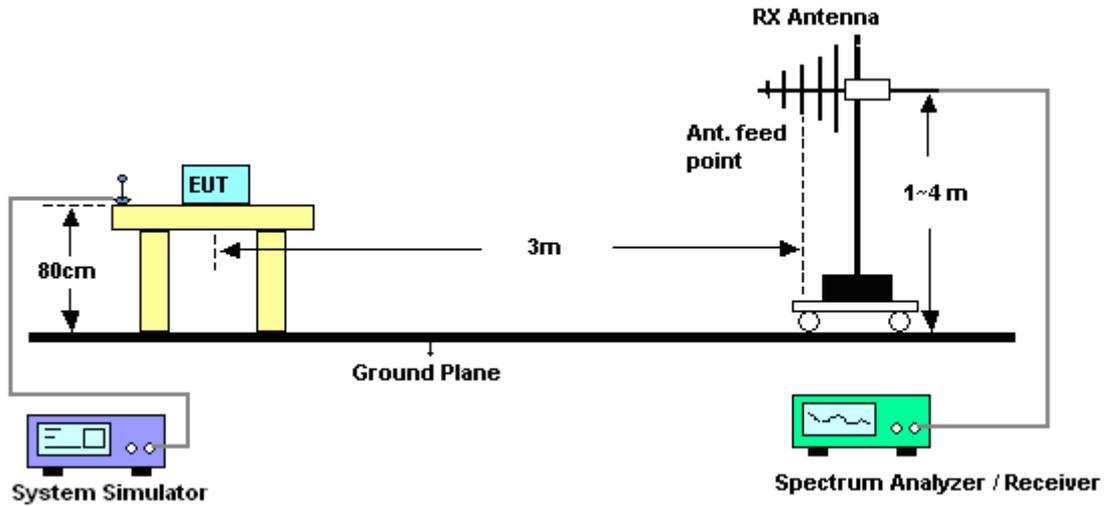
1. The EUT was placed on a non-conductive rotating platform with 0.8 meter height in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m.
2. During the measurement, the EUT was enforced in maximum power. The highest emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, $EIRP = LVL + \text{Correction factor}$.

3.1.4 Test Setup

<Conducted Power and Band Edge Measurement>



<Effective Isotropic Radiated Power Measurement>





3.1.5 Test Result of Maximum Output Power

Channel	Modulation Type	Zone Type	Coding Rate	Average Power (Unit: dBm)	
				5MHz Bandwidth	10MHz Bandwidth
Low	QPSK	PUSC	1/2	26.53	26.06
Middle	QPSK	PUSC	1/2	26.25	26.53
High	QPSK	PUSC	1/2	26.46	26.00

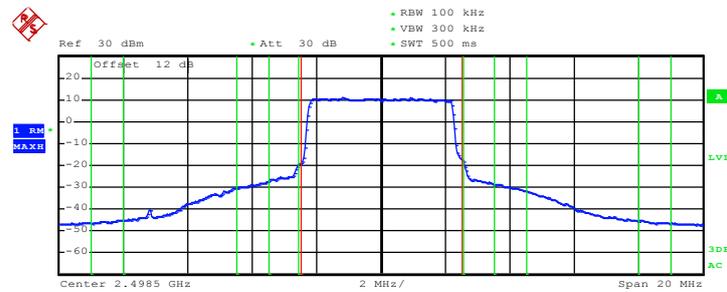
Channel	Modulation Type	Zone Type	Coding Rate	Average Power (Unit: dBm)	
				5MHz Bandwidth	10MHz Bandwidth
Low	16QAM	PUSC	1/2	26.44	26.21
Middle	16QAM	PUSC	1/2	26.20	26.56
High	16QAM	PUSC	1/2	26.49	25.97



3.1.6 Test Result of Band Edge Measurement

Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 5MHz		

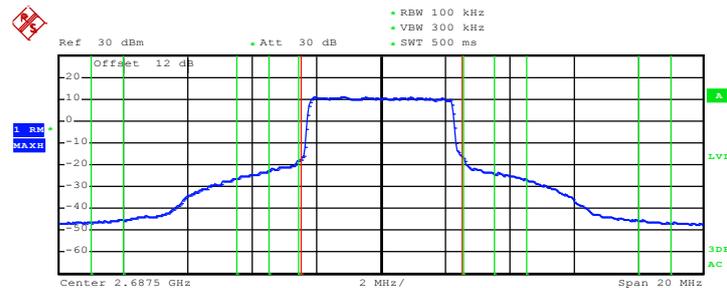
Lower Band Edge Plot on Low Channel



Tx Channel	Bandwidth	5 MHz	USER (PART27-5)	Power	26.35 dBm	
Adjacent Channel	Bandwidth	50 kHz	Lower	-22.72 dBm		Bandedge limit: -13dBm
	Spacing	2.525 MHz	Upper	-21.02 dBm		
Alternate Channel	Bandwidth	1 MHz	Lower	-19.31 dBm		Bandedge limit: -13dBm
	Spacing	4 MHz	Upper	-20.25 dBm		
2nd Alternate Channel	Bandwidth	1 MHz	Lower	-36.10 dBm		Bandedge limit: -25dBm
	Spacing	8.5 MHz	Upper	-36.36 dBm		

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Higher Band Edge Plot on High Channel



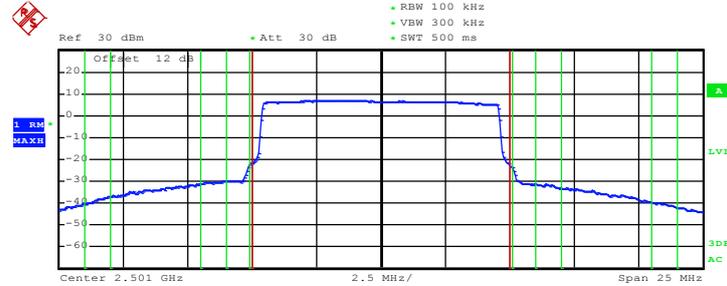
Tx Channel	Bandwidth	5 MHz	USER (PART27-5)	Power	26.45 dBm	
Adjacent Channel	Bandwidth	50 kHz	Lower	-21.04 dBm		Bandedge limit: -13dBm
	Spacing	2.525 MHz	Upper	-19.76 dBm		
Alternate Channel	Bandwidth	1 MHz	Lower	-14.83 dBm		Bandedge limit: -13dBm
	Spacing	4 MHz	Upper	-15.48 dBm		
2nd Alternate Channel	Bandwidth	1 MHz	Lower	-36.16 dBm		Bandedge limit: -25dBm
	Spacing	8.5 MHz	Upper	-36.62 dBm		

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Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 10MHz		

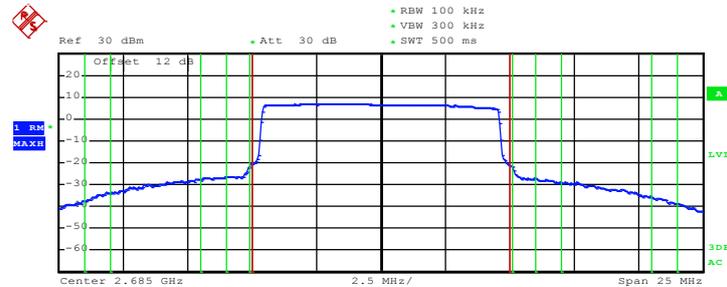
Lower Band Edge Plot on Low Channel



Tx Channel	Bandwidth	10 MHz	USER(PART27-10)	Power	25.70 dBm	
Adjacent Channel	Bandwidth	100 kHz	Lower	-22.34 dBm		Bandedge limit: -13dBm
	Spacing	5.05 MHz	Upper	-23.20 dBm		
Alternate Channel	Bandwidth	1 MHz	Lower	-20.78 dBm		Bandedge limit: -13dBm
	Spacing	6.5 MHz	Upper	-22.36 dBm		
2nd Alternate Channel	Bandwidth	1 MHz	Lower	-28.80 dBm		Bandedge limit: -25dBm
	Spacing	11 MHz	Upper	-30.92 dBm		

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Higher Band Edge Plot on High Channel



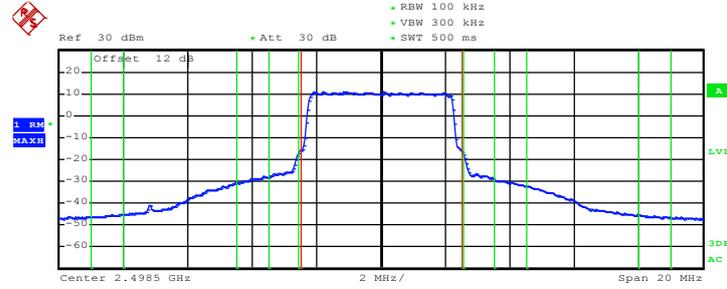
Tx Channel	Bandwidth	10 MHz	USER(PART27-10)	Power	25.67 dBm	
Adjacent Channel	Bandwidth	100 kHz	Lower	-21.23 dBm		Bandedge limit: -13dBm
	Spacing	5.05 MHz	Upper	-21.84 dBm		
Alternate Channel	Bandwidth	1 MHz	Lower	-17.37 dBm		Bandedge limit: -13dBm
	Spacing	6.5 MHz	Upper	-18.64 dBm		
2nd Alternate Channel	Bandwidth	1 MHz	Lower	-25.56 dBm		Bandedge limit: -25dBm
	Spacing	11 MHz	Upper	-27.64 dBm		

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Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 5MHz		

Lower Band Edge Plot on Low Channel

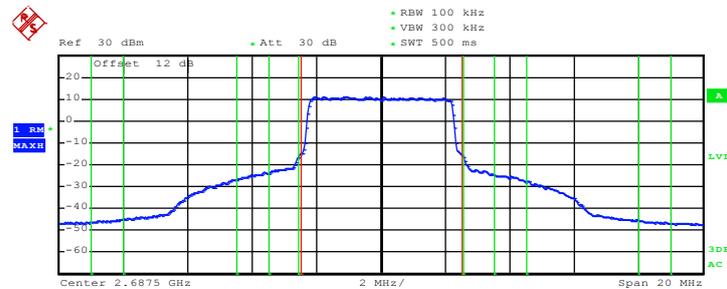


Tx Channel	Bandwidth	5 MHz	USER (PART27-5)	Power	26.29 dBm
Adjacent Channel	Bandwidth	50 kHz	Lower	-19.63 dBm	
	Spacing	2.525 MHz	Upper	-20.06 dBm	
Alternate Channel	Bandwidth	1 MHz	Lower	-19.53 dBm	
	Spacing	4 MHz	Upper	-20.94 dBm	
2nd Alternate Channel	Bandwidth	1 MHz	Lower	-36.11 dBm	
	Spacing	8.5 MHz	Upper	-36.52 dBm	

Bandedge limit: -13dBm
 Bandedge limit: -13dBm
 Bandedge limit: -25dBm

Date: 21.SEP.2010 17:57:52

Higher Band Edge Plot on High Channel



Tx Channel	Bandwidth	5 MHz	USER (PART27-5)	Power	26.41 dBm
Adjacent Channel	Bandwidth	50 kHz	Lower	-18.86 dBm	
	Spacing	2.525 MHz	Upper	-19.44 dBm	
Alternate Channel	Bandwidth	1 MHz	Lower	-15.27 dBm	
	Spacing	4 MHz	Upper	-16.19 dBm	
2nd Alternate Channel	Bandwidth	1 MHz	Lower	-36.07 dBm	
	Spacing	8.5 MHz	Upper	-36.70 dBm	

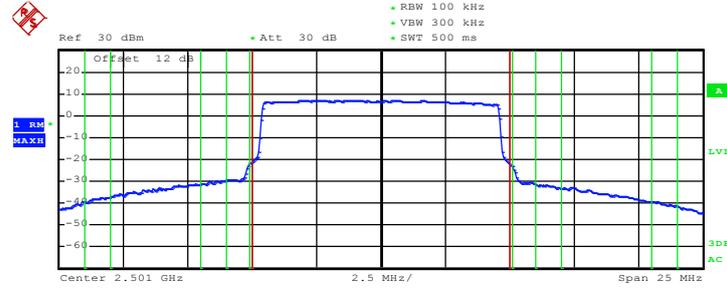
Bandedge limit: -13dBm
 Bandedge limit: -13dBm
 Bandedge limit: -25dBm

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Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 10MHz		

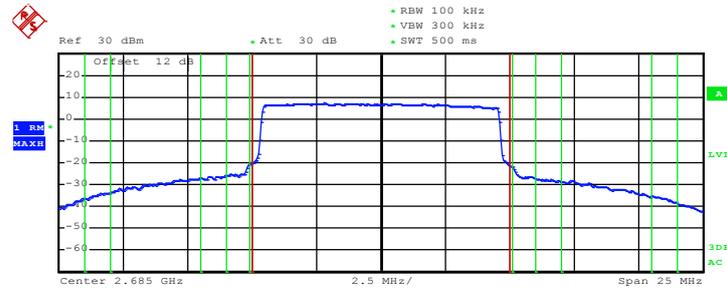
Lower Band Edge Plot on Low Channel



Tx Channel	Bandwidth	10 MHz	USER (PART27-10)	Power	25.72 dBm	
Adjacent Channel	Bandwidth	100 kHz	Lower	-21.82 dBm		Bandedge limit: -13dBm
	Spacing	5.05 MHz	Upper	-22.88 dBm		
Alternate Channel	Bandwidth	1 MHz	Lower	-20.82 dBm		Bandedge limit: -13dBm
	Spacing	6.5 MHz	Upper	-22.50 dBm		
2nd Alternate Channel	Bandwidth	1 MHz	Lower	-28.56 dBm		Bandedge limit: -25dBm
	Spacing	11 MHz	Upper	-30.69 dBm		

Date: 21.SEP.2010 18:39:51

Higher Band Edge Plot on High Channel



Tx Channel	Bandwidth	10 MHz	USER (PART27-10)	Power	25.73 dBm	
Adjacent Channel	Bandwidth	100 kHz	Lower	-20.85 dBm		Bandedge limit: -13dBm
	Spacing	5.05 MHz	Upper	-22.11 dBm		
Alternate Channel	Bandwidth	1 MHz	Lower	-17.13 dBm		Bandedge limit: -13dBm
	Spacing	6.5 MHz	Upper	-18.35 dBm		
2nd Alternate Channel	Bandwidth	1 MHz	Lower	-25.19 dBm		Bandedge limit: -25dBm
	Spacing	11 MHz	Upper	-26.93 dBm		

Date: 21.SEP.2010 18:54:53

3.1.7 Test Result of Effective Isotropic Radiated Power

802.16e (QPSK, BW 5MHz) Radiated Power (EIRP)				
Horizontal Polarization				
Channel	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
Low	-28.49	43.85	15.36	0.03
Middle	-27.03	44.06	17.03	0.05
High	-29.56	44.26	14.70	0.03
Vertical Polarization				
Channel	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
Low	-18.52	45.55	27.03	0.50
Middle	-18.13	46.72	28.59	0.72
High	-18.88	45.48	26.60	0.46

802.16e (QPSK, BW 10MHz) Radiated Power (EIRP)				
Horizontal Polarization				
Channel	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
Low	-28.32	43.85	15.53	0.04
Middle	-27.44	44.06	16.62	0.05
High	-30.07	44.26	14.19	0.03
Vertical Polarization				
Channel	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
Low	-18.76	45.55	26.79	0.48
Middle	-18.80	46.72	27.92	0.62
High	-20.03	45.48	25.45	0.35



802.16e (16QAM, BW 5MHz) Radiated Power (EIRP)				
Horizontal Polarization				
Channel	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
Low	-28.54	43.85	15.31	0.03
Middle	-26.91	44.06	17.15	0.05
High	-29.61	44.26	14.65	0.03
Vertical Polarization				
Channel	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
Low	-18.51	45.55	27.04	0.51
Middle	-18.52	46.72	28.20	0.66
High	-18.66	45.48	26.82	0.48

802.16e (16QAM, BW 10MHz) Radiated Power (EIRP)				
Horizontal Polarization				
Channel	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
Low	-28.41	43.85	15.44	0.03
Middle	-27.42	44.06	16.64	0.05
High	-30.15	44.26	14.11	0.03
Vertical Polarization				
Channel	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
Low	-18.79	45.55	26.76	0.47
Middle	-18.71	46.72	28.01	0.63
High	-20.27	45.48	25.21	0.33

3.2 Emission Bandwidth

3.2.1 Description of Emission Bandwidth Measurement

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. The designated emission bandwidth using a resolution bandwidth of at least 1% of the emission bandwidth of the fundamental emission and a video bandwidth is more than resolution bandwidth.

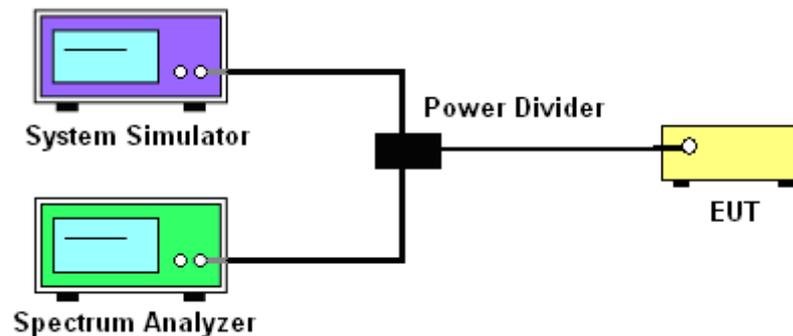
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and System Simulator via power divider.
2. The 99% and 26 dB occupied bandwidth (BW) of the middle channel for the highest RF powers were measured.

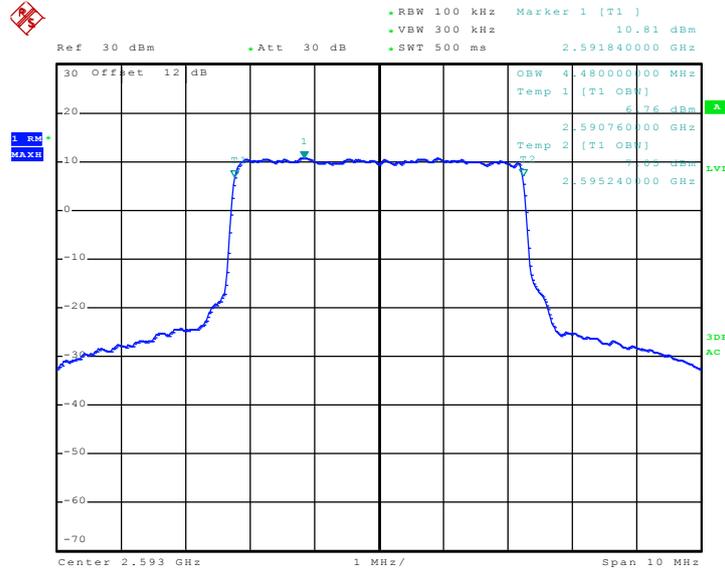
3.2.4 Test Setup



3.2.5 Test Result of Emission Bandwidth

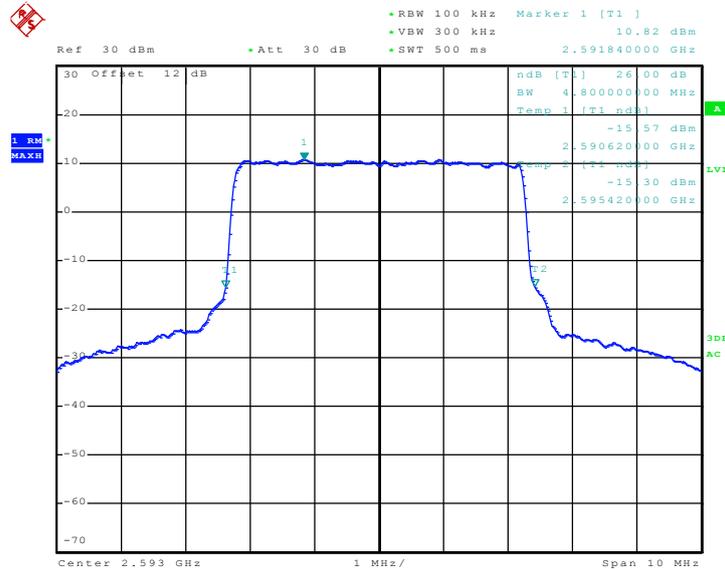
Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 5MHz		

99% Occupied Bandwidth Plot on Middle Channel



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26dB Bandwidth Plot on Middle Channel

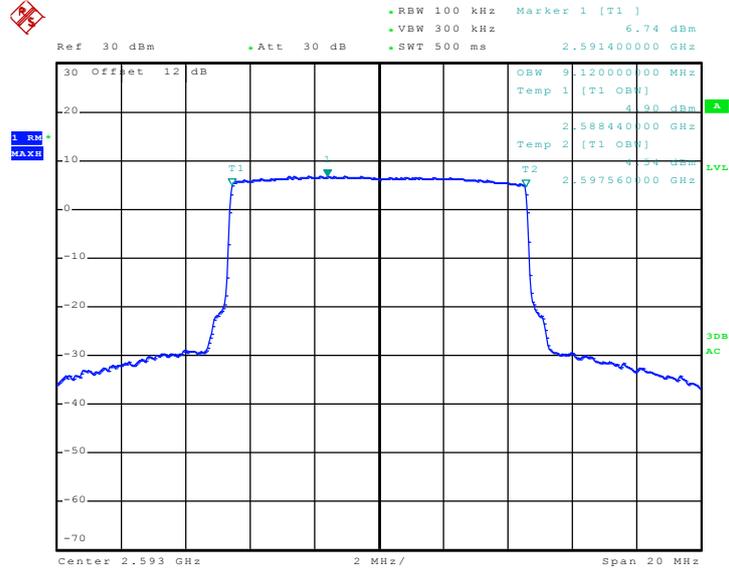


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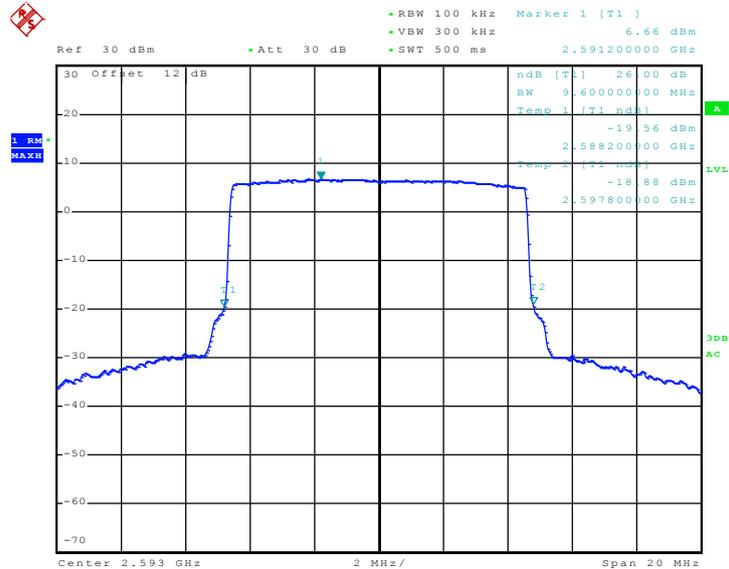
Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 10MHz		

99% Occupied Bandwidth Plot on Middle Channel



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26dB Bandwidth Plot on Middle Channel

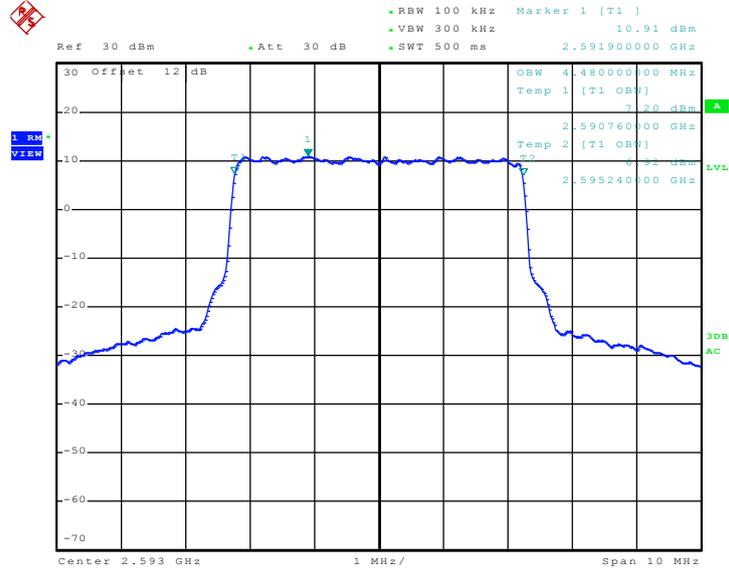


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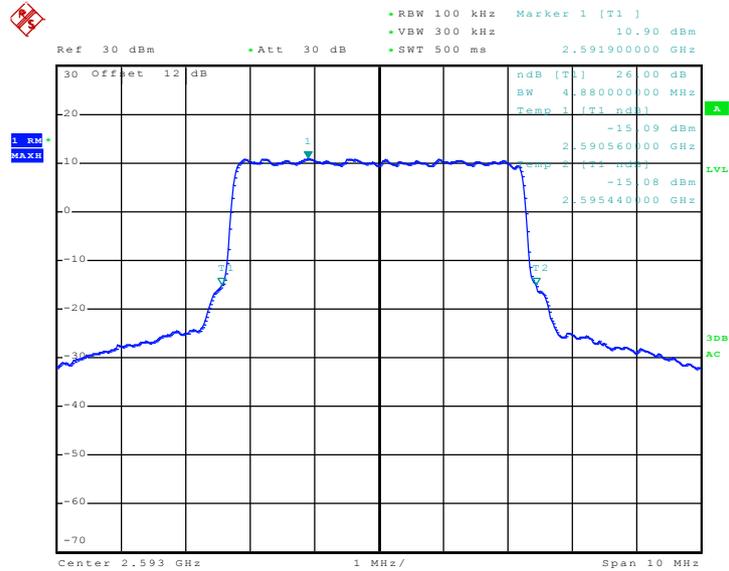
Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 5MHz		

99% Occupied Bandwidth Plot on Middle Channel



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26dB Bandwidth Plot on Middle Channel

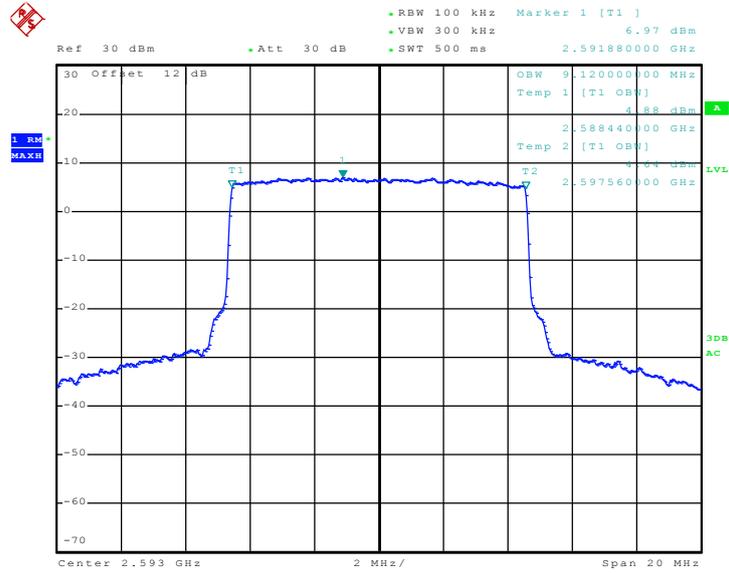


Date: 21.SEP.2010 17:44:54



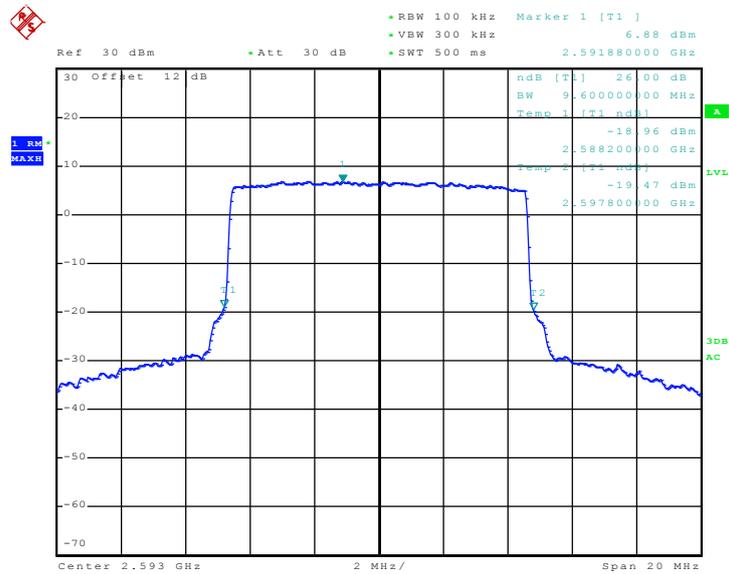
Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 10MHz		

99% Occupied Bandwidth Plot on Middle Channel



Date: 21.SEP.2010 18:37:00

26dB Bandwidth Plot on Middle Channel



Date: 21.SEP.2010 18:34:50



3.3 Conducted Spurious Emission Measurement

3.3.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of mobile digital stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge and $55 + 10 \log (P)$ dB at 5.5 MHz from the channel edges. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

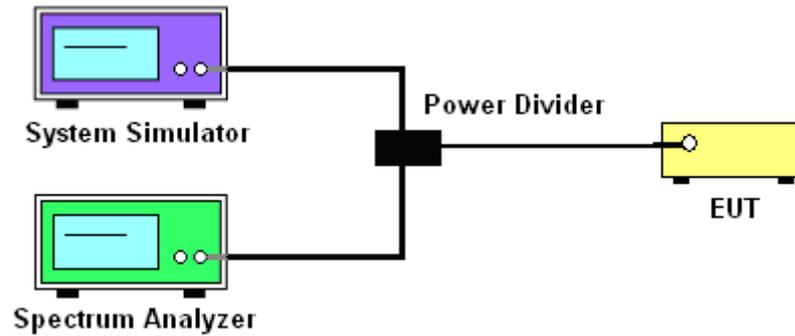
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The EUT was connected to spectrum analyzer and System Simulator via power divider.
2. The conducted spurious emission for the whole frequency range was taken.

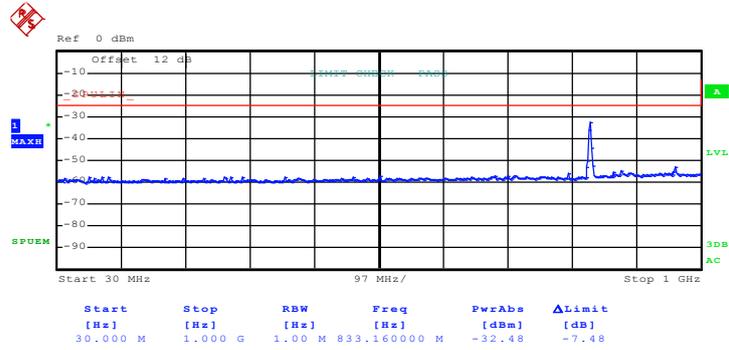
3.3.4 Test Setup



3.3.5 Test Plots of Spurious Emission

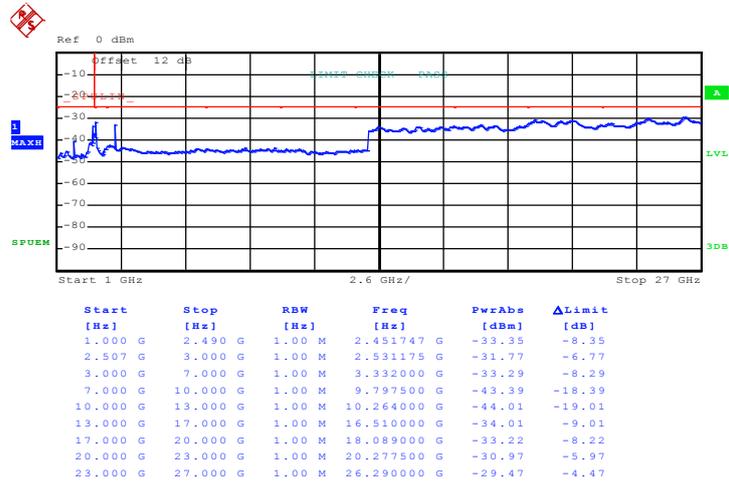
Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 5MHz	Channel :	Low

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:16:15

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

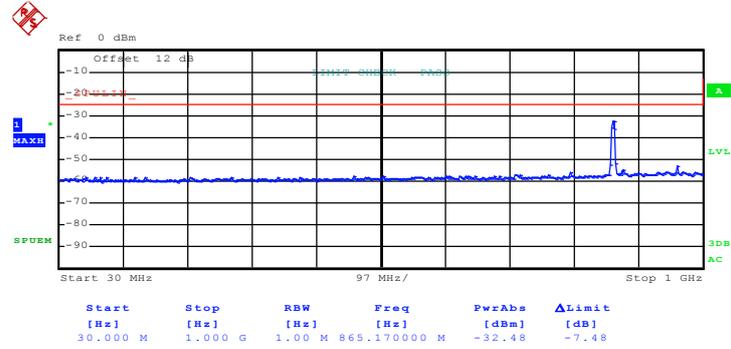


Date: 27.SEP.2010 19:49:15



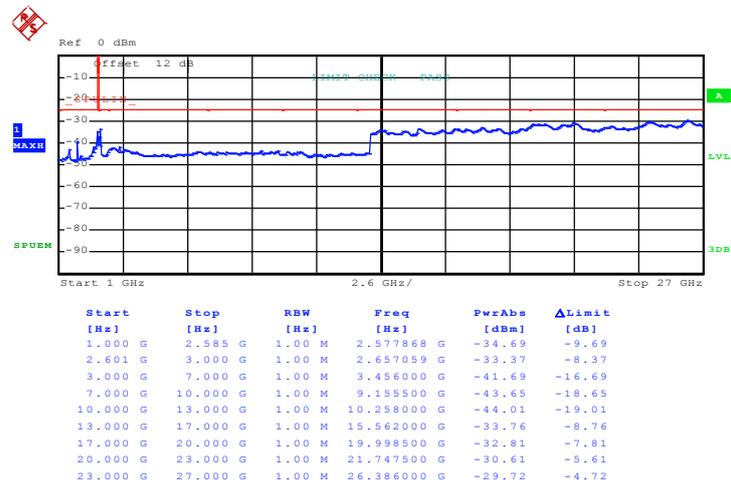
Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 5MHz	Channel :	Middle

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:19:14

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

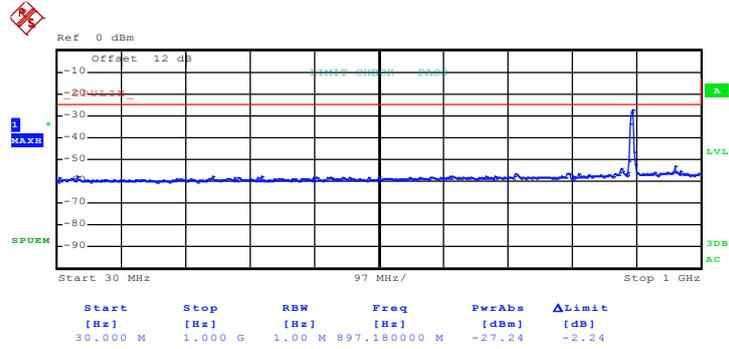


Date: 27.SEP.2010 19:35:42



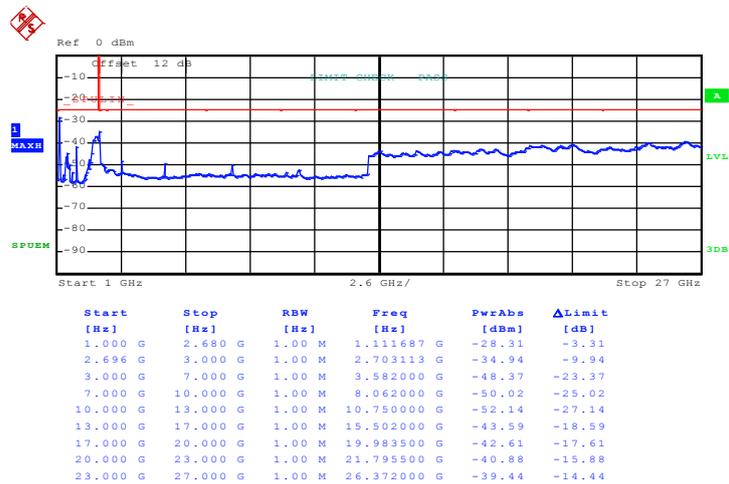
Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 5MHz	Channel :	High

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:12:10

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

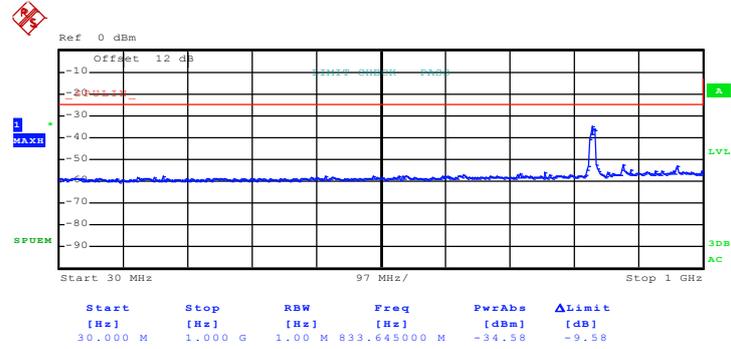


Date: 27.SEP.2010 13:54:44



Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 10MHz	Channel :	Low

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:41:47

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

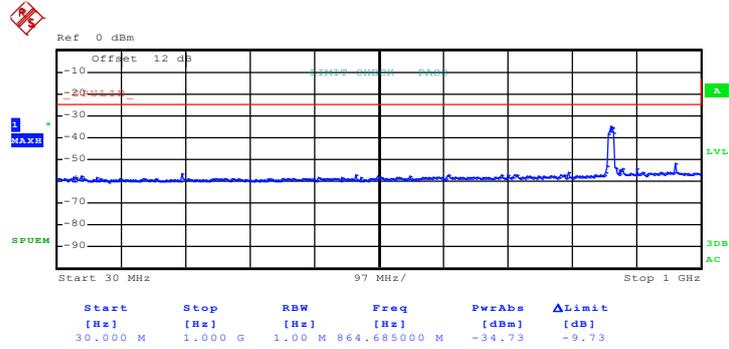


Date: 27.SEP.2010 11:54:57



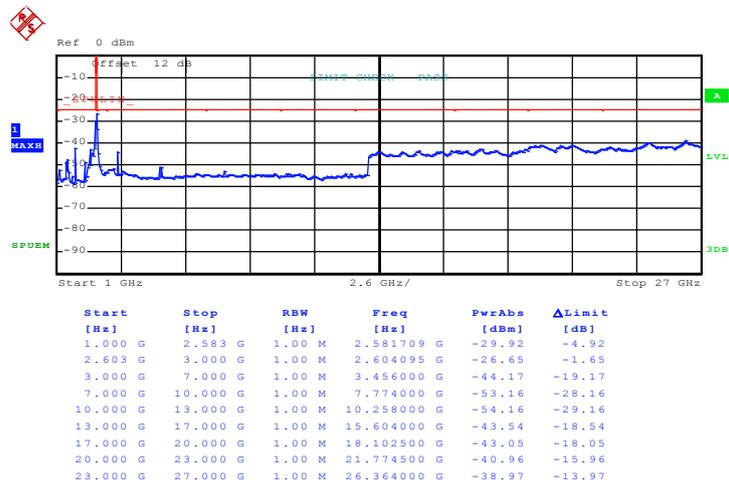
Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 10MHz	Channel :	Middle

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:22:02

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

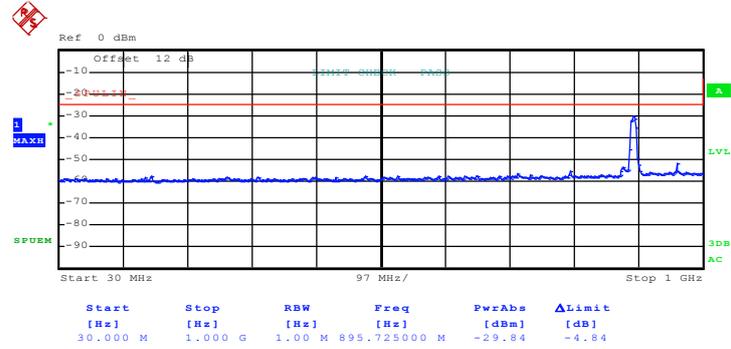


Date: 27.SEP.2010 11:37:53



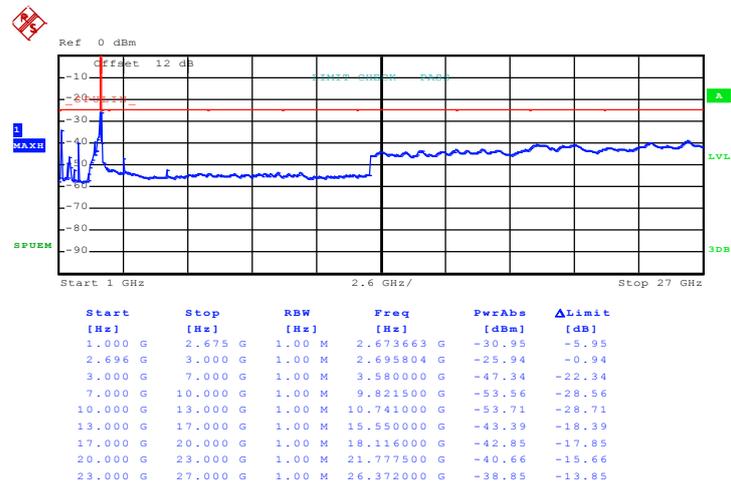
Band :	802.16e	Power Stage :	High
Test Mode :	QPSK, BW 10MHz	Channel :	High

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:52:28

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

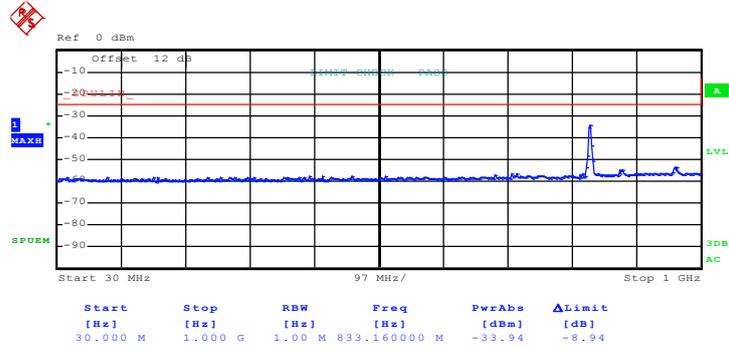


Date: 27.SEP.2010 13:43:06



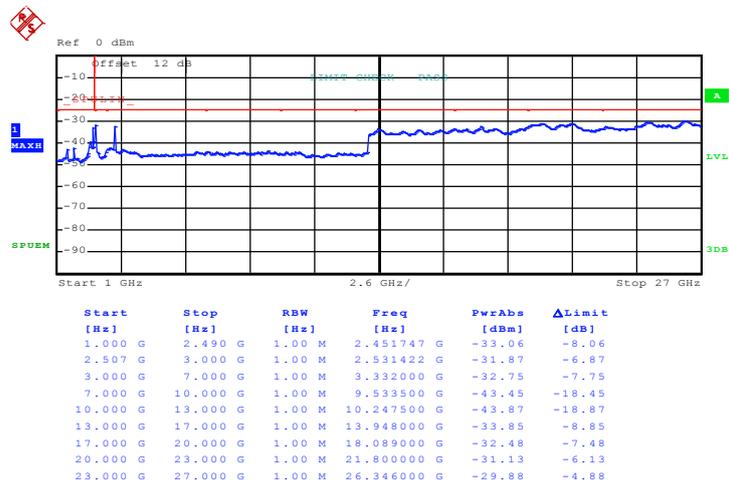
Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 5MHz	Channel :	Low

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:15:31

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

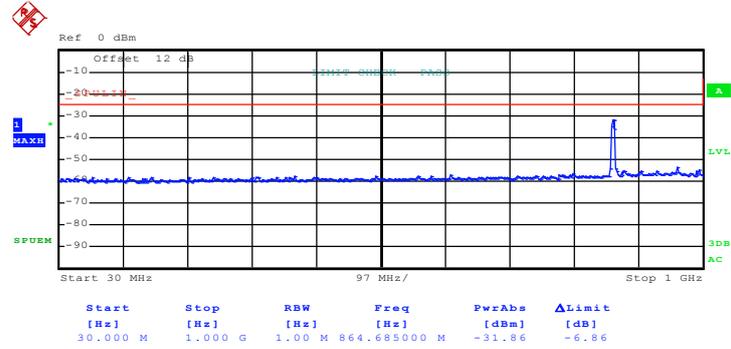


Date: 27.SEP.2010 19:47:51



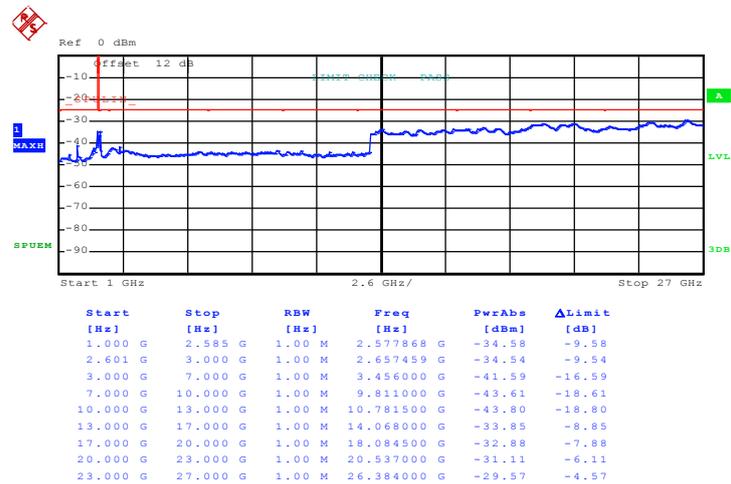
Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 5MHz	Channel :	Middle

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:19:48

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

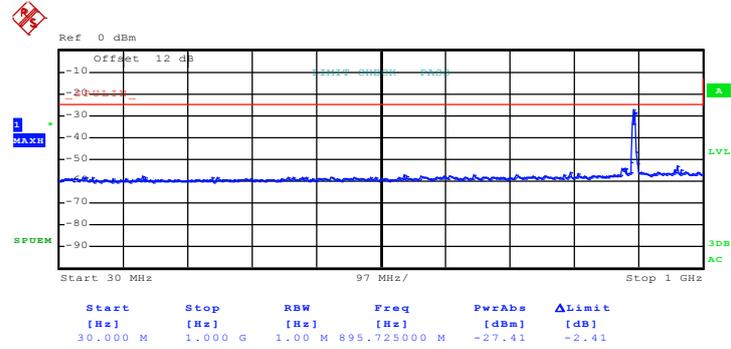


Date: 27.SEP.2010 19:37:03



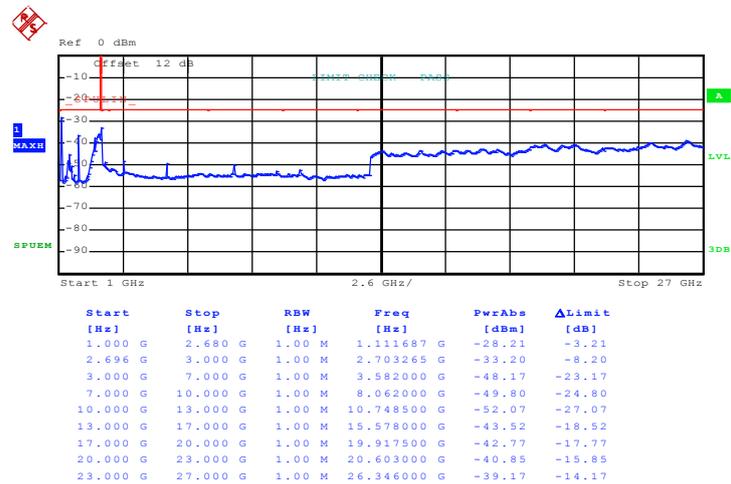
Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 5MHz	Channel :	High

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:12:56

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

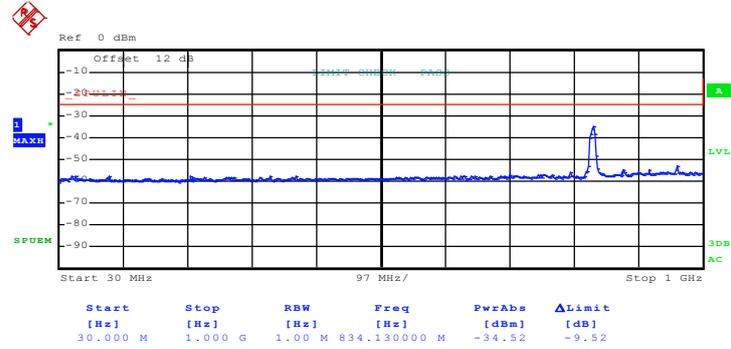


Date: 27.SEP.2010 13:56:06



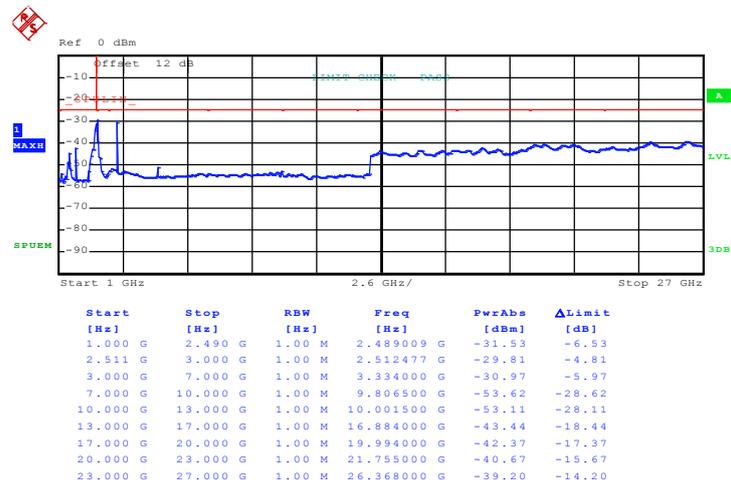
Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 10MHz	Channel :	Low

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:42:27

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

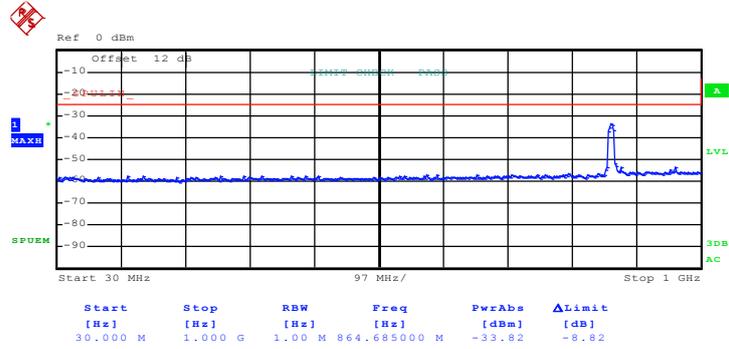


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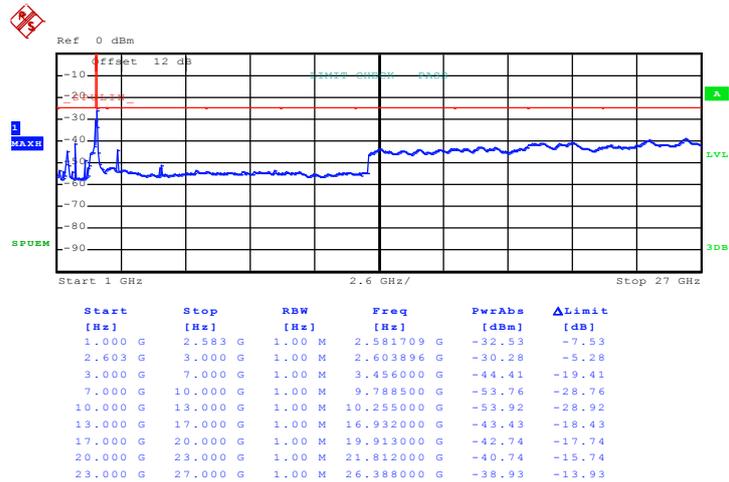
Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 10MHz	Channel :	Middle

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:33:25

Conducted Spurious Emission Plot between 1GHz ~ 27GHz

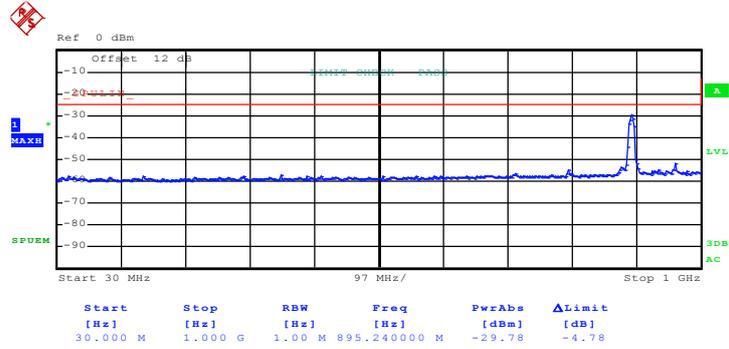


Date: 27.SEP.2010 11:41:50



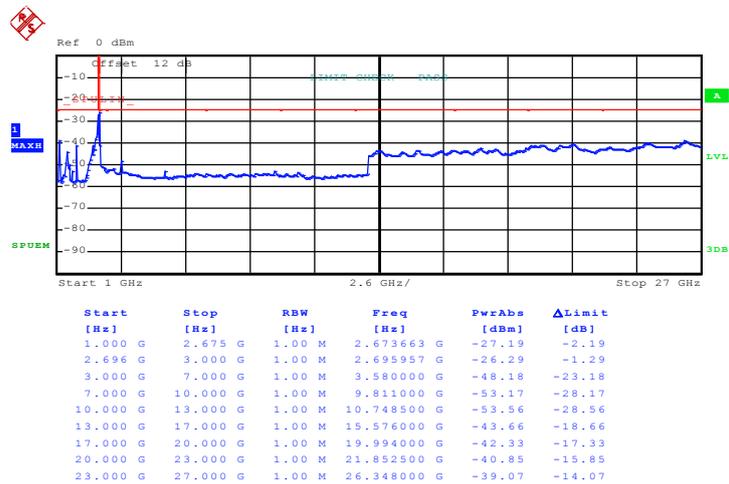
Band :	802.16e	Power Stage :	High
Test Mode :	16QAM, BW 10MHz	Channel :	High

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 21.SEP.2010 18:51:51

Conducted Spurious Emission Plot between 1GHz ~ 27GHz



Date: 27.SEP.2010 13:44:50

3.4 Radiated Emissions Measurement

3.4.1 Description of Radiated Emissions Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of mobile digital stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge and $55 + 10 \log (P)$ dB at 5.5 MHz from the channel edges. It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

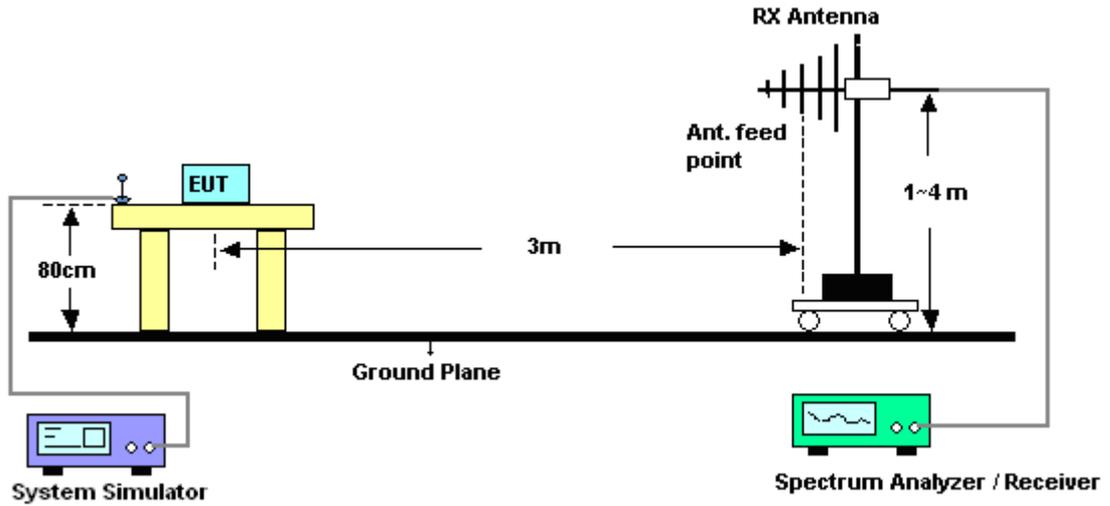
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 1MHz, Sweep = 500ms, Taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Emission level (dBm) = output power + substitution Gain.

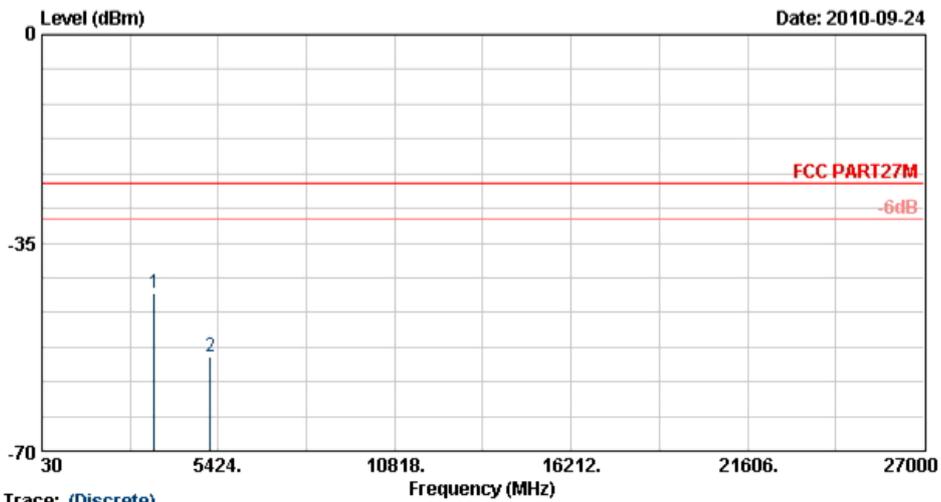
3.4.4 Test Setup





3.4.5 Test Result of Radiated Emissions

Band :	802.16e	Temperature :	23~25°C
Test Mode :	QPSK, BW 5MHz, Middle Ch (2593MHz)	Relative Humidity :	47~50%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value are not reported.		

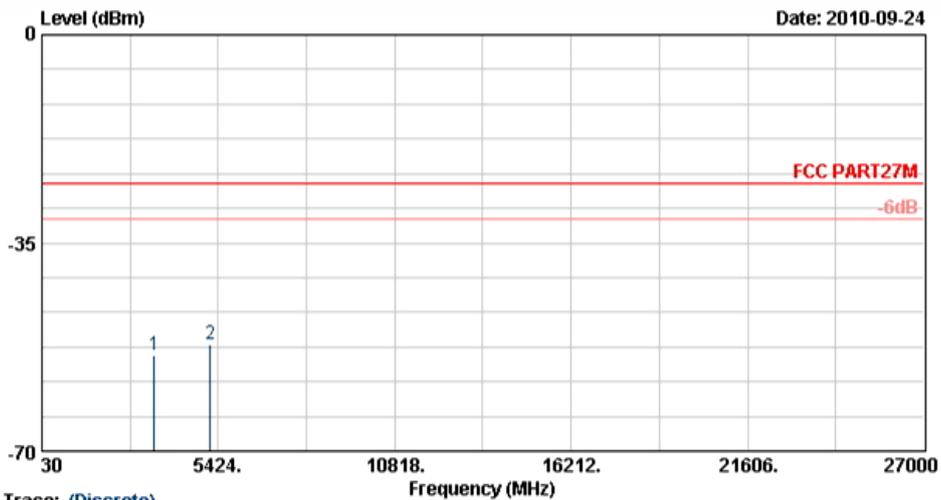


Trace: (Discrete)
 Site : 03CH06-RY
 Condition : FCC PART27M ETRP_100524 HORIZONTAL
 Project : FG 091308

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456	-43.40	-25	-18.40	-59.96	-49.83	1.04	7.47	H	Pass
5184	-54.06	-25	-29.06	-76.41	-62.94	1.29	10.17	H	Pass



Band :	802.16e	Temperature :	23~25°C
Test Mode :	QPSK, BW 5MHz, Middle Ch (2593MHz)	Relative Humidity :	47~50%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value are not reported.		

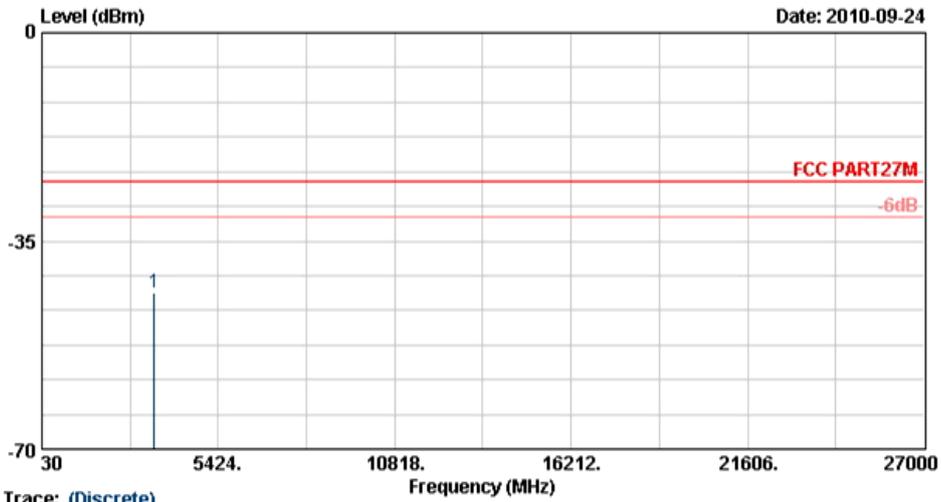


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC PART27M EIRP_100524 VERTICAL
 Project : FC 091308

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456	-53.99	-25	-28.99	-71.25	-60.42	1.04	7.47	V	Pass
5184	-52.14	-25	-27.14	-75.44	-61.02	1.29	10.17	V	Pass



Band :	802.16e	Temperature :	23~25°C
Test Mode :	QPSK, BW 10MHz, Middle Ch (2593MHz)	Relative Humidity :	47~50%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value are not reported.		

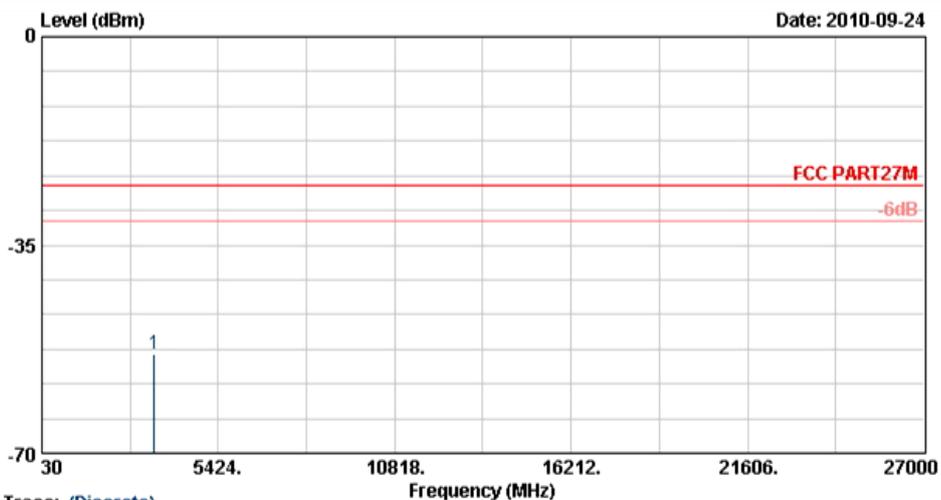


Trace: (Discrete)
 Site : 03CH06-RY
 Condition : FCC PART27M EIRP_100524 HORIZONTAL
 Project : FG 091308

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456	-43.66	-25	-18.66	-60.42	-50.09	1.04	7.47	H	Pass



Band :	802.16e	Temperature :	23~25°C
Test Mode :	QPSK, BW 10MHz, Middle Ch (2593MHz)	Relative Humidity :	47~50%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value are not reported.		

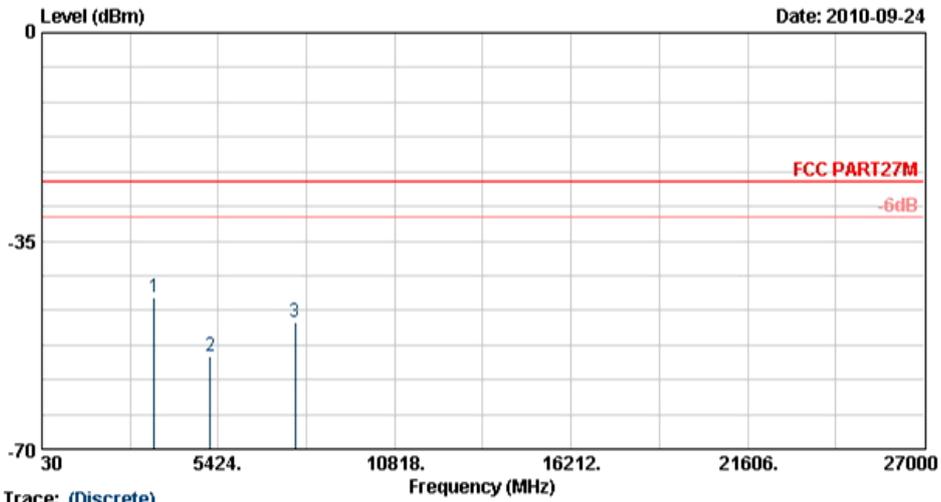


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC PART27M EIRP_100524 VERTICAL
 Project : FC 091308

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456	-53.33	-25	-28.33	-70.62	-59.76	1.04	7.47	V	Pass



Band :	802.16e	Temperature :	23~25°C
Test Mode :	16QAM, BW 5MHz, Middle Ch (2593MHz)	Relative Humidity :	47~50%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value are not reported.		

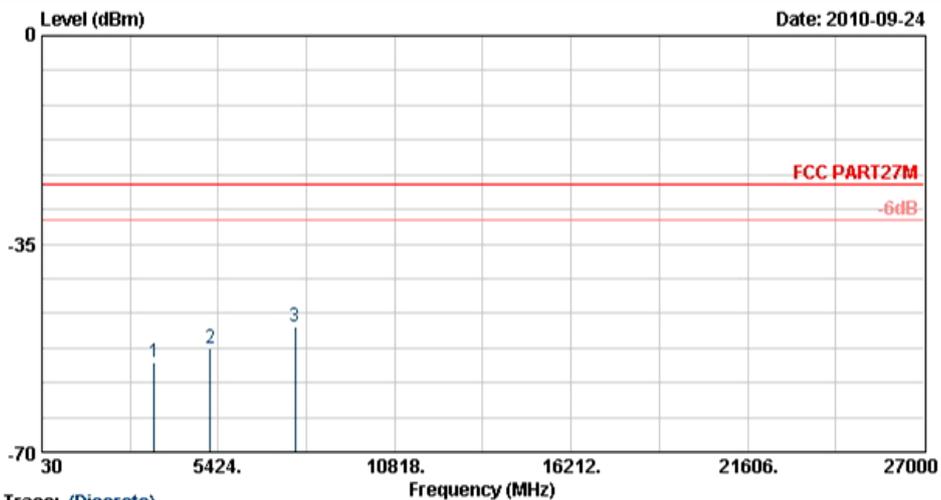


Trace: (Discrete)
 Site : 03CH06-RY
 Condition : FCC PART27M EIRP_100524 HORIZONTAL
 Project : FG 091308

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456	-44.60	-25	-19.60	-61.1	-51.03	1.04	7.47	H	Pass
5184	-54.39	-25	-29.39	-76.32	-63.27	1.29	10.17	H	Pass
7776	-48.70	-25	-23.70	-76.91	-59.19	1.63	12.12	H	Pass



Band :	802.16e	Temperature :	23~25°C
Test Mode :	16QAM, BW 5MHz, Middle Ch (2593MHz)	Relative Humidity :	47~50%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value are not reported.		

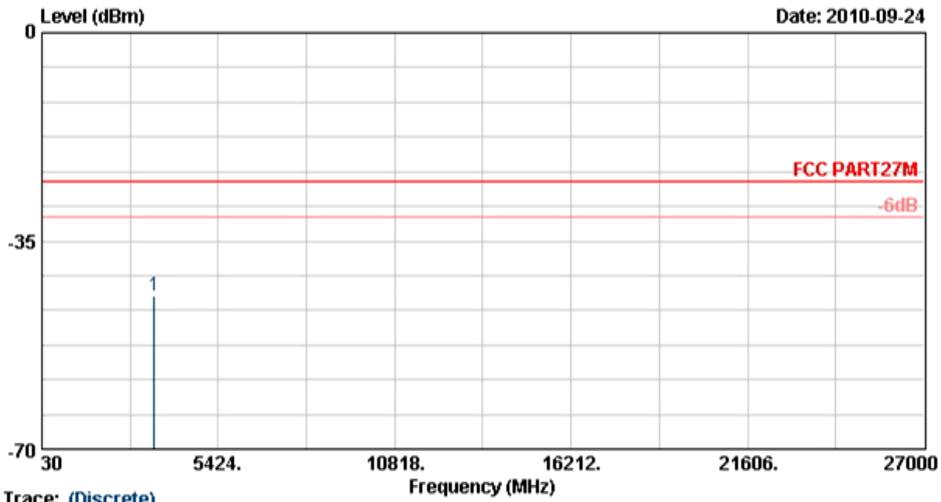


Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC PART27M EIRP_100524 VERTICAL
 Project : FC 091308

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456	-54.88	-25	-29.88	-72.03	-61.31	1.04	7.47	V	Pass
5184	-52.57	-25	-27.57	-76.48	-61.45	1.29	10.17	V	Pass
7776	-48.95	-25	-23.95	-76.03	-59.44	1.63	12.12	V	Pass



Band :	802.16e	Temperature :	23~25°C
Test Mode :	16QAM, BW 10MHz, Middle Ch (2593MHz)	Relative Humidity :	47~50%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value are not reported.		

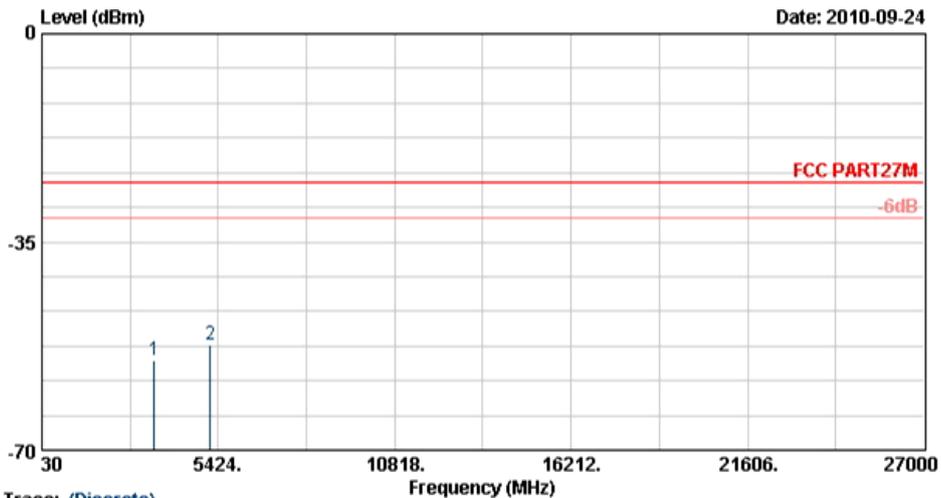


Trace: (Discrete)
 Site : 03CH06-RY
 Condition : FCC PART27M ETRP_100524 HORIZONTAL
 Project : FG 091308

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456	-44.25	-25	-19.25	-60.71	-50.68	1.04	7.47	H	Pass



Band :	802.16e	Temperature :	23~25°C
Test Mode :	16QAM, BW 10MHz, Middle Ch (2593MHz)	Relative Humidity :	47~50%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value are not reported.		



Trace: (Discrete)
 Site : 03CH06-HY
 Condition : FCC PART27M EIRP_100524 VERTICAL
 Project : FC 091308

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3456	-55.03	-25	-30.03	-72.89	-61.46	1.04	7.47	V	Pass
5184	-52.18	-25	-27.18	-76.25	-61.06	1.29	10.17	V	Pass



3.5 Frequency Stability Measurement

3.5.1 Description of Frequency Stability Measurement

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized frequency band. For equipment authorization purposes, this is a reporting requirement only.

3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

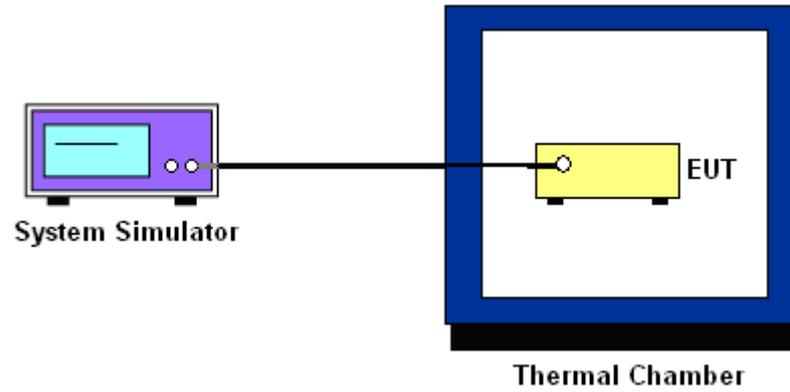
3.5.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the System Simulator.
2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at -30°C, the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

3.5.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 25±5° C and connected with the System Simulator.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

3.5.5 Test Setup



3.5.6 Test Result of Temperature Variation

Band :	802.16e	Channel :	Middle (2593MHz)
Limit (ppm) :	2.5		

Temperature (°C)	QPSK, BW 5MHz		QPSK, BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-2723	-1.05	-2717	-1.05	PASS
-20	-2360	-0.91	-2369	-0.91	
-10	-1893	-0.73	-1901	-0.73	
0	-1245	-0.48	-1221	-0.47	
10	-1037	-0.4	-1095	-0.42	
20	-830	-0.32	-903	-0.35	
30	-648	-0.25	-621	-0.24	
40	-545	-0.21	-532	-0.21	
50	-415	-0.16	-408	-0.16	

Band :	802.16e	Channel :	Middle (2593MHz)
Limit (ppm) :	2.5		

Temperature (°C)	16QAM, BW 5MHz		16QAM, BW 10MHz		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	-2697	-1.04	-2738	-1.06	PASS
-20	-2386	-0.92	-2364	-0.91	
-10	-1945	-0.75	-1897	-0.73	
0	-1271	-0.49	-1303	-0.50	
10	-1011	-0.39	-995	-0.38	
20	-804	-0.31	-852	-0.33	
30	-700	-0.27	-639	-0.25	
40	-519	-0.2	-545	-0.21	
50	-441	-0.17	-411	-0.16	



3.5.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Result
802.16e Middle (2593MHz)	QPSK, BW 5MHz	120	-713	-0.27	PASS
		102	-692	-0.27	
		138	-759	-0.29	
	QPSK, BW 10MHz	120	-762	-0.29	PASS
		102	-851	-0.33	
		138	-801	-0.31	
	16QAM, BW 5MHz	120	-621	-0.24	PASS
		102	-699	-0.27	
		138	-683	-0.26	
	16QAM, BW 10MHz	120	-754	-0.29	PASS
		102	-757	-0.29	
		138	-792	-0.31	

Note: Normal Voltage = AC 120V.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Mar. 19, 2009	Mar. 18, 2011	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30,2010	Jul. 29, 2011	Conducted (TH02-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz-26.5GHz	Oct. 23, 2009	Oct. 22, 2010	Radiation (03CH06-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 20, 2009	Oct. 19, 2010	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/003	20MHz-1000MHz	Apr. 28, 2010	Apr. 27, 2011	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2009	Oct. 31, 2010	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 02, 2010	Aug. 01, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Nov. 02, 2009	Nov. 01, 2010	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 14, 2009	Oct. 13, 2010	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 15, 2010	Apr. 14, 2011	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 15, 2010	Apr. 14, 2011	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH06-HY)
VSG (System Simulator)	Agilent	E4438C	MY49070423	N/A	Oct. 29, 2009	Oct. 28, 2011	-

5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	± 0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	± 1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	± 0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site Imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP091308 as below.