



FCC Test Report

**Product Name: WCDMA/GPRS/GSM/EDGE Mobile Phone
with Bluetooth**

Model Number: V736/Vodafone 736/U3210

**Report No: SYBH(R) E036022009EB-4
FCC ID: QISV736**

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REPORT ON FCC 47CFR part 15 subpart C Test of HUAWEI
 WCDMA/GPRS/GSM/EDGE Mobile Phone with Bluetooth

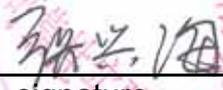
M/N: V736/Vodafone 736/U3210

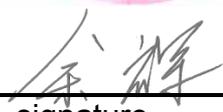
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FCC ID: QISV736

REGULATION **FCC CFR47 Part 2: Subpart J;**
 FCC CFR47 Part 15: Subpart C;

CONCLUSION **Pass**

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1 Summary

The table below summarizes the measurements and results for the HUAWEI WCDMA/GPRS/GSM/EDGE Mobile Phone with Bluetooth - V736/Vodafone 736/U3210. Detailed results and descriptions are shown in the following pages.

Table 1 Summary of results

FCC Measurement Specification	Description	Result
15.247 (a) (1)	20dB bandwidth measurement	PASS
15.247 (a) (1)	Carrier frequency separation measurement	PASS
15.247 (a) (1) III	Number of hopping channel	PASS
15.247 (a) (1) III	Time of occupancy	PASS
15.247 (b) (1)	Peak output power	PASS
15.247 (d)	Band edge compliance measurement	PASS
15.247 (d)	Conducted RF spurious	PASS
15.247 (d) / 15.205 & 15.209	Radiated spurious emission & Radiated restricted band measurement	PASS
15.207	Conducted emission test for power port	PASS



2 Product Description

2.1 Production Information

2.1.1 General Description

WCDMA/GPRS/GSM/EDGE Mobile Phone with Bluetooth–V736/Vodafone 736/U3210 is subscriber equipment in the WCDMA/GSM system. The WCDMA frequency band is Band I. The GSM frequency band includes E-GSM900 and DCS1800 and PCS1900. V736/Vodafone 736/U3210 implements such functions as RF signal receiving/sending, WCDMA and GSM/GPRS/EDGE protocol processing, voice and data service etc. Externally it provides Micro SD card interface, earphone port(to provide voice service) and USIM card interface.

2.1.2 Support function and Service

The EUT support the function and service as follows:

Table 2 Service and Test mode List

Service Name	Characteristic	Corresponding Test Mode	Note
Data and Voice	Modulation: GFSK	TM1	

2.2 Modification Information

For original equipment, following table is not application.

Table 3 Modification Information

Model Number	Board/Module	Original Version	New Version	Modify Information
Not applicable!				



3 Test Site Description

The test site of:

***Huawei Technologies Co. Ltd.
P.O. Box 518129
Huawei base, bantian,
Longgang District, Shenzhen, China***

The test site description has been submitted to  and registration granted under the registration number **97456** on April 20, 2006. The test site has been accredited by



and the accredited number is **2174.01** in June of 2006.

3.1 Testing Period

The test have been performed during the period of

FEB.10, 2009 to FEB.14, 2009

3.2 General Set up Description

The EUT can Support 2.4GHz Band. For compliance with FCC regulation 47CFR part15 subpart C, we set the EUT as following test mode to do all compliance tests.

Bluetooth MODE:

TM1: GFSK Modulation



4 Product Description

4.1 Technical Characteristics

4.1.1 Frequency Range

Table 4 Frequency Range

Uplink band:	2400 to 2483.5 MHz	
Downlink band:	2400 to 2483.5 MHz	
Hop frequency support:	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO

4.1.2 Channel Spacing / Separation

Table 5 Channel Spacing / Separation

Channel spacing:	1 MHz
Channel separation:	1 MHz

4.1.3 Type of Emission

Table 6 Type of Emission

Emission Designation:	-
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According to CFR 47 (FCC) part 2, subpart C, section 2.201 and 2.202

4.1.4 Antenna Information

Table 7 Antenna Information

Type:	Integrated / Internal
Maximum Gain(dBi):	0.02 (from 2400MHz to 2500MHz)

4.1.5 Environmental Requirements

Table 8 Environmental Requirements

Minimum temperature:	- 10 °C
Maximum temperature:	+ 55 °C
Relative Humidity:	5%-95%

4.1.6 Power Source

Table 9 Power Source

AC voltage nominal:	~120V
AC voltage range	~100V-240V
AC current maximal:	650mA

4.1.7 Tune-up Procedure

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (9).

Please reference the document Tune-up Procedure in TCF.

4.1.8 Applied DC Voltages and Currents

According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8).

The voltage and current in the final RF stage is:

Table 10 Applied RF module DC Voltages and Currents

Voltage:	 +2.8V
Current:	100mA According to CFR (FCC) part 2, subpart 2, section 2.1033(c) (8)



4.2 EUT Identification List

4.2.1 Board Information

Table 11 Board Information

WCDMA/GPRS/GSM/EDGE Mobile Phone with Bluetooth		
V736/Vodafone 736/U3210		
Board and Module		
Equipment Designation / Description	Model	Remarks
-Main board	HD1U320M	HD1U320M VER.C
-Battery	HB4A1H	V736/Vodafone 736/U3210

4.2.2 Adapter Technical Data

AC/DCAdapter Model	HS-050040E5
Manufacturer	Huawei Technologies Co., Ltd.
Input Voltage	100-240V ~50/60Hz 0.2A
Output Voltage	 5.0V 400 mA
Rated Power	2W
S/N	BYA8A1507116

4.2.3 Battery Technical Data

Type:	Li-ion battery
Manufacturer:	FMT Electronics Co.,Ltd.
Battery Model:	HB4A1H
Rated capacity:	900mAh
Nominal Voltage:	 +3.7V
Charging Voltage:	 +4.2V

4.2.4 FCC Identification

Grantee Code: QIS
 Product Code: V736
 FCC Identification: QISV736



5 Main Test Instruments

Table 12 Main Test Equipments

Equipment Description	Manufacturer	Model	Serial Number	Calibrated until (MM.DD.YYYY)
Signal Analyzer	R&S	FSQ 40	100025	05.11.2009
Test Receiver Display Unit	R&S	ESMI 804.8932.52	829214/011	04.21.2009
Test Receiver RF Unit	R&S	ESMI 1032.5640.53	829550/008	04.21.2009
Receiver	R&S	ESIB 26	100318	04.21.2009
Receiver	R&S	ESCS30	830245/018	04.21.2009
Pre-Amplifier	Agilent	8447D	2944A10146	05.11.2009
Pre-Amplifier	Agilent	83017A	3950M00246	05.11.2009
Loop Antenna	Schwarzbeck	FMZB1516	1516115	03.16.2009
BiLog Antenna	Schaffner	CBL 6112B	2747	11.09.2009
Horn Antenna	ETS-Lindgren	3117	00062549	08.10.2009
Signal Generator	R&S	SMR 40	100325	05.11.2009
Artificial Mains Network	R&S	ENV4200	100001	05.11.2009
Universal Radio Communication Tester	R&S	CMU200	105822	10.21.2009



6 Transmitter Measurements

6.1 20dB bandwidth measurement

6.1.1 Test Conditions

Table 13 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	23.5 °C
Relative humidity:	55%
Test Configurations:	TM1 at channel No.0, 40, 78

6.1.2 Test Specifications and Limits

6.1.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (1) and DA 00-705

6.1.2.2 Supporting Standards

Table 14 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.1.2.3 Limits

Not Applicable.

6.1.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measured frequency number and test the 20dB bandwidth with spectrum analyzer.

Test setup

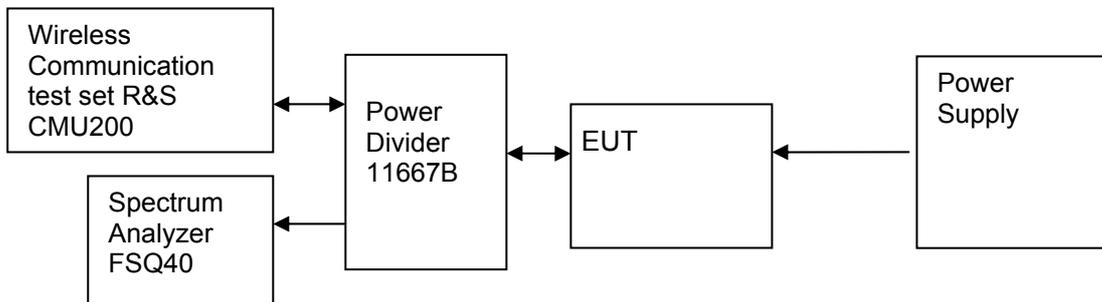


Figure 1. Test Set-up

6.1.4 Measurement Results

Table 15 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Bandwidth Type	Channel Position	Channel Number	Frequency [GHz]	Measured Bandwidth [MHz]	Result
20dB	B	0	2.402	1.267	PASS
20dB	M	40	2.442	1.293	PASS
20dB	T	78	2.480	1.297	PASS

Table 16 Measurement Results (Modulation: 8DPSK)

Bandwidth Type	Channel Position	Channel Number	Frequency [GHz]	Measured Bandwidth [MHz]	Result
20dB	B	0	2.402	1.290	PASS
20dB	M	40	2.442	1.293	PASS
20dB	T	78	2.480	1.284	PASS

6.1.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix A.



6.2 Carrier frequency separation measurement

6.2.1 Test Conditions

Table 17 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	23.5 °C
Relative humidity:	55%
Test Configurations:	TM1 at channel No.39, 40, 41

6.2.2 Test Specifications and Limits

6.2.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (1) and DA 00-705

6.2.2.2 Supporting Standards

Table 18 Supporting Standards:

ANSI/TIA-603-C:2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.2.2.3 Limits

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

Table 19 Limits Measurement Results (Modulation: $\pi/4$ -DQPSK)

Regulation:	≥ 0.025 or $2/3$ of the 20 dB bandwidth
Limit:	$2/3 \times 1.05 = 0.7$

Table 20 Limits Measurement Results (Modulation: 8DPSK)

Regulation:	≥ 0.025 or $2/3$ of the 20 dB bandwidth
Limit:	$2/3 \times 1.05 = 0.7$

6.2.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function, then set the measured frequency number to two adjacent channels separately and test the carrier frequency separation with spectrum analyzer.

Test setup

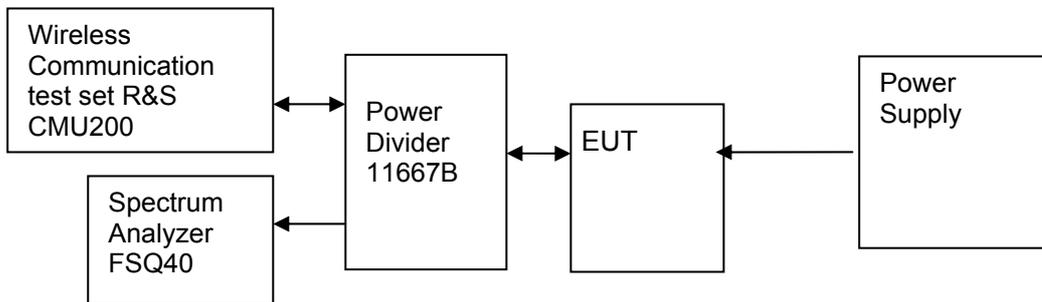


Figure 2. Test Set-up

6.2.4 Measurement Results

Table 21 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Channel No.	Frequency [GHz]	Channel No.	Frequency [GHz]	Measured frequency separation [MHz]	Limit [MHz]	Result
40	2.442	39	2.441	1.000	0.7	PASS
40	2.442	41	2.443	0.992	0.7	PASS

Table 22 Measurement Results (Modulation: 8DPSK)

Channel No.	Frequency [GHz]	Channel No.	Frequency [GHz]	Measured frequency separation [MHz]	Limit [MHz]	Result
40	2.442	39	2.441	0.992	0.7	PASS
40	2.442	41	2.443	1.025	0.7	PASS

6.2.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix B.



6.3 Number of hopping channel

6.3.1 Test Conditions

Table 23 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	22 °C
Relative humidity:	52 %
Test Configurations:	TM1 at hopping frequency state

6.3.2 Test Specifications and Limits

6.3.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (1) III and DA 00-705

6.3.2.2 Supporting Standards

Table 24 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.3.2.3 Limits

Number of hopping channel should be compliance with the requirements in part15.247 (a) (1) III.

Table 25 Limits

Limits	≥15 hopping frequency channel
--------	-------------------------------

6.3.3 Test Method and Setup

- Connect test port of EUT to spectrum analyzer and universal communication tester.
- Set the EUT to transmit maximum output power at 2.4GHz and switch on frequency hopping function, then set enough count time (larger than 5000 times) to get all the hopping frequency channel displayed on the screen of spectrum analyzer.
- Count the quantity of peaks to get the number of hopping channels.

Test setup

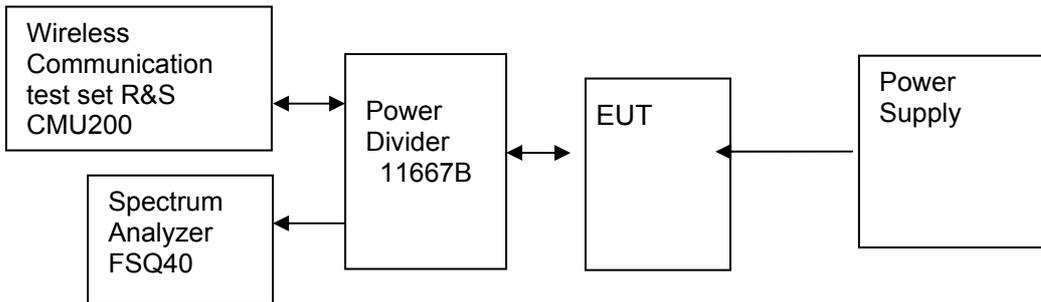


Figure 3. Test Set-up

6.3.4 Measurement Results

Table 26 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Measured frequency range [MHz]	Channel No. range	Measured Channel No.	Limit	Result
2400 to 2483.5	0-78	79	>15	PASS

Table 27 Measurement Results (Modulation: 8DPSK)

Measured frequency range [MHz]	Channel No. range	Measured Channel No.	Limit	Result
2400 to 2483.5	0-78	79	>15	PASS

6.3.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix C.

6.4 Time of occupancy

6.4.1 Test Conditions

Table 28 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1 at hopping frequency state

6.4.2 Test Specifications and Limits

6.4.2.1 Specification

CFR 47 (FCC) part 15.247 (a) (1) III and DA 00-705

6.4.2.2 Supporting Standards

Table 29 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.4.2.3 Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

Table 30 Limits

Limits for time of occupancy	$\leq 0.4s$
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6.4.3 Test Method and Setup

- Connect test port of EUT to spectrum analyzer and universal communication tester.
- Set the EUT to transmit maximum output power at 2.4GHz and switch on frequency hopping function.
- Set the span of spectrum analyzer to 0 Hz, and set the resolution bandwidth to 1 MHz and the video bandwidth to 1 MHz, then get the time domain measured diagram. and set sweep time to 2 times of one burst occupancy time, and measure the time of occupancy of one burst.
- Set the resolution bandwidth to 1 MHz and the video bandwidth to 3 MHz, and set the sweep time to a period (0.4 seconds multiplied by the number of hopping channels employed), and count the number of the bursts.
- Calculate the time of occupancy in a period with time occupancy of a burst and quantity of bursts.

Test setup

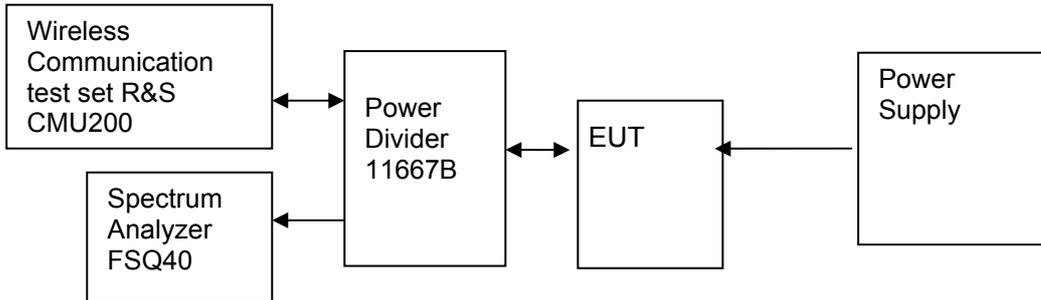


Figure 4. Test Set-up

6.4.4 Measurement Results π

Table 31 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Time of Single Slot [ms]	Numbers of slots in a period	Time of occupied in a period [s]	Limit [s]	Result
2.98	106.7	0.32	≤ 0.4	PASS

Table 32 Measurement Results (Modulation: 8DPSK)

Time of Single Slot [ms]	Numbers of slots in a period	Time of occupied in a period [s]	Limit [s]	Result
2.98	106.7	0.32	≤ 0.4	PASS

6.4.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix D.

6.5 Peak output power

6.5.1 Test Conditions

Table 33 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	23.5°C
Relative humidity:	55 %
Test Configurations:	TM1 at channel No.0, 40, 78

6.5.2 Test Specifications and Limits

6.5.2.1 Specification

CFR 47 (FCC) part 15.247 (b) (1) and DA 00-705

6.5.2.2 Supporting Standards

Table 34 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.5.2.3 Limits

Compliance with part 15.247 (b) (1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watt.

Table 35 Limits

2.4GHz and 5.8GHz hopping frequency system	1 Watt / 30 dBm
Other frequency hopping systems	0.125 Watts / 21 dBm

6.5.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester.
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted output power separately.

Test setup

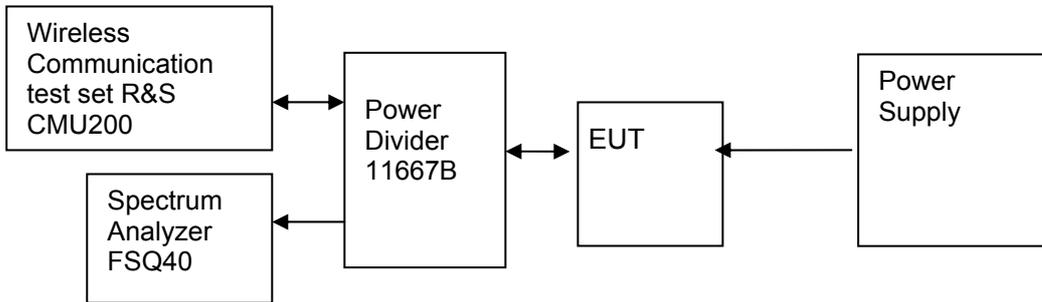


Figure 5. Test Set-up

6.5.4 Measurement Results

Table 36 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Channel	Channel No.	Center Freq.[MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
Bottom	0	2402	7.73	< 30	PASS
Middle	40	2442	7.54	< 30	PASS
Top	78	2480	6.69	< 30	PASS

Table 37 Measurement Results (Modulation: 8DPSK)

Channel	Channel No.	Center Freq.[MHz]	Meas. Level (Cond.) [dBm]	Limit [dBm]	Result
Bottom	0	2402	7.01	< 30	PASS
Middle	40	2442	6.92	< 30	PASS
Top	78	2480	6.68	< 30	PASS

6.5.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix E.



6.6 Band edge spurious emission

6.6.1 Test Conditions

Table 38 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna connector
Ambient temperature:	20°C
Relative humidity:	50 %
Test Configurations:	TM1 at channel No. 0, 78 and frequency hopping state

6.6.2 Test Specifications and Limits

6.6.2.1 Specification

CFR 47 (FCC) part 15.247 (d) and DA 00-705

6.6.2.2 Supporting Standards

Table 39 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.6.2.3 Limits

Compliance with part 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 Section 15.209(a) is not required.

Table 40 Limits

Band edge spurious:	20 dBc/100kHz
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6.6.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- (c) Then set the EUT to transmit at high, low frequency and measure the conducted band edge spurious separately.
- (d) Switch on the frequency hopping function, and repeat above measurement.

Test setup

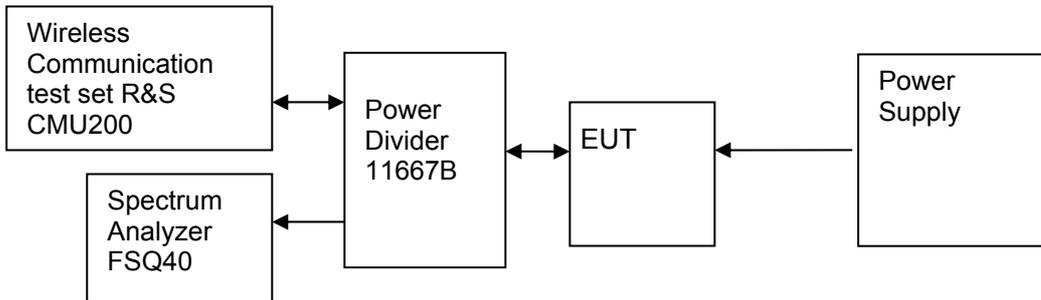


Figure 6. Test Set-up

6.6.4 Measurement Results

Table 41 Measurement Results for Band Edge immediately outside the 2.4G Band
(Modulation: $\pi/4$ -DQPSK)

	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
Low Edge	0	2402	6.41	Off	-27.87	< -13.6	PASS
	-	-	5.59	On	-32.89	< -14.4	PASS
High Edge	78	2480	6.21	Off	-36.82	< -13.8	PASS
	-	-	4.48	On	-44.84	< -15.5	PASS

Table 42 Measurement Results for Band Edge immediately outside the 2.4G Band
(Modulation: 8DPSK)

	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
Low Edge	0	2402	4.67	Off	-34.69	< -15.3	PASS
	-	-	4.63	On	-36.82	< -15.4	PASS
High Edge	78	2480	6.17	Off	-37.20	< -13.8	PASS
	-	-	6.10	On	-44.28	< -13.9	PASS

6.6.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix F.



6.7 Conducted RF spurious

6.7.1 Test Conditions

Table 43 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Antenna Connector
Ambient temperature:	22 °C
Relative humidity:	53 %
Test Configurations:	TM1 at channel No.0, 40, 78

6.7.2 Test Specifications and Limits

6.7.2.1 Specification

CFR 47 (FCC) part 15.247 (d) and DA 00-705

6.7.2.2 Supporting Standards

Table 44 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
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6.7.2.3 Limits

Compliance with part 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 Section 15.209(a) is not required.

Table 45 Limits

Band edge spurious:	20 dBc/100kHz
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6.7.3 Test Method and Setup

- (a) Connect test port of EUT to spectrum analyzer and universal communication tester
- (b) Set the EUT to transmit maximum output power at 2.4GHz and switch off frequency hopping function.
- (c) Then set the EUT to transmit at high, middle and low frequency and measure the conducted band edge spurious separately.
- (d) Switch on the frequency hopping function, and repeat above measurement.

Test setup

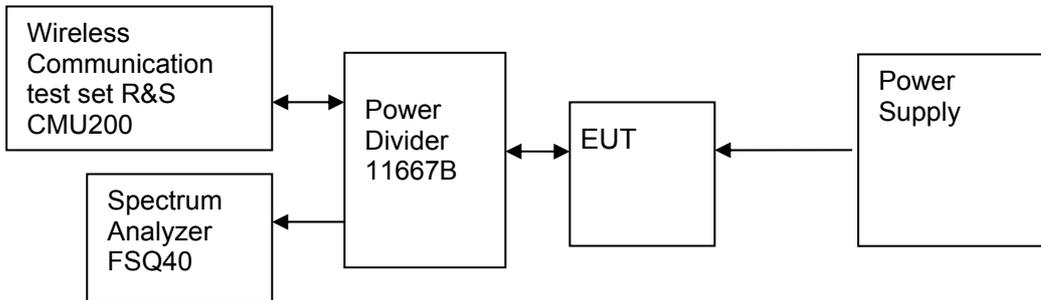


Figure 7. Test Set-up

6.7.4 Measurement Results

6.7.4.1 Measurement Results

Table 46 Measurement Results (Modulation: $\pi/4$ -DQPSK)

Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
9kHz-26GHz	0	2402	1.64	Off	-40.75	< -18.40	PASS
9kHz-26GHz	40	2442	1.35	Off	-39.37	< -18.60	PASS
9kHz-26GHz	78	2480	2.77	Off	-47.25	< -17.20	PASS

Table 47 Measurement Results (Modulation: 8DPSK)

Test Frequency Range	Channel No.	Carrier Frequency [MHz]	Carrier Power [dBm]	Frequency Hopping	Max. Spurious Level [dBm]	Limit [dBm]	Result
9kHz-26GHz	0	2402	1.57	Off	-32.31	< -18.40	PASS
9kHz-26GHz	40	2442	0.74	Off	-38.60	< -19.30	PASS
9kHz-26GHz	78	2480	4.30	Off	-37.72	< -15.70	PASS

6.7.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix G.

6.8 Radiated spurious emission & spurious in restricted band

6.8.1 Test Conditions

Table 48 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Enclosure
Ambient temperature:	25 °C
Relative humidity:	55 %
Test Configurations:	TM1 at channel No.0, 40, 78

6.8.2 Test Specifications and Limits

6.8.2.1 Specification

CFR 47 (FCC) part 15.247 (d), 15.205 & 15.209 and DA 00-705

6.8.2.2 Supporting Standards

Table 49 Supporting Standards:

ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

6.8.2.3 Limits

According to part 15.247 (d) / 15.205 & 15.209, all spurious emission in the frequency range from 30MHz to 10th harmonics of carrier frequency should be meet the requirement of following table.

Table 50 Limits

Frequency (MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)	Detector
30 – 88	100	40	3	QP
88 – 216	150	43.5	3	QP
216 – 960	200	46	3	QP
960 -1000	500	54	3	QP
Above 1000	500	54	3	PK

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table 42).

6.8.3 Test Method and Setup

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4. The Radiated Disturbance measurements were made using a Rohde and Schwarz Test Receiver and control software.

A preliminary scan and a final scan of the emissions were made by using test script of software; the

emissions were measured using a Quasi-Peak Detector below 1GHz, and AV detector above 1GHz. The maximal emission value was acquired by adjusting the antenna height, polarisation and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0° to 360°, The receive antenna has two polarizations V and H.

The EUT was communicated with the BTS simulator through Air interface. The EUT operated on the typical channel.

Measurement bandwidth: 30 MHz – 1000 MHz: 120 kHz
 Measurement bandwidth: 1000 MHz – 10th Carrier Frequency: 1 MHz

Test set up

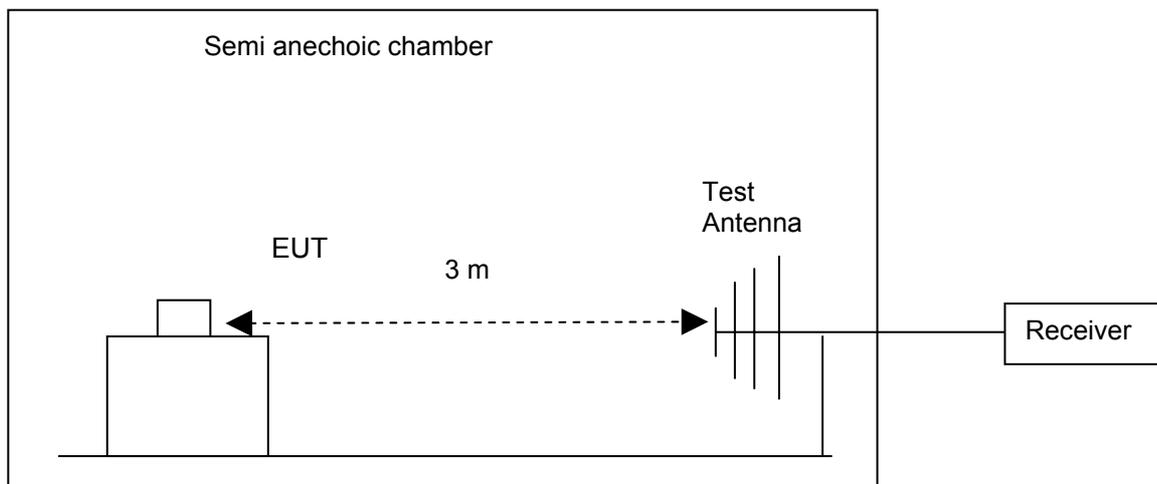


Figure 8. Test Set up

6.8.4 Measurement Results

6.8.4.1 Measurement Result

Note: The following measurement results exceed the limit line is the carrier frequency.

Measured Result of channel: 0 (2402MHz)

Table 51 MEASUREMENT RESULT

Frequency (MHz)	Level (dBµV/m)	Transd (dB)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
33.960000	22.00	11.7	40.0	18.0	125.0	251.00	VERTICAL
84.480000	23.70	10.0	40.0	16.3	267.0	0.00	VERTICAL
163.200000	18.30	9.7	43.5	25.2	163.0	355.00	HORIZONTAL
192.000000	33.70	11.9	43.5	9.8	220.0	297.00	HORIZONTAL
518.400000	34.30	20.4	47.0	12.7	108.0	300.00	VERTICAL
576.000000	38.70	21.6	47.0	8.3	115.0	231.00	VERTICAL
1525.000000	19.90	-14.5	54.0	34.1	234.0	235.00	VERTICAL
2402.000000	69.80	-11.7	54.0	-15.8	210.0	210.00	VERTICAL
3762.000000	30.00	-6.2	54.0	24.0	153.0	256.0	HORIZONTAL
5483.400000	30.10	-4.1	54.0	23.9	143.0	164.00	HORIZONTAL
12522.000000	33.70	5.4	54.0	20.3	220.0	246.00	HORIZONTAL
17998.000000	40.10	17.1	54.0	13.9	215.0	176.00	VERTICAL
18994.000000	31.40	18.7	54.0	22.6	130.0	210.00	HORIZONTAL
19465.500000	30.80	18.9	54.0	23.2	160.0	180.00	VERTICAL
20903.000000	32.70	20.5	54.0	21.3	180.0	256.00	VERTICAL



22634.000000	33.30	20.4	54.0	20.7	210.0	230.00	HORIZONTAL
24572.000000	31.90	22.3	54.0	22.1	230.0	185.00	VERTICAL
26469.000000	34.50	27.9	54.0	19.5	170.0	162.00	HORIZONTAL
2310.000000	22.10	-11.7	54.0	31.9	224.0	127.00	VERTICAL
2390.000000	24.20	-11.8	54.0	29.8	251.0	188.00	HORIZONTAL
2402.000000	70.00	-11.7	54.0	-16.0	267.0	191.00	VERTICAL
2483.500000	22.20	-11.5	54.0	31.8	135.0	216.00	VERTICAL
2500.000000	22.00	-11.4	54.0	32.0	140.0	201.00	HORIZONTAL

Measured Result of channel: 40 (2442MHz)

Table 52 MEASUREMENT RESULT

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
34.150000	21.50	11.7	40.0	19.5	120.0	145.00	VERTICAL
84.500000	23.50	10.0	40.0	16.5	211.0	137.00	VERTICAL
164.200000	18.70	9.7	43.5	24.8	142.0	316.00	HORIZONTAL
192.000000	33.70	11.9	43.5	9.8	250.0	289.00	HORIZONTAL
518.400000	34.50	20.4	47.0	12.5	158.0	214.00	HORIZONTAL
576.000000	38.90	21.6	47.0	8.1	203.0	227.00	VERTICAL
1691.000000	21.40	-15.2	54.0	33.6	224.0	127.00	VERTICAL
2442.000000	69.70	-11.7	54.0	-15.7	251.0	188.00	HORIZONTAL
3147.800000	29.10	-9.8	54.0	22.9	267.0	191.00	VERTICAL
4078.000000	30.10	-0.3	54.0	21.9	135.0	216.00	VERTICAL
8246.000000	33.10	5.2	54.0	20.9	140.0	201.00	HORIZONTAL
11860.000000	35.20	17.1	54.0	18.7	141.0	159.00	VERTICAL
18750.000000	31.50	18.5	54.0	22.5	130.0	210.00	HORIZONTAL
19481.000000	30.00	18.9	54.0	24.0	160.0	180.00	VERTICAL
21782.000000	31.70	20.5	54.0	22.3	180.0	256.00	VERTICAL
24190.000000	31.50	21.5	54.0	22.5	210.0	230.00	HORIZONTAL
25378.500000	31.70	23.1	54.0	22.3	230.0	185.00	VERTICAL
26492.000000	34.60	27.9	54.0	19.4	170.0	162.00	HORIZONTAL

Measured Result of channel: 78 (2480MHz)

Table 53 MEASUREMENT RESULT

Frequency (MHz)	Level (dBμV/m)	Transd (dB)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Polarisation
34.000000	21.50	11.7	40.0	18.5	130.0	252.00	HORIZONTAL
85.400000	21.10	10.0	40.0	18.9	150.0	140.00	VERTICAL
163.200000	20.30	9.7	43.5	26.2	140.0	244.00	HORIZONTAL
195.000000	33.90	11.9	43.5	9.6	190.0	176.00	HORIZONTAL
520.300000	33.80	20.4	47.0	13.2	120.0	235.00	VERTICAL
578.000000	38.20	21.6	47.0	8.8	110.0	223.00	HORIZONTAL
1415.000000	19.10	-12.2	54.0	34.9	119.0	156.00	VERTICAL
2480.000000	69.90	-6.7	54.0	-15.9	153.0	168.00	HORIZONTAL
3145.000000	28.40	-1.5	54.0	25.6	167.0	218.00	HORIZONTAL
4032.500000	30.90	-1.0	54.0	23.1	106.0	140.00	VERTICAL
10615.500000	32.50	11.9	54.0	21.5	145.0	150.00	VERTICAL
17991.000000	40.10	26.0	54.0	13.9	137.0	344.00	HORIZONTAL
19490.000000	30.10	18.9	54.0	23.9	213.0	152.00	HORIZONTAL
20472.000000	32.00	19.7	54.0	22.0	156.0	159.00	VERTICAL
21768.000000	32.10	20.5	54.0	21.9	114.0	165.00	HORIZONTAL
23534.000000	31.50	20.5	54.0	22.5	174.0	281.00	HORIZONTAL
24205.100000	31.20	21.5	54.0	22.8	200.0	48.00	VERTICAL
26490.000000	34.00	27.9	54.0	20.0	190.0	151.00	HORIZONTAL
2310.000000	20.90	-11.7	54.0	33.1	184.0	85.00	VERTICAL



2390.000000	21.30	-11.8	54.0	32.7	264.0	156.00	HORIZONTAL
2480.000000	69.80	-11.6	54.0	-12.3	143.0	284.00	HORIZONTAL
2483.500000	41.70	-11.5	54.0	12.3	168.0	55.00	VERTICAL
2500.000000	21.10	-11.4	54.0	32.9	211.0	329.00	VERTICAL

6.8.5 Conclusion

The equipment **PASSED** the requirement of this clause.
For the measurement results refer to appendix H.

6.9 Conducted Emission at Power Port

6.9.1 Test Conditions

Table 54 Test Conditions

Preconditioning:	0.5 hour
Measured at:	Power port
Ambient temperature:	23.5°C
Relative humidity:	55 %
Test Configurations:	TM1 at channel No. 40

6.9.2 Test Specifications and Limits

6.9.2.1 Specification

CFR 47 (FCC) part 15.207 and DA 00-705

6.9.2.2 Supporting Standards

Table 55 Supporting Standards:

ANSI C63.4: 2003	Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
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6.9.2.3 Limits

Compliance with part15.207, conducted emission must meet the requirement of following table.

Table 56 Limits

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

Note: * Decreases with the logarithm of the frequency.

6.9.3 Test Method and Setup

The Table-top EUT was placed upon a non-metallic table 0.8 m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4: 2003.

Conducted Disturbance at AC Port measurements were undertaken on the L and N Lines. The emissions were measured using a Quasi-Peak Detector and Average Detector.

The EUT was communicated with the BTS simulator through Air interface, the BTS simulator controls the EUT to transmitter the maximum power which defined in specification of product. The EUT operated on the typical channel.

Measurement bandwidth (RBW) for 150kHz to 30 MHz: 9 kHz;

Test Set-up

The Mobile Phone was setup in the screened chamber and operated under nominal conditions.

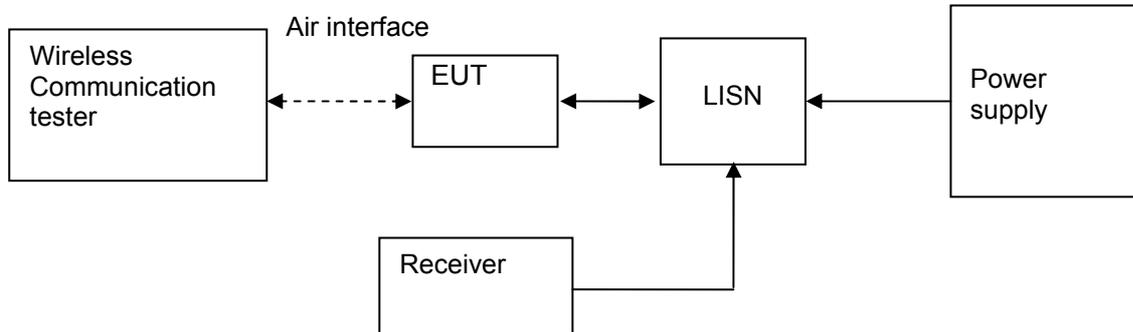


Figure 9. Test Set-up

6.9.4 Measurement Results

Table 57 MEASUREMENT RESULT:QP DECTER

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.169500	29.60	10.1	65	34.4	QP	L1	FLO
0.485500	33.20	10.1	57	23.8	QP	N	FLO
0.904000	32.70	10.1	56	23.3	QP	N	FLO
3.219000	35.10	10.2	56	20.9	QP	N	FLO
4.139000	42.20	10.2	56	13.8	QP	N	FLO
7.355500	34.70	10.2	60	25.3	QP	N	FLO

Table 58 MEASUREMENT RESULT:AV DECTER

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Detector	Line	PE
0.169500	23.10	10.1	55	31.9	AV	N	FLO
0.490500	26.70	10.1	47	20.3	AV	N	FLO
0.915000	27.10	10.1	46	18.9	AV	N	FLO
3.221000	26.20	10.2	46	19.8	AV	N	FLO
4.142500	36.30	10.2	46	9.7	AV	N	FLO
7.478000	29.20	10.2	50	20.8	AV	L1	FLO

6.9.5 Conclusion

The equipment **PASSED** the requirement of this clause.
 For the measurement results refer to appendix I.



7 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

Table 59 System Measurement Uncertainty

Items		Extended Uncertainty
20dB bandwidth measurement	Magnitude (%)	U=0.2%; k=2
Carrier frequency separation measurement	Magnitude (%)	U=0.2%; k=2
Time of occupancy	Magnitude (%)	U=0.2%; k=2
Peak output power	Power(dBm)	U=0.39dB; k=2
Band edge compliance measurement	Disturbance Power(dBm)	U=2.0dB; k=2
Conducted RF spurious	Disturbance Power(dBm)	U=2.0dB; k=2
Radiated spurious emission & Radiated restricted band measurement	Field strength (dB μ V/m)	U=2.2dB; k=2 U=5dB; k=2
Conducted emission test for power port	Disturbance Voltage(dB μ V)	U=4dB; k=2



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(END OF REPORT)