

TEST REPORT

Reference No..... : WTX23X06138749W001
FCC ID : 2AMLF-JM-VL03
Applicant : Shenzhen Jimi IoT Co., Ltd
Address : 3-4/F, Block A, Building #7, Shenzhen International Innovation Valley, Dashi
1st Road, Nanshan District, Shenzhen, Guangdong, China
Manufacturer : The same as Applicant
Address : The same as Applicant
Product Name : GNSS Vehicle Terminal
Model No..... : JM-VL03
Standards : FCC Part 22H, FCC Part 24E
Date of Receipt sample : 2023-06-27
Date of Test..... : 2023-06-27 to 2023-07-17
Date of Issue : 2023-07-17
Test Report Form No. : WTX_Part 22_ Part 24W
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

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Report version

Version No.	Date of issue	Description
Rev.00	2023-07-17	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT:	
Product Name:	GNSS Vehicle Terminal
Trade Name:	JIMI
Model No.:	JM-VL03
Adding Model(s):	VL03L, JM-VL03M, JM-VL03E, VL03, JM-EL103, EL103, JM-EV40, EV40, VL03MX, VL03CO, JM-C41
Rated Voltage:	Input:DC12/24V
Battery:	Built-in battery DC3.7V
Adapter Model:	/
Software Version:	VT81_V141_WAAP_ME_V14.0_230530.1317
Hardware Version:	VT81-MB
<p><i>Note: The test data is gathered from a production sample, provided by the manufacturer. The appearance of others models listed in the report is different from main-test model JM-VL03, but the circuit and the electronic construction do not change, declared by the manufacturer.</i></p>	

Technical Characteristics of EUT:	
2G	
Support Networks:	GSM, GPRS
Support Band:	GSM850/PCS1900
Uplink Frequency:	GSM/GPRS 850: 824~849MHz GSM/GPRS 1900: 1850~1910MHz
Downlink Frequency:	GSM/GPRS 850: 869~894MHz GSM/GPRS 1900: 1930~1990MHz
Max RF Output Power:	GSM850: 32.69dBm, GSM1900: 29.62dBm
Type of Emission:	GSM850: 235KGXW, GSM1900: 236KGXW
Type of Modulation:	GMSK
Type of Antenna:	Integral Antenna
Antenna Gain:	GSM850: -2.4dBi; GSM1900: -2.1dBi
GPRS/EDGE Class:	Class 12

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 2: FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS.

FCC Rules Part 22: PRIVATE LAND MOBILE RADIO SERVICES.

FCC Rules Part 24: PUBLIC MOBILE SERVICES.

TIA/EIA 603 E March 2016: Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

ANSI C63.26-2015: American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

KDB 971168 D01 Power Meas License Digital Systems v03r01: MEASUREMENT GUIDANCE FOR CERTIFICATION OF LICENSED DIGITAL TRANSMITTERS.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with TIA/EIA 603 E/ KDB 971168/ ANSI C63.26. The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	GSM 850	Low, Middle, High Channels
TM2	GPRS 850	Low, Middle, High Channels
TM3	GSM 1900	Low, Middle, High Channels
TM4	GPRS 1900	Low, Middle, High Channels

Testing Configure			
Support Band	Support Standard	Channel Frequency(MHz)	Channel Number
GSM 850	GSM/GPRS	824.2	128
		836.6	190
		848.8	251
PCS 1900	GSM/GPRS	1850.2	512
		1880.0	661
		1909.8	810

Note: the transmitter has been tested on the communications mode of GSM, GPRS, compliance test and record the worst case.

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
DC Cable	1.5	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Battery	JIADÉ	DC12x2	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Frequency Stability	Conducted	2.3%
Transmitter Spurious Emissions	Conducted	$\pm 0.42\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

1.7 Test Equipment List and Details

Fixed asset Number	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
WTXE1041A 1001	Communication Tester	Rohde & Schwarz	CMW500	148650	2023-02-25	2024-02-24
WTXE1022A 1002	GSM Tester	Rohde & Schwarz	CMU200	114403	2023-02-25	2024-02-24
WTXE1104A 1001	MXG Vector Signal Generator	Agilent	N5182A	MY47420108	2023-02-25	2024-02-24
WTXE1104A 1002	DC Power Supply	Agilent	E3634A	MY40009294	2023-02-25	2024-02-24
WTXE1104A 1003	EXG Analog Signal Generator	KEYSIGHT	N5173B	MY61252892	2023-02-25	2024-02-24
WTXE1104A 1004	Spectrum Analyzer	Rohde&Schwarz	FSV40-N	101559	2023-02-25	2024-02-24
WTXE1104A 1005-2	Band Reject Filter Group	Tonscend	JS0806-F	23A806F0658	2023-02-25	2024-02-24
<input type="checkbox"/> Chamber A: Below 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
WTXE1007A 1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
WTXE1007A 1001	Amplifier	HP	8447F	2805A03475	2023-02-25	2024-02-24
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1010A 1006	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2023-03-20	2026-03-19
<input type="checkbox"/> Chamber A: Above 1GHz						
WTXE1005A 1003	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2023-02-25	2024-02-24
WTXE1007A 1001	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2023-02-25	2024-02-24
WTXE1065A 1001	Amplifier	C&D	PAP-1G18	14918	2023-02-25	2024-02-24
WTXE1010A 1005	Horn Antenna	ETS	3117	00086197	2021-03-19	2024-03-18
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
WTXE1003A	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24

1001						
WTXE1004A 1-001	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2023-02-25	2024-02-24
<input type="checkbox"/> Chamber B:Below 1GHz						
WTXE1010A 1006	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2024-04-08
WTXE1038A 1001	Amplifier	Agilent	8447D	2944A10179	2023-02-25	2024-02-24
WTXE1001A 1002	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2023-02-25	2024-02-24
<input checked="" type="checkbox"/> Chamber C:Below 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1010A 1013-1	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2024-05-27
WTXE1010A 1007	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2024-03-19
WTXE1007A 1002	Amplifier	HP	8447F	2944A03869	2023-02-25	2024-02-24
<input checked="" type="checkbox"/> Chamber C: Above 1GHz						
WTXE1093A 1001	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2023-02-25	2024-02-24
WTXE1103A 1005	Horn Antenna	POAM	RTF-11A	LP228060221	2023-03-10	2026-03-09
WTXE1103A 1006	Amplifier	Tonscend	TAP01018050	AP22E806235	2023-02-25	2024-02-24
WTXE1010A 1010	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2021-03-19	2024-03-18
WTXE1003A 1001	Pre-amplifier	Schwarzbeck	BBV 9721	9721-031	2023-02-25	2024-02-24

Software List			
Description	Manufacturer	Model	Version
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§22.917(a), §24.238(a)	Spurious Radiation Emissions	Compliant

Class II Permissive Change: The device has updated the software.

Note: Report is for Class II Permissive Change only. Updated test data include Spurious Radiation Emissions.

Other test data refer to the original report WTX21X06058400W-1, the original FCC ID issue date: 04/20/2022.

3. Spurious Radiated Emissions

3.1 Standard Applicable

According to §22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

3.2 Test Procedure

1. The setup of EUT is according with per ANSI/TIA Standard 603E and ANSI C63.26 measurement procedure.
2. 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.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. 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.

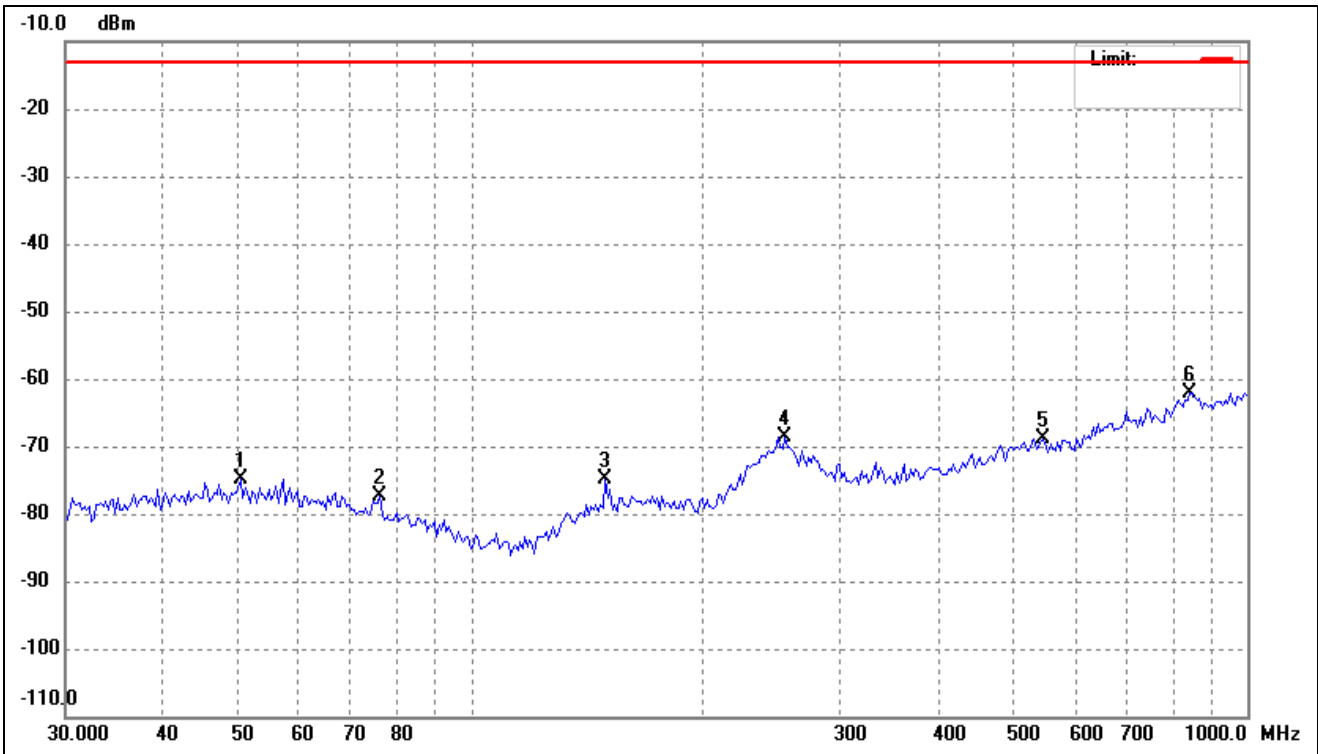
Spurious attenuation limit in dB = $43 + 10 \log_{10}$ (power out in Watts)

3.3 Summary of Test Results/Plots

Note: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

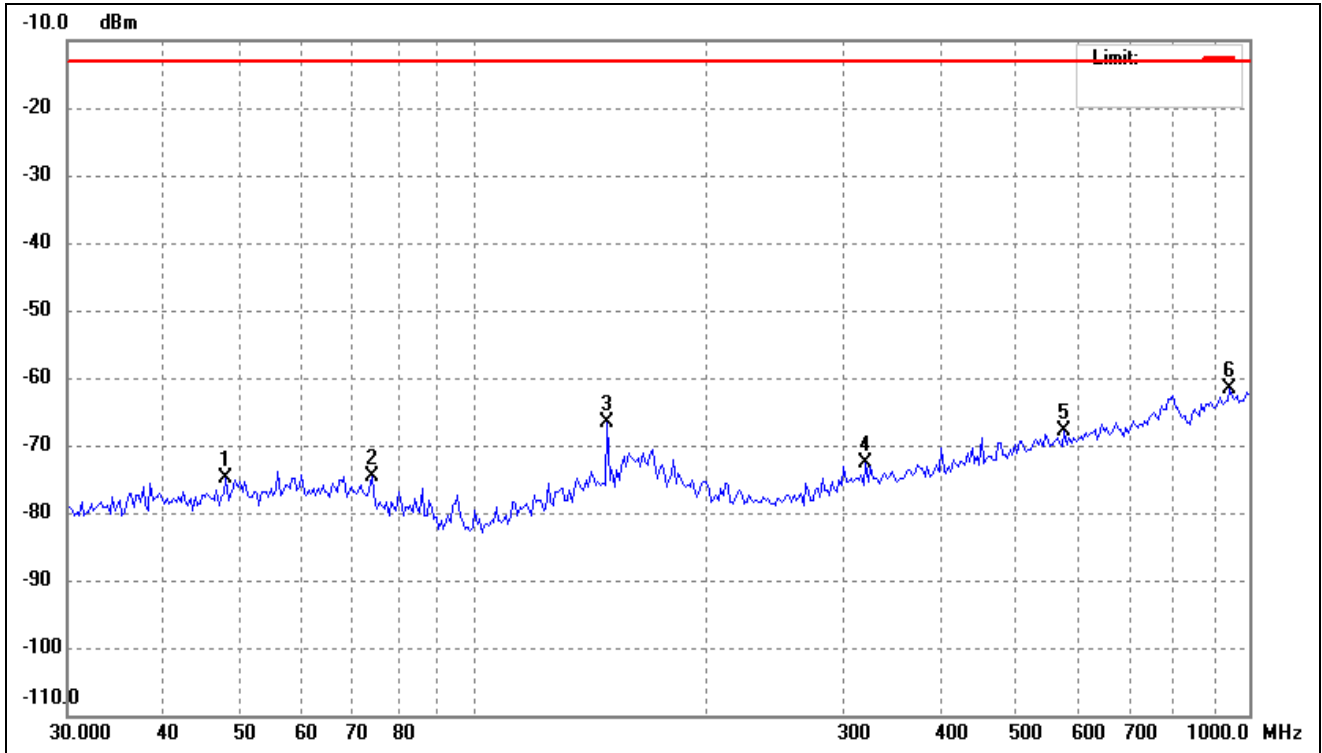
➤ Spurious Emissions Below 1GHz

For Cellular Band			
Test Channel	GSM850	Polarity:	Horizontal



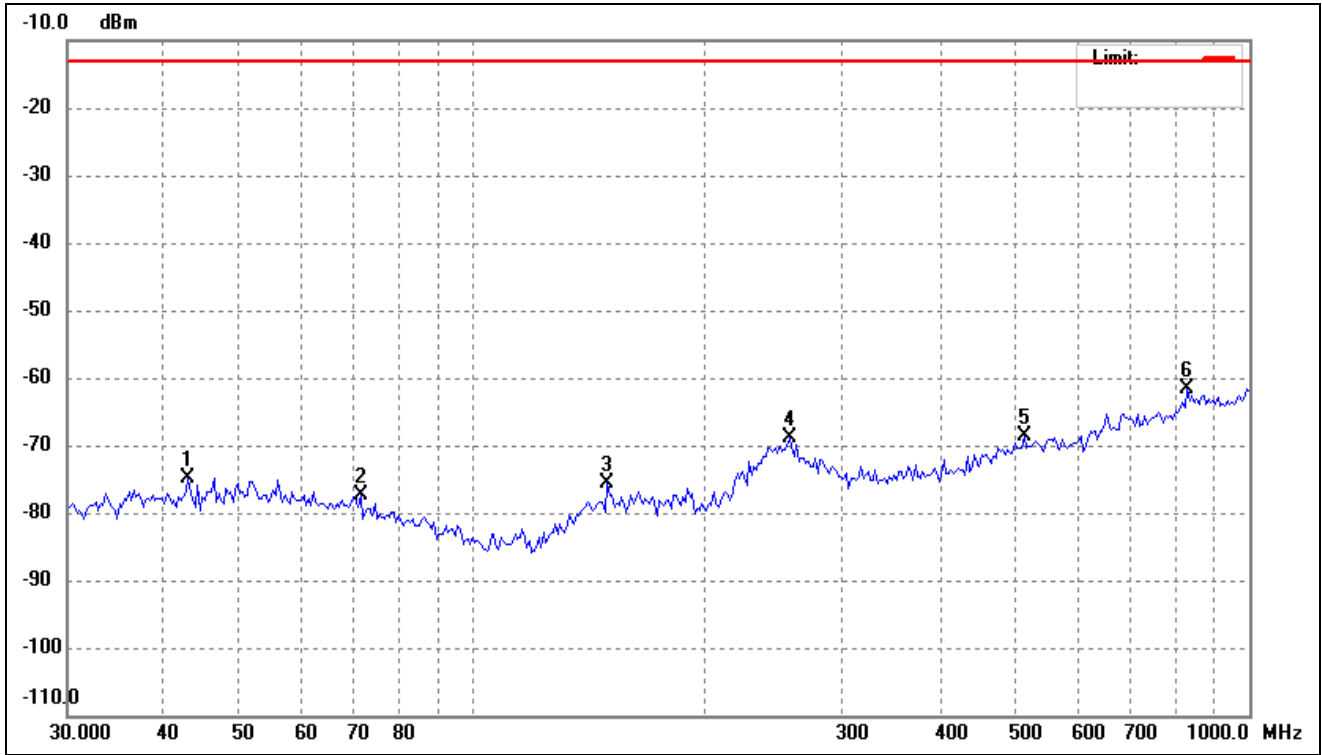
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	50.4614	-78.25	3.44	-74.81	-13.00	-61.81	-	-	peak
2	76.3869	-77.41	-0.05	-77.46	-13.00	-64.46	-	-	peak
3	148.9175	-75.60	0.75	-74.85	-13.00	-61.85	-	-	peak
4	254.0312	-76.75	8.21	-68.54	-13.00	-55.54	-	-	peak
5	546.4368	-76.55	7.71	-68.84	-13.00	-55.84	-	-	peak
6	844.8028	-75.69	13.63	-62.06	-13.00	-49.06	-	-	peak

For Cellular Band			
Test Channel	GSM850	Polarity:	Vertical



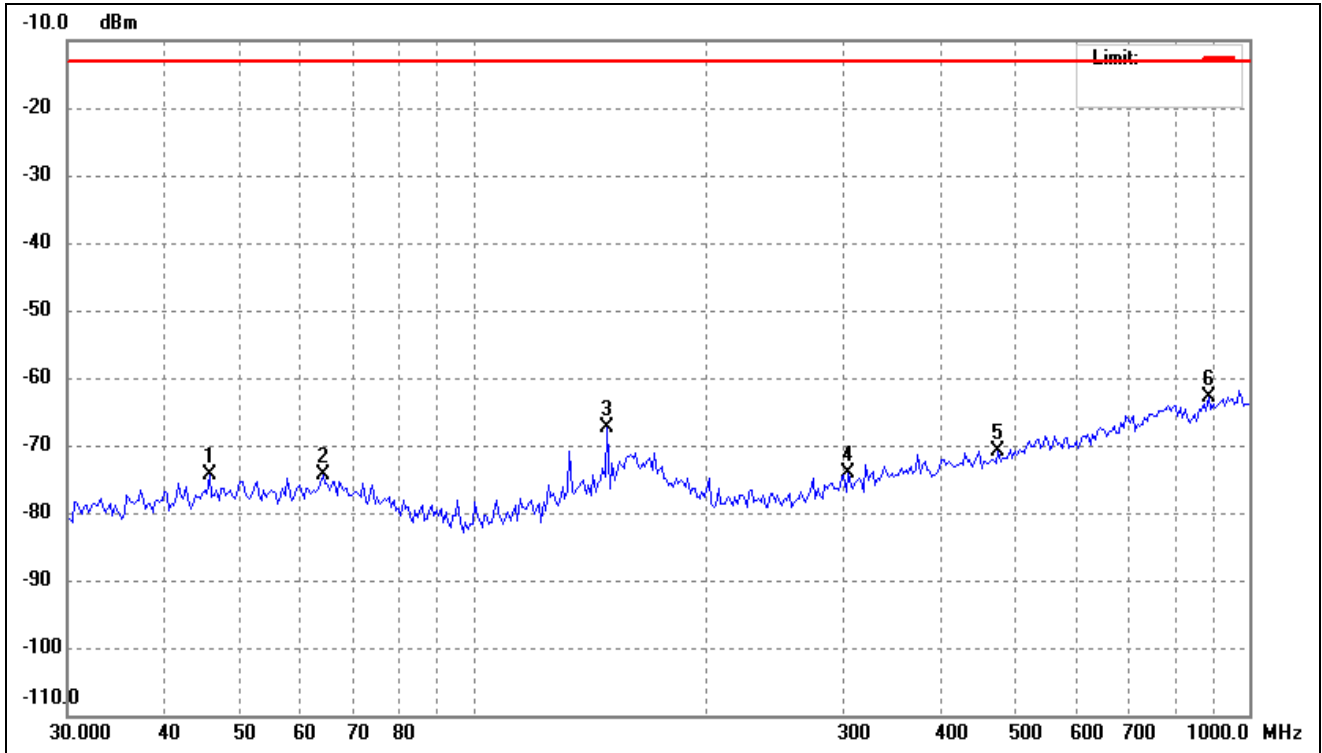
No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	48.0392	-78.19	3.31	-74.88	-13.00	-61.88	-	-	peak
2	74.2696	-76.48	1.94	-74.54	-13.00	-61.54	-	-	peak
3	148.9175	-70.68	3.95	-66.73	-13.00	-53.73	-	-	peak
4	320.3306	-76.35	3.73	-72.62	-13.00	-59.62	-	-	peak
5	578.0359	-76.22	8.47	-67.75	-13.00	-54.75	-	-	peak
6	945.3336	-74.16	12.59	-61.57	-13.00	-48.57	-	-	peak

For Cellular Band			
Test Channel	GSM1900	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	42.9305	-77.62	2.83	-74.79	-13.00	-61.79	-	-	peak
2	71.7054	-78.09	0.77	-77.32	-13.00	-64.32	-	-	peak
3	148.9175	-76.25	0.75	-75.50	-13.00	-62.50	-	-	peak
4	255.8226	-76.92	8.07	-68.85	-13.00	-55.85	-	-	peak
5	512.9478	-76.14	7.41	-68.73	-13.00	-55.73	-	-	peak
6	833.0127	-75.10	13.37	-61.73	-13.00	-48.73	-	-	peak

For Cellular Band			
Test Channel	GSM1900	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBm)	Correct (dB)	Result (dBm)	Limit (dBm)	Margin (dB)	Degree ()	Height (cm)	Remark
1	45.7333	-77.41	3.09	-74.32	-13.00	-61.32	-	-	peak
2	64.0800	-77.67	3.21	-74.46	-13.00	-61.46	-	-	peak
3	148.9175	-71.29	3.95	-67.34	-13.00	-54.34	-	-	peak
4	304.9548	-77.54	3.41	-74.13	-13.00	-61.13	-	-	peak
5	474.7913	-77.66	6.72	-70.94	-13.00	-57.94	-	-	peak
6	887.3978	-75.06	12.15	-62.91	-13.00	-49.91	-	-	peak

Note: Margin= (Reading+ Correct)- Limit

Remark: '-'Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

- Spurious Emissions Above 1GHz
- For Cellular Band_GSM850 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (824.2MHz)						
1648.4	-42.73	4.94	-37.79	-13	-24.79	H
2472.6	-42.73	8.46	-34.27	-13	-21.27	H
1648.4	-48.18	4.94	-43.24	-13	-30.24	V
2472.6	-51.82	8.46	-43.36	-13	-30.36	V
Middle Channel (836.6MHz)						
1673.2	-45.45	5.11	-40.34	-13	-27.34	H
2509.8	-45.45	8.54	-36.91	-13	-23.91	H
1673.2	-43.64	5.11	-38.53	-13	-25.53	V
2509.8	-42.73	8.54	-34.19	-13	-21.19	V
High Channel (848.8MHz)						
1697.6	-53.64	5.29	-48.35	-13	-35.35	H
2546.4	-51.82	8.59	-43.23	-13	-30.23	H
1697.6	-47.27	5.29	-41.98	-13	-28.98	V
2546.4	-47.27	8.59	-38.68	-13	-25.68	V

- For PCS Band_GSM1900 Mode

Frequency	Reading	Correct	Result	Limit	Margin	Polar
(MHz)	(dBm)	dB	(dBm)	(dBm)	(dB)	H/V
Low Channel (1850.2MHz)						
3700.4	-51.82	10.54	-41.28	-13	-28.28	H
5550.6	-42.73	13.37	-29.36	-13	-16.36	H
3700.4	-51.82	10.54	-41.28	-13	-28.28	V
5550.6	-42.73	13.37	-29.36	-13	-16.36	V
Middle Channel (1880MHz)						
3760.0	-53.64	10.64	-43.00	-13	-30.00	H
5640.0	-51.82	13.54	-38.28	-13	-25.28	H
3760.0	-45.45	10.64	-34.81	-13	-21.81	V
5640.0	-45.45	13.54	-31.91	-13	-18.91	V
High Channel (1909.8MHz)						
3819.6	-51.82	10.74	-41.08	-13	-28.08	H
5729.4	-54.55	13.71	-40.84	-13	-27.84	H
3819.6	-46.36	10.74	-35.62	-13	-22.62	V
5729.4	-52.73	13.71	-39.02	-13	-26.02	V

Note: Result=Reading+ Correct, Margin= Result- Limit

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

APPENDIXPHOTOGRAPHS

Please refer to “ANNEX”

******* END OF REPORT *******