DIGITAL EMC CO., LTD.

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CERTIFICATION OF COMPLIANCE

CERTIFICATE OF COMPLIANCE
FCC Part 22 Certification

Dates of Tests: December 3 ~ 22, 2009
Test Report S/N: DR50110912M
Test Site : DIGITAL EMC CO., LTD.

Model No. **X25-GPS150MV**

APPLICANT **JOA TELECOM CO., LTD.**

Classification	:	**Licensed Non-Broadcast Station Transmitter(TNB)**
FCC Rule Part(s)	:	**§22(H), §2**
EUT Type	:	**LBS CDMA Mobile Unit**
Model name	:	**GPS150MV**
Serial number	:	**Identical prototype**
TX Frequency Range	:	**824.70 ~848.31 MHz**
RX Frequency Range	:	**869.70 ~893.31 MHz**
Max. RF Output Power	:	**0.256 W ERP(24.08 dBm)**
Emission Designators:	:	**1M26F9W**
Date of Issue	:	**December 24, 2009**

The Test results relate only to the tested sample. It is not allowed to copy this report even partly without the allowance of DIGITAL EMC CO., LTD.

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MEASUREMENT REPORT

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

§2.1033 General Information

Applicant: JOA TELECOM CO., LTD.
Address: 1007, SICOX Tower, 513-14, Sangdeawon-dong, Jungwon-gu, Sunganam-City, Kyunggi-Do, 462-806, Korea
Attention: HOON AHN

- FCC ID: X25-GPS150MV
- Quantity: Quantity production is planned
- Emission Designators: 1M26F9W
- Tx Freq. Range: 824.70 ~ 848.31 MHz
- Rx Freq. Range: 869.70 ~ 893.31 MHz
- Max. Power Rating: 0.256 W ERP(24.08 dBm)
- FCC Classification(s): Licensed Non-Broadcast Station Transmitter(TNB)
- Equipment (EUT) Type: LBS CDMA Mobile Unit
- Frequency Tolerance: ± 0.00025 % (2.5ppm)
- FCC Rule Part(s): §22(H), §2
- Dates of Tests: December 3 ~ 22, 2009
- Place of Tests: DIGITAL EMC
- Test Report S/N: DR50110912M

2.1. General Information

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.
Address : 683-3, Yubang-Dong, Yongin-Si, Kyunggi-Do, Korea. 449-080
http://www.digitalemc.com E-mail: harveysung@digitalemc.com
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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

Tested by: ***Engineer***

December 24, 2009	Sun-Kyu Ryu	
Date	Name	Signature

Reviewed by: ***Manager***

December 24, 2009	W.J. Lee	
Date	Name	Signature

Applicant:

Company name	:	JOA TELECOM CO., LTD.
Address	:	1007, SICOX Tower, 513-14, Sangdeawon-dong, Jungwon-gu, Sungnam City, Kyunggi-Do, 462-806, Korea
Date of order	:	November 18, 2009

3.1 DESCRIPTION OF TESTS

3.1.1 Occupied Bandwidth Emission Limits

(a) On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

(b) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the licensee's frequency block edges, both upper and lower, as the design permits.

(c) The measurement of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.

3.1.2 Occupied Bandwidth

The 99% power bandwidth was measured with a calibrated spectrum analyzer.

3.1.3 Spurious and Harmonic Emissions at Antenna Terminal

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10^{th} harmonic.

3.1.5 Radiation Spurious and Harmonic Emissions

Radiation and harmonic emissions are measured outdoors at our 3-meter test range. The equipment under test is placed on a wooden turntable 3-meters from the receive antenna.
The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

3.1 DESCRIPTION OF TESTS (Continued…)

3.1.6 Frequency Stability/Temperature Variation.

The frequency stability of the transmitter is measured by:

a) **Temperature**: The temperature is varied from -30°C to +60°C increments using an environmental chamber.

b) **Primary Supply Voltage**: The primary supply voltage is varied from 85% to 115% of the normal voltage for non hand-carried battery equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification - *The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025(±2.5ppm) of the center frequency.*

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature (25°C to 27 °C to provide a reference)

2. The equipment is tuned on in a "standby" condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10°C intervals ranging from -30°C up to +60°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

3.1 DESCRIPTION OF TESTS (Continued…)

3.1.7 Radiated Emission

Final test was performed according to ANSI C63.4-2003 at the open field test site. There are no deviations from the standard.
The EUT was placed in a 0.8m high table along with the peripherals. The turn table was separated from the antenna distance 3meters. Cables were placed in a position to produce maximum emissions as determined by experimentation, and operation mode was selected for maximum.
The frequencies and amplitudes of maximum emission were measured at varying azimuths, antenna heights and antenna polarities. Reported are maximized emission levels.
These tests were performed at 120kHz of 6dB bandwidth.

3.1.8 Conducted Emission

The power line conducted interference measurements were performed according to ANSI C63.4-2003 in a shielded enclosure with peripherals placed on a table, 0.8m high over a metal floor. It was located more than required distance away from the shielded enclosure wall. There are no deviations from the standard.
The EUT was plugged into the LISN and the frequency range of interest scanned.
Reported are maximized emission levels.
These tests were performed at 9kHz of 6dB bandwidth.

4.1 TEST DATA

4.1.1 Conducted Output Power

The output power was measured under all R.C.s and S.O.s which are listed below measurement data.
The worst case output power is reported with SO55 of RC3.
Therefore this device was tested under SO55 of RC3.

- Measurement data

Band	Channel	1X RRT				
		RC1	RC1	RC3	RC3	RC3
		SO2	SO55	SO2	SO55	SO32 (TDSO)
Cellular	1013	24.06	24.12	24.23	**24.36**	24.35
	0384	24.12	24.22	24.32	**24.34**	24.25
	0777	24.05	24.22	24.25	**24.38**	24.32

4.1.2 Effective Radiated Power Output

A. POWER: **High (Cellular Mode)**

Freq. Tuned (MHz)	**REF. LEVEL** (dBm)	**POL** (H/V)	**ERP** (W)	**ERP** (dBm)	**Supplied Power**	**Note**
824.70	**-14.66**	**H**	**0.256**	**24.08**	**DC 12.0V**	**RC3 SO55**
836.52	-16.40	H	0.172	22.35	DC 12.0V	RC3 SO55
848.31	-16.21	H	0.173	22.37	DC 12.0V	RC3 SO55

NOTES:

Effective Radiated Power Output Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminals of the dipole is measured. The ERP is recorded.

4.1.3 CDMA Radiated Measurements

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 824.70 MHz
CHANNEL : 1013(Low)
MEASURED OUTPUT POWER : 24.08 dBm = 0.256 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 37.08 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1649.40	-28.49	5.57	-22.92	H	47.00
1649.40	-30.36	5.57	-24.79	V	48.87
2474.10	-42.69	6.99	-35.70	H	59.78
2474.10	-54.18	6.99	-47.19	V	71.27
-	-	-	-	-	-

NOTE

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

4.1.3 CDMA Radiated Measurements (Continued…)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 836.52 MHz
CHANNEL : 384(Mid)
MEASURED OUTPUT POWER : 22.35 dBm = 0.172 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 35.35 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1673.04	-38.57	5.66	-32.91	H	55.26
1673.04	-39.34	5.66	-33.68	V	56.03
2509.56	-50.99	7.00	-43.99	H	66.34
2509.56	-54.29	7.00	-47.29	V	69.64
-	-	-	-	-	-

NOTE

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

4.1.3 CDMA Radiated Measurements (Continued…)

Field Strength of SPURIOUS Radiation

OPERATING FREQUENCY : 848.31 MHz
CHANNEL : 777(High)
MEASURED OUTPUT POWER : 22.37 dBm = 0.173 W
MODULATION SIGNAL : CDMA (Internal)
DISTANCE : 3 meters
LIMIT : 43 + 10 $\log_{10}$ (W) = 35.37 dBc

Freq. (MHz)	**LEVEL@ ANTENNA TERMINALS** (dBm)	**SUBSTITUTE ANTENNA GAIN** (dBd)	**CORRECT GENERATOR LEVEL** (dBm)	**POL** (H/V)	(dBc)
1696.62	-41.20	5.74	-35.46	H	57.83
1696.62	-43.59	5.74	-37.85	V	60.22
2544.93	-55.46	7.02	-48.44	H	70.81
2544.93	-57.72	7.02	-50.70	V	73.07
-	-	-	-	-	-

NOTE

Radiated Spurious Emission Measurements by Substitution Method according to ANSI/TIA/EIA-603-C-2004, Aug. 17, 2004:

The EUT was placed on a wooden turn table 3-meters from the receive antenna. The receive antenna height and turntable rotation was adjusted for the highest reading on the receive spectrum analyzer. A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

4.1.4 Frequency Stability (CDMA)

OPERATING FREQUENCY : 836,519,997 Hz

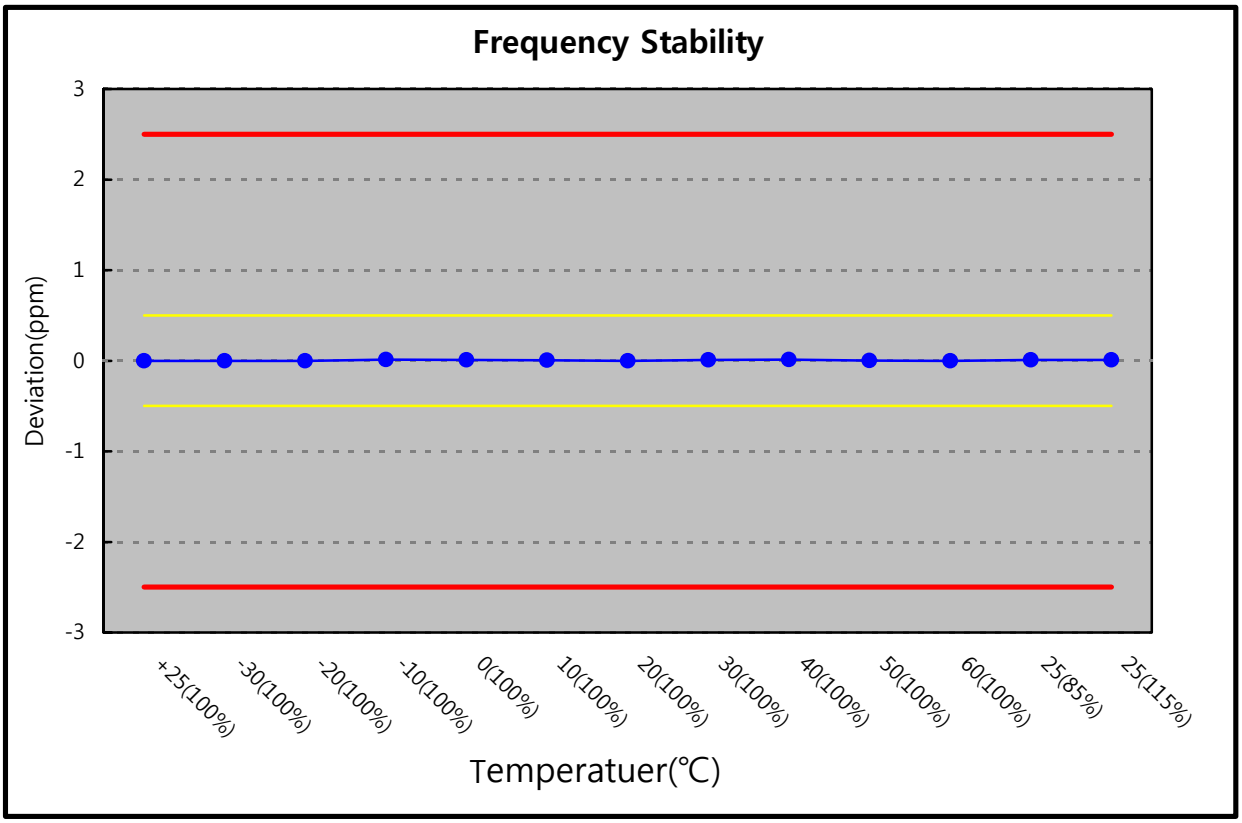
CHANNEL : 0384(Mid)

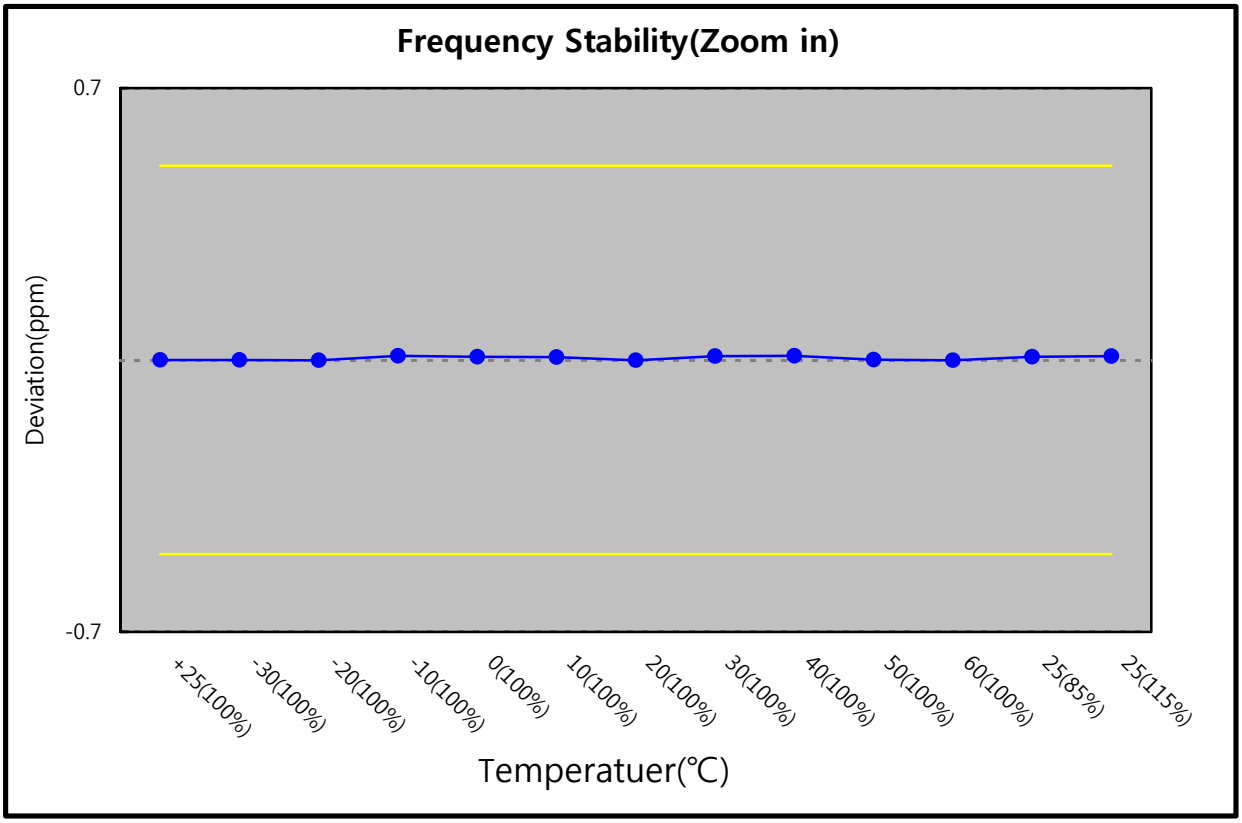
REFERENCE VOLTAGE : 12 VDC

DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (VAC)	TEMP (dB)	FREQ (Hz)	Deviation (ppm)
100%	12.0	+25(Ref)	836,519,997	0.000
100%		-30	836,519,997	0.000
100%		-20	836,519,996	-0.001
100%		-10	836,520,006	0.011
100%		0	836,520,004	0.008
100%		+10	836,520,003	0.007
100%		+20	836,519,996	-0.001
100%		+30	836,520,005	0.010
100%		+40	836,520,006	0.011
100%		+50	836,519,998	0.001
100%		+60	836,519,996	-0.001
85%	10.2	+25	836,520,004	0.008
115%	13.8	+25	836,520,005	0.010
BATT.ENDPOINT	-	-	-	-

4.1.4 Frequency Stability (CDMA) (Continued…)





5.1 PLOTS OF EMISSIONS

(SEE ATTACHMENT “Test Plots”)

6.1 LIST OF TEST EQUIPMENT

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
☒	Spectrum Analyzer	Agilent	E4440A	25/09/09	25/09/10	MY45304199
☐	Spectrum Analyzer	Rohde Schwarz	FSQ26	05/06/09	05/06/10	200445
☐	Spectrum Analyzer(RE)	H.P	8563E	13/10/09	13/10/10	3551A04634
☒	Power Meter	H.P	EMP-442A	02/07/09	02/07/10	GB37170413
☒	Power Sensor	H.P	8481A	02/07/09	02/07/10	3318A96332
☐	Power Divider	Agilent	11636B	13/10/09	13/10/10	56471
☐	Power Splitter	Anritsu	K241B	13/10/09	13/10/10	20611
☒	Power Splitter	Anritsu	K241B	02/07/09	02/07/10	017060
☐	Frequency Counter	H.P	5342A	13/07/09	13/07/10	2119A04450
☒	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	10/10/09	10/10/10	30604493/021031
☒	Digital Multimeter	H.P	34401A	13/03/09	13/03/10	3146A13475, US36122178
☐	Multifuction Synthesizer	HP	8904A	06/10/09	06/10/10	3633A08404
☒	Signal Generator	Rohde Schwarz	SMR20	13/03/09	13/03/10	101251
☒	Signal Generator	H.P	ESG-3000A	02/07/09	02/07/10	US37230529
☐	Vector Signal Generator	Rohde Schwarz	SMJ100A	02/02/09	02/02/10	100148
☐	Audio Analyzer	H.P	8903B	02/07/09	02/07/10	3011A09448
☐	Modulation Analyzer	H.P	8901B	02/07/09	02/07/10	3028A03029
☒	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	02/07/09	02/07/10	GB43461134
☐	Universal Radio communication Tester	Rohde Schwarz	CMU 200	19/05/09	19/05/10	106760
☐	Bluetooth Tester	TESCOM	TC-3000B	02/07/09	02/07/10	3000B000268
☐	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-3
☒	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-2
☐	Thermo hygrometer	BODYCOM	BJ5478	06/02/09	06/02/10	090205-4
☐	AC Power supply	DAEKWANG	5KVA	13/03/09	13/03/10	20060321-1
☒	DC Power Supply	HP	6622A	13/03/09	13/03/10	3448A03760
☒	DC Power Supply	HP	6633A	13/03/09	13/03/10	3524A06634
☒	BAND Reject Filter	Microwave Circuits	N0308372	06/10/09	06/10/10	3125-01DC0352
☐	BAND Reject Filter	Wainwright	WRCG1750	06/10/09	06/10/10	2
☐	High-Pass Filter	ANRITSU	MP526D	06/10/09	06/10/10	M27756
☒	High-pass filter	Wainwright	WHKX2.1	N/A	N/A	1
☐	High-Pass Filter	Wainwright	WHKX3.0	N/A	N/A	9
☐	Tunable Notch Filter	Wainwright	WRCT800.0 /960.0-0.2/40-8SSK	N/A	N/A	10
☐	Tunable Notch Filter	Wainwright	WRCD1700.0 /2000.0-0.2/40-10SSK	N/A	N/A	27
☐	Tunable Notch Filter	Wainwright	WRCT1900.0/ 2200.0-5/40-10SSK	N/A	N/A	7
☒	HORN ANT	ETS	3115	17/06/09	17/06/10	6419
☒	HORN ANT	ETS	3115	23/09/09	23/09/10	21097
☐	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/10	154
☐	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/10	155

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
☒	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	06/10/10	2116
☒	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	06/10/10	2117
☐	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	05/10/10	2261
☐	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	05/10/10	2262
☐	LOOP Antenna	ETS	6502	14/09/09	14/09/10	3471
☒	Coaxial Fixed Attenuators	Agilent	8491B	02/07/09	02/07/10	MY39260700
☒	Attenuator (10dB)	WEINSCHEL	23-10-34	01/10/09	01/10/10	BP4386
☐	Attenuator (10dB)	WEINSCHEL	23-10-34	19/01/09	19/01/10	BP4387
☐	Attenuator (20dB)	WEINSCHEL	86-20-11	06/10/09	06/10/10	432
☐	Attenuator (10dB)	WEINSCHEL	31696	06/10/09	06/10/10	446
☐	Attenuator (10dB)	WEINSCHEL	31696	06/10/09	06/10/10	408
☐	Attenuator (40dB)	WEINSCHEL	57-40-33	01/10/09	01/10/10	NN837
☐	Attenuator (30dB)	JFW	50FH-030-300	13/03/09	13/03/10	060320-1
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	02/07/09	02/07/10	788
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	02/07/09	02/07/10	790
☐	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0215CAN	02/07/09	02/07/10	112
☒	Amplifier (30dB)	Agilent	8449B	10/10/09	10/10/10	3008A01590
☒	Amplifier	EMPOWER	BBS3Q7ELU	02/02/09	02/02/10	1020
☐	RF Power Amplifier	OPHIRRF	5069F	02/07/09	02/07/10	1006
☐	EMI TEST RECEIVER	R&S	ESU	02/02/09	02/02/10	100014
☐	BILOG ANTENNA	SCHAFFNER	CBL6112B	02/06/09	02/06/10	2737
☐	Amplifier (22dB)	H.P	8447E	05/02/09	05/02/10	2945A02865
☐	EMI TEST RECEIVER	R&S	ESCI	12/05/09	12/05/10	100364
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A	30/05/09	30/05/10	590
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	02/06/09	02/06/10	2233
☐	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A1	07/10/09	07/10/10	1098
☐	BICONICAL ANT.	Schwarzbeck	VHA 9103	06/10/09	06/10/10	91031946
☐	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	13/03/09	13/03/10	1252741
☐	Amplifier (25dB)	Agilent	8447D	12/05/09	12/05/10	2944A10144
☐	Amplifier (25dB)	Agilent	8447D	03/07/09	03/07/10	2648A04922
☐	Spectrum Analyzer(CE)	H.P	8591E	26/04/09	26/04/10	3649A05889
☐	LISN	Kyoritsu	KNW-407	03/07/09	03/07/10	8-317-8
☐	LISN	Kyoritsu	KNW-242	13/10/09	13/10/10	8-654-15
☐	CVCF	NF Electronic	4420	13/03/09	13/03/10	304935/337980
☐	DC BLOCK	Hyuplip	KEL-007	N/A	N/A	7-1581-5
☐	50 ohm Terminator	HME	CT-01	22/01/09	22/01/10	N/A
☐	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	03/07/09	03/07/10	4N-170-3

7.1 SAMPLE CALCULATIONS

A. Emission Designator

Emission Designator = 1M26F9W

CDMA BW = 1.2600 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)
(Measured at the 99.75% power bandwidth)

8.1 CONCLUSION

The data collected shows that the **JOA TELECOM CO., LTD. LBS CDMA Mobile Unit** (**FCC ID: X25-GPS150MV)** complies with all the requirements of Parts 2 and 22 of the FCC rules.