A Test Lab Techno Corp.

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MPE Report

Test Report No.	:	1501FS12-01
Applicant	:	MobiRoam Pty Ltd
Manufacturer	:	Dongguan Branch of Shenzhen StrongRising Electronics Co.,Ltd
Product Type	:	Media Gateway
Trade Name	:	SmartBox
Model Number	:	PMG-005
Date of Received	:	Dec. 24, 2014
Test Period	:	Dec. 31, 2014 ~ Jan. 13, 2015
Date of Issued	:	Feb. 10, 2015
Test Specification	:	47 CFR § 2.1091
		47 CFR §1.1310
		ANSI / IEEE Std.C95.1-1992
Location of Test Lab.	:	Chang-an Lab.

1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
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4. This document may be altered or revised by A Test Lab Techno. Corp. personnel only, and shall be noted in the revision section of the document.

Approved By : Bill Hu (Bill Hu)

Tested By : Sky Chou (Sky Chou)

Contents

1. Description of Equipment under Test (EUT)

Applicant	MobiRoam Pty Ltd
Applicant Address	5 Learoyd Street, Mt Lawley, Perth, Australia
Manufacturer	Dongguan Branch of Shenzhen StrongRising Electronics Co.,Ltd
Manufacturer Address	Qingping Road No.2 Qinghutou Village Tangxia Town,Dongguan city,Guangdong Province,China
Product Type	Media Gateway
Trade Name	SmartBox
Model Number	PMG-005
FCC ID	2ADXTPMG-005
Frequency Range	824.2 - 848.8 MHz GPRS/EGPRS 850 1850.2 - 1909.8 MHz GPRS/EGPRS 1900 1852.4 - 1907.6 MHz WCDMA(RMC 12.2K)/HSDPA/HSUPA Band II 826.4 - 846.6 MHz WCDMA(RMC 12.2K)/HSDPA/HSUPA Band V 2412 - 2462 MHz IEEE 802.11b / 802.11g 2412 - 2462 MHz IEEE 802.11n 2.4GHz Standard-20MHz 2422 - 2452 MHz IEEE 802.11n 2.4GHz Wide-40MHz *GPRS/EGPRS Multi Class :12
Transmit Power (conducted power)	GPRS/EGPRS 850: 1.879 W / 32.74 dBm GPRS/EGPRS 1900: 0.853 W / 29.31 dBm WCDMA(RMC 12.2K)/HSDPA/HSUPA Band II: 0.213 W / 23.29 dBm WCDMA(RMC 12.2K)/HSDPA/HSUPA Band V: 0.226 W / 23.54 dBm IEEE 802.11b: 0.067 W / 18.24 dBm IEEE 802.11g: 0.028 W / 14.45 dBm IEEE 802.11n 2.4GHz Standard-20MHz: 0.028 W / 14.41 dBm IEEE 802.11n 2.4GHz Standard-40MHz: 0.022 W / 13.40 dBm
Antenna Specification	GSM 850: 1 dBi PCS 1900: 1 dBi WCDMA Band II: 1 dBi WCDMA Band V: 1 dBi IEEE 802.11b, IEEE 802.11g: 0 dBi IEEE 802.11n 2.4GHz Standard-20MHz / Wide-40MHz: 0 dBi
Antenna Designation	Internal Antenna
RF Evaluation	1.00 W/m^2

The above equipment was tested by A Test Lab Techno Corp. For compliance with the requirements set forth in 47 CFR § 2.1091 & 47 CFR § 1.1310. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties

2. Human Exposure Assessment

Due to the design and installation of this product, it is not possible to conduct SAR evaluation. This is because client either manufactures or supplies the antenna(s) that will be used in the installation of this product. Therefore, this product will be evaluated as a mobile device per 47 CFR §1.1310 titled “Radiofrequency radiation exposure limits”, generally referred to as MPE limits.

In 47 CFR § 2.1091, paragraph (b) defines a mobile device as “a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 cm is normally maintained between the transmitter’s radiating structure(s) and the body of the user or nearby persons. ” This product is intended to be installed into a vehicle such that the unit is physically secured at one location. In the installation guide supplied with the product,

Client has made the following statement: “IMPORTANT: To meet the FCC’s RF Exposure Guidelines, the antenna should be installed so there is at least 20 cm of separation between the body of the user and nearby persons and the antenna”. Based on the installation of the transceiver and the antenna, the transmitters radiating structure is more than 20 cm from the user. Thus, this product is a “mobile device” as defined in section § 2.1091 paragraph (b).

Exposure evaluation
$$S = \frac{PG}{4\pi R^2}$$ Where S: power density P: power input to the antenna G: power gain of the antenna in the direction of interest relative to an isotropic radiator. R: distance to the center of radiation of the antenna.

3. RF Output Power

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)
GPRS850	4Down1Up	128	824.2	32.53
		190	836.6	32.74
		251	848.8	32.61
	3Down2Up	128	824.2	31.01
		190	836.6	31.22
		251	848.8	31.09
	2Down3Up	128	824.2	29.53
		190	836.6	29.74
		251	848.8	29.61
	1Down4Up	128	824.2	27.94
		190	836.6	28.15
		251	848.8	28.02
EGPRS850	4Down1Up	128	824.2	26.68
		190	836.6	26.73
		251	848.8	26.58
	3Down2Up	128	824.2	24.65
		190	836.6	24.70
		251	848.8	24.55
	2Down3Up	128	824.2	22.99
		190	836.6	23.04
		251	848.8	22.89
	1Down4Up	128	824.2	21.34
		190	836.6	21.39
		251	848.8	21.24

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)
GPRS1900	4Down1Up	512	1850.2	29.31
		661	1909.8	29.16
		810	1909.8	29.08
	3Down2Up	512	1850.2	27.94
		661	1909.8	27.79
		810	1909.8	27.72
	2Down3Up	512	1850.2	26.31
		661	1909.8	26.22
		810	1909.8	26.09
	1Down4Up	512	1850.2	24.98
		661	1909.8	24.85
		810	1909.8	24.68
EGPRS1900	4Down1Up	512	1850.2	26.75
		661	1909.8	26.83
		810	1909.8	26.58
	3Down2Up	512	1850.2	24.69
		661	1909.8	24.78
		810	1909.8	24.58
	2Down3Up	512	1850.2	23.34
		661	1909.8	23.51
		810	1909.8	23.16
	1Down4Up	512	1850.2	22.35
		661	1909.8	22.46
		810	1909.8	22.17

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)
WCDMA Band II	---	9262	1852.4	23.25
		9400	1880.0	23.29
		9538	1907.6	23.16
HSDPA Band II	1	9262	1852.4	22.19
		9400	1880.0	22.25
		9538	1907.6	22.12
	2	9262	1852.4	22.16
		9400	1880.0	22.23
		9538	1907.6	22.08
	3	9262	1852.4	21.71
		9400	1880.0	21.76
		9538	1907.6	21.62
	4	9262	1852.4	21.67
		9400	1880.0	21.72
		9538	1907.6	21.58
HSUPA Band II	1	9262	1852.4	21.49
		9400	1880.0	21.58
		9538	1907.6	21.42
	2	9262	1852.4	19.51
		9400	1880.0	19.59
		9538	1907.6	19.42
	3	9262	1852.4	20.51
		9400	1880.0	20.59
		9538	1907.6	20.41
	4	9262	1852.4	19.46
		9400	1880.0	19.56
		9538	1907.6	19.41
	5	9262	1852.4	21.47
		9400	1880.0	21.55
		9538	1907.6	21.38

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)
WCDMA Band V	---	4132	826.4	23.54
		4183	836.6	23.23
		4233	846.4	23.48
HSDPA Band V	1	4132	826.4	22.56
		4183	836.6	22.22
		4233	846.4	22.45
	2	4132	826.4	22.54
		4183	836.6	22.19
		4233	846.4	22.41
	3	4132	826.4	22.07
		4183	836.6	21.72
		4233	846.4	21.98
	4	4132	826.4	22.04
		4183	836.6	21.71
		4233	846.4	21.93
HSUPA Band V	1	4132	826.4	21.87
		4183	836.6	21.53
		4233	846.4	21.75
	2	4132	826.4	19.88
		4183	836.6	19.55
		4233	846.4	19.75
	3	4132	826.4	20.86
		4183	836.6	20.51
		4233	846.4	20.72
	4	4132	826.4	19.85
		4183	836.6	19.52
		4233	846.4	19.72
	5	4132	826.4	21.85
		4183	836.6	21.49
		4233	846.4	21.72

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)
IEEE 802.11b	1M	1	2412.0	18.24
		6	2437.0	17.65
		11	2462.0	17.14
	2M	1	2412.0	17.98
		6	2437.0	17.48
		11	2462.0	17.02
	5.5M	1	2412.0	18.02
		6	2437.0	17.67
		11	2462.0	17.17
	11M	1	2412.0	17.62
		6	2437.0	17.26
		11	2462.0	16.73
IEEE 802.11g	6M	1	2412.0	14.45
		6	2437.0	14.43
		11	2462.0	14.35
	9M	1	2412.0	14.18
		6	2437.0	14.13
		11	2462.0	14.02
	12M	1	2412.0	13.97
		6	2437.0	13.92
		11	2462.0	13.79
	18M	1	2412.0	13.78
		6	2437.0	13.71
		11	2462.0	13.72
	24M	1	2412.0	13.35
		6	2437.0	13.61
		11	2462.0	13.54
	36M	1	2412.0	12.82
		6	2437.0	12.86
		11	2462.0	12.99
	48M	1	2412.0	12.58
		6	2437.0	12.71
		11	2462.0	12.70
	54M	1	2412.0	12.37
		6	2437.0	12.62
		11	2462.0	12.64

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)
IEEE 802.11n 20MHz	6.5M	1	2412.0	14.41
		6	2437.0	14.19
		11	2462.0	13.95
	13M	1	2412.0	13.87
		6	2437.0	13.92
		11	2462.0	13.95
	19.5M	1	2412.0	13.72
		6	2437.0	13.77
		11	2462.0	13.63
	26M	1	2412.0	13.43
		6	2437.0	13.60
		11	2462.0	13.60
	39M	1	2412.0	12.95
		6	2437.0	12.94
		11	2462.0	13.20
	52M	1	2412.0	12.61
		6	2437.0	12.50
		11	2462.0	12.72
	58.5M	1	2412.0	12.53
		6	2437.0	12.36
		11	2462.0	12.19
	65M	1	2412.0	12.37
		6	2437.0	12.50
		11	2462.0	12.69

Band	Date Rate	CH	Frequency (MHz)	Average Conducted power (dBm)
IEEE 802.11n 40MHz	13M	3	2422.0	13.38
		6	2437.0	13.38
		9	2452.0	13.40
	26M	3	2422.0	13.28
		6	2437.0	13.34
		9	2452.0	13.28
	39M	3	2422.0	12.82
		6	2437.0	12.72
		9	2452.0	12.66
	52M	3	2422.0	12.41
		6	2437.0	12.58
		9	2452.0	12.36
	78M	3	2422.0	12.04
		6	2437.0	12.05
		9	2452.0	12.09
	104M	3	2422.0	11.27
		6	2437.0	11.25
		9	2452.0	11.48
	117M	3	2422.0	11.25
		6	2437.0	11.09
		9	2452.0	11.04
	130M	3	2422.0	11.08
		6	2437.0	10.93
		9	2452.0	10.79

4. Test Result

Band	Data Rate	Frequency (MHz)	Limit (mw/cm^2)	Distance [R] (cm)	Power [P] (dBm)	ANT Gain (dB)	Numeric Gain [G] (dBi)	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw/cm^2)
GPRS 850	4Down1Up	824.2	0.549	20	33	1	1.26	0.125	314.25	0.063
		836.6	0.558	20	33	1	1.26	0.125	314.25	0.063
		848.8	0.566	20	33	1	1.26	0.125	314.25	0.063
	3Down2Up	824.2	0.549	20	32	1	1.26	0.250	499.24	0.099
		836.6	0.558	20	32	1	1.26	0.250	499.24	0.099
		848.8	0.566	20	32	1	1.26	0.250	499.24	0.099
	2Down3Up	824.2	0.549	20	30	1	1.26	0.375	472.50	0.094
		836.6	0.558	20	30	1	1.26	0.375	472.50	0.094
		848.8	0.566	20	30	1	1.26	0.375	472.50	0.094
	1Down4Up	824.2	0.549	20	29	1	1.26	0.500	500.43	0.100
		836.6	0.558	20	29	1	1.26	0.500	500.43	0.100
		848.8	0.566	20	29	1	1.26	0.500	500.43	0.100
EGPRS 850	4Down1Up	824.2	0.549	20	27	1	1.26	0.125	78.94	0.016
		836.6	0.558	20	27	1	1.26	0.125	78.94	0.016
		848.8	0.566	20	27	1	1.26	0.125	78.94	0.016
	3Down2Up	824.2	0.549	20	26	1	1.26	0.250	125.40	0.025
		836.6	0.558	20	26	1	1.26	0.250	125.40	0.025
		848.8	0.566	20	26	1	1.26	0.250	125.40	0.025
	2Down3Up	824.2	0.549	20	24	1	1.26	0.375	118.69	0.024
		836.6	0.558	20	24	1	1.26	0.375	118.69	0.024
		848.8	0.566	20	24	1	1.26	0.375	118.69	0.024
	1Down4Up	824.2	0.549	20	23	1	1.26	0.500	125.70	0.025
		836.6	0.558	20	23	1	1.26	0.500	125.70	0.025
		848.8	0.566	20	23	1	1.26	0.500	125.70	0.025

Note: 1.The Power [P] is max tune-up power (upper limit).

2.The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).

Band	Data Rate	Frequency (MHz)	Limit (mw/cm^2)	Distance [R] (cm)	Power [P] (dBm)	ANT Gain (dB)	Numeric Gain [G] (dBi)	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw/cm^2)
GPRS 1900	4Down1Up	1850.2	1.000	20	30	1	1.26	0.125	157.50	0.031
		1880.0	1.000	20	30	1	1.26	0.125	157.50	0.031
		1909.8	1.000	20	30	1	1.26	0.125	157.50	0.031
	3Down2Up	1850.2	1.000	20	29	1	1.26	0.250	250.21	0.050
		1880.0	1.000	20	29	1	1.26	0.250	250.21	0.050
		1909.8	1.000	20	29	1	1.26	0.250	250.21	0.050
	2Down3Up	1850.2	1.000	20	27	1	1.26	0.375	236.81	0.047
		1880.0	1.000	20	27	1	1.26	0.375	236.81	0.047
		1909.8	1.000	20	27	1	1.26	0.375	236.81	0.047
	1Down4Up	1850.2	1.000	20	26	1	1.26	0.500	250.81	0.050
		1880.0	1.000	20	26	1	1.26	0.500	250.81	0.050
		1909.8	1.000	20	26	1	1.26	0.500	250.81	0.050
EGPRS 1900	4Down1Up	1850.2	1.000	20	27	1	1.26	0.125	78.94	0.016
		1880.0	1.000	20	27	1	1.26	0.125	78.94	0.016
		1909.8	1.000	20	27	1	1.26	0.125	78.94	0.016
	3Down2Up	1850.2	1.000	20	26	1	1.26	0.250	125.40	0.025
		1880.0	1.000	20	26	1	1.26	0.250	125.40	0.025
		1909.8	1.000	20	26	1	1.26	0.250	125.40	0.025
	2Down3Up	1850.2	1.000	20	24	1	1.26	0.375	118.69	0.024
		1880.0	1.000	20	24	1	1.26	0.375	118.69	0.024
		1909.8	1.000	20	24	1	1.26	0.375	118.69	0.024
	1Down4Up	1850.2	1.000	20	23	1	1.26	0.500	125.70	0.025
		1880.0	1.000	20	23	1	1.26	0.500	125.70	0.025
		1909.8	1.000	20	23	1	1.26	0.500	125.70	0.025

Note: 1.The Power [P] is max tune-up power (upper limit).

2.The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).

Band	Sub-Test	Frequency (MHz)	Limit (mw/cm^2)	Distance [R] (cm)	Power [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G] (dBi)	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw/cm^2)
WCDMA Band II	RMC12.2K	1852.4	1.000	20	24	1	1.26	1.000	316.5	0.063
		1880.0	1.000	20	24	1	1.26	1.000	316.5	0.063
		1907.6	1.000	20	24	1	1.26	1.000	316.5	0.063
WCDMA Band V	RMC12.2K	826.4	0.551	20	24	1	1.26	1.000	316.5	0.063
		836.6	0.558	20	24	1	1.26	1.000	316.5	0.063
		846.6	0.564	20	24	1	1.26	1.000	316.5	0.063

Note: 1.The Power [P] is max tune-up power (upper limit).

2.The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).

Band	Data Rate	Frequency (MHz)	Limit (mw)	Distance [R] (cm)	Max tune-up Power (upper limit) [P] (dBm)	ANT Gain (dBi)	Numeric Gain [G] (dBi)	Duty Cycle	[P] x [G] with Duty cycle [TP] (mW)	Power Density [S] (mw)/cm^2
IEEE 802.11b	11M	2412.0	1.000	20	19	0	1	1.000	79.43	0.016
		2437.0	1.000	20	19	0	1	1.000	79.43	0.016
		2462.0	1.000	20	19	0	1	1.000	79.43	0.016
IEEE 802.11g	6M	2412.0	1.000	20	15	0	1	1.000	31.62	0.006
		2437.0	1.000	20	15	0	1	1.000	31.62	0.006
		2462.0	1.000	20	15	0	1	1.000	31.62	0.006
IEEE 802.11n (2.4GHz) 20MHz	6.5M	2412.0	1.000	20	15	0	1	1.000	31.62	0.006
		2437.0	1.000	20	15	0	1	1.000	31.62	0.006
		2462.0	1.000	20	15	0	1	1.000	31.62	0.006
IEEE 802.11n (2.4GHz) 40MHz	13M	2422.0	1.000	20	14	0	1	1.000	25.12	0.005
		2437.0	1.000	20	14	0	1	1.000	25.12	0.005
		2452.0	1.000	20	14	0	1	1.000	25.12	0.005

Note: 1.The Power [P] is max tune-up power (upper limit).

2.The Numeric Gain calculated by 10^(ant. Gain(dBi) /10).