

FCC Part 15B TEST REPORT

Report No: STS1701081E01

Issued for

Legacy Direct

1221 E. Dyer Rd., #110 Santa Ana, CA 92705, USA

Product Name:	Game Controller	
Brand Name:	Legacy Direct	
Model Name:	B-GC	
Series Model:	WIL-BGC, LD-BGC	
Test Standard:	FCC Part 15B	

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Shenzhen STS Test Services Co., Ltd.

1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,
Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
TEL: +86-755 3688 6288 FAX: +86-755 3688 6277 E-mail:sts@stsapp.com



Report No.: STS1701081E01



TEST RESULT CERTIFICATION Applicant's name.....: Legacy Direct Address: 1221 E. Dyer Rd., #110 Santa Ana, CA 92705, USA Manufacture's Name.....: Wiatec International Ltd. Unit 601-605, TaoJinDi Electronic Commercial Plaza B, TengLong Address: Rd, LongHua, Shenzhen, China 518131 **Product description** Product name: Game Controller Brand name.....: Legacy Direct Model and/or type reference..: B-GC Standards..... FCC Part 15B Test procedure...... ANSI C63.4-2014 This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report. This report shall not be reproduced except in full, without the written approval of STS, this document may be altered or revised by STS, personal only, and shall be noted in the revision of the document. Date of Test Date of performance of tests 14 Jan. 2017~ 01 Mar. 2017 Date of Issue 02 Mar. 2017 Test ResultPass Barry Li **Testing Engineer** (Barry Li) Technical Manager: (Alan Cao)

(Bovey Yang)

Authorized Signatory:







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Revision History

Rev.	Rev. Issue Date Report NO.		Rev. Issue Date Report NO. Effect Page Cor		Contents
00	00 02 Mar. 2017 STS1701081E01		ALL	Initial Issue	





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

EMISSION						
Standard	Item	Result	Remarks			
FCC 47 CFR Part 15 Subpart B	Conducted Emission	PASS	Meet Class B limit			
(10-1-05 Edition)	Radiated Emission	PASS	Meet Class B limit			

NOTE:

(1) " N/A" denotes test is not applicable in this Test Report

1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.

Add.: 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,

Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y \pm U , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2 , providing a level of confidence of approximately 95 % ,

No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	±2.88dB
2	Conducted Emission (150KHz-30MHz)	±2.67dB
3	RF power,conducted	±0.70dB
4	Spurious emissions,conducted	±1.19dB
5	All emissions,radiated(<30M) (9KHz-30MHz)	±2.45dB
6	All emissions,radiated(<1G) 30MHz-200MHz	±2.83dB
7	All emissions,radiated(<1G) 200MHz-1000MHz	±2.94dB
8	All emissions,radiated(>1G)	±3.03dB
9	Temperature	±0.5°C
10	Humidity	±2%



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Game Controller
Trade Name	Legacy Direct
Model Name	B-GC
Series Model	WIL-BGC, LD-BGC
Model Difference	Only different in model name
	Rated Voltage: 3.7V
Battery	Charge Limit: 4.2V
	Capacity: 400mAh
Hardware version number	WIL-BGC V1.0
Software version number	BGC V1.0
Connecting I/O Port(s)	Please refer to the User's Manual

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description		
Mode 1	USB port communication with PC		

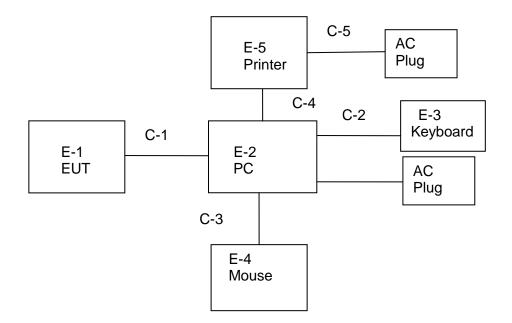
For Conducted Test				
Final Test Mode Description				
Mode 1	USB port communication with PC			

For Radiated Test				
Final Test Mode Description				
Mode 1	USB port communication with PC			

NOTE:

- 1. Due to the different configuration and test, in this list only some worse mode. The worst test data of the worse modeis reported by this report.
- 2. We have be tested for all avaiable U.S. voltage and frequencies(For 120V, /60Hz) for which the device is capable of operation.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	Game Controller	Legacy Direct	B-GC	N/A	EUT
E-2	PC	4CV428DQXR	500-320cx	4CV428DQYN	N/A
E-3	Keyboard	HP	PR1101U	DKUSB1B06Q42209FBK800	N/A
E-4	Mouse	MOTOSPEED	F66	697738-001	N/A
E-5	Printer	HP	HP1020	CNBB102765	N/A
C-6	AC (PC Adapter)	LITEON	PA-1650-86	3X06399004	N/A

Item	Shielded Type	e Ferrite Core Length		Note
C-1	USB Cable (FTP)	NO	90cm	N/A
C-2	USB Cable (FTP)	NO	100cm	N/A
C-3	USB Cable (FTP)	NO	100cm	N/A
C-4	USB Cable (FTP)	NO	110cm	N/A
C-5	AC (Printer Cable) (FTP)	NO	100cm	N/A
C-6	AC (PC Cable) (FTP)	NO	120cm	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in <code>"Length_"</code> column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".
- (4) PC is the FCC DOC is approved.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Radiation Test equipment

	•				
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESCI	101427	2016.10.23	2017.10.22
Loop Antenna	EMCO	6502	9003-2485	2016.03.06	2019.03.03
Bilog Antenna	TESEQ	CBL6111D	34678	2014.11.24	2017.11.23
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2015.03.05	2018.03.04
PreAmplifier	Agilent	8449B	60538	2016.10.23	2017.10.22
Temperature & Humitidy	Mieo	HH660	N/A	2016.10.23	2017.10.22
Unversal radio communication tester	R&S	CMU200	111764	2016.10.23	2017.10.22
Spectrum Analyzer	Agilent	E4407B	MY50140340	2016.10.23	2017.10.22
Low frequency cable	EM	R01	N/A	2016.10.23	2017.10.22
High frequency cable	SCHWARZBE CK	AK9515H	SN-96286/9628 7	2016.10.23	2017.10.22
Semi-anechoic chamber	Changling	966	N/A	2016.10.23	2017.10.22

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESPI	102086	2016.10.23	2017.10.22
LISN	R&S	ENV216	101242	2016.10.23	2017.10.22
LISN	EMCO	3810/2NM	000-23625	2016.10.23	2017.10.22
Conduction Cable	EM	C01	N/A	2016.10.23	2017.10.22
Shielding Room	Changling	854	N/A	2016.10.23	2017.10.22



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits

	Conducted Emission Limits (dBuV)					
FREQUENCY (MHz)	Clas	ss A	Class B			
	Quasi-peak	Average	Quasi-peak	Average		
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *		
0.50 -5.0	73.00	60.00	56.00	46.00		
5.0 -30.0	73.00	60.00	60.00	50.00		

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz





3.1.2 TEST PROCEDURE

The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance

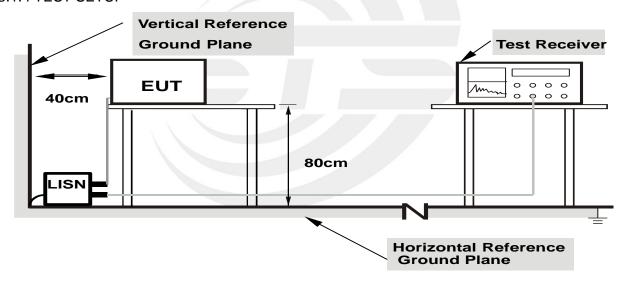
- a. stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

 I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the
- c. cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



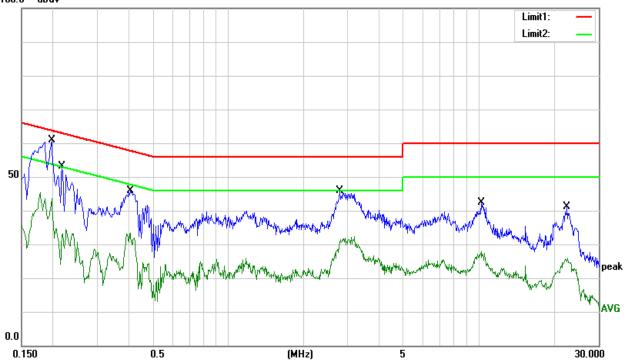
3.1.6 TEST RESULTS

Temperature:	26 ℃	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	L
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 1

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1980	51.52	9.23	60.75	63.69	-2.94	QP
2	0.1980	32.44	9.23	41.67	53.69	-12.02	AVG
3	0.2180	43.80	9.21	53.01	62.89	-9.88	QP
4	0.2180	23.39	9.21	32.60	52.89	-20.29	AVG
5	0.4100	36.48	9.41	45.89	57.65	-11.76	QP
6	0.4100	21.92	9.41	31.33	47.65	-16.32	AVG
7	2.7940	36.64	9.26	45.90	56.00	-10.10	QP
8	2.7940	21.19	9.26	30.45	46.00	-15.55	AVG
9	10.1900	32.93	9.50	42.43	60.00	-17.57	QP
10	10.1900	17.10	9.50	26.60	50.00	-23.40	AVG
11	22.4300	31.25	9.83	41.08	60.00	-18.92	QP
12	22.4300	15.06	9.83	24.89	50.00	-25.11	AVG

Remark:

- 1. All readings are Quasi-Peak and Average values.
- 2. Margin = Result (Result = Reading + Factor)-Limit 100.0 dBuV





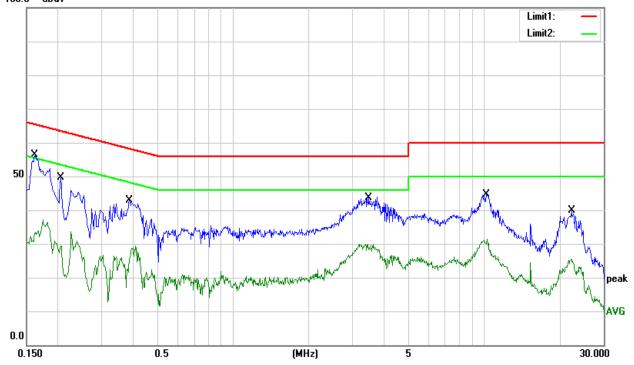
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Temperature:	26 ℃	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	Ν
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 1

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1621	47.07	9.23	56.30	65.36	-9.06	QP
2	0.1621	24.10	9.23	33.33	55.36	-22.03	AVG
3	0.2060	40.52	9.22	49.74	63.37	-13.63	QP
4	0.2060	20.25	9.22	29.47	53.37	-23.90	AVG
5	0.3860	33.69	9.23	42.92	58.15	-15.23	QP
6	0.3860	16.21	9.23	25.44	48.15	-22.71	AVG
7	3.4820	34.29	9.26	43.55	56.00	-12.45	QP
8	3.4820	19.28	9.26	28.54	46.00	-17.46	AVG
9	10.2220	35.32	9.40	44.72	60.00	-15.28	QP
10	10.2220	20.27	9.40	29.67	50.00	-20.33	AVG
11	22.3020	30.16	9.83	39.99	60.00	-20.01	QP
12	22.3020	14.79	9.83	24.62	50.00	-25.38	AVG

Remark:

- 1. All readings are Quasi-Peak and Average values.
- 2. Margin = Result (Result = Reading + Factor)-Limit 100.0 dBuV





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 Radiated Emission Limits

In case the emission fall within the restricted band specified on 15.105(a)&109(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (d	BuV/m) (at 3M)	Class B (dBuV/m) (at 3M)		
FREQUENCT (IVII12)	PEAK	AVERAGE	PEAK	AVERAGE	
Above 1000	80	60	74	54	

Note:

- (1) The limit for radiated test was performed according to FCC PART 15B.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper	
frequency of measurement used in the device	Range (MHz)
or on which the device operates or tunes	Kange (Minz)
(MHz)	
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz,
Above 1000	whichever is lower



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Spectrum Parameter	Setting	
Attenuation	Auto	
Detector	Peak	
Start Frequency	1000 MHz(Peak/AV)	
Stop Frequency	5th harmonic (Peak/AV)	
DD ///D /orginalism in reconstituted bound	30MHz to 1000MHz: 100 KHz / 300 KHz	
RB / VB (emission in restricted band)	Above 1000MHz: 1 MHz / 3 MHz	

Receiver Parameter	Setting	
Attenuation	Auto	
Start ~ Stop Frequency	30MHz to 1000MHz: 100 KHz / 300 KHz	
	Above 1000MHz: 1 MHz / 3 MHz	

3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz and above 1GHz.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter b. anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- the height of the antenna shall vary between 1m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector d. mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the e. EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

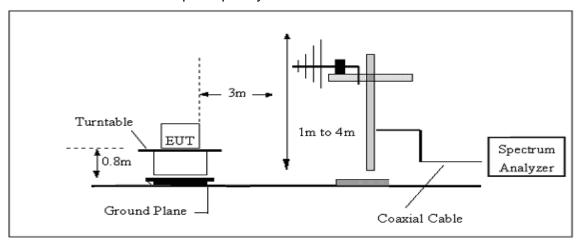
3.2.3 DEVIATION FROM TEST STANDARD

No deviation

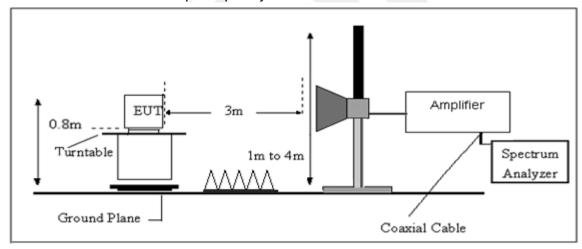


3.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency 30MHz~1GHz



(B) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



3.2.6 TEST RESULTS

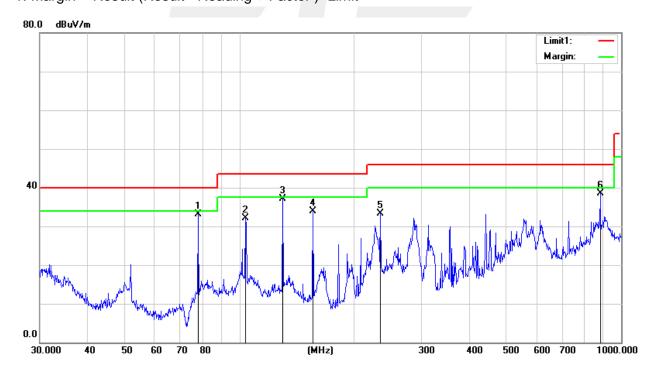
30MHz -1000MHz

Temperature:	26 ℃	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 1

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	77.8654	56.02	-23.00	33.02	40.00	-6.98	QP
2	103.8055	51.03	-18.87	32.16	43.50	-11.34	QP
3	129.9226	54.59	-17.55	37.04	43.50	-6.46	QP
4	155.9101	52.20	-18.28	33.92	43.50	-9.58	QP
5	234.1684	51.49	-18.18	33.31	46.00	-12.69	QP
6	881.4067	40.95	-2.51	38.44	46.00	-7.56	QP

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit





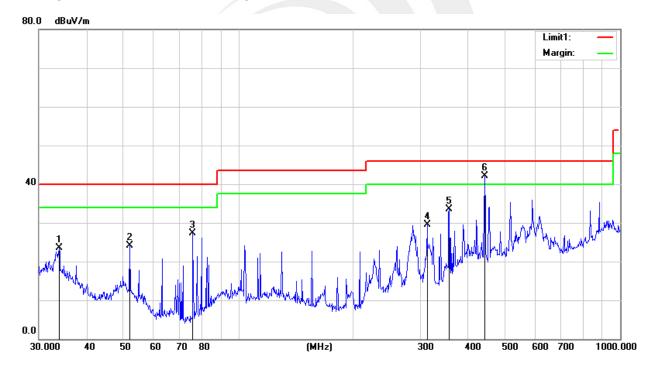
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Temperature:	26 ℃	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 1

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Results (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	33.9174	36.75	-13.20	23.55	40.00	-16.45	QP
2	51.8430	46.15	-22.00	24.15	40.00	-15.85	QP
3	75.9773	50.50	-23.26	27.24	40.00	-12.76	QP
4	312.1794	44.02	-14.42	29.60	46.00	-16.40	QP
5	356.6758	46.72	-13.28	33.44	46.00	-12.56	QP
6	441.7426	52.84	-10.82	42.02	46.00	-3.98	QP

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit







(1 GHz to 25GHz.)

Temperature:	26 ℃	Relative Humidity:	60%
Pressure:	1010hPa	Phase:	Vertical/Horizontal
Test Voltage:	AC 120V/60Hz	Test Mode:	Mode 1

PΚ

Freq.	Ant.	Peak	Amplifier	Loss	Antenna	Orrected	Actual Fs	Peak	Peak
Pol	i Gan	Amplinei	L055	Factor	Factor	Actual 1 5	1 can	1 can	
	H/V	Reading	(dB)	(dD)	(dP/m)	(dB)	Peak	Limit	margin
(MHz)	⊓/ V	(dBuV)	(UB)	(dB)	(dB/m)	(UB)	(dBuV/m)	(dBuV/m)	(dBuV/m)
1402.1	Н	66.20	45.1	4.0	25.1	-16.0	50.20	74.00	-23.80
3005.61	Н	53.41	44.7	6.7	28.2	-9.8	43.61	74.00	-30.39
4012.02	Η	60.11	44.2	7.9	29.7	-6.6	53.51	74.00	-20.49
5501.04	Н	49.66	44.2	9.7	32.0	-2.5	47.16	74.00	-26.84
N/A									
1402.1	V	54.79	45.1	4.0	25.1	-16.0	38.79	74.00	-35.21
3005.61	V	49.67	44.7	6.7	28.2	-9.8	39.87	74.00	-34.13
4012.02	V	63.89	44.2	7.9	29.7	-6.6	57.29	74.00	-16.71
5501.04	V	55.26	44.2	9.7	32.0	-2.5	52.76	74.00	-21.24
N/A									

AV

~~									
Freq.	Ant.	AV	Amplifier	Loss	Antenna	Orrected		AV	AV
	Pol				Factor	Factor			
(MHz)	H/V	Reading	(dB)	(dB)	(dB/m)	(dB)	AV	Limit	margin
(1411 12)	1 1/ V	(dBuV)	(UB)	(ub)	(UD/III)	(UD)	(dBuV/m)	(dBuV/m)	(dBuV/m)
1402.1	Н	48.56	45.1	4.0	25.1	-16.0	32.56	54.00	-21.44
3005.61	Н	47.02	44.7	6.7	28.2	-9.8	37.22	54.00	-16.78
4012.02	Н	50.19	44.2	7.9	29.7	-6.6	43.59	54.00	-10.41
5501.04	Н	47.88	44.2	9.7	32.0	-2.5	45.38	54.00	-8.62
N/A									
	.,								
1402.1	V	37.69	45.1	4.0	25.1	-16.0	21.69	54.00	-32.31
3005.61	V	40.15	44.7	6.7	28.2	-9.8	30.35	54.00	-23.65
4012.02	V	35.82	44.2	7.9	29.7	-6.6	29.22	54.00	-24.78
5501.04	V	32.59	44.2	9.7	32.0	-2.5	30.09	54.00	-23.91
N/A									

Notes:

- 1. Measuring frequencies from 1 GHz to 25GHz.
- 2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.
- 3. The frequency that above 3GHz is mainly from the environment noise.



4. PHOTOS OF TEST SETUP

Radiated Measurement Photos

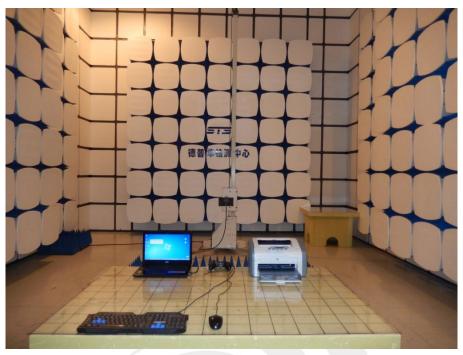
30MHz-1GHz











Conducted Measurement Photos







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