



TEST REPORT

Report Reference No. : TRE15090055 **R/C** : 65253

FCC ID : M7N-BW8510

Applicant's name : Remotec Technology Ltd

Address : Workshop No. 2, 2 nd Fl, Blk B, Tonic Industrial Centre, 19 Lam Hing St, Kowloon Bay, HK

Manufacturer : Remotec Technology Ltd

Address : Workshop No. 2, 2 nd Fl, Blk B, Tonic Industrial Centre, 19 Lam Hing St, Kowloon Bay, HK

Test item description : ZRC-90US Scene Master

Trade Mark : -

Model/Type reference : BW8510US

Listed Model(s) : BW8510NA, BW8511US, BW8511NA, BW8500US, BW8500NA, RMZ3103

Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.249

Date of receipt of test sample : Sept 17, 2015

Date of testing : Sept 18, 2015- Sept 28, 2015

Date of issue : Sept 29, 2015

Result : **PASS**

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Testing Laboratory Name : Shenzhen Huatongwei International Inspection Co., Ltd

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1. **TEST STANDARDS AND TEST DESCRIPTION**

1.1. **Test Standards**

The tests were performed according to following standards:

[FCC Rules Part 15.249](#): Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHZ, and 24.0-24.25 GHz.

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices.

1.2. **Test Description**

Test Item	Section in CFR 47	Result
Conducted Emissions	15.207	N/A
Radiated Emissions	15.249(a)/15.209/15.205(a)	PASS
20dB Bandwidth	15.215(c)	PASS
Outside of Band Emission	15.249/15.205/15.209	PASS

Remark: The measurement uncertainty is not included in the test result.

2. SUMMARY

2.1. Client Information

Applicant:	Remotec Technology Ltd
Address:	Workshop No. 2, 2 nd Fl, Blk B, Tonic Industrial Centre, 19 Lam Hing St, Kowloon Bay, HK
Manufacturer:	Remotec Technology Ltd
Address:	Workshop No. 2, 2 nd Fl, Blk B, Tonic Industrial Centre, 19 Lam Hing St, Kowloon Bay, HK

2.2. Product Description

Name of EUT	ZRC-90US Scene Master
Trade Mark:	-
Model No.:	BW8510US
Listed Model(s):	BW8510NA, BW8511US, BW8511NA, BW8500US, BW8500NA, RMZ3103
Power supply:	DC3.0V AAAx2
Adapter information:	/
Operation frequency:	908.42MHz
Channel number:	1
Antenna type:	Integral Antenna
Antenna gain:	0dBi

2.3. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continuous transmitting mode for testing.

2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

<input type="radio"/>	PowerCable	Length (m) :	/
		Shield :	/
		Detachable :	/
<input type="radio"/>	Multimeter	Manufacturer :	/
		Model No. :	/

2.5. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd. (Gongming)
Address: Bldg3, Hongfa Hi-tech Industrial Park, Genyu Road, Shenzhen, China
Phone: 86-755-26748019 Fax: 86-755-26748089

3.1. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept 30, 2015.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection 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. Registration 662850, Renewal date April. 24,2015, valid time is until April. 24,2018.

FCC-Registration No.: 317478

Shenzhen Huatongwei International Inspection Co., Ltd. (Gongming 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. Registration 317478, Renewal date July 18, 2014, valid time is until July. 18, 2017.

IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.

IC-Registration No.: 5377B

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. (Gongming EMC Laboratory) has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on September 3, 2014, valid time is until September 3, 2017.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.:R-2484. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 29, 2015.

Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.2. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

3.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	5.16 dB	(1)
Radiated Emissio 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

3.4. Equipments Used during the Test

Occupied Bandwidth					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Spectrum Analyzer	AGILENT	E4407B	MY44210775	2014/11/01
2	Climate Chamber	ESPEC	EL-10KA	05107008	2014/11/01
3	Spectrum Analyzer	Rohde&Schwarz	FSP40	1164.4391.40	2014/11/01

Transmitter spurious emissions&Outside of Band Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2014/11/01
2	RF TEST PANEL	Rohde&Schwarz	TS / RSP	335015/0017	N/A
3	EMI TEST SOFTWARE	Rohde&Schwarz	ESK1	N/A	N/A
4	High pass filter	Compliance Direction systems	BSU-6	34202	2014/11/01
5	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2014/11/01
6	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	539	2014/11/01
7	HORNANTENNA	ShwarzBeck	9120D	1011	2014/11/01
8	HORNANTENNA	ShwarzBeck	9120D	1012	2014/11/01
9	TURNTABLE	MATURO	TT2.0	----	N/A
10	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
11	EMI TEST SOFTWARE	Audix	E3	N/A	N/A

The Cal.Interval was one year

4. **TEST CONDITIONS AND RESULTS**

4.1. **Antenna requirement**

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Test Result:

The antenna is integral antenna, the best case gain of the antenna is 0dBi

4.2. AC Power Conducted Emission

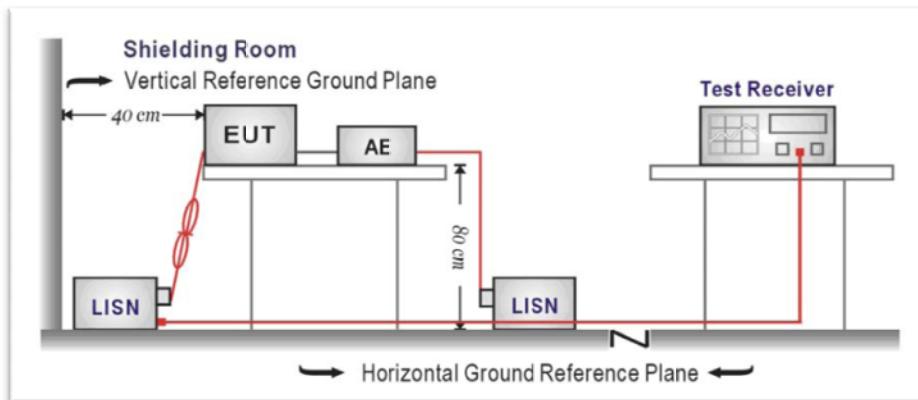
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.249 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

TEST RESULTS

Not applicable to this device.

4.3. Radiated Emission

LIMIT

Field strength of emissions from intentional radiators

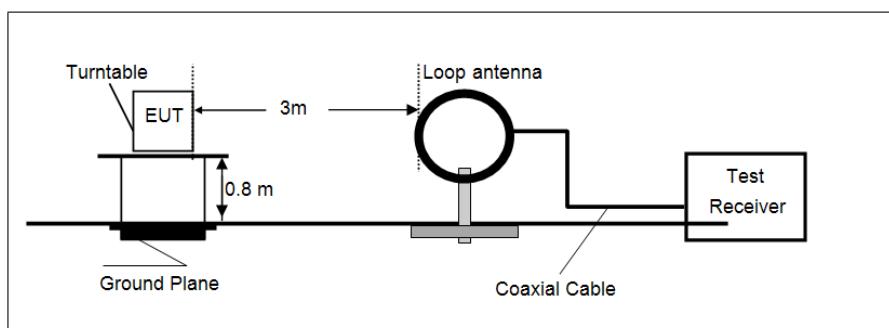
Fundamental Frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902 - 928	50	500

Unintentional radiators

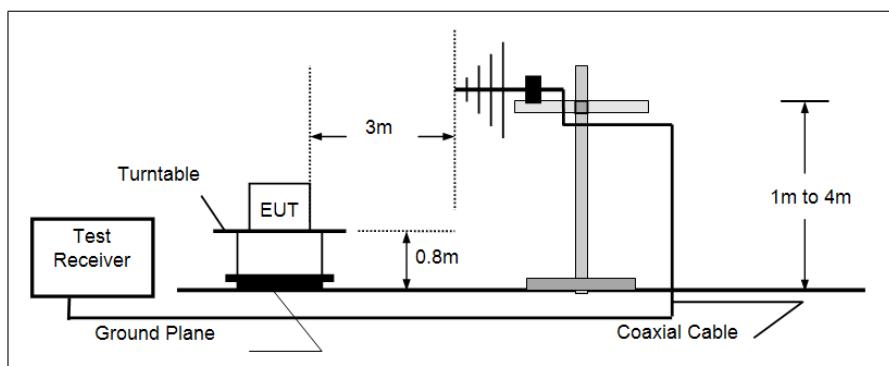
Frequency (MHz)	Distance(Meters)	Radiated(dB μ V/m)	Radiated(μ V/m)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST CONFIGURATION

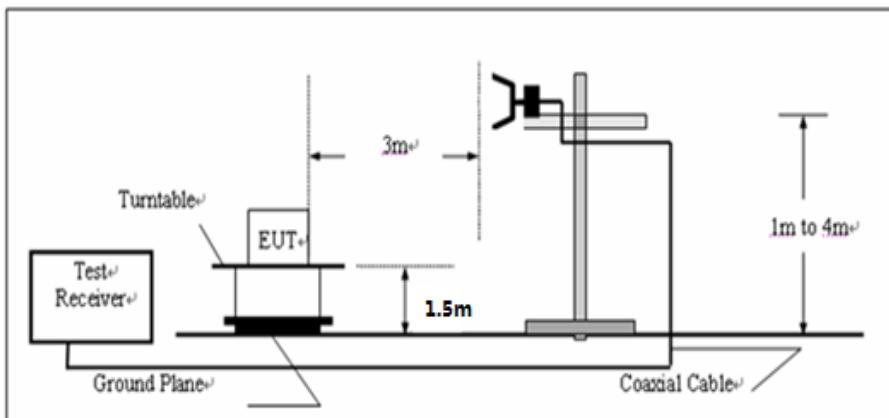
Below 30MHz



30MHz~1000MHz



Above 1GHz



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable was turned from 0 degrees to 360 degrees to find the maximum reading.
5. Use the following spectrum analyzer settings
 - a) Span shall be wide enough to fully capture the emission being measured;
 - b) Below 1GHz, RBW=120KHz, VBW=300KHz, Sweep=auto, Detector function=peak, Trace=max hold; *If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.*
 - c) Above 1GHz, RBW=1MHz, VBW=3MHz, Detector function=peak for Peak value RBW=1MHz, VBW=10Hz, Detector function=peak for Average value.

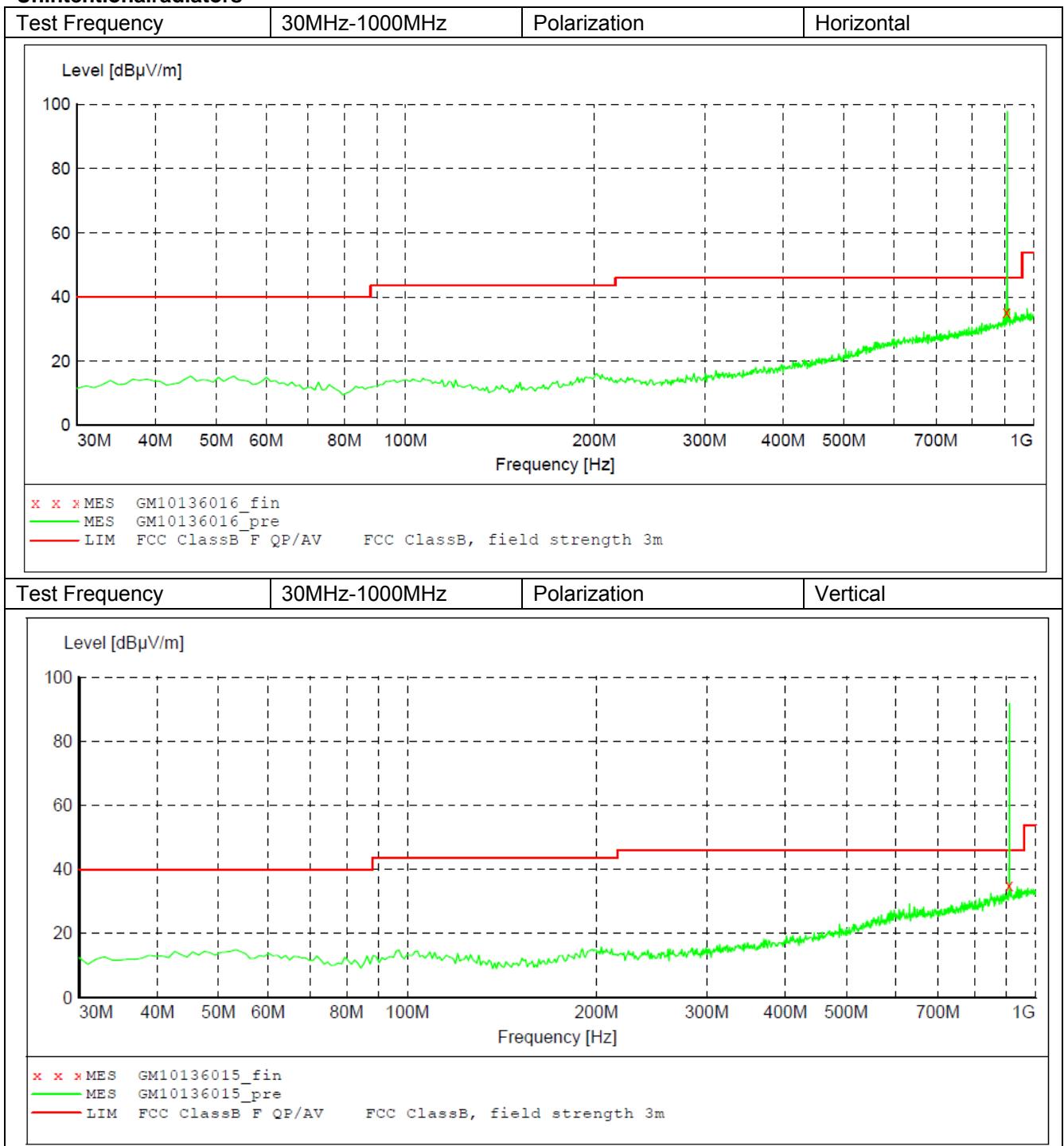
TEST RESULTS

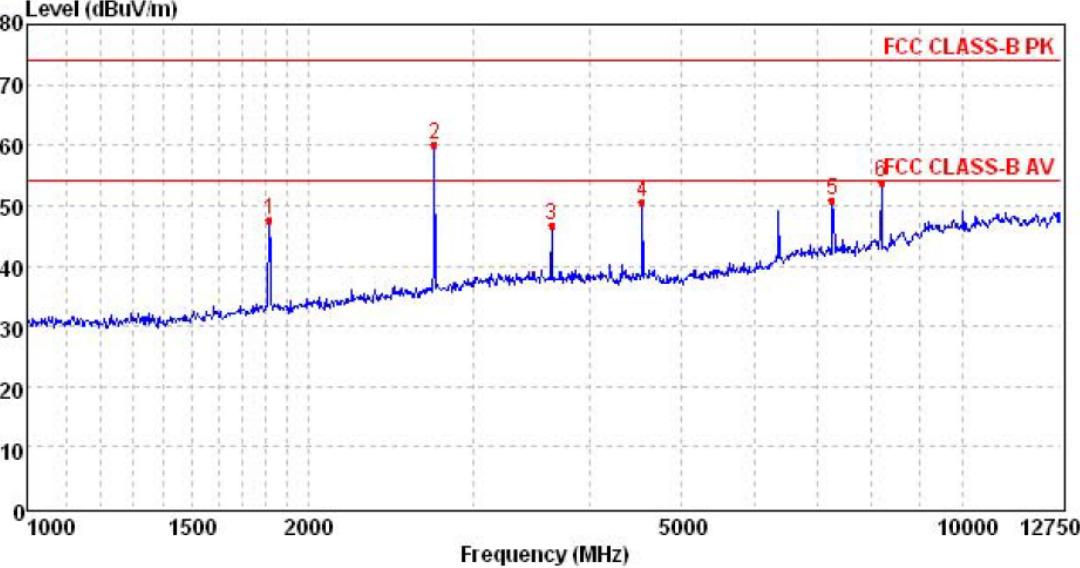
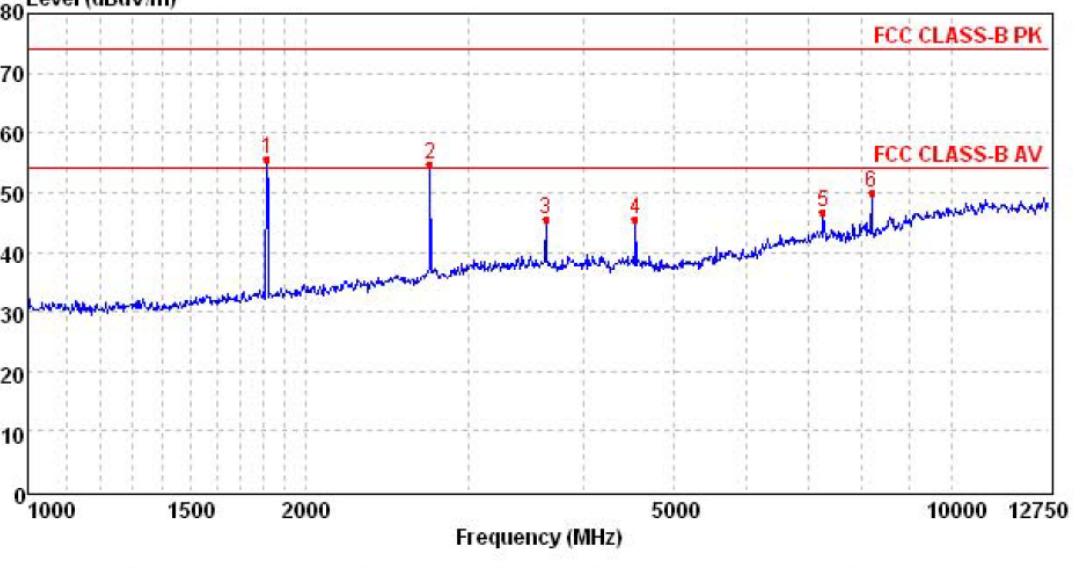
Note: Duty cycle=100%, duty factor =1.

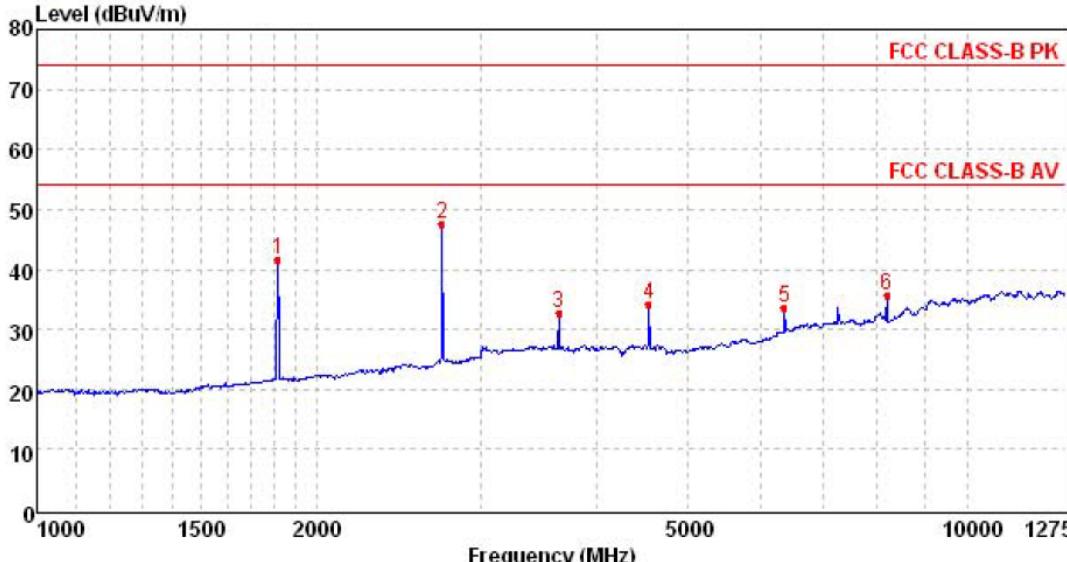
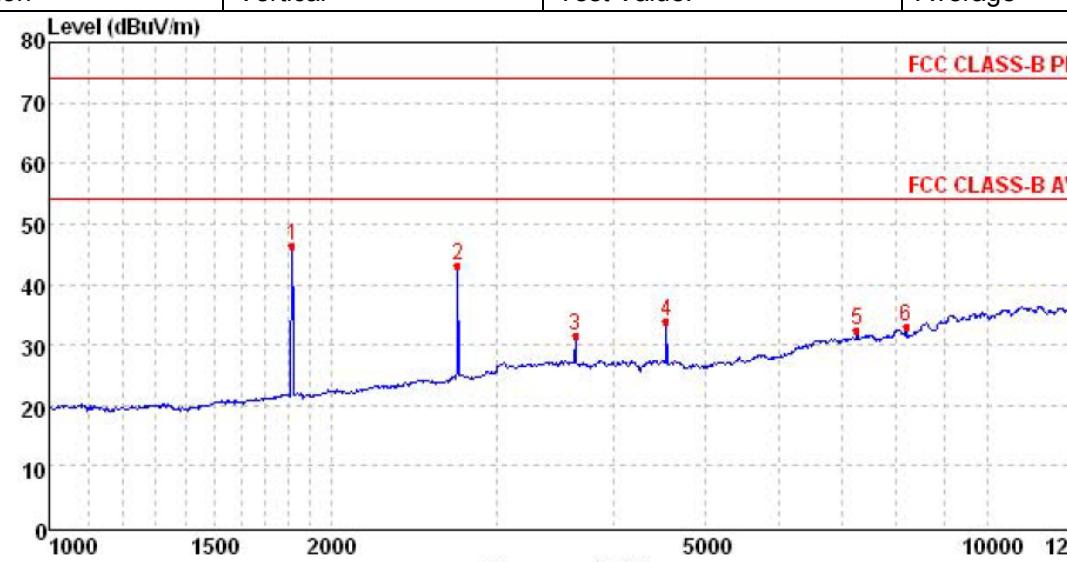
Field strength of emissions from intentional radiators

Frequency (MHz)	Reading (dB _{uv} /m)	Antenna factor (dB)	Cable loss (dB)	Preamp factor (dB)	Level (dB _{uv} /m)	Limit (dB _{uv} /m)	Over limit	Reamrk	Polarization
908.45	66.09	22.61	3.62	0.00	92.32	94.00	-1.68	QP	Horizontal
908.45	61.15	22.61	3.62	0.00	87.38	94.00	-6.62	QP	Vertical

Unintentional radiators



Polarization	Horizontal	Test Value:	Peak						
Level (dBuV/m)									
									
Frequency (MHz)									
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1814.22	53.15	25.62	5.82	37.11	47.48	74.00	-26.52	Peak
2	2726.28	62.29	28.19	7.55	37.82	60.21	74.00	-13.79	Peak
3	3634.91	47.06	28.94	8.75	37.99	46.76	74.00	-27.24	Peak
4	4547.56	49.05	30.93	9.02	38.37	50.63	74.00	-23.37	Peak
5	7264.28	41.94	36.02	10.87	38.11	50.72	74.00	-23.28	Peak
6	8187.50	43.87	36.89	11.24	38.19	53.81	74.00	-20.19	Peak
Polarization	Vertical	Test Value:	Peak						
Level (dBuV/m)									
									
Frequency (MHz)									
Mark	Frequency MHz	Reading dBuV/m	Antenna dB	Cable dB	Preamp dB	Level dBuV/m	Limit dBuV/m	Over limit	Remark
1	1814.22	61.37	25.62	5.82	37.11	55.70	74.00	-18.30	Peak
2	2726.28	56.79	28.19	7.55	37.82	54.71	74.00	-19.29	Peak
3	3634.91	45.83	28.94	8.75	37.99	45.53	74.00	-28.47	Peak
4	4547.56	43.93	30.93	9.02	38.37	45.51	74.00	-28.49	Peak
5	7264.28	37.95	36.02	10.87	38.11	46.73	74.00	-27.27	Peak
6	8187.50	40.15	36.89	11.24	38.19	50.09	74.00	-23.91	Peak

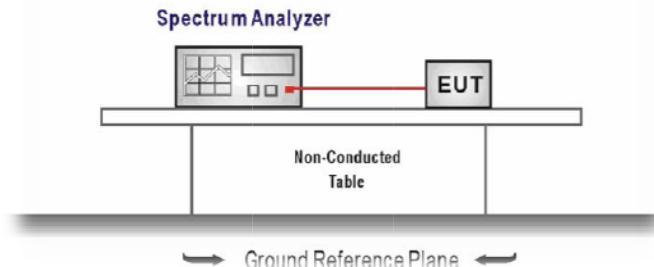
Polarization	Horizontal	Test Value:	Average						
Level (dBuV/m)									
									
Frequency (MHz)									
Mark	Frequency	Reading	Antenna	Cable	Preamp	Level	Limit	Over	Remark
	MHz	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
1	1814.22	47.30	25.62	5.82	37.11	41.63	54.00	-12.37	Average
2	2726.28	49.75	28.19	7.55	37.82	47.67	54.00	-6.33	Average
3	3634.91	33.12	28.94	8.75	37.99	32.82	54.00	-21.18	Average
4	4547.56	32.62	30.93	9.02	38.37	34.20	54.00	-19.80	Average
5	6363.65	26.82	34.56	10.18	37.96	33.60	54.00	-20.40	Average
6	8187.50	25.87	36.89	11.24	38.19	35.81	54.00	-18.19	Average
Polarization	Vertical	Test Value:	Average						
Level (dBuV/m)									
									
Frequency (MHz)									
Mark	Frequency	Reading	Antenna	Cable	Preamp	Level	Limit	Over	Remark
	MHz	dBuV/m	dB	dB	dB	dBuV/m	dBuV/m	limit	
1	1814.22	52.14	25.62	5.82	37.11	46.47	54.00	-7.53	Average
2	2726.28	45.30	28.19	7.55	37.82	43.22	54.00	-10.78	Average
3	3634.91	31.83	28.94	8.75	37.99	31.53	54.00	-22.47	Average
4	4547.56	32.18	30.93	9.02	38.37	33.76	54.00	-20.24	Average
5	7264.28	23.51	36.02	10.87	38.11	32.29	54.00	-21.71	Average
6	8187.50	23.16	36.89	11.24	38.19	33.10	54.00	-20.90	Average

4.4. 20dB Bandwidth

LIMIT

N/A

TEST CONFIGURATION

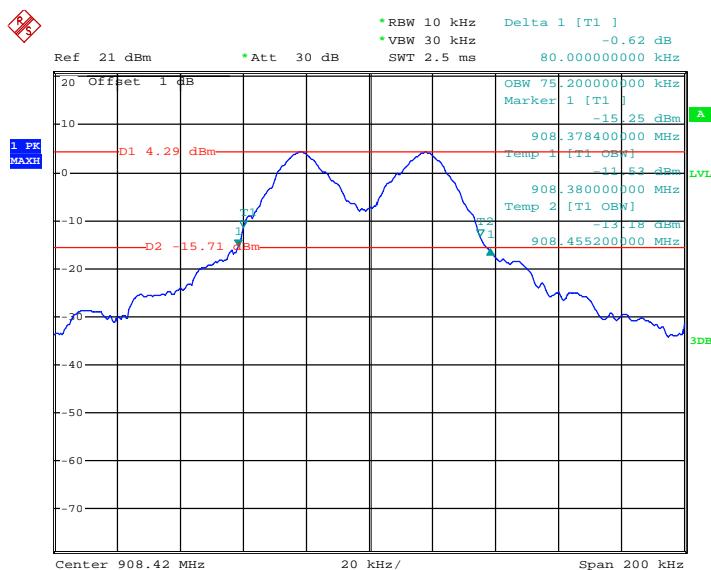


TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with $RBW \geq 1\%$ of the 20 dB bandwidth and $VBW \geq RBW$.
3. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

TEST RESULTS

Channel Frequency (MHz)	20dB Bandwidth (KHz)	Limit (MHz)	Result
908.42	80	N/A	PASS



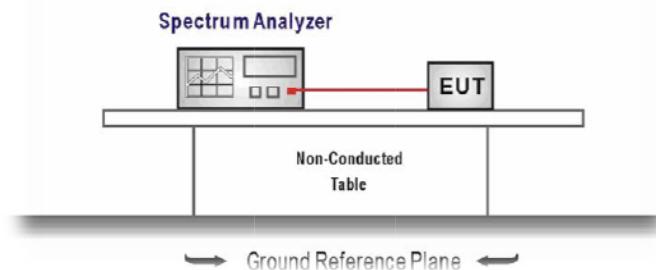
4.5. Outside of Band Emission

LIMIT

FCC Part15.249(d):

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

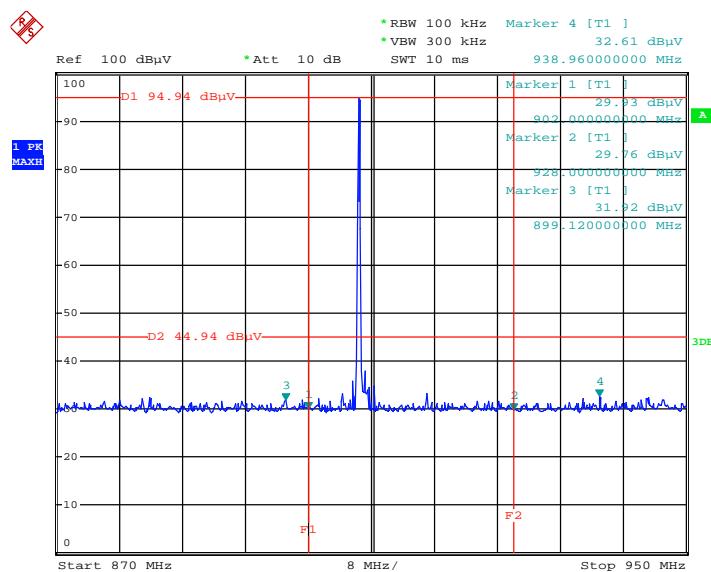
TEST CONFIGURATION



TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. The bandwidth of the fundamental frequency was measured by spectrum analyzer with RBW=100KHz, VBW=300KHz
3. Record the level of 902MHz and 928MHz.

TEST RESULTS



Date: 28.SEP.2015 15:59:08

.....End of Report.....