



Neutron Engineering Inc.

Radio Test Report

FCC ID: YZ7001

This report concerns (check one) : ☒ Original Grant ☐ Class II Change

Issued Date : Sep. 21, 2010
Project No. : R0911004
Equipment : Wireless LED Helmet Brake & Turn Signal Indicator
Model Name : Snap-On Type, Slot-In Type
Applicant : Universal Test Solution Sdn. Bhd.
Address : 1-4-16, Ideal Avenue, Medan Kampung Relau 1, Relau, 11900 Bayan Lepas, Penang

Tested by: Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Dec. 08, 2009
Date of Test: Dec. 08, 2009 ~ Dec. 31, 2009

Testing Engineer : Rush Kao
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Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C.**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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1. CERTIFICATION

Equipment : Wireless LED Helmet Brake & Turn Signal Indicator
Trade Name : Life Sparx
Model No. : Snap-On Type, Slot-In Type
Applicant : Universal Test Solution Sdn. Bhd.
Data of Test : Dec. 08, 2009 ~ Dec. 31, 2009
Test Item : ENGINEERING SAMPLE
Standards : FCC Part15, Subpart C / ANCI C63.4 : 2003

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-R0911004) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).



2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards: (Antenna to EUT distance is **3 m**)

FCC Part15(15.231), Subpart C		
Standard	Test Item	Judgment
15.207	Conducted Emission	N/A NOTE(1)
15.209	Radiated Emission	PASS
15.231(a)(1)	Transmitting Time	PASS
15.231(b)	Radiated Emission	PASS NOTE(2)
15.231(c)	20dB Occupied Bandwidth Measurement	PASS

NOTE:

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

(2) The EUT is manually operated transmitter, not periodic transmissions.

**2.1 TEST FACILITY**

CB07: 1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

CB08: (VCCI RN: G-91; FCC RN: 614388)

1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

2.2 MEASUREMENT UNCERTAINTY

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

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
C01	ANSI	150 kHz ~ 30 MHz	1.94	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U , (dB)	NOTE
OS-01	ANSI	30 MHz ~ 200 MHz	V	2.86	
		30 MHz ~ 200 MHz	H	2.56	
		200 MHz ~ 1, 000 MHz	V	2.88	
		200 MHz ~ 1, 000 MHz	H	2.98	
OS-02	ANSI	30 MHz ~ 200 MHz	V	2.48	
		30 MHz ~ 200 MHz	H	2.16	
		200 MHz ~ 1, 000 MHz	V	2.50	
		200 MHz ~ 1, 000 MHz	H	2.66	

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in CISPR 16-4-2 terminology.

Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U_{CISPR} , as follows:

Conducted Disturbance (mains port) – 150 kHz – 30 MHz : 3.6 dB

Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz : 5.2 dB

It can be seen that our U_{lab} values are smaller than U_{CISPR} .



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	Wireless LED Helmet Brake & Turn Signal Indicator	
Trade Name	Life Sparx	
Model No.	Snap-On Type, Slot-In Type	
OEM Brand/Model No.	N/A	
Model Difference	N/A	
Product Description	The EUT is a Wireless LED Helmet Brake & Turn Signal Indicator.	
	Operation Frequency	433.92 MHz
	Modulation Type	Pulse Modulation (ASK)
	Antenna Designation	Printed Antenna
	Number Of Channel	1
	Transmitting Time	< 5 seconds
	Associated Receiver	FCC Verification
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	DC Voltage supplied from Battery.	
Power Supply	I/P: DC 12V	
Connecting I/O Port(s)	Please refer to the User's Manual	
Products Covered	AC/DC adapter: SME-2B	
EUT Modification(s)	N/A	

Note:

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



3.2 DESCRIPTION OF TEST MODES

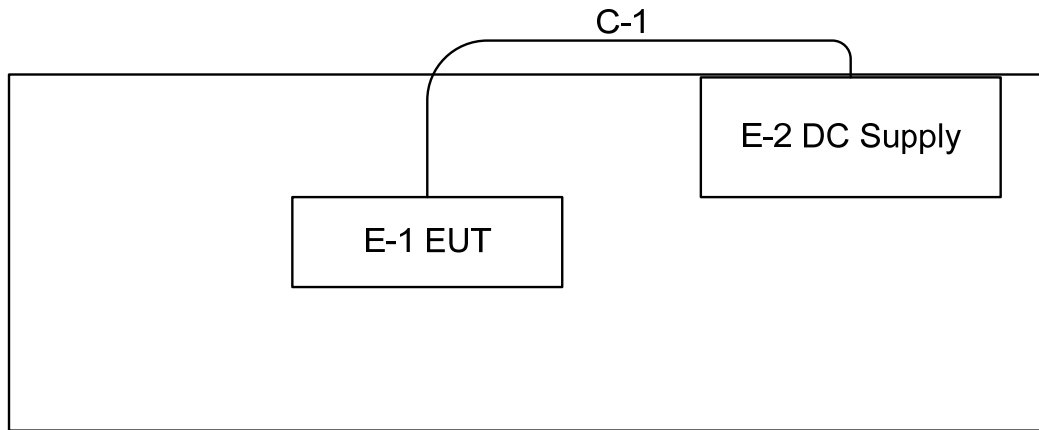
To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration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

Pretest Test Mode	Description
Mode 1	TX 433MHz

For Radiated Test	
Final Test Mode	Description
Mode 1	TX 433MHz



3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



**3.4 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.	FCC ID	Series No.	Note
E-1	Wireless LED Helmet Brake & Turn Signal Indicator	Life Sparx	Snap-On Type, Slot-In Type	YZ7001	N/A	EUT
E-2	DC Power Supply	Lokc	DPS-3050	N/A	400003829	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	10CM	

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 『Length』 column.



4. EMC EMISSION TEST

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 RADIATED EMISSION LIMITS (Frequency Range 30MHz-1000MHz)

According to 15.231 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	uV/meter	dBuV/meter	uV/meter	dBuV/meter
40.66 – 40.70	2250	67.04	225	48.04
70 – 130	1250	61.94	125	41.94
130 – 174	1250 to 3750	61.94 to 71.48	125 to 375	41.94 to 51.48
174 – 260	3750	71.48	75	37.50
260 – 470	3750 to 12500	71.48 to 81.94	375 to 1250	51.48 to 61.94
Above 470	12500	81.94	1250	61.94

Notes:

- (1) Emission level in dBuV/m=20 log (uV/m)
- (2) Measurement was performed at an antenna to the closed point of EUT distance of meters.
- (3) Fundamental frequency shall not be located within the Restricted Bands specified in provision of 15.205.
- (4) If spurious frequency which falls within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Notes:

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Sep. 10, 2010
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-546	Jun. 04, 2010
3	Microwave Pre_amplifier	Agilent	8449B	3008A01714	Apr. 20, 2010
4	Microflex Cable	N/A	N/A	1m	May. 20, 2010
5	Microflex Cable	AISI	S104-SMAP- 1	10m	Aug. 23, 2010
6	Microflex Cable	N/A	N/A	3m	Aug. 23, 2010
7	Test Cable	N/A	LMR-400	966_12m	Jun. 18, 2010
8	Test Cable	N/A	LMR-400	966_3m	Jun. 18, 2010
9	Pre-Amplifier	EMC	EMC-330	980001	Jun. 04, 2010
10	Log-Bicon Antenna	Schwarzbeck	VULB9168-3 52	9168-352	Jun. 17, 2010

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

4.1.3 TEST PROCEDURE

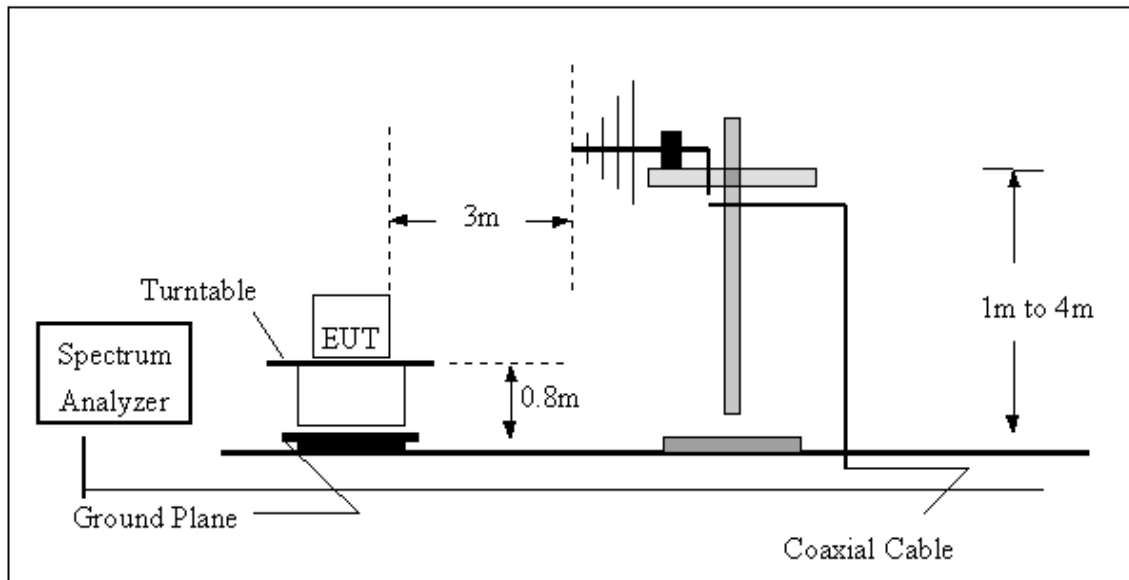
- The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m 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 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 EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.4 DEVIATION FROM TEST STANDARD

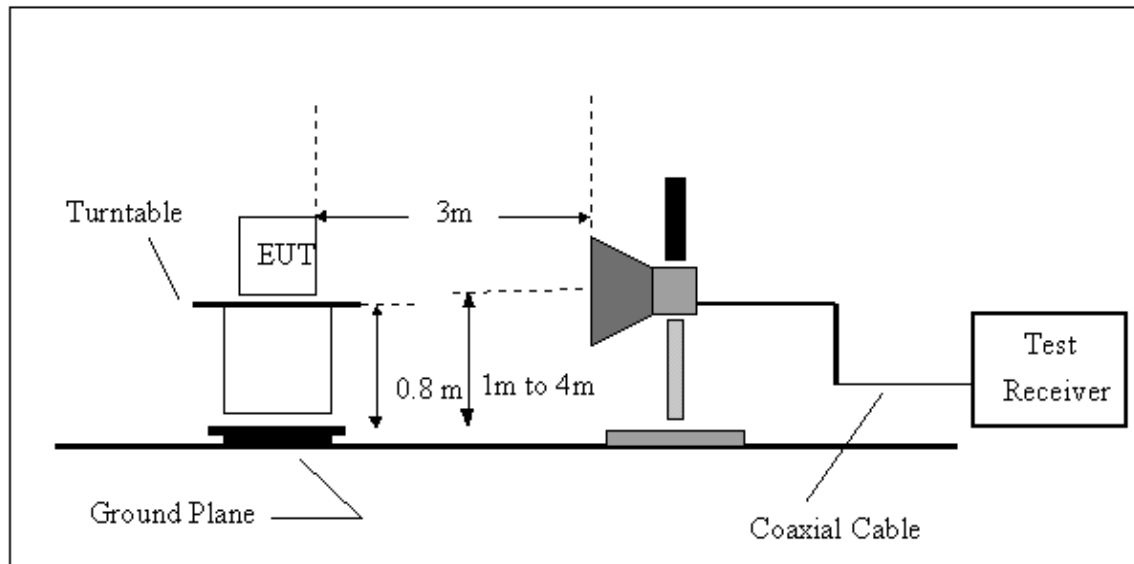
No deviation

4.1.5 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



4.1.6 EUT OPERATING CONDITIONS



4.1.7 TEST RESULTS (BETWEEN 30 – 1000 MHz)

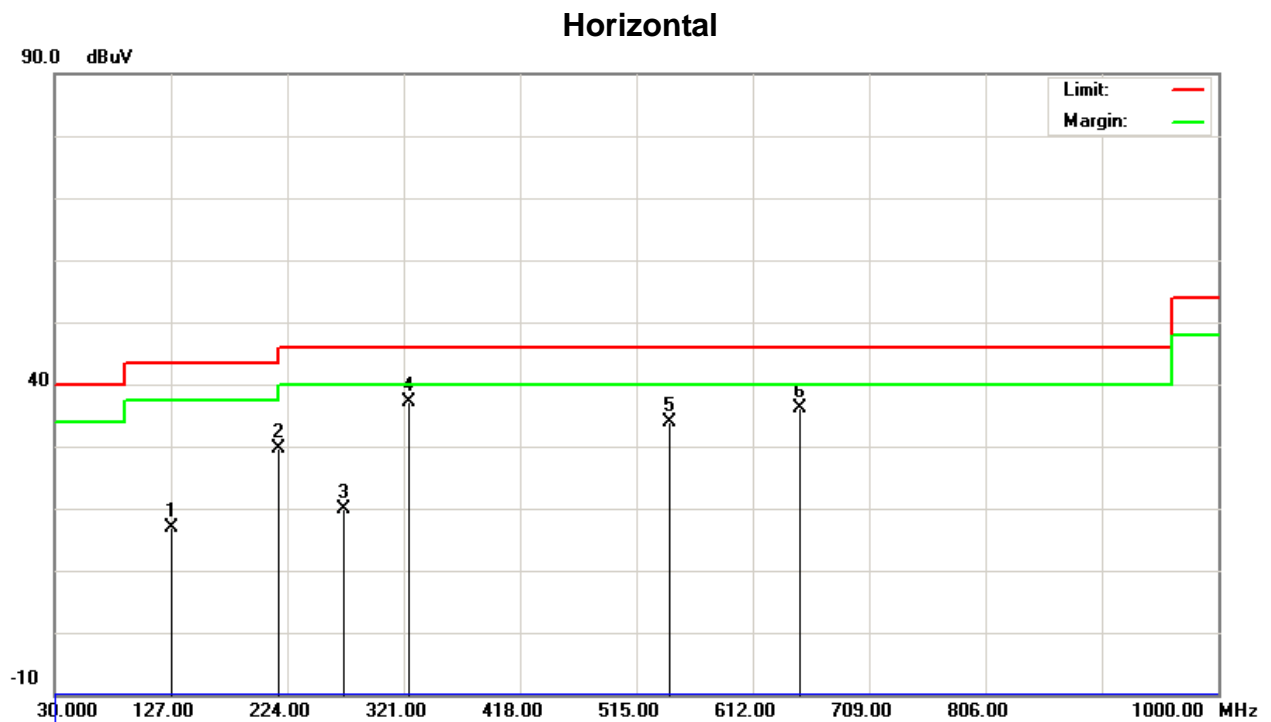
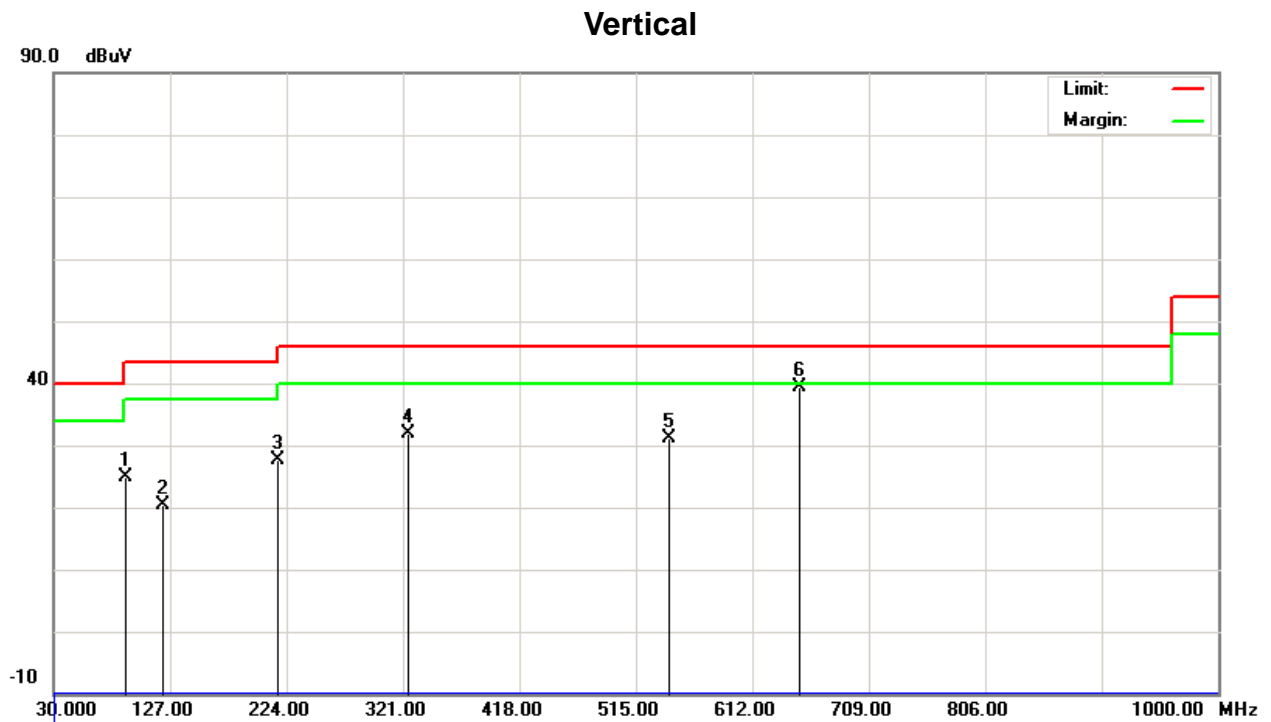
EUT :	Wireless LED Helmet Brake & Turn Signal Indicator	Model No. :	Snap-On Type, Slot-In Type
Temperature :	25 °C	Relative Humidity :	47%
Test Power :	DC 12V		
Test Mode :	TX 433MHz		

The following table lists worst case data from TX with various orthogonal planes on the EUT antenna.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit-3m (dBuV/m)	Safe Margins (dBuV/m)	Note
90.14	V	Peak	50.45	- 23.18	27.27	43.50	- 16.23	
148.34	V	Peak	40.50	- 18.22	22.28	43.50	- 21.22	
216.24	V	Peak	45.74	- 21.63	24.11	46.00	- 21.89	
324.88	V	Peak	51.86	- 18.39	33.47	46.00	- 12.53	
542.16	V	Peak	46.62	- 13.65	32.97	46.00	- 13.03	
650.80	V	Peak	50.43	- 11.64	38.79	46.00	- 7.21	
90.14	H	Peak	37.09	- 23.18	13.91	43.50	- 29.59	
216.24	H	Peak	51.56	- 21.63	29.93	46.00	- 16.07	
270.56	H	Peak	39.30	- 19.76	19.54	46.00	- 26.46	
324.88	H	Peak	54.86	- 18.39	36.47	46.00	- 9.53	
542.16	H	Peak	45.13	- 13.65	31.48	46.00	- 14.52	
650.80	H	Peak	49.55	- 11.64	37.91	46.00	- 8.09	

Remark :

- (1) Spectrum Setting:
 9 KHz – 150 KHz, RBW= 1 KHz, VBW=1 KHz, Sweep time = 200 ms.
 150 K Hz – 30 MHz, RBW= 9 KHz, VBW=9 KHz, Sweep time = 200 ms.
 30 MHz – 1000 MHz, RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (3) Measuring frequency range from 30MHz to 1000MHz ◦
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table ◦
- (5) The average value of fundamental frequency is:
 Average = Peak value + 20log(Duty cycle)
- (6) EUT Orthogonal Axes :
 "X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand





4.1.8 TEST RESULTS (BETWEEN 30 – 5000 MHz)

EUT :	Wireless LED Helmet Brake & Turn Signal Indicator	Model No. :	Snap-On Type, Slot-In Type
Temperature :	24 °C	Relative Humidity :	38%
Test Power :	DC 12V		
Test Mode :	TX 433MHz		
The following table lists worst case data from TX with various orthogonal planes on the EUT antenna.			
About the duty cycle correction factor calculated, please refer to the next page (Table-1).			

Freq. (MHz)	F/S	Ant. Pol. H/V	Reading (dBuV)	Ant./CL CF(dB)	Duty Cycle CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margins (dBuV/m)	Note
433.92	F	V	83.18	- 15.61	- 13.52	67.57	54.05	100.83	80.83	- 26.78	
867.83	S	V	53.65	- 8.61	- 13.52	45.04	31.52	80.83	60.83	- 29.31	
1296.00	S	V	53.97	- 6.29	- 13.52	47.68	34.16	74.00	54.00	- 19.84	
1736.00	S	V	53.15	- 4.69	- 13.52	48.46	34.94	74.00	54.00	- 19.06	
2600.00	S	V	55.32	- 2.22	- 13.52	53.10	39.58	74.00	54.00	- 14.42	
3472.00	S	V	59.87	- 0.46	- 13.52	59.41	45.89	74.00	54.00	- 8.11	
3912.00	S	V	48.12	1.03	- 13.52	49.15	35.63	74.00	54.00	- 18.37	
4344.00	S	V	47.00	2.29	- 13.52	49.29	35.77	80.83	60.83	- 25.06	

Remark :

- (1) Spectrum Setting:
9 KHz – 150 KHz, RBW= 1 KHz, VBW=1 KHz, Sweep time = 200 ms.
150 K Hz – 30 MHz, RBW= 9 KHz, VBW=9 KHz, Sweep time = 200 ms.
30 MHz – 1000 MHz, RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (3) Measuring frequency range from 30MHz to 5000MHz ◦ "F" denotes fundamental frequency; "S" denotes spurious Frequency ◦
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table ◦
- (5) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle)
- (6) EUT Orthogonal Axes :
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand



EUT :	Wireless LED Helmet Brake & Turn Signal Indicator	Model No. :	Snap-On Type, Slot-In Type
Temperature :	24 °C	Relative Humidity :	38%
Test Power :	DC 12V		
Test Mode :	TX 433MHz		
The following table lists worst case data from TX with various orthogonal planes on the EUT antenna.			
<i>About the duty cycle correction factor calculated, please refer to the next page (Table-1).</i>			

Freq. (MHz)	F/S	Ant. Pol. H/V	Reading (dBuV)	Ant./CL CF(dB)	Duty Cycle CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margins (dBuV/m)	Note
433.92	F	H	93.80	- 15.61	- 13.52	78.19	64.67	100.83	80.83	- 16.16	
867.83	S	H	58.57	- 8.61	- 13.52	49.96	36.44	80.83	60.83	- 24.39	
1296.00	S	H	50.43	- 6.29	- 13.52	44.14	30.62	74.00	54.00	- 23.38	
1736.00	S	H	57.38	- 4.69	- 13.52	52.69	39.17	74.00	54.00	- 14.83	
2600.00	S	H	57.59	- 2.22	- 13.52	55.37	41.85	74.00	54.00	- 12.15	
3040.00	S	H	45.51	- 1.94	- 13.52	43.57	30.05	74.00	54.00	- 23.95	
3472.00	S	H	60.60	- 0.46	- 13.52	60.14	46.62	74.00	54.00	- 7.38	
3912.00	S	H	45.26	1.03	- 13.52	46.29	32.77	80.83	60.83	- 28.06	

Remark :

- (1) Spectrum Setting:
9 KHz – 150 KHz, RBW= 1 KHz, VBW=1 KHz, Sweep time = 200 ms.
150 K Hz – 30 MHz, RBW= 9 KHz, VBW=9 KHz, Sweep time = 200 ms.
30 MHz – 1000 MHz, RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform ◦
- (3) Measuring frequency range from 30MHz to 5000MHz ◦ "F" denotes fundamental frequency; "S" denotes spurious Frequency ◦
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table ◦
- (5) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle)
- (6) EUT Orthogonal Axes :
"X" - denotes Laid on Table ; "Y" - denotes Vertical Stand ; "Z" - denotes Side Stand

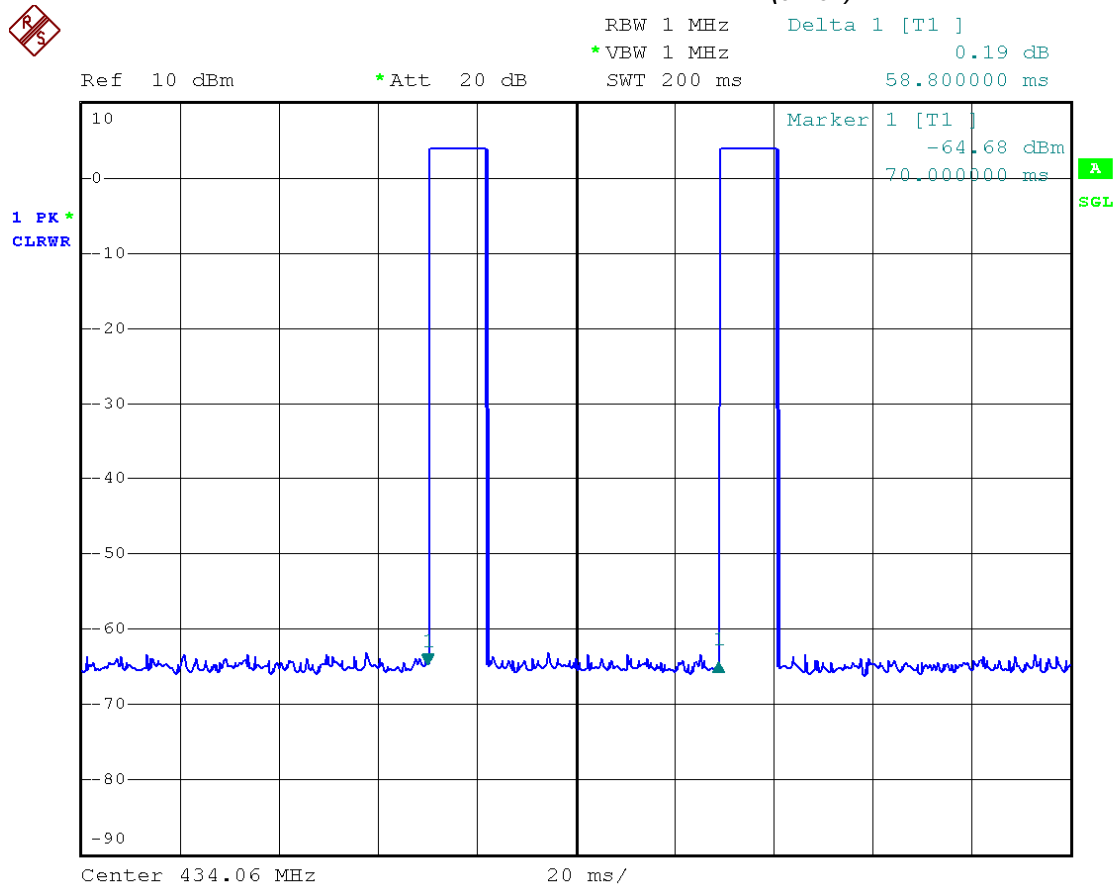


Table - 1

Duty Cycle Correction Factor Calculated			
EUT :	Wireless LED Helmet Brake & Turn Signal Indicator	Model No. :	Snap-On Type, Slot-In Type
Temperature :	15 °C	Relative Humidity :	58%
Test Power :	DC 12V		

Frequency (MHz)	Pulse Train $T_{(on+off)}$ (ms)	Total Duration of EUT at active state($T_{(on)}$) (ms)	Factor = $20 \log[T_{(on)} / T_{(on+off)}]$
433.92	12.4 ms	58.8 ms	-13.52 dB

Plot For Pulse Train: $T_{(on+off)}$

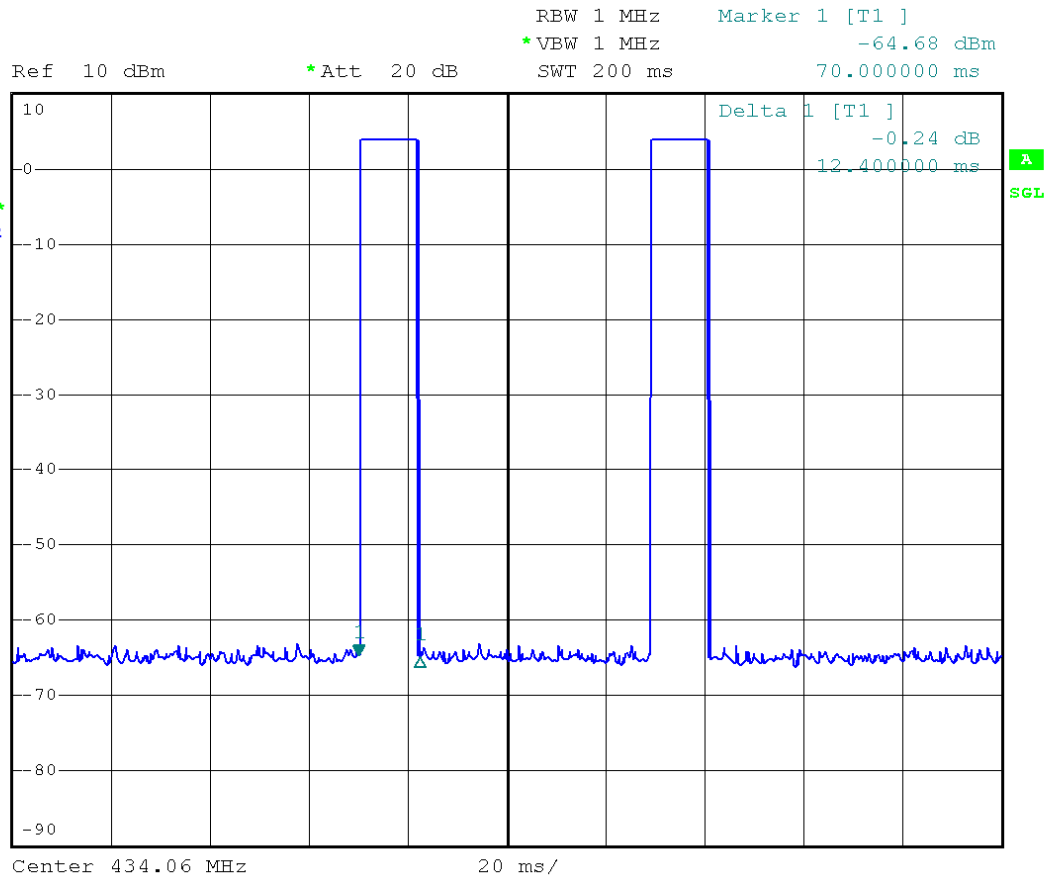




Plot For Total Duration of EUT at active state: $T_{(ON)}$



1 PK *
CLRWR





4.2 20dB OCCUPIED BANDWIDTH MEASUREMENT

4.2.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Sep. 10, 2010

Remark: " N/A" denotes No Model No. / Serial No. and No Calibration specified.

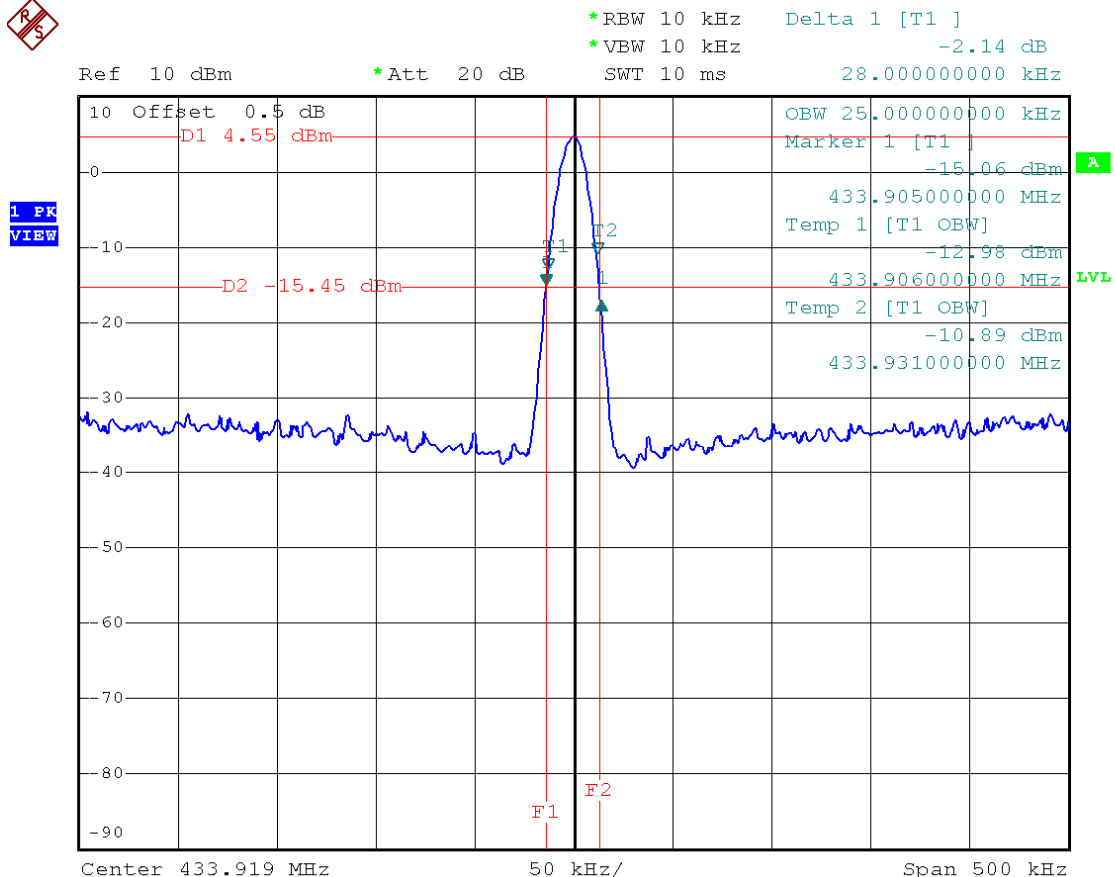
4.2.2 TEST RESULTS

EUT :	Wireless LED Helmet Brake & Turn Signal Indicator	Model No. :	Snap-On Type, Slot-In Type
Temperature :	15°C	Relative Humidity :	58%
Test Power :	DC 12V		
Test Mode :	TX 433MHz		

Frequency (MHz)	20dB Bandwidth (KHz)	99% Occupied BW (KHz)	Maximum Limit(KHz)	Result
433.9200	28.00	25.00	1084.8	PASS

Note:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for device operating above 70 MHz and below 900 MHz.





5. TIMING TESTING

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS

According to 15.231(a) (1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

5.1.2 MEASURING INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Sep. 10, 2010

5.1.3 TEST PROCEDURE

- The transmitter was used antenna to receive and measure the release time in peak hold mode.
- Spectrum Setting:
RBW= 100 KHz, VBW=100 KHz, Sweep time = 10 s.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in normal mode.



5.1.6 TEST RESULTS

EUT :	Wireless LED Helmet Brake & Turn Signal Indicator	Model No. :	Snap-On Type, Slot-In Type
Temperature :	15 °C	Relative Humidity :	58%
Test Power :	DC 12V		
Test Mode :	TX 433MHz		

Frequency (MHz)	Pulse Train T _(on+off) (ms)	Release Time (Second)	Result
433.9200	58.8 Note(1)	< 5 Note(2)	PASS

Note:

- (1) Please refer to **Section 4, Table 1: Duty Cycle Correction Factor Calculated** of the test report.
- (2) The EUT is a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

