FCC Test Report

Product Name	Keyless Entry and Start System
Model No.	MQB-B H
FCC ID.	NBGMQBBH

Applicant	Hella KGaA Hueck & Co.
Address	Rixbecker Strasse 75, D-59552 Lippstadt, Germany

Date of Receipt	Jan. 10, 2014
Issued Date	Feb. 19, 2014
Report No.	1410276R-RFUSP20V00
Report Version	V1.0

Testing Laboratory
0914

Test Report Certification

Issued Date: Feb. 19, 2014

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Product Name	Keyless Entry and Start System
Applicant	Hella KGaA Hueck & Co.
Address	Rixbecker Strasse 75, D-59552 Lippstadt, Germany
Manufacturer	Hella KGaA Hueck & Co.
Model No.	MQB-B H
FCC ID.	NBGMQBBH
EUT Rated Voltage	DC 12V (Power by Battery)
EUT Test Voltage	DC 12V (Power by Battery)
Trade Name	HELLA
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.10: 2009
Test Result	Complied

The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

This report must not be used to claim product endorsement by TAF any agency of the U.S. Government

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Approved By :

(Director / Vincent Lin)

TABLE OF CONTENTS

Description Page

1. GENERAL INFORMATION 4

1.1. EUT Description 4
1.2. Operational Description 5
1.3. Test System Details 6
1.4. Configuration of Test System 6
1.5. EUT Exercise Software 6
1.6. Test Facility 7

2. Radiated Emission 8

2.1. Test Equipment 8
2.2. Test Setup 8
2.3. Limits 9
2.4. Test Procedure 10
2.5. Uncertainty 10
2.6. Test Result of Radiated Emission 11

3. EMI Reduction Method During Compliance Testing 14

Attachment 1: EUT Test Photographs
Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Keyless Entry and Start System
Trade Name	HELLA
Model No.	MQB-B H
FCC ID.	NBGMQBBH
Frequency Range	125kHz
Type of Modulation	ASK
Type of antenna	Coil
Number of Channel	1

Center Frequency of Each Channel:

Channel	Frequency
1	125 kHz

Note:
1. The EUT is a Keyless Entry and Start System with a built-in 125kHz transmitter.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.209
3. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmit

1.2. Operational Description

The EUT is Keyless Entry and Start System with a built-in 125kHz transmitter. The operation frequency is from 125kHz. The signal will be transmitted through 125kHz RF signal from the Induction coil. DC 12V (Power by Battery) shall be provided for EUT operation.

Keyless Entry and Start System are the consequent development of well-known Remote Keyless Entry Systems(RKE), the usage of the key fob with button pressing is still possible, but not necessary anymore to enter the vehicle or to start it.

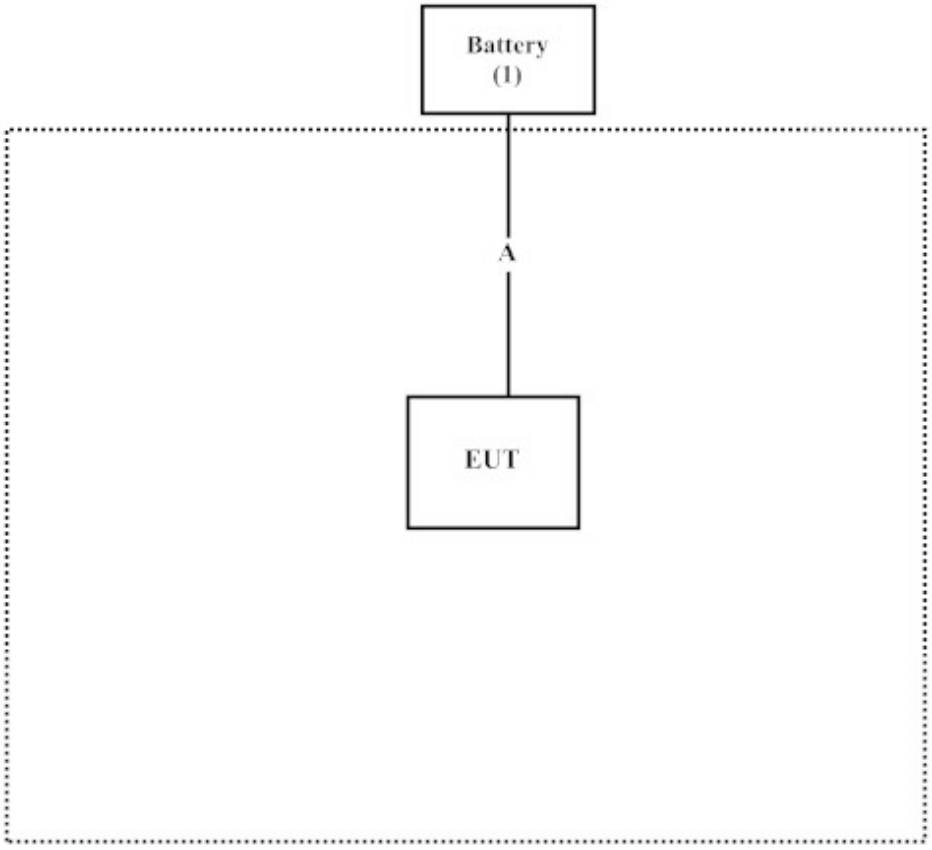
1.3. Test System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
(1)	DC 12V Battery	TRANE	12B50PE	N/A	N/A

Signal Cable Type		Signal cable Description
A	Power Cable	Non-shielded, 1.8m

1.4. Configuration of Test System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in section 1.4.

(2) Provide the DC Power Source, start continuous transmit

(3) Verify that the EUT works correctly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : http://tw.quietek.com/tw/emc/accreditations/accreditations.htm
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : http://www.quietek.com/

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Radiated Emission

2.1. Test Equipment

The following test equipment are used during the radiated emission test:

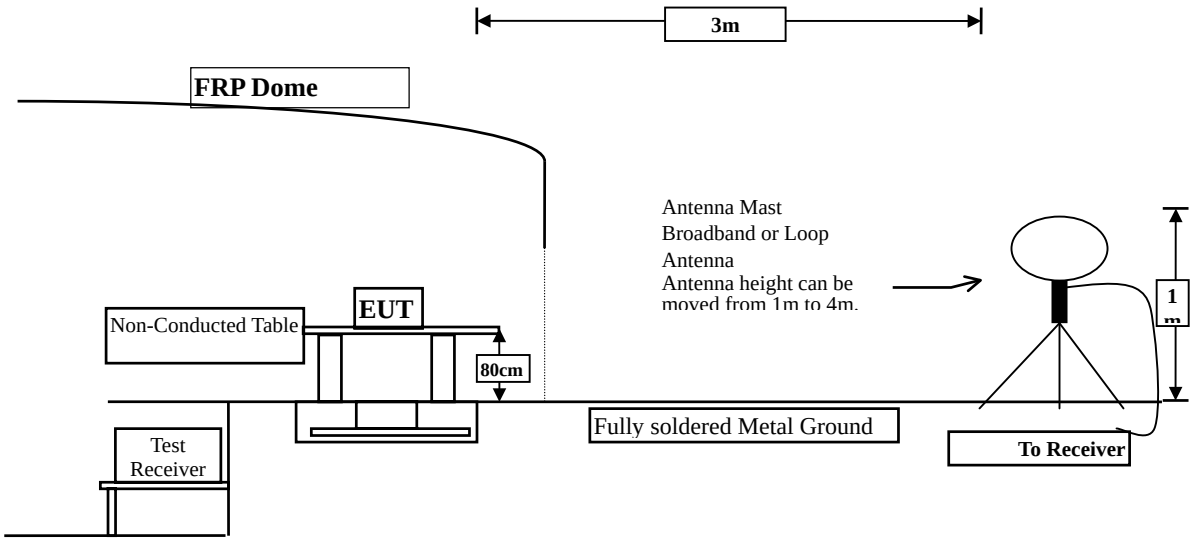
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2013
		Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2013
		Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2014
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

Note: 1. All equipments are calibrated every one year.

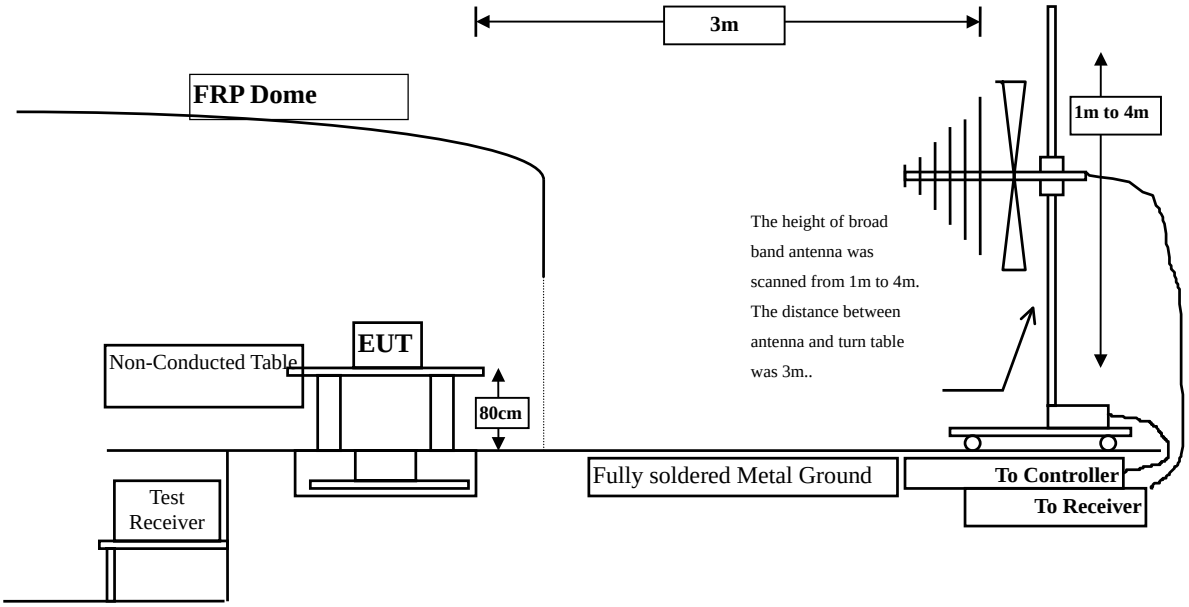
2. The test equipments marked by “X” are used to measure the final test results.

2.2. Test Setup

Under 30MHz Test Setup



Radiated Emission Below 1GHz



2.3. Limits

FCC Part 15 Subpart B Paragraph 15.209 Limits		
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2,400/F(kHz)	300
0.490– 1.705	24,000/F(kHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Remarks : 1. RF Voltage (dBμv) = 20 log RF Voltage (μv)

2. Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

2.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz. Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

2.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

2.6. Test Result of Radiated Emission

Product : Keyless Entry and Start System
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμv	dBμv/m	dB	dBμv/m
X-axis					
Peak					
Horizontal					
0.125	19.950	75.100	95.050	-30.616	125.666
Vertical					
0.125	19.950	69.700	89.650	-36.016	125.666
Y-axis					
Peak					
Horizontal					
0.125	19.950	63.000	82.950	-42.716	125.666
Vertical					
0.125	19.950	49.900	69.850	-55.816	125.666
Z-axis					
Peak					
Horizontal					
0.125	19.950	73.500	93.450	-32.216	125.666
Vertical					
0.125	19.950	69.600	89.550	-36.116	125.666

Note:

1. Limit=25.666dBμv/m + 40*Log (300(m)/3(m))=105.666dBμv/m(Average detector), 125.666666dBμv/m (Peak detector)
2. All Readings below 1GHz are Quasi-Peak, above are average value.
3. Measurement Level = Reading Level + Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Keyless Entry and Start System
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

9kHz~30MHz

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμv	dBμv/m	dB	dBμv/m
Quasi-Peak					
Horizontal					
0.250	20.000	37.900	57.900	-41.745	99.645
0.375	19.900	34.200	54.100	-42.024	96.124
0.500	19.897	26.800	46.697	-26.928	73.625
0.625	19.840	20.000	39.840	-31.847	71.687
0.750	19.800	19.500	39.300	-30.803	70.103
0.875	19.800	13.900	33.700	-35.064	68.764
1.000	19.800	9.700	29.500	-38.104	67.604
1.125	19.822	8.600	28.422	-38.159	66.581
1.250	19.850	11.200	31.050	-34.616	65.666
Vertical					
0.250	20.000	41.600	61.600	-38.045	99.645
0.375	19.900	33.500	53.400	-42.724	96.124
0.500	19.897	27.700	47.597	-26.028	73.625
0.625	19.840	18.800	38.640	-33.047	71.687
0.750	19.800	16.600	36.400	-33.703	70.103
0.875	19.800	14.400	34.200	-34.564	68.764
1.000	19.800	9.900	29.700	-37.904	67.604
1.125	19.822	8.500	28.322	-38.259	66.581
1.250	19.850	9.300	29.150	-36.516	65.666

Note:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement Level = Reading Level + Correct Factor.
3. “ ” means the worst emission level.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Keyless Entry and Start System
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

30MHz~1GHz

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBμv	dBμv/m	dB	dBμv/m
Horizontal					
99.952	-15.301	38.476	23.175	-20.325	43.500
224.311	-20.048	46.984	26.936	-19.064	46.000
390.641	-12.022	39.335	27.313	-18.687	46.000
622.260	-6.336	39.503	33.167	-12.833	46.000
780.817	-5.979	39.405	33.426	-12.574	46.000
973.574	-5.452	42.452	37.000	-17.000	54.000
Vertical					
45.030	-19.902	49.700	29.798	-10.202	40.000
224.311	-12.743	42.686	29.943	-16.057	46.000
378.205	-13.722	38.990	25.268	-20.732	46.000
546.090	-10.848	38.584	27.736	-18.264	46.000
687.548	-8.961	38.886	29.925	-16.075	46.000
847.660	-6.322	37.847	31.525	-14.475	46.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
2. “ ” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

3. EMI Reduction Method During Compliance Testing

No modification was made during testing.