

# FCC Test Report

Product Name	Keyless Entry and Start System
Model No.	MQB-B B
FCC ID.	NBGMQB BBB

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

Date of Receipt	Jan. 13, 2014
Issued Date	Feb. 19, 2014
Report No.	1410290R-RFUSP20V00
Report Version	V1.0



The Test Results relate only to the samples tested.

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

# Test Report Certification

Issued Date: Feb. 19, 2014

Report No.: 1410290R-RFUSP20V00



Product Name	Keyless Entry and Start System
Applicant	Hella KGaA Hueck & Co.
Address	Rixbecker Strass 75, D-59552 Lippstadt, Germany
Manufacturer	Hella KGaA Hueck & Co.
Model No.	MQB-B B
FCC ID.	NBGMQBBB
EUT Rated Voltage	DC12V (Power by Battery)
EUT Test Voltage	DC12V (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.

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

Documented By

A handwritten signature in blue ink that reads 'Genie Chang'.

( Senior Adm. Specialist / Genie Chang )

Tested By

A handwritten signature in blue ink that reads 'Jack Hsu'.

( Engineer / Jack Hsu )

Approved By

A handwritten signature in black ink that reads 'Vincent Lin'.

( Director / Vincent Lin )

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**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 B
FCC ID.	NBGMQBBB
Frequency Range	125kHz
Type of Modulation	ASK
Type of antenna	Coil
Number of Channel	1

Frequency of Each Channel:

Channel      Frequency

1              125kHz

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
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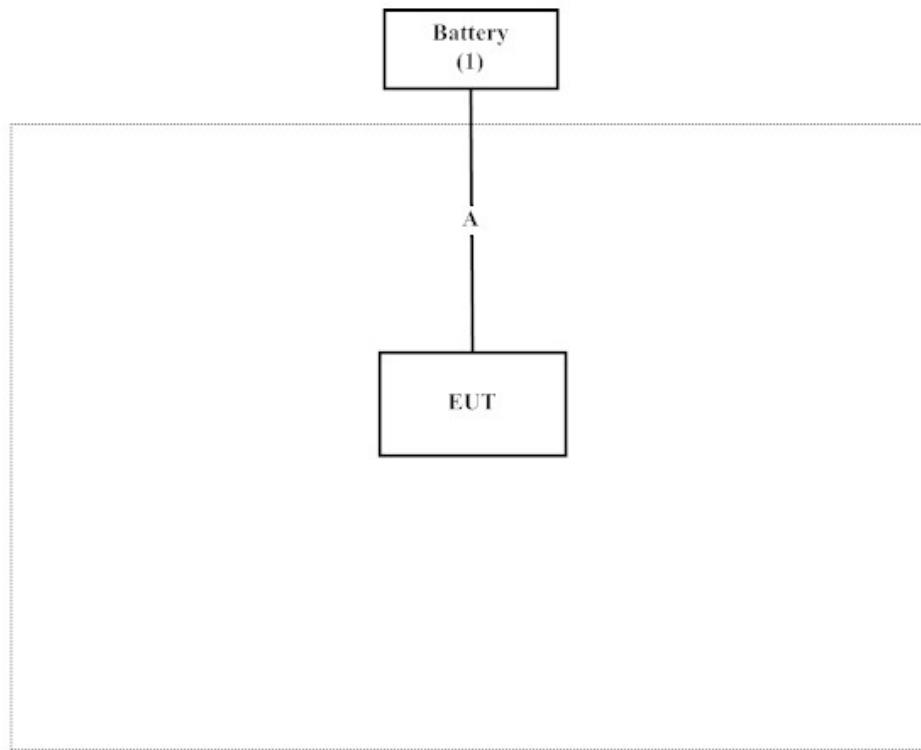
### 1.3. Test System Details

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://www.quietek.com/tw/ctg/cts/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, Ruishukeng,  
Linkou Dist. New Taipei City 24451,  
Taiwan, R.O.C.  
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E-Mail : [service@quietek.com](mailto:service@quietek.com)

FCC Accreditation Number: TW1014

## 2. Radiated Emission

### 2.1. Test Equipment

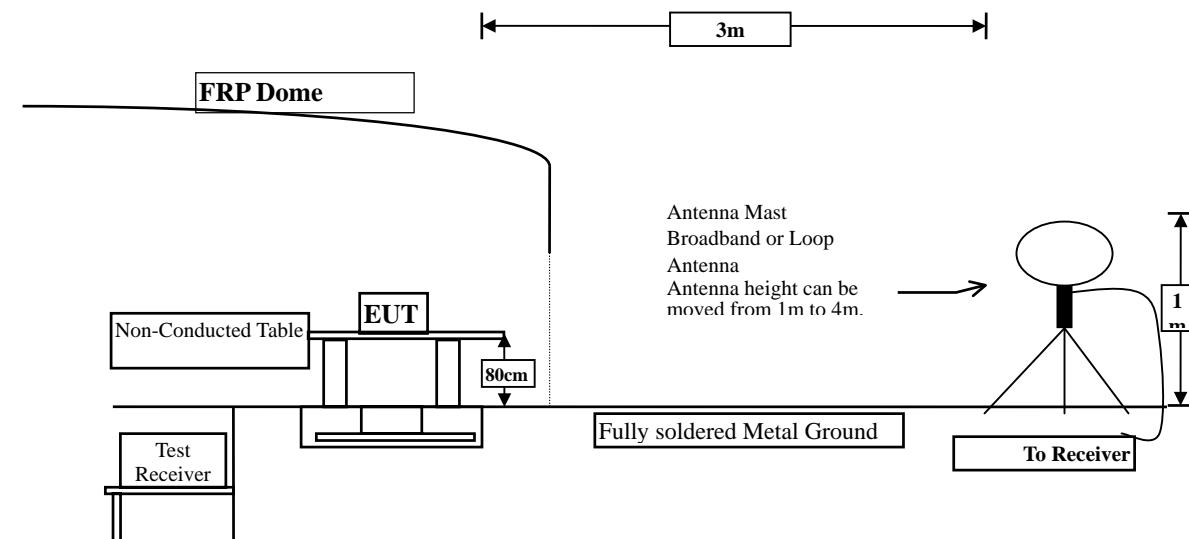
The following test equipment are used during the radiated emission test:

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	

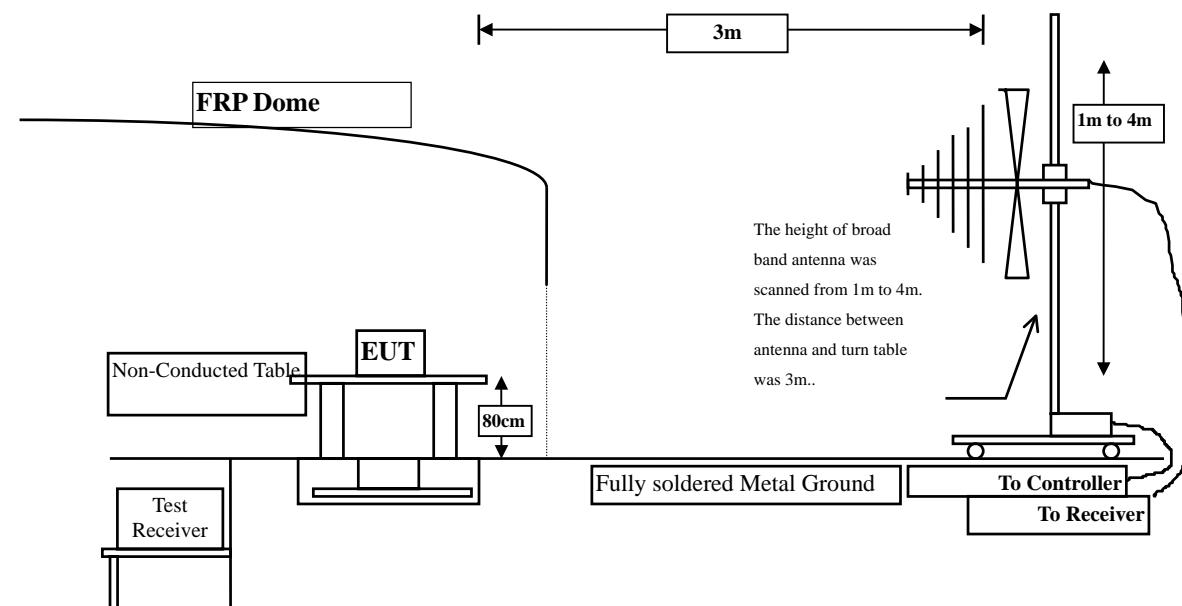
- Note:
1. All equipments are calibrated every one year.
  2. The test equipments marked by “X” are used to measure the final test results.

### 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 (dB $\mu$ V) = 20 log RF Voltage ( $\mu$ V)
  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 from 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 : Fundamental Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>X-axis</b>					
<b>Horizontal</b>					
0.125	19.950	75.130	95.080	-30.586	125.666
<b>Vertical</b>					
0.125	19.950	71.200	91.150	-34.516	125.666
<b>Y-axis</b>					
<b>Horizontal</b>					
0.125	19.950	63.140	83.090	-42.576	125.666
<b>Vertical</b>					
0.125	19.950	50.300	70.250	-55.416	125.666
<b>Z-axis</b>					
<b>Horizontal</b>					
0.125	19.950	74.100	94.050	-31.616	125.666
<b>Vertical</b>					
0.125	19.950	70.200	90.150	-35.516	125.666

Note:

1. Limit=25.666dB $\mu$ V/m + 40\*Log (300(m)/3(m))=105.666dB $\mu$ V/m(Average detector),  
125.666666dB $\mu$ V/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 : Fundamental Radiated Emission  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmit

**9kHz~30MHz**

Frequency MHz	Correct Factor	Reading dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m

**Quasi-Peak**
**Horizontal**

0.250	20.000	37.300	57.300	-42.345	99.645
0.375	19.900	33.000	52.900	-43.224	96.124
0.500	19.897	24.700	44.597	-29.028	73.625
0.625	19.840	19.900	39.740	-31.947	71.687
0.750	19.800	18.200	38.000	-32.103	70.103
0.875	19.800	14.100	33.900	-34.864	68.764
1.000	19.800	11.800	31.600	-36.004	67.604
1.125	19.822	9.100	28.922	-37.659	66.581
1.250	19.850	13.800	33.650	-32.016	65.666

**Vertical**

0.250	20.000	35.500	55.500	-44.145	99.645
0.375	19.900	33.500	53.400	-42.724	96.124
0.500	19.897	31.810	51.707	-21.918	73.625
0.625	19.840	19.400	39.240	-32.447	71.687
0.750	19.800	16.900	36.700	-33.403	70.103
0.875	19.800	10.400	30.200	-38.564	68.764
1.000	19.800	11.000	30.800	-36.804	67.604
1.125	19.822	8.600	28.422	-38.159	66.581
1.250	19.850	12.600	32.450	-33.216	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 MHz	Correct Factor	Reading Level dB $\mu$ V	Measurement Level dB $\mu$ V/m	Margin dB	Limit dB $\mu$ V/m
	dB	dB $\mu$ V	dB $\mu$ V/m	dB	dB $\mu$ V/m
<b>Horizontal</b>					
99.952	-15.301	38.584	23.283	-20.217	43.500
256.955	-18.050	39.447	21.397	-24.603	46.000
448.157	-11.101	41.594	30.475	-15.525	46.000
595.833	-6.277	38.887	32.610	-13.390	46.000
776.154	-6.046	38.615	32.570	-13.430	46.000
909.840	-6.039	42.111	36.072	-9.928	46.000
<b>Vertical</b>					
101.506	-15.574	38.916	23.342	-20.158	43.500
174.567	-16.294	39.063	22.769	-20.731	43.500
336.234	-16.691	38.661	21.970	-24.030	46.000
476.138	-12.080	38.301	26.239	-19.761	46.000
606.715	-9.404	37.762	28.358	-17.642	46.000
790.144	-7.703	39.334	31.631	-14.369	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.

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### 3. EMI Reduction Method During Compliance Testing

No modification was made during testing.