FCC/IC TEST REPORT

Test report No.: **EMC- FCC- R0105**

FCC ID: **SY5SMK30**

IC ID: **8325A-SMK30**

Type of equipment: **Smart Key ECU**

Basic Model: **SMK 3.0**

Varient Model: **-**

Applicant: **Continental Automotive Systems Corporation**

FCC Rule Part(s): **FCC Part 15 Subpart C 2008**
Section 15.209
IC RSS-210, Issue 8 : 2010

Frequency Range: **125 kHz**

Test result: **Complied**

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations.
The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Date of test: March 25, 2013 ~ March 27, 2013

Issued date: March 29, 2013

Tested by: SON, MIN GI

Approved by: KIM, CHANG MIN .

[Contents]

1. Client information

Applicant : Continental Automotive Systems Corporation
Address : 29, Siemens-Road, Icheon-City, Gyeonggi-Do, 467-080, Korea
Telephone number : +82-31-645-4864
Facsimile number : +82-31-637-0371
Contact person : SungMin Jang

Manufacturer: Continental Automotive Systems Corporation
Address : 29, Siemens-Road, Icheon-City, Gyeonggi-Do, 467-080, Korea

2. Laboratory information

Address
EMC Compliance Ltd.
480-5 Shin-dong, Yeongtong-gu, Suwon-city, Gyunggi-do, 443-390, Korea
Telephone Number: 82 31 336 9919 Facsimile Number: 82 31 336 4767

Certificate
CBTL Testing Laboratory, KOLAS NO.: 231
FCC Filing No.: 508785
VCCI Registration No.: C-1713, R-1606, T-258

SITE MAP

3. Description of E.U.T.

3.1 Basic description

Applicant :	Continental Automotive Systems Corporation
Address of Applicant:	29, Siemens-Road, Icheon-City, Gyeonggi-Do, 467-080, Korea
Manufacturer:	Continental Automotive Systems Corporation
Address of Manufacturer:	29, Siemens-Road, Icheon-City, Gyeonggi-Do, 467-080, Korea
Type of equipment:	Smart Key ECU
Basic Model:	SMK 3.0
Varient model:	-
Serial number:	Engineering Sample

3.2 General description

Frequency	125 kHz
Type of Modulation	ASK
Number of Channels	1 channel
Type of Antenna	Integral
Power supply	DC 12 V
Operating temperature	-20 ℃ ~ 50 ℃
Operating Humidity	10% to 90% relative humidity non-condensing
Dimension	166 mm X 128 mm X 38 mm (WxHxD)

3.3 Test frequency

	Frequency
Low frequency	**-**
Middle frequency	**125 kHz**
High frequency	**-**

4. Summary of test results

4.1 Standards & results

Rule Reference	Parameter	Report Section	Test Result
15.203	Antenna Requirement	5.1	C
15.209	Field Strength of Fundamental	5.2	C
15.209	Radiated Emissions	5.3	C
RSS-Gen, Issue 3,6	Receiver Spurious Emission (Radiated)	5.4	C
15.207	Conducted Emissions	5.5	N/A*
N/A	Occupied bandwidth	5.6	C

Note: C=complies
NC= Not complies
NT=Not tested
NA=Not Applicable

*The test is not applicable since the EUT is not the device that is designed to be connected to the public utility(AC) power line.

4.2 Uncertainty

Measurement Item	Combined Standard Uncertainty Uc	Expanded Uncertainty U = KUc (K = 2)
Conducted RF power	**± 0.29 dB**	**± 0.58 dB**
Radiated disturbance	**+ 2.97 dB / - 2.975 dB**	**+ 5.94 dB / - 5.95 dB**
Conducted disturbance	9 ~ 150 ㎑: **± 1.975 [dB]** 150 ㎑ ~ 30 ㎒: **± 1.775 [dB]**	9 ㎑ ~ 150 ㎑: **± 3.95 [dB]** 150 ㎑ ~ 30 ㎒: **± 3.55 [dB]**

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5. Test results

5.1 Antenna Requirement

5.1.1 Regulation

According to §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 shall be considered sufficient to comply with the provisions of this Section. 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.

And according to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

5.1.2 Result

-Complied

The transmitter has an integral antenna.

5.2 Field Strength of Fundamental Emissions

5.2.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Field strength (μV/m @ 3m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

**Except as provided in paragraph(g).fundamental emissions from intentional radiators operating under the section shall not be located in the frequency bands 54-72MHz. 76-88MHz. 174-216MHz or 470-806MHz. however. Operation within these frequency bands is permitted under other sections of this part. e.g.,
Section 15.231 and 15.241.

**Limit : 2400/135=17.78uV/m @ 300m
Distance Correction Factor = 40log(test distance /specific distance)

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5.2.2 Measurement Procedure

Test Procedure The Radiated Electric Field Strength intensity has been measured on semi anechoic chamber with a ground plane and at a distance of 3m.

Frequency : From 9kHz to 30MHz at distance 3m The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

Frequency : From 30MHz to 1GHz at distance 3m The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified. The specifications for the measuring instrument using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Interference (CISPR) of the International Electrotechnical Commission. As an alternative to CISPR quasi-peak measurements, the responsible party, at its option, may demonstrate compliance with the emission limits using measuring equipment employing a peak detector function, properly adjusted for such factors as pulse desensitization, as long as the same bandwidths as indicated for CISPR quasi-peak measurements are employed.(15.35(a))

below 1GHz : quasi-peak

* Part 15 Section 15.31 (f)(2) (9kHz-30MHz)
[Limit at 3m]=[Limit at 300m]-40 x log(3[m]/300[m])
[Limit at 3m]=[Limit at 30m]-40 x log (3[m]/30[m])

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5.2.3 Test Result

-Complied

ANT1 _INT1
Measurement Distance: 3m

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
0.125	0.2	88.5	H	-25.4	105.67	63.1	42.57

*worstcase Horizontal

ANT2 _INT2
Measurement Distance: 3m

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
0.125	0.2	88.1	H	-25.4	105.67	62.7	42.97

*worstcase vertical

ANT3 _Bumper
Measurement Distance: 3m

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
0.125	0.2	85.7	H	-25.4	105.67	60.3	45.37

*worstcase Horizontal

ANT4 _Immo
Measurement Distance: 3m

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
0.125	0.2	70.66	H	-25.4	105.67	45.2	60.47

*worstcase Horizontal

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ANT5 _DRV
Measurement Distance: 3m

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
0.125	0.2	88.3	H	-25.4	105.67	62.9	42.77

*worstcase Horizontal

ANT6 _AST
Measurement Distance: 3m

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
0.125	0.2	88.7	H	-25.4	105.67	63.3	42.37

*worstcase vertical

ANT7 _Reav
Measurement Distance: 3m

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
0.125	0.2	82.2	H	-25.4	105.67	56.8	48.47

*worstcase Horizontal

Margin (dB) = Limit – Actual
[Resultl = Reading – Amp Gain + Attenuator + AF + CL]
1. H = Horizontal, V = Vertical Polarization
2. ATT = Attenuation (10dB pad and/or Insertion Loss of HPF), AF/CL = Antenna Factor and Cable Loss

* The spurious emission at the frequency does not fall in the restricted bands.
** The measured result is within the test standard limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95 % level of confidence. However, the result indicates that compliance is more probable than non-compliance.

NOTE: All emissions not reported were more than 20 dB below the specified limit or in the noise floor.

5.3 Radiated Emissions

5.3.1 Regulation

According to §15.209(a), for an intentional device, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Field strength (μV/m @ 3m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30–88	100**	3
88–216	150**	3
216–960	200**	3
Above 960	500	3

**Except as provided in paragraph(g).fundamental emissions from intentional radiators operating under the section shall not be located in the frequency bands 54-72MHz. 76-88MHz. 174-216MHz or 470-806MHz. however. Operation within these frequency bands is permitted under other sections of this part. e.g.,
Section 15.231 and 15.241.

**Limit : 2400/135=17.78uV/m @ 300m
Distance Correction Factor = 40log(test distance /specific distance)

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5.3.2 Measurement Procedure

The spurious emissions from the EuT will be measured on an open area test site in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna.
The antenna was positioned 3, 10 or 30 meters horizontally from the EuT.
Measurements have been made in all three orthogonal axes and the shielded loop antenna was rotated to locate the maximum of the emissions.
In the case where larger measuring distances are required the results will extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2].

The final measurement will be performed with an EMI Receiver set to Quasi Peak detector except for the frequency bands 9 kHz to 90 kHz and 110 to 490 kHz where an average detector will be used according to Section 15.209 (d) [2].

The final level, expressed in dBµV/m, is arrived at by taking the reading from the EMI receiver (Level dBµV) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has to be compared with the relevant FCC limit. The resolution bandwidth during the measurement is as follows:
9 kHz – 150 kHz: ResBW: 200 Hz
150 kHz – 30 MHz: ResBW: 9 kHz

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5.3.3 Test Result

-Complied

ANT1_INT1
Measurement Distance: 3m
-Below 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
Below 30MHz	Not detected	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
36.256	120	33.1	V	-15.2	40.0	17.9	22.1
60.366	120	25.8	H	-14.4	40.0	11.4	28.6
67.951	120	22.3	H	-15.4	40.0	6.9	33.1
85.654	120	30.9	H	-19	40.0	11.9	28.1
134.760	120	27.2	V	-14.5	43.5	12.7	30.8

Margin (dB) = Limit – Actual
[Resultl = Reading – Amp Gain + Attenuator + AF + CL]
1. H = Horizontal, V = Vertical Polarization
2. ATT = Attenuation (10dB pad and/or Insertion Loss of HPF), AF/CL = Antenna Factor and Cable Loss

* The spurious emission at the frequency does not fall in the restricted bands.
** The measured result is within the test standard limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on the 95 % level of confidence. However, the result indicates that compliance is more probable than non-compliance.

NOTE: All emissions not reported were more than 20 dB below the specified limit or in the noise floor.

ANT2_INT2
Measurement Distance: 3m
-Below 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
Below 30MHz	Not detected	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
45.399	120	25.0	V	-14.2	40.0	10.8	29.2
66.860	120	32.3	V	-15.2	40.0	17.1	22.9
86.260	120	30.7	V	-19.1	40.0	11.6	28.4
167.013	120	26.2	V	-13.5	43.5	12.7	30.8

ANT3_Bumper
Measurement Distance: 3m
-Below 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
Below 30MHz	Not detected	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
36.184	120	34.9	V	-15.2	40.0	19.7	20.3
64.799	120	22.1	V	-14.9	40.0	7.2	32.8
86.745	120	29.5	V	-19.2	40.0	10.3	29.7
150.038	120	27.2	V	-13.6	43.5	13.6	29.9
163.133	120	26.0	V	-13.4	43.5	12.6	30.9
402.844	120	22.0	V	-9.4	46.0	12.6	33.4

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ANT4_Immo
Measurement Distance: 3m
-Below 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
Below 30MHz	Not detected	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
41.276	120	24.4	V	-14.6	40.0	9.8	30.2
69.164	120	26.0	V	-15.6	40.0	10.4	29.6
85.896	120	30.5	V	-19.0	40.0	11.5	28.5
126.742	120	29.3	V	-15.2	43.5	14.1	29.4
169.680	120	25.7	V	-13.7	43.5	12.0	31.5

ANT5_DRV
Measurement Distance: 3m
-Below 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
Below 30MHz	Not detected	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
36.274	120	38.3	V	-15.2	40.0	23.1	16.9
84.078	120	22.0	V	-18.7	40.0	3.3	36.7
117.664	120	25.5	V	-16.1	43.5	9.4	34.1
165.436	120	26.3	V	-13.5	43.5	12.8	30.7
191.505	120	22.2	V	-15.8	43.5	6.4	37.1
313.361	120	22.9	V	-11.6	46.0	11.3	34.7

ANT6_AST
Measurement Distance: 3m
-Below 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
Below 30MHz	Not detected	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
36.184	120	31.0	V	-15.2	40.0	15.8	24.2
87.594	120	31.2	V	-19.3	40.0	11.9	28.1
162.041	120	23.1	V	-13.4	43.5	9.7	33.8
192.718	120	30.1	V	-15.9	43.5	14.2	29.3
339.066	120	22.5	V	-11.0	46.0	11.5	34.5

ANT7_Reav
Measurement Distance: 3m
-Below 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
Below 30MHz	Not detected	-	-	-	-	-	-

-Above 30MHz

Frequency [MHz]	Receiver Bandwidth [kHz]	Reading [dB(μV)]	Pol. [V/H]	Factor [dB]	Limit [dB(μV/m)]	Result [dB(μV/m)]	Margin [dB]
QP DATA.							
36.184	120	38.1	V	-15.2	40.0	22.9	17.1
88.200	120	26.2	H	-19.3	43.5	6.9	36.6
125.788	120	30.1	V	-15.2	43.5	14.9	28.6
151.614	120	22.3	V	-13.6	43.5	8.7	34.8
220.363	120	28.7	V	-15.6	46.0	13.1	32.9

5.4 Receiver Spurious Emission(Radiated)-N/A

5.4.1 Regulation

According to § RSS-Gen, Issue 3, 6
Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table: 2

Frequency (MHz)	Field Strength (microvolts/m at 3 meters)
30 – 88	100
88 – 216	150
216 -960	200
Above 960	500

5.4.2 Measurement Procedure

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. During performing radiated emission below 1 ㎓, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 ㎓, the EUT was set 3 meter away from the interference-receiving antenna.

c. The antenna is a broadband antenna, and its 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.

d. 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 table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

5.4.3 Test Result

- N/A

5.5 Conducted Emission- N/A

5.5.1 Regulation

According to §15.207(a), for an intentional radiator that is designed to be connected tothe public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Qausi-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.

According to §15.107(a), for unintentional device, except for Class A digital devices, line conducted emission limits are the same as the above table.

5.4.2 Measurement Procedure

1. The EUT was placed on a wooden table of size, 1 m by 1.5 m, raised 80 cm in which is located 40 cm away from the vertical wall and 1.5m away from the side wall of the shielded room.
2. Each current-carrying conductor of the EUT power cord was individually connected through a 50Ω/50μH LISN, which is an input transducer to a Spectrum Analyzer or an EMI/Field Intensity Meter, to the input power source.
3. Exploratory measurements were made to identify the frequency of the emission that had the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable position, and with a typical system equipment configuration and arrangement. Based on the exploratory tests of the EUT, the one EUT cable configuration and arrangement and mode of operation that had produced the emission with the highest amplitude relative to the limit was selected for the final measurement.
4. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment is the system) was then performed over the frequency range of 0.15 MHz to 30 MHz.
5. The measurements were made with the detector set to PEAK amplitude within a bandwidth of 10 kHz or to QUASI-PEAK and AVERAGE within a bandwidth of 9 kHz. The EUT was in transmitting mode during the measurements.

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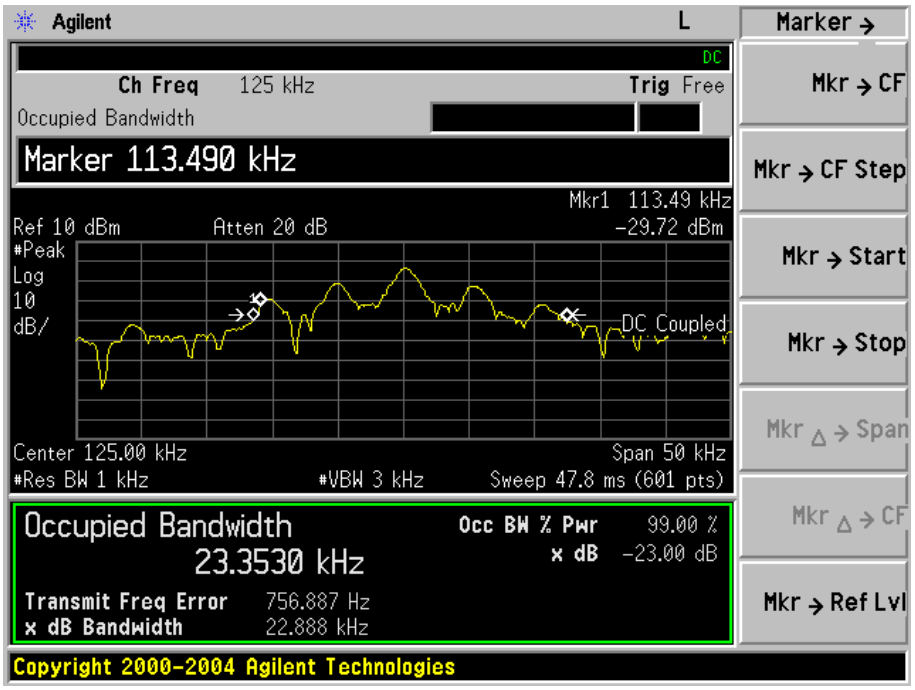
5.6 Occupied bandwidth

5.6.1 Test Result

-Complied

ANT1_INT1



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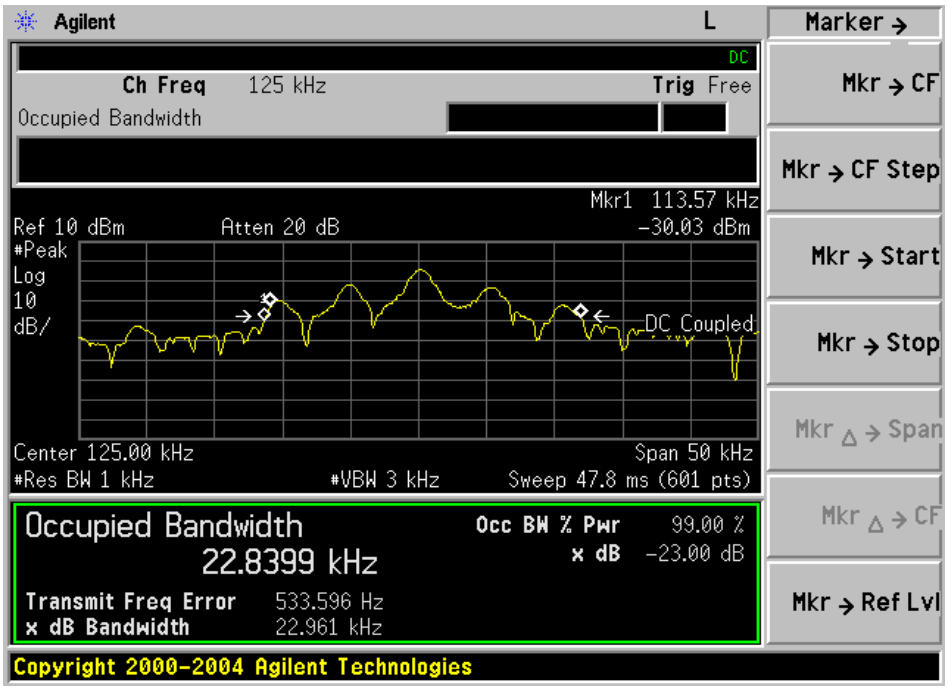
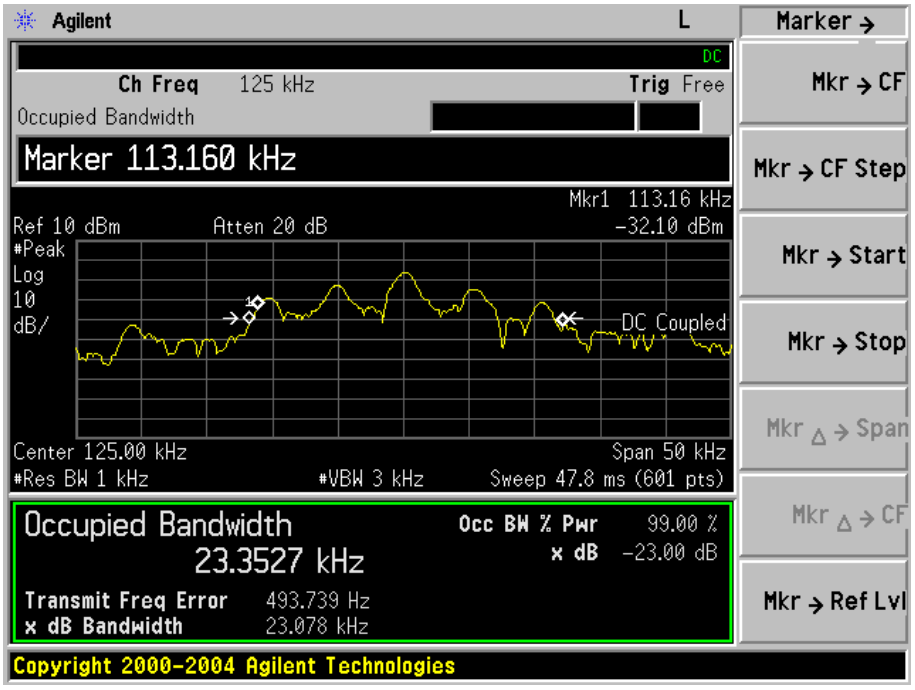
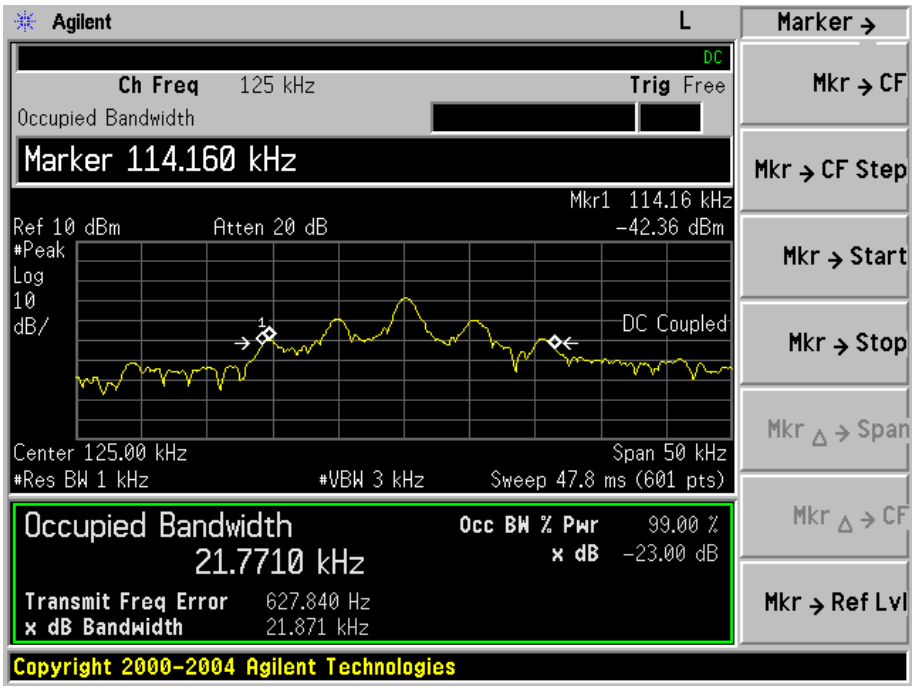
ANT2_INT2



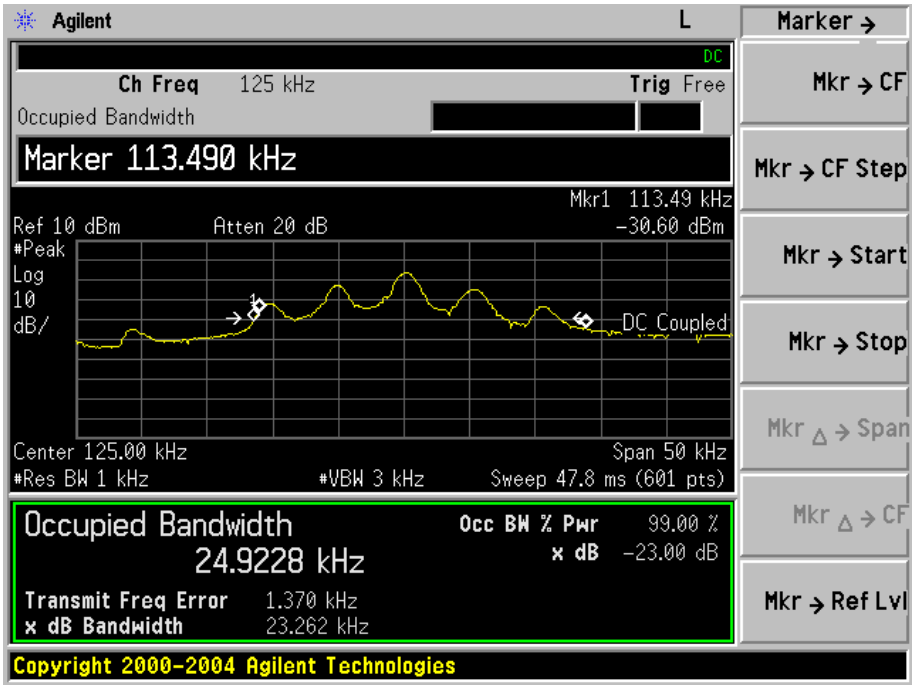
ANT3_Bumper



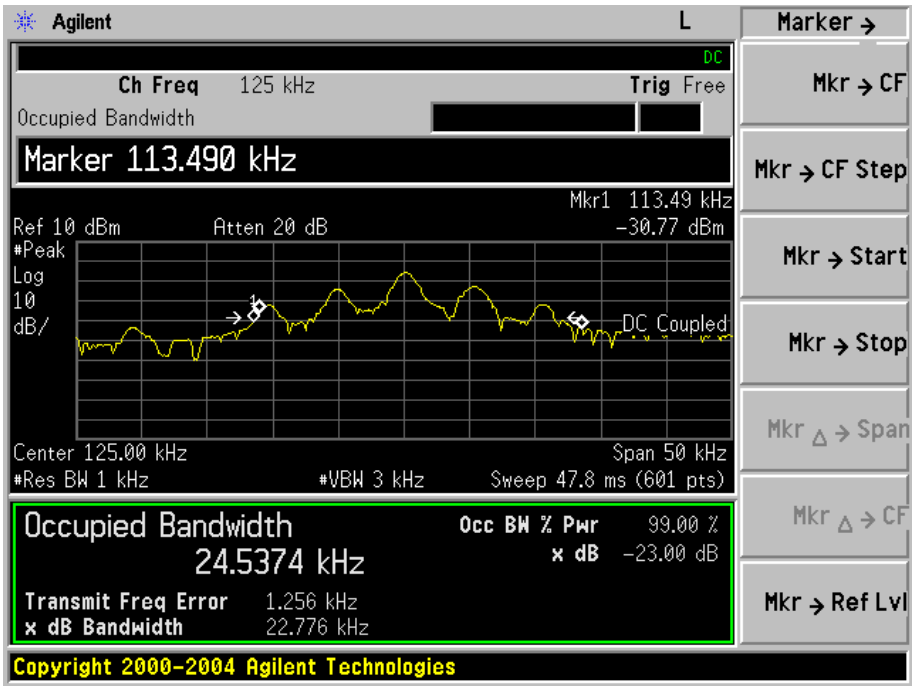
ANT4_Immo



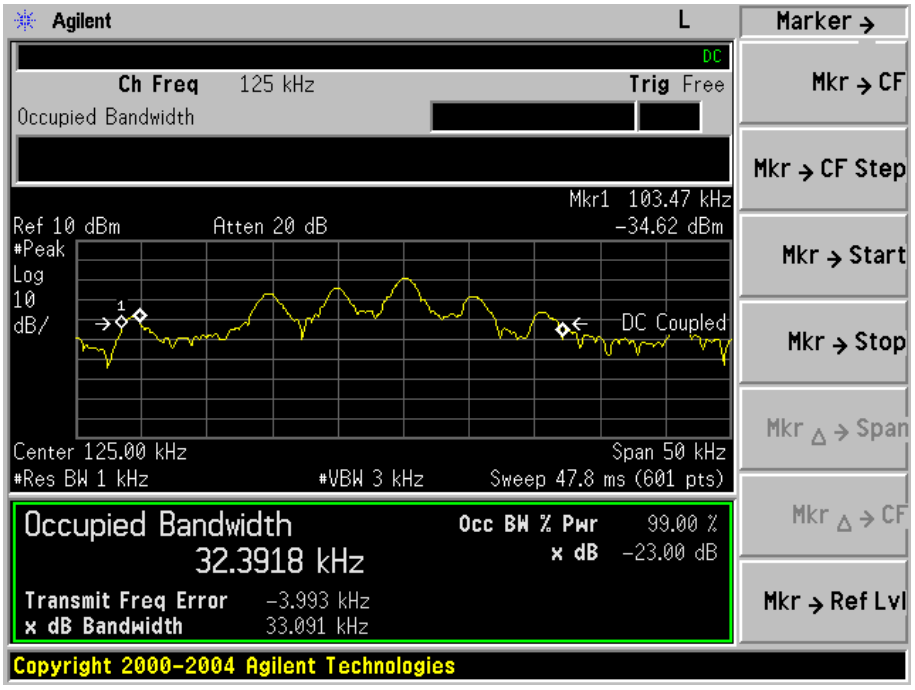
ANT5_DRV



ANT6_AST



ANT7_Reav



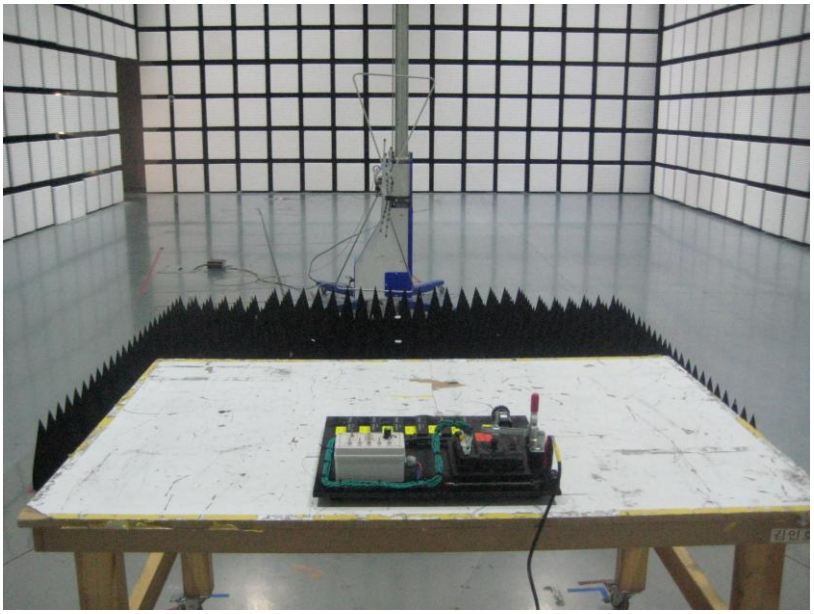
6. Test equipment used for test

	Description	Manufacture	Model No.	Serial No.	Next Cal Date.
☐	Temp & humidity chamber	taekwang	TK-04	TK001	13.12.07
☐	Temp & humidity chamber	taekwang	TK-500	TK002	13.09.03
☐	Frequency Counter	HP	53150A	US39250565	13.09.04
■	Spectrum Analyzer	Agilent	E4440A	MY44303500	13.06.27
☐	Spectrum Analyzer	R & S	FSP40	100209	13.10.23
■	Signal Generator	R & S	SMR40	100007	13.06.27
☐	Modulation Analyzer	HP	8901B	3538A05527	13.11.06
☐	Audio Analyzer	HP	8903B	3729A19213	14.01.06
☐	AC Power Supply	KIKUSUI	PCR2000W	GB001619	13.10.23
■	DC Power Supply	Tektronix	PS2520G	TW50517	14.03.12
☐	DC Power Supply	Tektronix	PS2521G	TW53135	13.10.23
☐	Dummy Load	BIRD	8141	7560	13.09.09
☐	Dummy Load	BIRD	8401-025	799	13.09.09
■	EMI Test Receiver	R&S	ESCI	100001	13.07.10
☐	Attenuator	HP	8494A	2631A09825	13.10.24
☐	Attenuator	HP	8496A	3308A16640	13.10.24
☐	Attenuator	R&S	RBS1000	D67079	13.10.24
☐	WIDEBAND POWER SENSOR	R & S	NRP-Z81	100677	13.05.04
☐	LOOP Antenna	EMCO	EMCO6502	9205-2745	13.05.23
■	BILOG Antenna	Schwarzbeck	VULB 9168	375	13.09.21
☐	BILOG Antenna	Schwarzbeck	VULB 9168	375	13.10.04
■	HORN Antenna	ETS	3115	00086706	13.11.21
☐	HORN Antenna	ETS	3115	00062589	13.09.06
☐	HORN Antenna	ETS	3116	00086632	13.11.15
☐	HORN Antenna	ETS	3116	00086632	13.11.15
■	Amplifier	SONOMA INSTRUMENT	310N	293004	2013.11.06
☐	Power Divider	Weinschel	1580-1	NX375	12.10.26
☐	Power Divider	Weinschel	1580-1	NX380	13.09.09
☐	Power Divider	Weinschel	1594	671	13.09.09
☐	Test Receiver	R&S	ESHS30	828765/009	12.10.28
☐	LISN	R&S	ENV216	101358	12.10.26
☐	LISN	PMM	L2-16A	0000J10705	-

480-5 Shin-dong, Yeongtong-gu, Suwon-city, Gyunggi-do, 443-390, Korea
82 31 336 9919 (Main) 82 31 336 4767 (Fax)

Test Setup Photos

9kHz – 30MHz



30MHz – 1GHz