

RF MEASUREMENT REPORT

FCC ID: HD5-CT4XVDWL
Applicant: Honeywell International Inc
Honeywell Safety and Productivity Solutions
Product: Vehicle Dock
Model No.: CT4X-VD-WL
Brand Name: Honeywell
FCC Classification: Part 15 Low Power Transmitter Below 1705 kHz (DCD)
FCC Rule Part(s): Part15 Subpart C (Section 15.209)
Result: Complies
Received Date: 2024-03-07
Test Date: 2024-03-16 ~ 2024-03-21

Reviewed By:

Jame Yuan

Approved By:

Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2403RSU014-U2	V01	Initial Report	2024-03-29	Valid

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1.4. Product Information

Product Name	Vehicle Dock
Model No.	CT4X-VD-WL
EUT Identification No.	20240307Sample#10
Brand Name	Honeywell
WPT Specification	144kHz
NFC Specification	13.56MHz(tag)
Antenna Information	Refer to Section 1.5
Power Voltage	12/24VDC
Operating Temperature	-20~50 °C
Notes: <ol style="list-style-type: none">1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.2. There is no difference between product in 12V supply and in 24V supply after evaluating; we select 12V supply to test.	

1.5. Radio Specification under Test

Frequency Range	144kHz
Modulation	ASK
Antenna Type	Coil Antenna

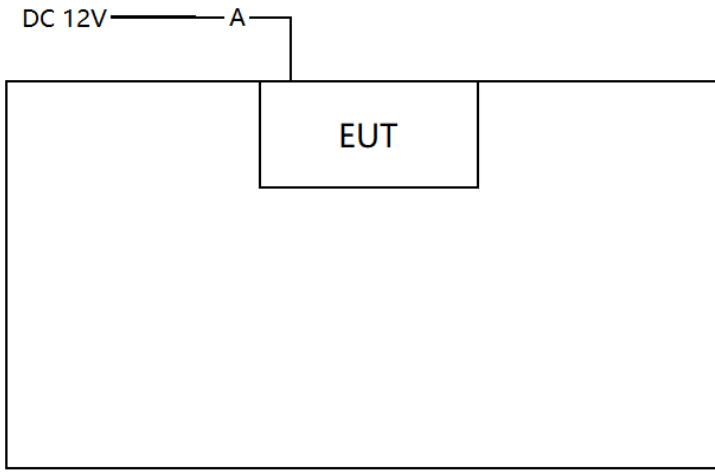
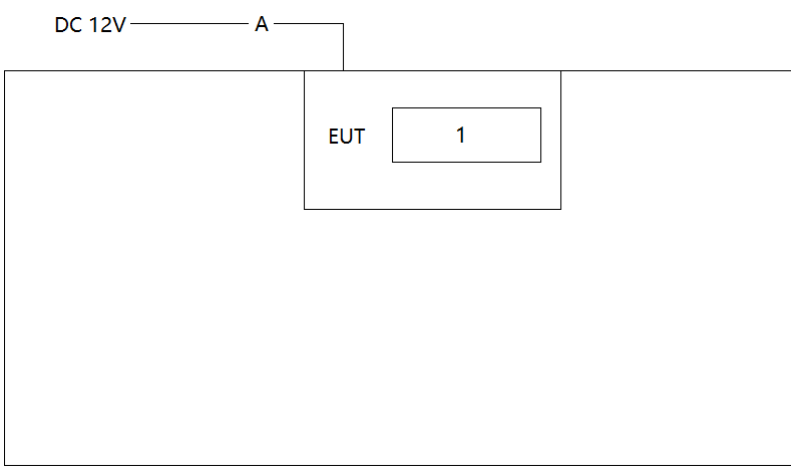
2. Test Configuration

2.1. Test Mode

Mode 1: Standby Mode
Mode 2: Charge the Mobile Phone

2.2. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Mode 1			
			
Mode 2			
			
Cable Type	Cable Description		Length
A	DC Power Cable	Non-Shielded	1.5m
Product	Manufacturer	Model No.	
1	Mobile Phone	Honeywell	CT47

2.3. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15.209
- ANSI C63.10-2013

2.4. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

3. Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 antenna of the device is **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2024-12-17	SIP-AC1
Anechoic Chamber	RIKEN	SIP-AC1	MRTSUE06554	1 year	2024-12-21	SIP-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2024-05-23	SIP-AC1
Thermohygrometer	testo	608-H1	MRTSUE06616	1 year	2024-10-28	SIP-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06645	1 year	2024-07-13	SIP-AC1
Loop Antenna	Schwarzbeck	FMZB 1519 B	MRTSUE06937	1 year	2025-01-27	SIP-AC1/SIP-AC3
Thermohygrometer	testo	608-H1	MRTSUE06619	1 year	2024-10-28	SIP-AC3
Anechoic Chamber	RIKEN	SIP-AC3	MRTSUE06782	1 year	2024-12-21	SIP-AC3
Signal Analyzer	Keysight	N9010B	MRTSUE06603	1 year	2024-09-27	SIP-AC3

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
Controller_MF 7802BS	1.02	RE Antenna & Turntable

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Emission Measurement
The maximum measurement uncertainty is evaluated as: Coaxial: 9kHz~30MHz: 2.61dB Coplanar: 9kHz~30MHz: 2.62dB Horizontal: 30MHz~200MHz: 3.79dB 200MHz~1GHz: 3.91dB 1GHz~40GHz: 4.99dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.21dB 1GHz~40GHz: 4.90dB

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.215 (c)	20dB Bandwidth	Radiated	Pass
15.209	General Field Strength Limits		Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	N/A

Note: "N/A" means that this item is not applicable, and the detail information refer to relevant section.

6.2. 20dB Bandwidth Measurement

6.2.1. Test Limit

N/A

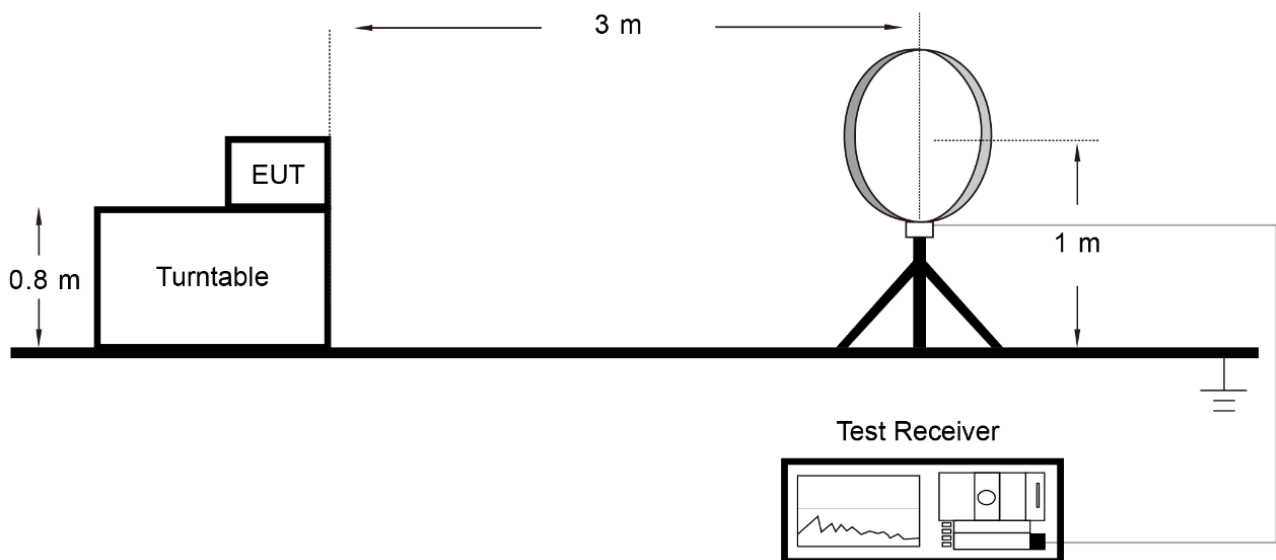
6.2.2. Test Procedure

ANSI C63.10:2013 Clause 6.9.2

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 20dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 20$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. The span range shall be between two times and five times the OBW
3. Set RBW = approximately half of the OBW
4. $VBW \geq 3 \times RBW$
5. Detector = Peak
6. Trace mode = max hold
7. Sweep = auto couple
8. Allow the trace to stabilize.

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.1.

6.3. General Field Strength Measurement

6.3.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
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

6.3.2. Test Procedure

ANSI C63.10 - 2013 - Section 6.3 (General Requirements)

ANSI C63.10 - 2013 - Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 - 2013 - Section 6.5 (Standard test method above 30MHz to 1GHz)

6.3.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz

Peak Measurements below 30MHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = Peak

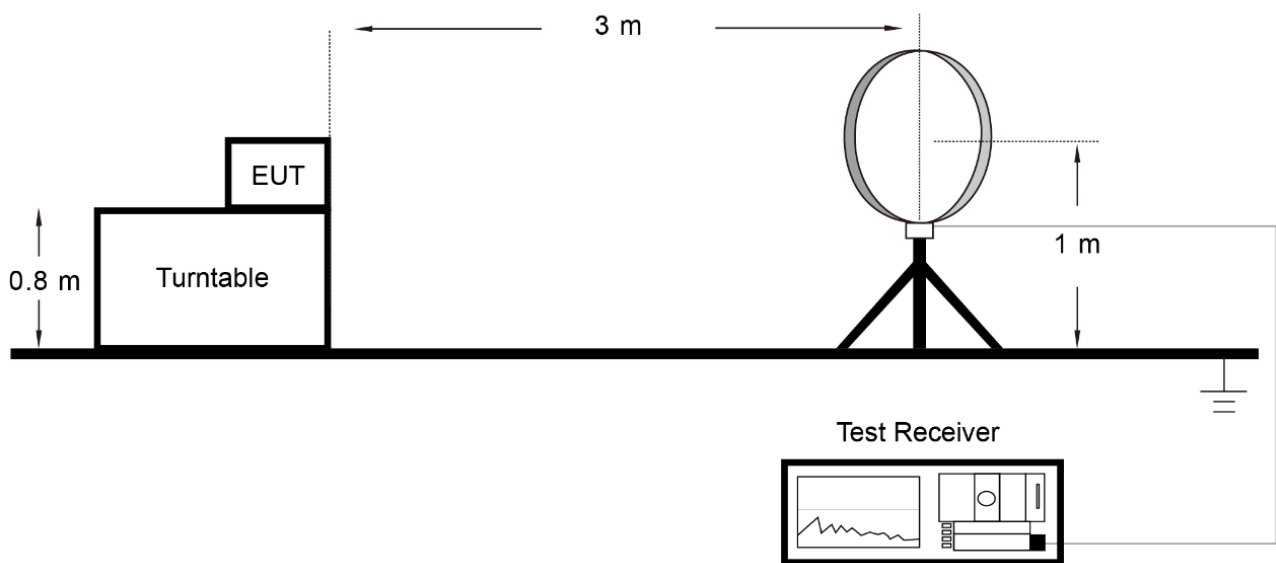
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Quasi-Peak Measurements below 1GHz

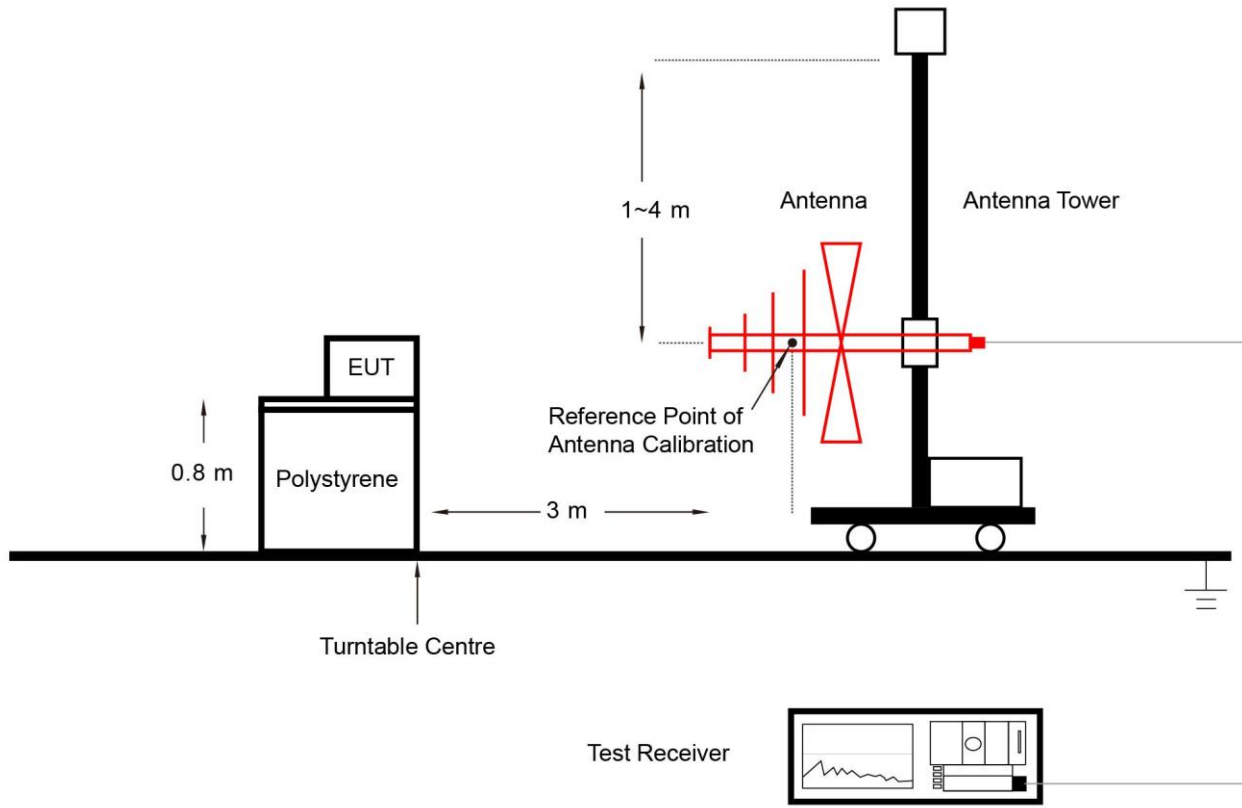
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

6.3.4. Test Setup

Below 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



6.3.5. Test Result

Refer to Appendix A.2.

6.4. AC Conducted Emissions Measurement

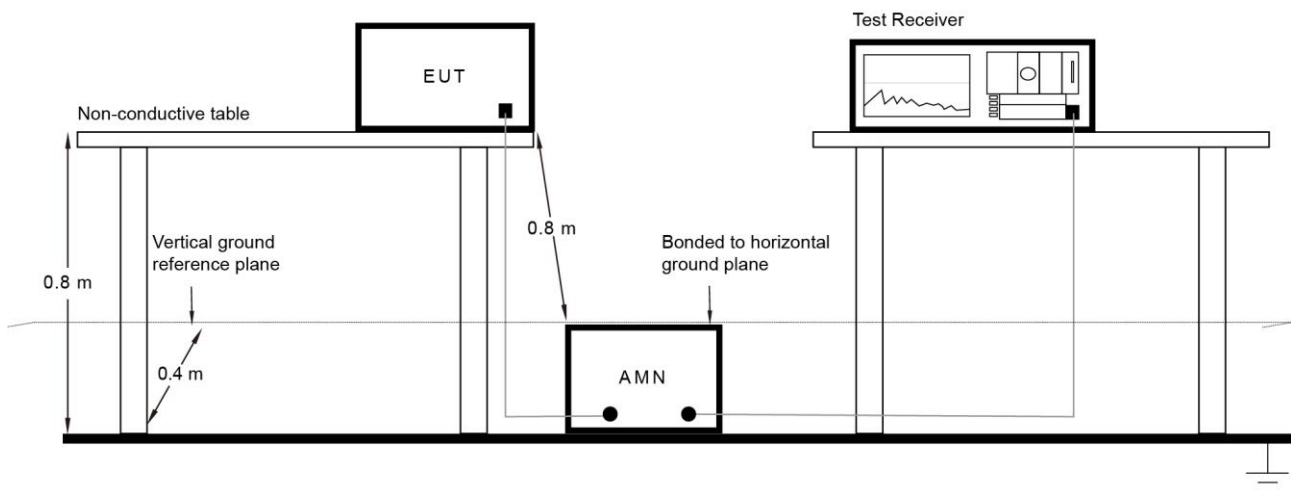
6.4.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.4.2. Test Setup



6.4.3. Test Result

This device is powered by DC 12V&24V, so the item is not applicable.

Appendix A - Test Result

A.1 20dB Bandwidth Test Result

Test Site	SIP-AC3	Test Engineer	Mero Zhou
Test Date	2024-03-20 ~ 2024-03-21		

Test Mode	20dB Bandwidth (Hz)
Mode 1	867
Mode 2	868



Note: Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

A.2 General Field Strength Test Result

Test Site	SIP-AC1	Test Engineer	Barry Wu
Test Date	2024-03-16 ~ 2024-03-19	Test Mode	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.143	71.330	20.104	91.434	104.500	-13.066	Peak	Coaxial
0.143	37.617	20.104	57.721	104.500	-46.779	Peak	Coplanar
Radiated Spurious Emission							
0.021	19.672	20.439	40.111	121.145	-81.034	Peak	Coaxial
0.033	17.620	20.439	38.059	117.221	-79.162	Peak	Coaxial
0.060	16.021	20.425	36.446	112.031	-75.585	Peak	Coaxial
0.986	26.401	19.232	45.633	67.744	-22.111	Peak	Coaxial
1.284	22.457	19.340	41.797	65.456	-23.659	Peak	Coaxial
1.568	18.878	19.420	38.298	63.726	-25.428	Peak	Coaxial
0.032	18.504	20.439	38.943	117.488	-78.545	Peak	Coplanar
0.062	11.399	20.423	31.822	111.746	-79.924	Peak	Coplanar
0.082	12.982	20.398	33.380	109.319	-75.939	Peak	Coplanar
0.702	28.774	19.234	48.008	70.686	-22.678	Peak	Coplanar
1.001	21.128	19.275	40.403	67.613	-27.210	Peak	Coplanar
1.284	18.865	19.340	38.205	65.456	-27.251	Peak	Coplanar
60.555	1.300	17.389	18.689	40.000	-21.311	QP	Horizontal
137.185	-2.300	17.543	15.243	43.500	-28.257	QP	Horizontal
350.100	1.300	19.400	20.700	46.000	-25.300	QP	Horizontal
440.795	1.200	22.204	23.404	46.000	-22.596	QP	Horizontal
720.640	0.100	27.237	27.337	46.000	-18.663	QP	Horizontal
938.890	-1.300	29.836	28.536	46.000	-17.464	QP	Horizontal
34.850	0.100	16.855	16.955	40.000	-23.045	QP	Vertical
39.700	-0.200	17.385	17.185	40.000	-22.815	QP	Vertical
110.510	1.300	14.903	16.203	43.500	-27.297	QP	Vertical
133.790	0.200	17.019	17.219	43.500	-26.281	QP	Vertical
461.650	2.000	22.412	24.412	46.000	-21.588	QP	Vertical
898.635	-1.200	29.737	28.537	46.000	-17.463	QP	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)



Test Site	SIP-AC1	Test Engineer	Barry Wu
Test Date	2024-03-16 ~ 2024-03-19	Test Mode	Mode 2

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.143	64.003	20.104	84.107	104.500	-20.393	Peak	Coaxial
0.143	60.331	20.104	80.435	104.500	-24.065	Peak	Coplanar
Radiated Spurious Emission							
0.022	19.254	20.439	39.693	120.741	-81.048	Peak	Coaxial
0.036	15.066	20.439	35.505	116.465	-80.960	Peak	Coaxial
0.072	10.360	20.410	30.770	110.448	-79.678	Peak	Coaxial
0.702	20.069	19.234	39.303	70.686	-31.383	Peak	Coaxial
1.284	20.896	19.340	40.236	65.456	-25.220	Peak	Coaxial
1.568	18.150	19.420	37.570	63.726	-26.156	Peak	Coaxial
0.030	15.515	20.439	35.954	118.048	-82.094	Peak	Coplanar
0.052	12.410	20.435	32.845	113.273	-80.428	Peak	Coplanar
0.105	12.035	20.373	32.408	107.173	-74.765	Peak	Coplanar
0.702	18.270	19.234	37.504	70.686	-33.182	Peak	Coplanar
1.284	19.623	19.340	38.963	65.456	-26.493	Peak	Coplanar
6.568	17.003	19.666	36.669	69.500	-32.831	Peak	Coplanar
39.700	1.300	17.385	18.685	40.000	-21.315	QP	Horizontal
72.680	1.200	15.186	16.386	40.000	-23.614	QP	Horizontal
142.035	-2.300	18.097	15.797	43.500	-27.703	QP	Horizontal
350.100	4.300	19.400	23.700	46.000	-22.300	QP	Horizontal
623.640	0.100	25.557	25.657	46.000	-20.343	QP	Horizontal
814.245	-1.200	28.296	27.096	46.000	-18.904	QP	Horizontal
39.215	9.400	17.308	26.708	40.000	-13.292	QP	Vertical
60.555	2.100	17.389	19.489	40.000	-20.511	QP	Vertical
72.680	1.300	15.186	16.486	40.000	-23.514	QP	Vertical
145.430	4.600	18.407	23.007	43.500	-20.493	QP	Vertical
464.560	3.600	22.308	25.908	46.000	-20.092	QP	Vertical
898.150	-0.200	29.716	29.516	46.000	-16.484	QP	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Appendix B - Test Setup Photograph

Refer to "2403RSU014-UT" file.

Appendix C - EUT Photograph

Refer to "2403RSU014-UE" file.

_____ The End _____