

RF MEASUREMENT REPORT

FCC ID: HD5-CT4XVDWLSPK
Applicant: Honeywell International Inc
Honeywell Safety and Productivity Solutions
Product: Vehicle Dock
Model No.: CT4X-VD-WL-SPK
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 ~ 2024-03-20

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
2403RSU013-U3	V01	Initial Report	2024-03-29	Valid

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1.4. Product Information

Product Name	Vehicle Dock
Model No.	CT4X-VD-WL-SPK
EUT Identification No.	20240307Sample#07
Brand Name	Honeywell
WPT Specification	144kHz
NFC Specification	13.56MHz(tag)
Bluetooth Specification	V5.0 (Dual Mode)
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

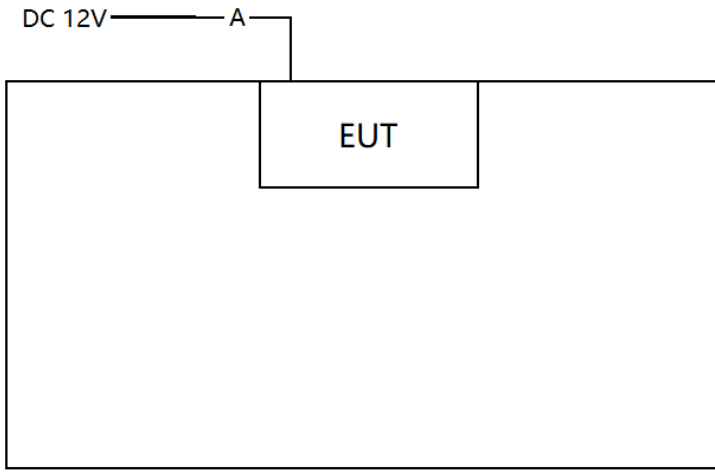
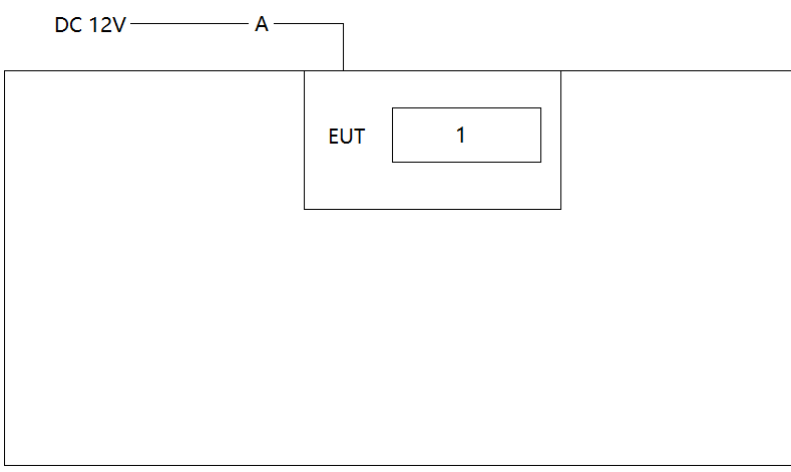
2. Test Configuration

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
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 9kHz~150kHz: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): Horizontal: 30MHz~200MHz: 3.85dB 200MHz~1GHz: 4.36dB 1GHz~40GHz: 4.98dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.28dB 1GHz~40GHz: 4.91dB

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

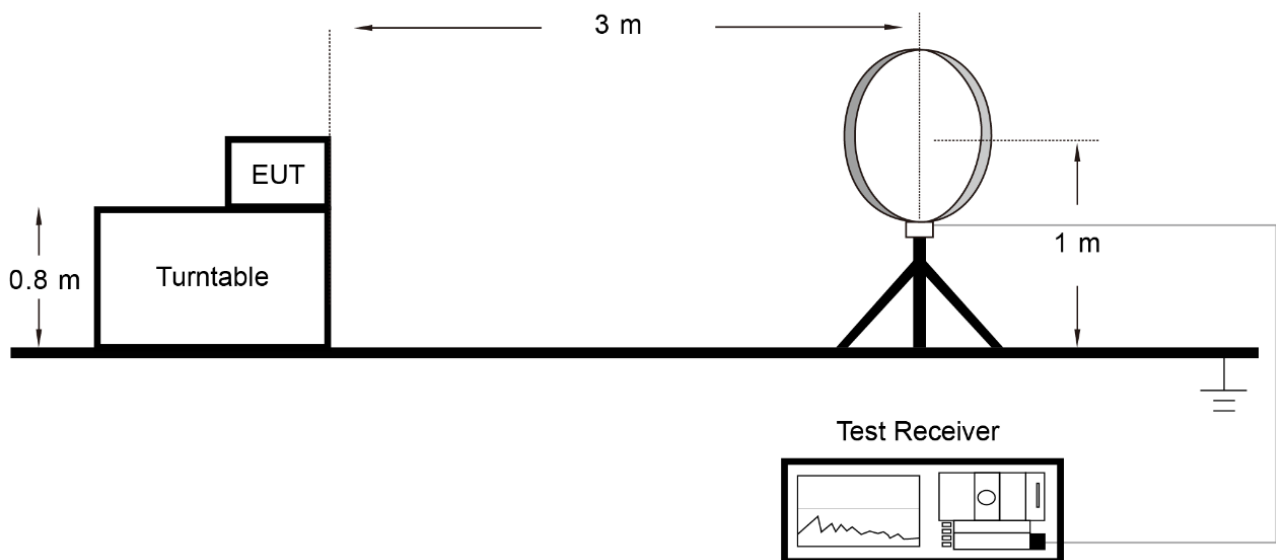
6.2.2. Test Procedure

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

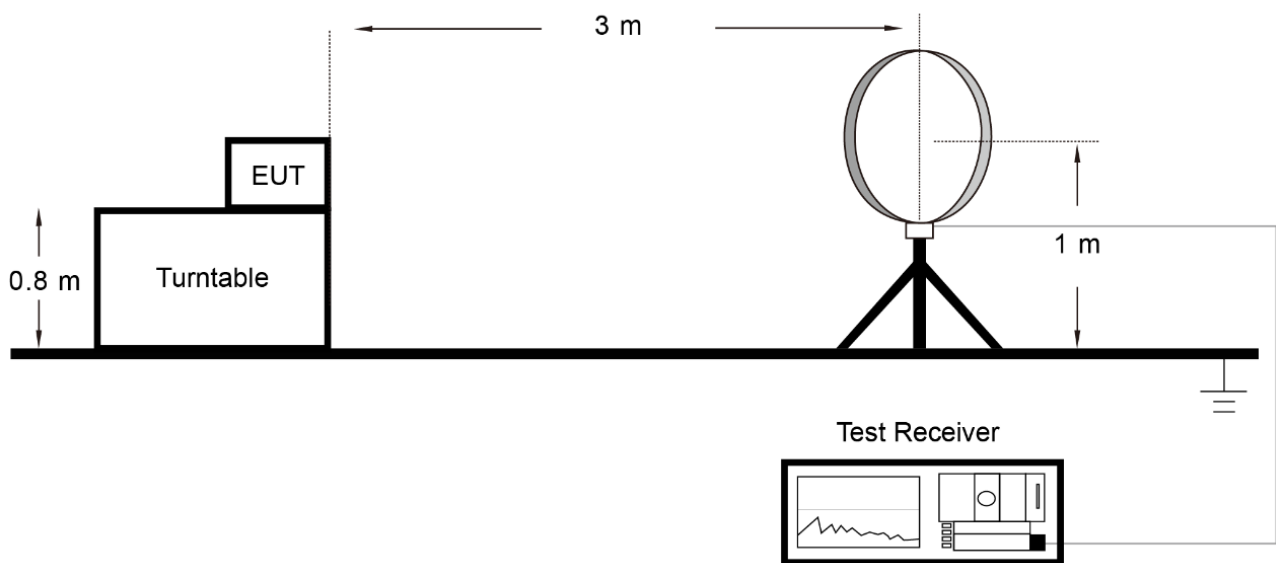
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Quasi-Peak Measurements below 1GHz

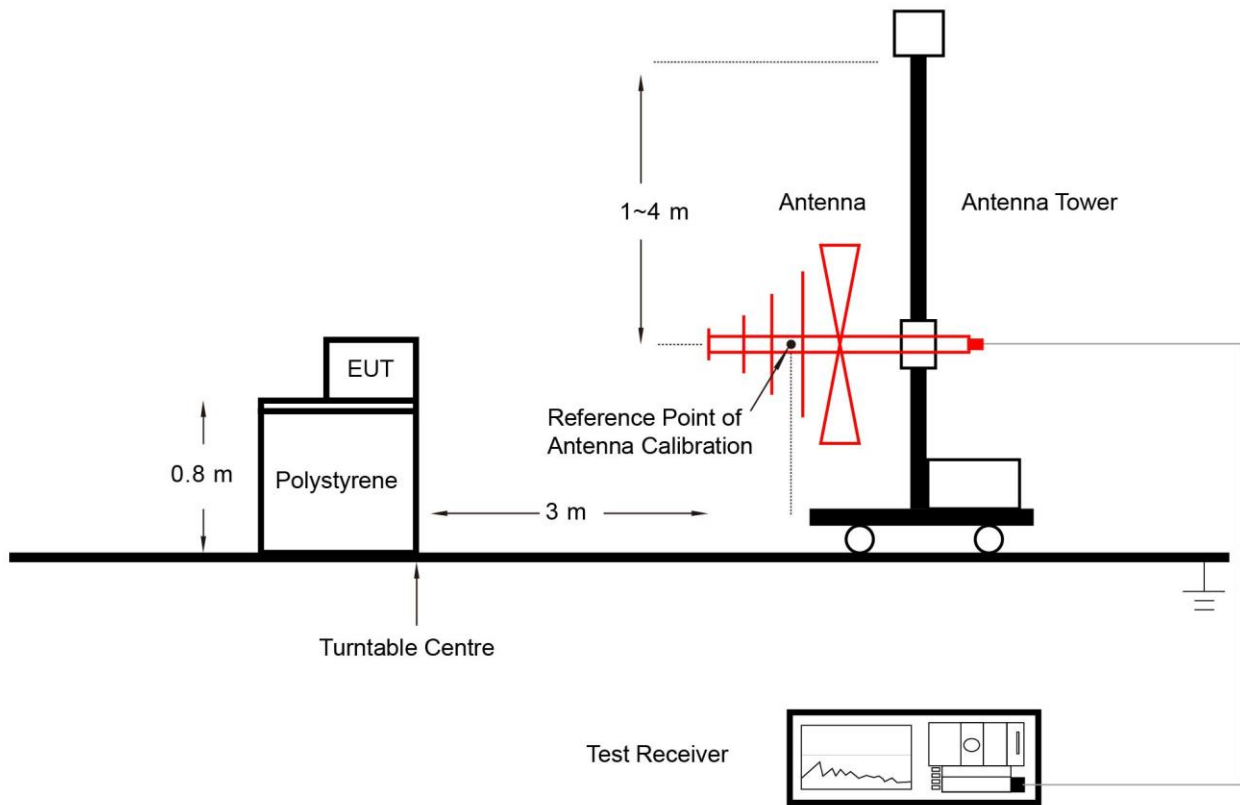
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

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

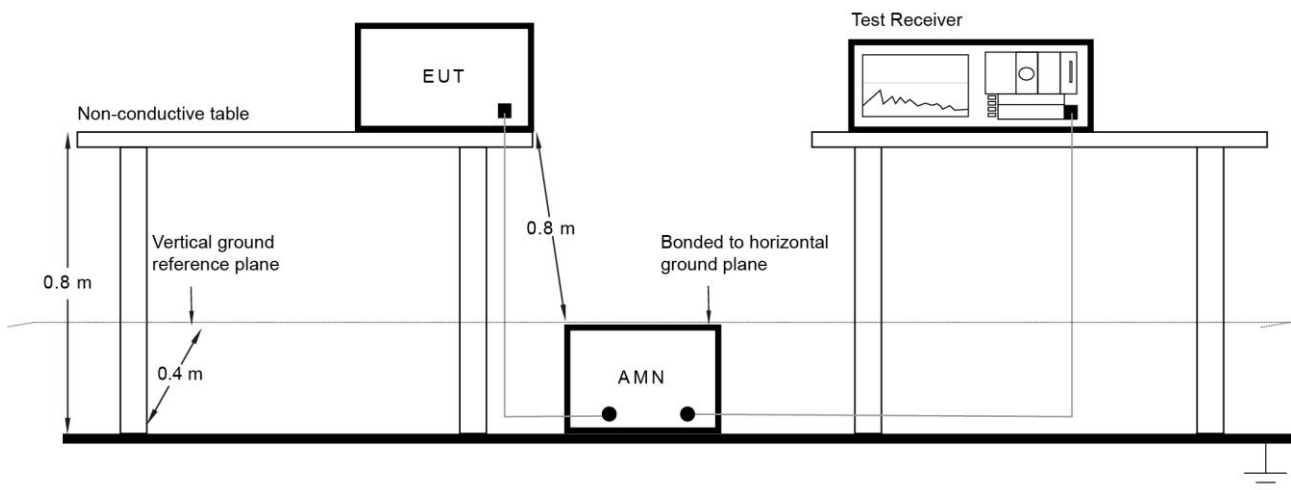
6.4.1. Test Limit

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		

Test Mode	20dB Bandwidth (Hz)
Mode 1	861
Mode 2	858



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 (dB μ V)	Factor (dB/m)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.144	70.952	20.102	91.054	104.44	-13.386	Peak	Coaxial
0.144	67.055	20.102	87.157	104.44	-17.283	Peak	Coplanar
Radiated Spurious Emission							
0.023	19.171	20.439	39.610	120.355	-80.745	Peak	Coaxial
0.044	16.380	20.439	36.819	114.723	-77.904	Peak	Coaxial
0.060	15.530	20.425	35.955	112.031	-76.076	Peak	Coaxial
0.717	31.741	19.236	50.977	70.503	-19.526	Peak	Coaxial
1.001	27.252	19.275	46.527	67.613	-21.086	Peak	Coaxial
1.284	22.281	19.340	41.621	65.456	-23.835	Peak	Coaxial
0.035	15.310	20.439	35.749	116.710	-80.961	Peak	Coplanar
0.061	14.264	20.424	34.688	111.887	-77.199	Peak	Coplanar
0.078	12.434	20.403	32.837	109.753	-76.916	Peak	Coplanar
0.717	26.926	19.236	46.162	70.503	-24.341	Peak	Coplanar
1.001	22.241	19.275	41.516	67.613	-26.097	Peak	Coplanar
1.284	19.225	19.340	38.565	65.456	-26.891	Peak	Coplanar
60.555	0.200	17.389	17.589	40.000	-22.411	QP	Horizontal
145.915	-1.300	18.368	17.068	43.500	-26.432	QP	Horizontal
350.100	2.300	19.400	21.700	46.000	-24.300	QP	Horizontal
612.000	-2.300	25.881	23.581	46.000	-22.419	QP	Horizontal
739.555	0.100	27.747	27.847	46.000	-18.153	QP	Horizontal
907.850	-1.600	29.600	28.000	46.000	-18.000	QP	Horizontal
36.305	0.200	16.998	17.198	40.000	-22.802	QP	Vertical
60.555	-1.300	17.389	16.089	40.000	-23.911	QP	Vertical
194.900	1.200	14.619	15.819	43.500	-27.681	QP	Vertical
452.435	-1.500	22.423	20.923	46.000	-25.077	QP	Vertical
723.065	-2.300	27.273	24.973	46.000	-21.027	QP	Vertical
947.620	-2.100	29.722	27.622	46.000	-18.378	QP	Vertical

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + 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	64.794	20.104	84.898	104.50	-19.602	Peak	Coaxial
0.143	60.697	20.104	80.801	104.50	-23.699	Peak	Coplanar
Radiated Spurious Emission							
0.037	13.777	20.439	34.216	116.228	-82.012	Peak	Coaxial
0.062	10.326	20.423	30.749	111.746	-80.997	Peak	Coaxial
0.106	18.533	20.372	38.905	107.090	-68.185	Peak	Coaxial
0.717	21.081	19.236	40.317	70.503	-30.186	Peak	Coaxial
1.284	18.207	19.340	37.547	65.456	-27.909	Peak	Coaxial
1.568	17.675	19.420	37.095	63.726	-26.631	Peak	Coaxial
0.041	13.086	20.439	33.525	115.336	-81.811	Peak	Coplanar
0.062	10.981	20.423	31.404	111.746	-80.342	Peak	Coplanar
0.106	13.209	20.372	33.581	107.090	-73.509	Peak	Coplanar
1.060	16.994	19.285	36.279	67.117	-30.838	Peak	Coplanar
1.568	18.356	19.420	37.776	63.726	-25.950	Peak	Coplanar
3.434	16.461	19.740	36.201	69.500	-33.299	Peak	Coplanar
31.940	-1.200	16.725	15.525	40.000	-24.475	QP	Horizontal
60.555	-1.400	17.389	15.989	40.000	-24.011	QP	Horizontal
151.250	-2.300	18.321	16.021	43.500	-27.479	QP	Horizontal
350.100	-2.400	19.400	17.000	46.000	-29.000	QP	Horizontal
648.375	-2.600	26.055	23.455	46.000	-22.545	QP	Horizontal
872.930	-3.100	28.634	25.534	46.000	-20.466	QP	Horizontal
30.970	10.200	16.785	26.985	40.000	-13.015	QP	Vertical
39.215	3.000	17.308	20.308	40.000	-19.692	QP	Vertical
60.555	-2.100	17.389	15.289	40.000	-24.711	QP	Vertical
120.210	1.300	15.625	16.925	43.500	-26.575	QP	Vertical
723.065	-2.100	27.273	25.173	46.000	-20.827	QP	Vertical
927.732	-3.500	29.662	26.162	46.000	-19.838	QP	Vertical

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

Appendix B - Test Setup Photograph

Refer to "2403RSU013-UT" file.

Appendix C - EUT Photograph

Refer to "2403RSU013-UE" file.

_____ The End _____