

FCC Part 15B




Measurement and Test Report

For

Honeywell Integrated Technology(China) Co.,LTD

430 Li Bing Road, Shanghai ,P.R. China

FCC ID: 2AJAWVCU-047015EN

FCC Rule(s):	<u>FCC Part 15 Subpart B</u>
Product Description:	<u>Tema-Voyager TM Compact</u>
Tested Model:	<u>VCU-047015EN1N01</u>
Report No.:	<u>STR16078141I-2</u>
Tested Date:	<u>2016-12-25 to 2017-01-11</u>
Issued Date:	<u>2017-01-12</u>
Tested By:	<u>Jason Su / Engineer</u> 
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Prepared By:	

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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM.Test Technology Co., Ltd.

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Honeywell Integrated Technology(China) Co.,LTD
Address of applicant: 430 Li Bing Road, Shanghai ,P.R. China

Manufacturer: Honeywell S.r.l.
Address of manufacturer: Via PHILIPS 12, 20052, MONZA- ITALY

General Description of EUT	
Product Name:	Tema-Voyager TM Compact
Trade Name:	Honeywell
Model No.:	VCU-047015EN1N01
Adding Model(s):	/
Rated Voltage:	DC12V From Power Supply
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Rated Voltage:	DC12V From Power Supply
Power Adapter Model:	RTU Q03 I/P: AC 120V/60Hz; O/P: DC 12V
Rated Power:	/
Lowest Internal Frequency:	32.768kHz
Highest Internal Frequency:	26MHz
Classification of ITE:	CLASS B

1.2 Test Standards

The following report is prepared on behalf of the Honeywell Integrated Technology(China) Co.,LTD in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Operating	Connect to Notebook by RJ45

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

Special Cable List and Details

Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
RJ45 Cable*2	3.0	Shielded	Without Ferrite
AC Cable	1.3	Unshielded	Without Ferrite
Signal Cable	1.8	Unshielded	Without Ferrite

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E23	/
Power Supply	Honeywell	RTU Q03	/

1.6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
Conducted Emissions	Conducted	$\pm 2.88\text{dB}$
Transmitter Spurious Emissions	Radiated	$\pm 5.1\text{dB}$

1.7 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2016-06-04	2017-06-03
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2016-06-04	2017-06-03
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2016-06-04	2017-06-03
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2016-06-04	2017-06-03
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2016-06-04	2017-06-03
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2016-06-04	2017-06-03
SEMT-1042	Horn Antenna	ETS	3117	00086197	2016-06-04	2017-06-03
SEMT-1121	Horn Antenna	ETS	3116B	00088203	2016-06-04	2017-06-03
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2016-06-04	2017-06-03
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2016-06-04	2017-06-03
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2016-06-04	2017-06-03
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2016-06-04	2017-06-03

2. SUMMARY OF TEST RESULTS

Description of Test	Result
§15.107 (a) Conducted Emission	Compliant
§15.109(a) Radiated Emission	Compliant

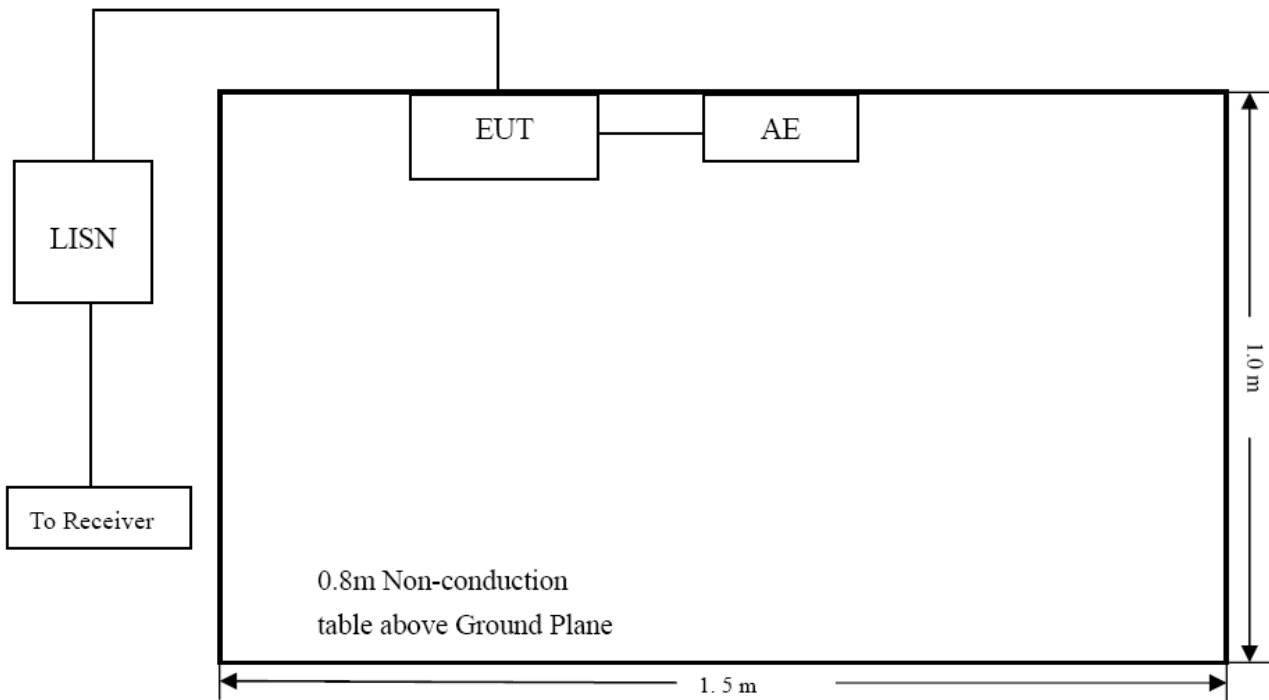
N/A: not applicable

3. Conducted Emissions

3.1 Test Procedure

Test is conducting under the description of ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

3.2 Basic Test Setup Block Diagram



3.3 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

3.4 Summary of Test Results/Plots

According to the data in section 3.5, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

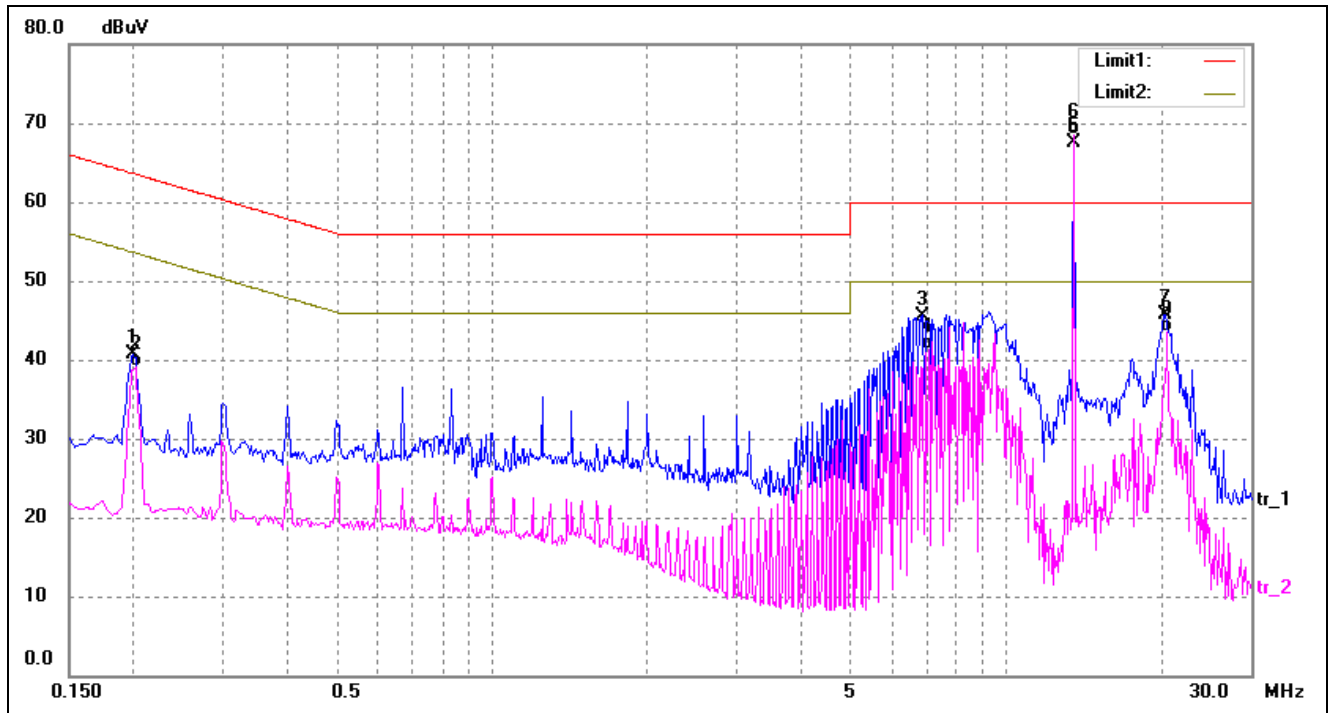
-3.34 dB at 7.4019 MHz in the Line, Average detector, 0.15-30MHz

3.5 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

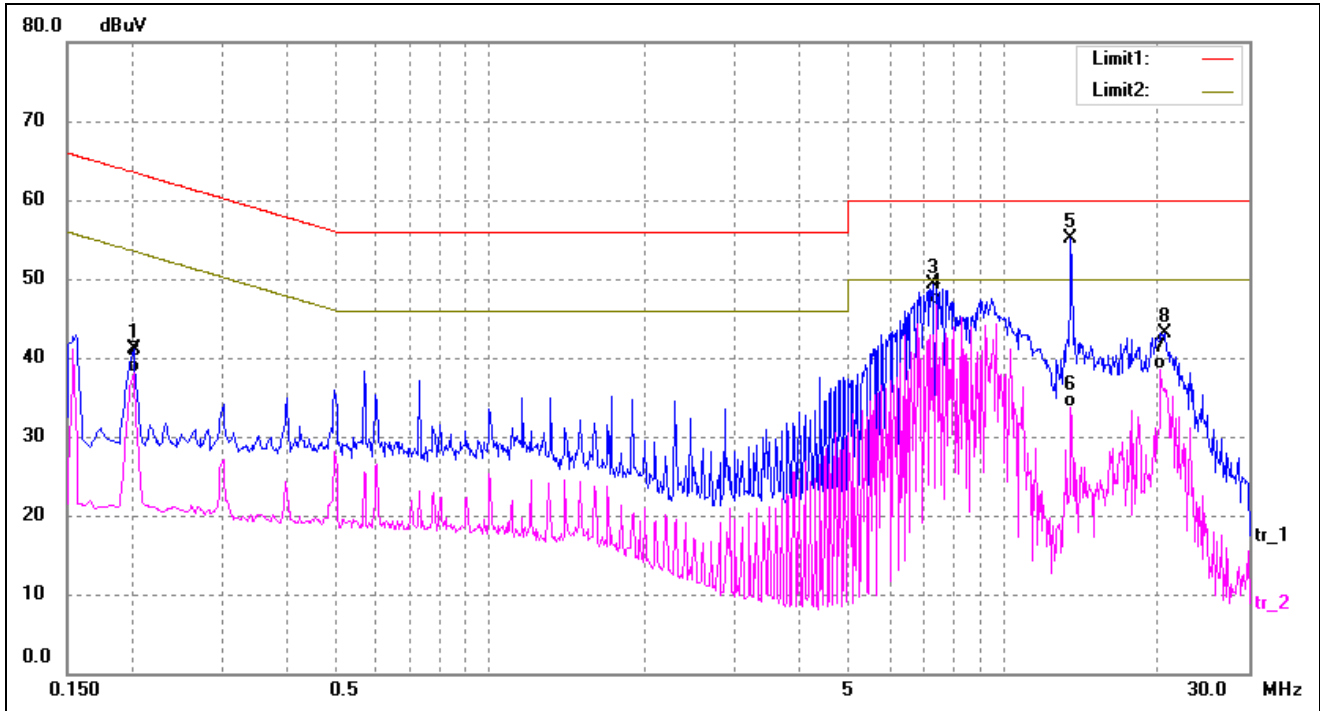
EUT: Tema-Voyager TM Compact
 Tested Model: VCU-047015EN1N01
 Operating Condition: TM1
 Comment: AC 120V/60Hz; Power Supply DC 12V

Test Specification: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1995	31.13	9.50	40.63	63.63	-23.00	QP
2	0.2020	29.55	9.50	39.05	53.52	-14.47	AVG
3	6.9019	35.31	10.29	45.60	60.00	-14.40	QP
4	7.0937	30.96	10.29	41.25	50.00	-8.75	AVG
5X	13.5579	57.12	10.40	67.52	/	/	Fundamental
6*	13.5579	58.16	10.40	68.56	/	/	
7	20.3978	35.26	10.47	45.73	60.00	-14.27	QP
8	20.5978	32.99	10.47	43.46	50.00	-6.54	AVG

Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2020	31.63	9.50	41.13	63.52	-22.39	QP
2	0.2020	28.69	9.50	38.19	53.52	-15.33	AVG
3	7.2899	39.10	10.29	49.39	60.00	-10.61	QP
4	7.4019	36.36	10.30	46.66	50.00	-3.34	AVG
5	13.5457	44.78	10.40	55.18	/	/	Fundamental
6	13.5457	23.31	10.40	33.71	/	/	
7	20.2179	28.06	10.46	38.52	50.00	-11.58	AVG
8	20.5138	32.69	10.47	43.16	60.00	-16.84	QP

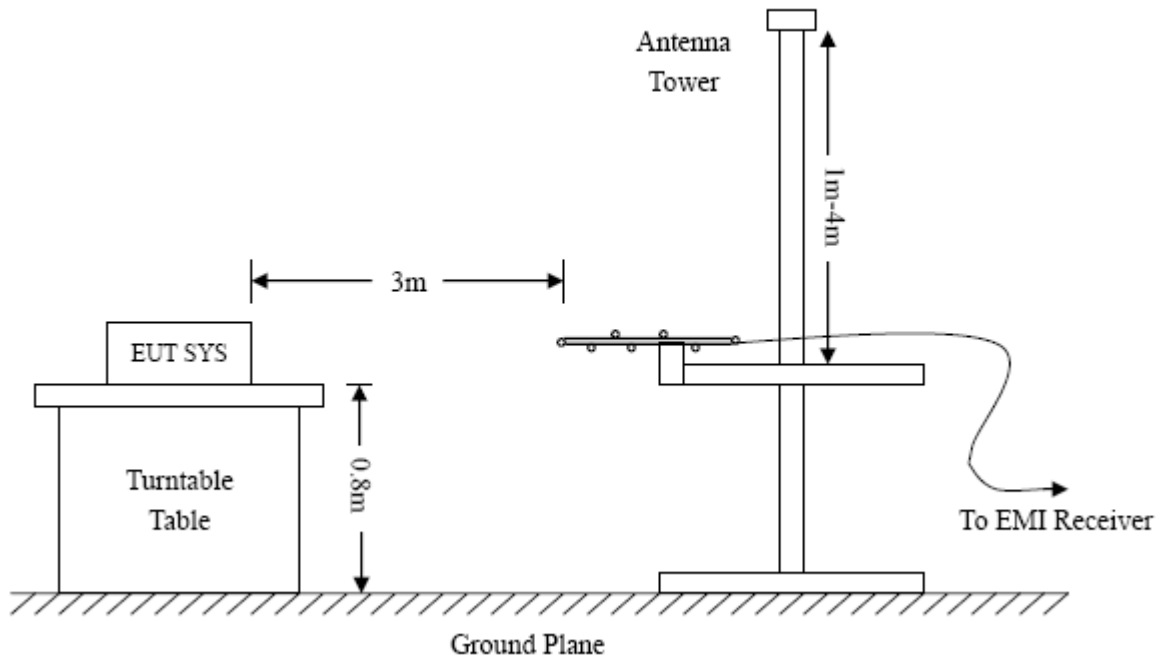
4. RADIATED EMISSION

4.1 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.109 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.



4.2 Test Receiver Setup

Frequency :9kHz-30MHz

RBW=10KHz,

VBW =30KHz

Sweep time= Auto

Trace = max hold

Detector function = peak

Frequency :30MHz-1GHz

RBW=120KHz,

VBW=300KHz

Sweep time= Auto

Trace = max hold

Detector function = peak, QP

4.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} - \text{Corr. Factor}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dB μ V means the emission is 6dB μ V below the maximum limit for a Class B device. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15.109(a) Limit}$$

4.4 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

4.5 Summary of Test Results/Plots

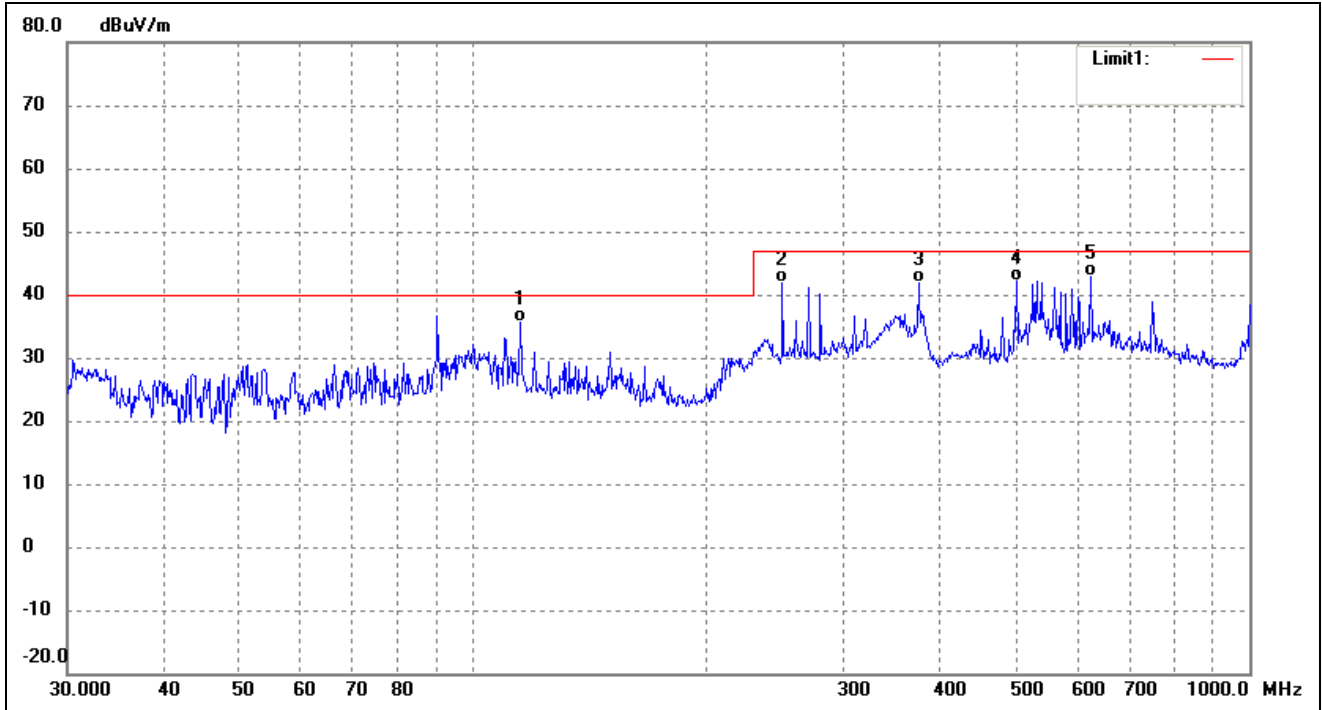
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-3.57 dB at 375.9384 MHz in the Vertical polarization, 30 MHz to 1 GHz, 3Meters

Plot of Radiated Emissions Test Data

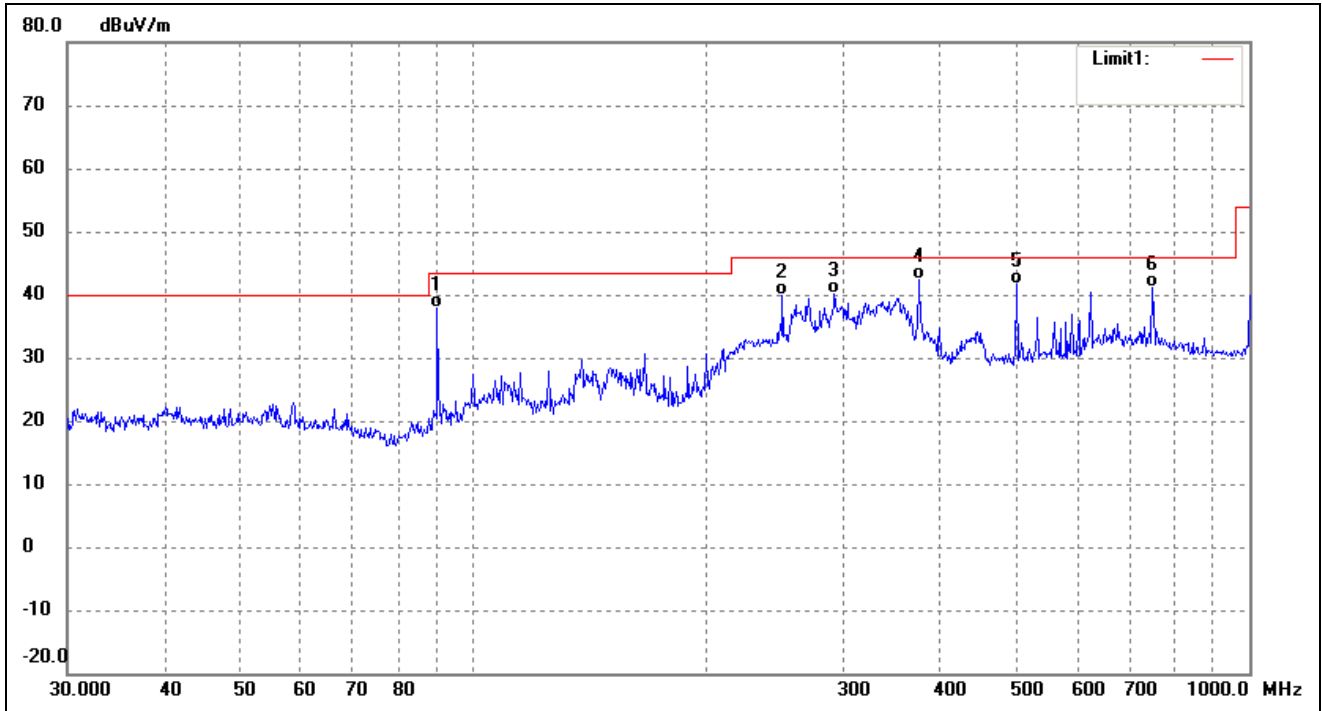
EUT: *Tema-Voyager TM Compact*
 Tested Model: *VCU-047015EN1N01*
 Operating Condition: *TM1*
 Comment: *AC 120V/60Hz; Power Supply DC 12V*

Test Specification: *Horizontal*



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	114.9169	30.66	4.85	35.51	40.00	-4.49	281	100	QP
2	250.3012	32.62	9.32	41.94	47.00	-5.06	140	100	QP
3	374.6226	29.94	11.82	41.76	47.00	-5.24	93	100	QP
4	501.1790	28.80	13.37	42.17	47.00	-4.83	281	100	QP
5	625.0780	25.38	17.55	42.93	47.00	-4.07	211	100	QP

Test Specification: Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	89.9047	34.47	3.38	37.85	43.50	-5.65	245	100	QP
2	250.3011	30.52	9.32	39.84	46.00	-6.16	113	100	QP
3	292.0582	28.59	11.65	40.24	46.00	-5.76	55	100	QP
4	375.9384	30.62	11.81	42.43	46.00	-3.57	233	100	QP
5	501.1789	28.31	13.37	41.68	46.00	-4.32	143	100	QP
6	750.1082	22.49	18.58	41.07	46.00	-4.93	297	100	QP

***** END OF REPORT *****