

Emissions Test Report

EUT Name: RFID Tag

Model No.: View 4

CFR 47, Part 15.231 and RSS-210 Issue 9 August 2016

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Statement of Compliance

Manufacturer: Panasonic Corporation of North America
28 East Main Street, Suite 2100
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U.S.A
Requester / Applicant: Igor Orlovich
Name of Equipment: RFID Tag
Model No. View 4
Type of Equipment: Intentional Radiator
Application of Regulations: CFR 47 Part 15.231 and RSS 210 Issue 9 August 2016
Test Dates: August 11, 2019 to August 29, 2019

Guidance Documents:

CFR 47 Part 15.231 and RSS 210 Issue 9 August 2016

Test Methods:

Emissions: CFR 47 Part 15.231 and RSS Gen Issue 5 March 2019

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that the equipment described above has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by A2LA or any agency of the U.S. Government. This report shall not be reproduced except in full, without the written authorization of TUV Rheinland of North America.

Alexander Sowinski October 2, 2019

Test Engineer Date

Josie Sabado October 2, 2019

A2LA Signatory Date



Testing Cert #3331.02



US1131

ISED

US0185

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1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.231 and RSS 210 Annex A based on the results of testing performed from August 11, 2019 through August 29, 2019, on the RFID Tag Model View 4 manufactured by Panasonic Corporation of North America. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

This test report documents the 433MHz radio implementation of the RFID Tag, which is based on 2-GFSK communication technology.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Standards	Limit	Worse Case (Measured)	Result
Occupied Bandwidth	FCC part 15.231(c) and RSS-210 Annex A	20 dB BW $\leq$ 0.25% of center freq. 99% BW $\leq$ 0.25% of center freq.	250.80 kHz 217.20 kHz	Complied
Type of Momentary Signal	FCC part 15.231(a)(3) and RSS-210 A.1.1(c)	Total transmission time shall not exceed two seconds per hour	1.056 sec /h r.	Complied
Radiated Output Power for Fundamental and Harmonic Frequencies	FCC part 15.231(a)(2) and RSS-210 A.1.2(a)	Below the applicable limits	61.85 dB μ V /m 25.38 dB μ V/m	Complied
Out-of-Band Spurious Emissions and Band Edges (EUT in Transmit Mode)	FCC part 15.231(b)(3) and RSS-210 A.1.2(b)	Below the applicable limits	43.05 dB μ V/m	Complied

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

None

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission



TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont, CA 94538, are recognized by the Commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (Registration No. US1131). The laboratory Scopes of Accreditation include Title 47 CFR Parts 15, 18 and 90. The accreditations are updated every three years.

2.1.2 NIST / A2LA



TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:2017. The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 ISED

The Pleasanton 5-meter Semi-Anechoic Chamber, has been accepted by ISED to perform testing to 3 and 5 meters based on the test procedures described in ANSI C63.4-2014. The Fremont 10-meter Semi-Anechoic Chamber, has been accepted by ISED to perform testing to 3 and 10 meters based on the test procedures described in ANSI C63.4-2014. Under US0185

2.1.4 VCCI



The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America EMC test facilities located at 1279 Quarry Lane, Ste. A, Pleasanton, CA, 94566, and 5015 Brandin Ct, Fremont, CA 94538, have been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0326

VCCI Registration No. for Fremont: A-0327

2.1.5 Acceptance by Mutual Recognition Arrangement



The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / A2LA accreditation will be accepted by each member

country.

2.2 Test Facilities

Test facilities are located at 5015 Brandin Ct, Fremont, California, 94538, USA and 1279 Quarry Lane, Pleasanton, California 94566, USA (Fremont is the Pleasanton Annex).

2.2.1 Emission Test Facility

The Semi-Anechoic Chambers and AC Line Conducted measurement facilities used to collect radiated and conducted emissions data have been constructed in accordance with ANSI C63.7:1992. The Fremont 10 meter semi-anechoic chamber has been measured in accordance with and verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2014 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04), at test distances of 3 and 10 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02). The Pleasanton 5 meter semi-anechoic chamber has been verified to comply with the theoretical volumetric normalized site attenuation of ANSI C63.4:2009 and SVSWR requirements of CISPR 16-1-4 Consol. Ed. 3.0 (2010-04) at a test distance of 3 meters. This site has been described in reports dated November 1st, 2006, submitted to the FCC, and accepted by letter dated November 28, 2006. The site is listed with the FCC and accredited by A2LA (Testing Certificate #3331.02).

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term *standard uncertainty* is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurement and the fraction may be viewed as the coverage probability or level of confidence of the interval.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{RAW} - \text{AMP} + \text{CBL} + \text{ACF}$$

Where: RAW = Measured level before correction (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{\text{dB}\mu\text{V/m}}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

$$25 \text{ dBuV/m} + 17.5 \text{ dB} - 20 \text{ dB} + 1.0 \text{ dB} = 23.5 \text{ dBuV/m}$$

2.3.2 Measurement Uncertainty

Per CISPR 16-4-2	U _{lab}	U _{cispr}
Radiated Disturbance @ 10 meters		
30 – 1,000 MHz	2.25 dB	4.51 dB
Radiated Disturbance @ 3 meters		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 18 GHz	2.47 dB	4.93 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.09 dB	2.18 dB
Disturbance Power		
30 MHz – 300 MHz	3.92 dB	4.3 dB

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2005. Equipment calibration records are kept on file at the test facility.

3 Product Information

3.1 Product Description

The View 4 is a RFID tag that operates at 433 MHz band. It consists of an RFID transmitter/receiver and an e-paper display processor. A button is incorporated that can initiate a manual RFID transmit cycle. The View 4 uses a 4" diagonal display. The View 4 RFID tag has an FCC ID under the Panasonic North American Grantee of ACJ-VT04-G3, and an Industry Canada ID of 216A-VT04-G3.

3.2 Equipment Configuration

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with the testes standard. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of a EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of a EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing.

3.4 EUT Photos

See “View4 Tag Front.jpg”

Figure 1 - Photo of the EUT – Front

See “View4 Edge1.jpg”

Figure 2 - Photo of the EUT – Front & Sides

See “View4 Edge2.jpg”

Figure 3 – Photo of the EUT – Back & Sides

See “View4 PCBA Back.jpg”

Figure 4 – Photo of the EUT – PCB detail – Back

See “View4 PCBA.jpg”

Figure 5 – Photo of the EUT – PCB detail – Front

See “View4 Antenna.jpg”

Figure 6 – Photo of the EUT – Detail – EUT with temporary SMA connector

4 Radiated Emissions in Transmit Mode

4.1 20 dB Bandwidth and 99% Bandwidth

4.1.1 Overview of Test

Results	Complies (as tested per this report)					Date	08/20/19
Product	RFID Tag View 4			Serial#	01AF, 0195, 0194		
EUT Powered By	3V	Temp	24° C	Humidity	45%	Pressure	996 mbar
Frequency Range	433.164 MHz to 434.676 MHz						
Perf. Criteria	(Below Limit)			Test Performed By	Alexander Sowinski		

4.1.2 Test Specifications

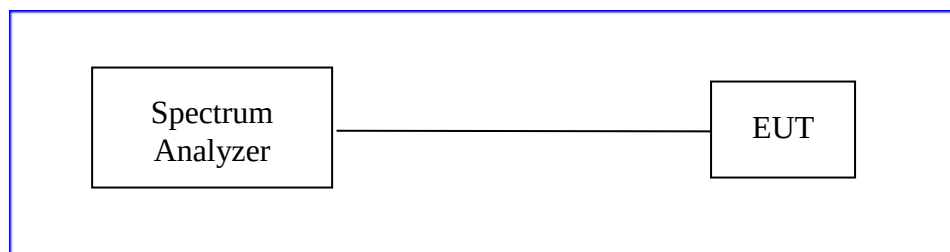
15.231(c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

A.1.3 Bandwidth of Momentary Signals

The 99% bandwidth of momentarily operated devices shall be less or equal to 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the 99% bandwidth shall be less or equal to 0.5% of the centre frequency.

4.1.3 Test Setup

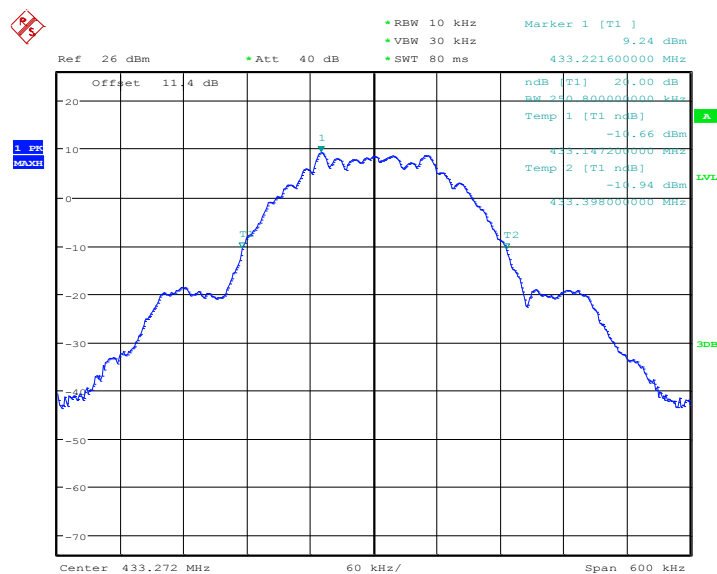


4.1.4 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

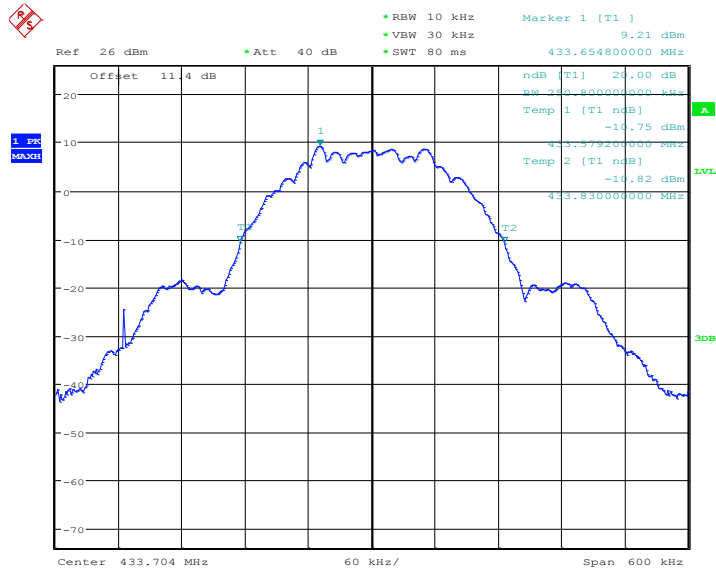
Table 2: Occupied Bandwidth – Test Results

Bandwidth (MHz)			
Data Rate	Freq. (MHz)	20dB Bandwidth (KHz)	99% Bandwidth (KHz)
200 kb/s	433.272	250.80	216.00
	433.704	250.80	216.00
	434.568	250.80	217.20
	Note: None		



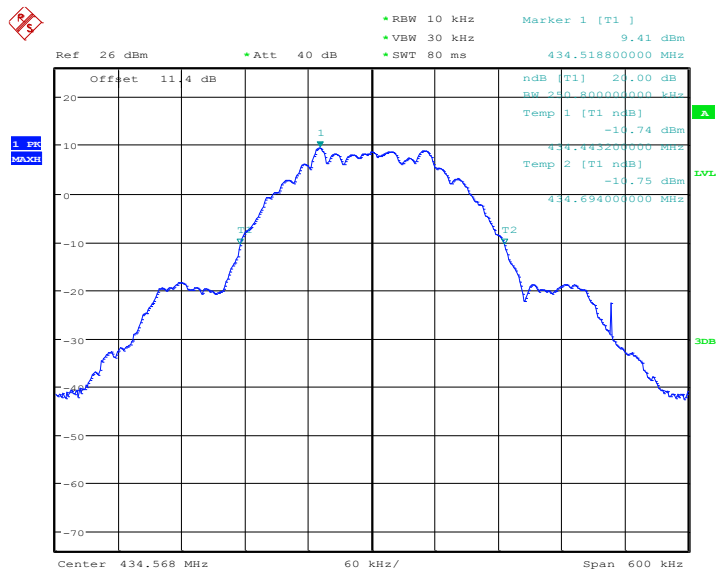
Date: 29.AUG.2019 15:33:43

Figure 7: 433.272MHz, 20dB Bandwidth



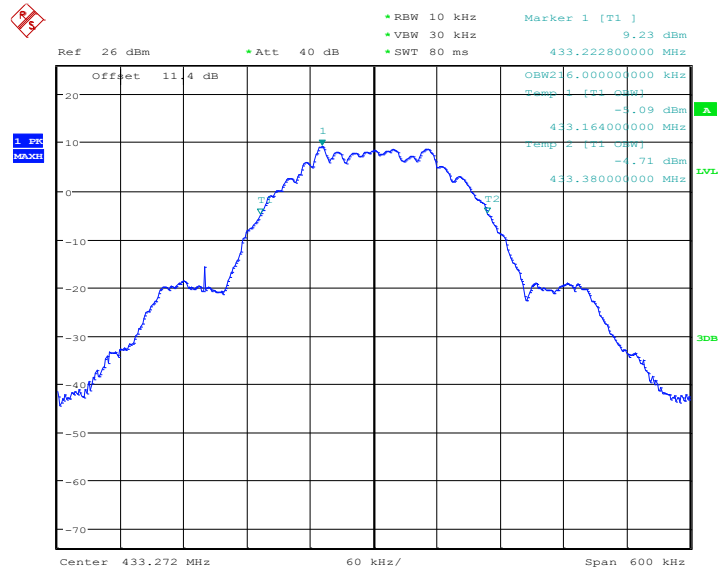
Date: 29.AUG.2019 15:35:00

Figure 8: 433.704MHz, 20dB Bandwidth



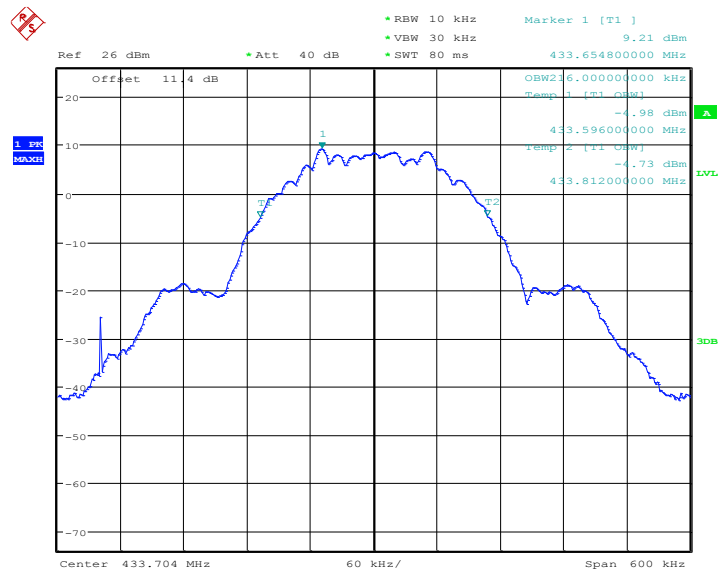
Date: 29.AUG.2019 15:38:19

Figure 9: 434.568MHz, 20dB Bandwidth



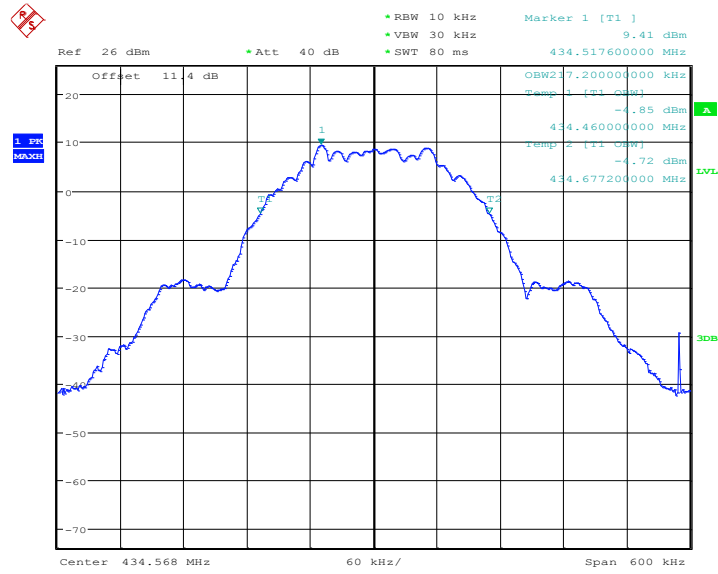
Date: 29.AUG.2019 15:32:42

Figure 10: 433.272MHz, 99% Occupied Bandwidth



Date: 29.AUG.2019 15:35:43

Figure 11: 433.704MHz, 99% Occupied Bandwidth



Date: 29.AUG.2019 15:37:36

Figure 12: 433.568MHz, 99% Occupied Bandwidth

4.2 Peak Type of Momentary Signal

4.2.1 Overview of Test

Results	Complies (as tested per this report)					Date	08/20/2019	
Product	View 4				Serial#	0196		
EUT Powered By	3V	Temp	24° C	Humidity	45%	Pressure	996 mbar	
Frequency Range	433.164 MHz to 434.676 MHz							
Perf. Criteria	(Below Limit)			Test Performed By		Alexander Sowinski		

4.2.2 Test Specifications

15.231(a) 3

Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

A.1.1 (c)

Periodic transmissions at regular, predetermined intervals are not permitted, except as (c) specified in Section A.1.4. However, polling or supervision transmissions that determine system integrity of transmitters used in security or safety applications are permitted, provided the total duration of transmission does not exceed 2 seconds per hour for each transmitter

4.2.3 Results

Based on the following information from the customer, the EUT was found to be compliant to the requirements of the test standard(s).

Each periodic announce is 0.88ms long, every 3sec. For a one (1) hour observation period, that translates to just over one second (1.056s) on-the-air time.

4.3 Radiated Output Power for Fundamental and Harmonic Frequencies

4.3.1 Overview of Test

Results	Complies (as tested per this report)					Date	08/15/2019	
Product	View 4				Serial#	0196		
EUT Powered By	3V	Temp	23° C	Humidity	41%	Pressure	998 mbar	
Frequency Range	433.164 MHz to 434.676 MHz							
Perf. Criteria	(Below Limit)			Test Performed By		Alexander Sowinski		

4.3.2 Test Specifications

15.231(b) 2

The field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2250	225
70-130	1,250	125
130-174	¹ 1,250 to 3,750	¹ 125 to 375
174-260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

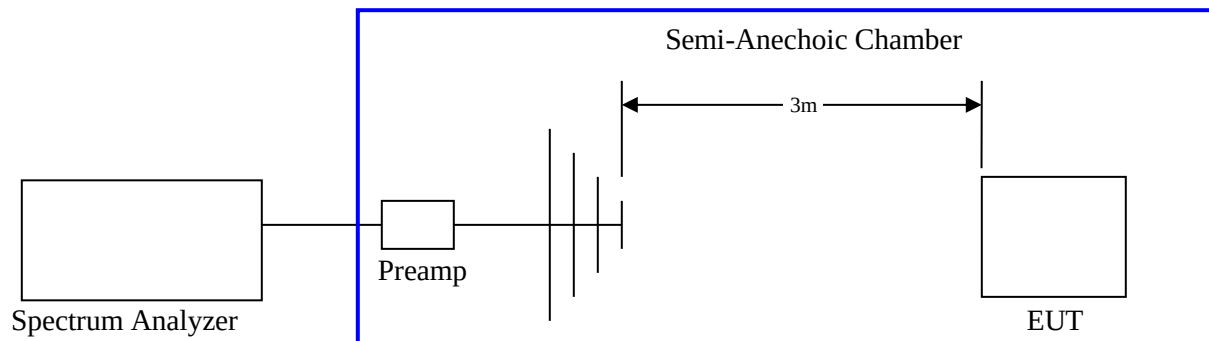
¹ Linear interpolations.

Intentional radiators operating under the provisions of this section shall demonstrate compliance with the limits on the field strength of emissions as shown in above table, based on the average value of the measured emissions. As an alternative, compliance with the limits in the above table may be based on the use of measurement instrumentation with a CISPR quasi-peak detector. The specific method of measurement employed shall be specified in the application for equipment authorization.

A.1.2 (a)

The field strength of emissions from momentarily operated intentional radiators shall (a) not exceed the limits outlined in Table, based on the average value of the measured emissions. The requirements of the Pulsed Operation section of RSS-Gen apply for averaging pulsed emissions and limiting peak emissions. Alternatively, compliance with the limits in Table A1 may be demonstrated using an International Special Committee on Radio Interference (CISPR) quasi-peak detector.

4.3.3 Test Setup:



4.3.4 Limits

Standard	Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
CFR 47, Part 15, Subpart C	260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
RSS-210 Issue 9	260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
CFR 47, Part 15, Subpart C	433.272	80.80	60.80
CFR 47, Part 15, Subpart C	433.704	80.82	60.82
CFR 47, Part 15, Subpart C	434.568	80.85	60.85

¹Linear interpolations.

4.3.5 Deviations from Standard

The duty cycle correction is calculated as follows.

$$\delta(\text{dB}) = 20\log(\Delta) \text{ where}$$

δ is the duty cycle correction factor (dB)

Δ is the duty cycle (dimensionless) $(100 * ((.88\text{mS})/ (.88\text{mS} + 3\text{sec})))$

$$\delta(\text{dB}) = -30.66$$

4.3.6 Test results:

The EUT is Compliant to the requirements of this test.

4.3.7 Test Data

Frequency (MHz)	Quasi Peak (dBuV/m)	Polarity (V/H)	Height (cm)	Azimuth (degree)	δ (dB) Duty cycle correction	Corrected Value (dBuV/m)
433.272	76.7	V	400	0	-30.66	46.04
866.544	56.04	H	300	0	-30.66	25.38

Frequency (MHz)	Quasi Peak (dBuV/m)	Polarity (V/H)	Height (cm)	Azimuth (degree)	δ (dB) Duty cycle correction	Corrected Value (dBuV/m)
433.704	91.29	H	400	0	-30.66	60.63
867.408	31.84	V	200	0	-30.66	1.18

Frequency (MHz)	Quasi Peak (dBuV/m)	Polarity (V/H)	Height (cm)	Azimuth (degree)	δ (dB) Duty cycle correction	Corrected Value (dBuV/m)
434.568	92.51	V	300	0	-30.66	61.85
869.136	31.98	H	400	0	-30.66	1.32

4.4 Spurious Emissions

4.4.1 Overview of Test

Results	Complies (as tested per this report)					Date	08/15/2019
Product	View 4				Serial#	0196	
EUT Powered By	3V	Temp	23° C	Humidity	41%	Pressure	998 mbar
Frequency Range	433.164 MHz to 434.568 MHz						
Perf. Criteria	(Below Limit)		Test Performed By		Alexander Sowinski		

4.4.2 Test Specifications

15.231 (b) 3

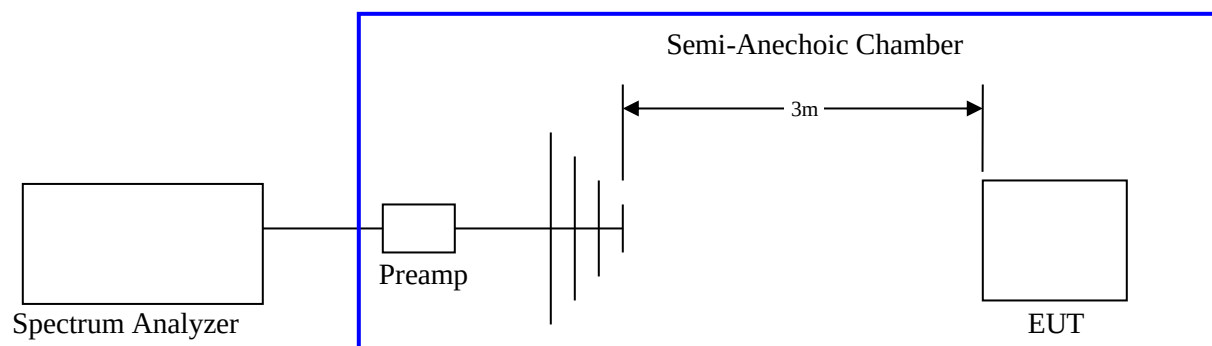
The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

A.1.2 (b)

Unwanted emissions shall be 10 times below the fundamental emissions field strength (b) limits in Table A1 or comply with the limits specified in RSS-Gen, whichever is less stringent.

4.4.3 Test Setup

Normal Conditions Test Setup:



4.4.4 Limits

Standard	Fundamental Frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
CFR 47, Part 15, Subpart C	260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
RSS-210 Issue 9	260-470	¹ 3,750 to 12,500	¹ 375 to 1,250

¹Linear interpolations.

4.4.5 Deviations

A Quasi-Peak detector was used to measure the emissions < 1000MHz.

4.4.6 Results

Frequency MHz	Level dBuV/m	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB
1.561225	50.11	PE	125	0	63.74	-13.62
12.89745	46.8	PE	125	0	69.5	-22.7
0.409963	53.48	PE	125	0	76.24	-22.76
0.159284	65.5	PE	125	0	89.18	-23.68
25.08914	45.75	PE	125	0	69.5	-23.75
0.242844	58.5	PE	125	0	83.41	-24.91

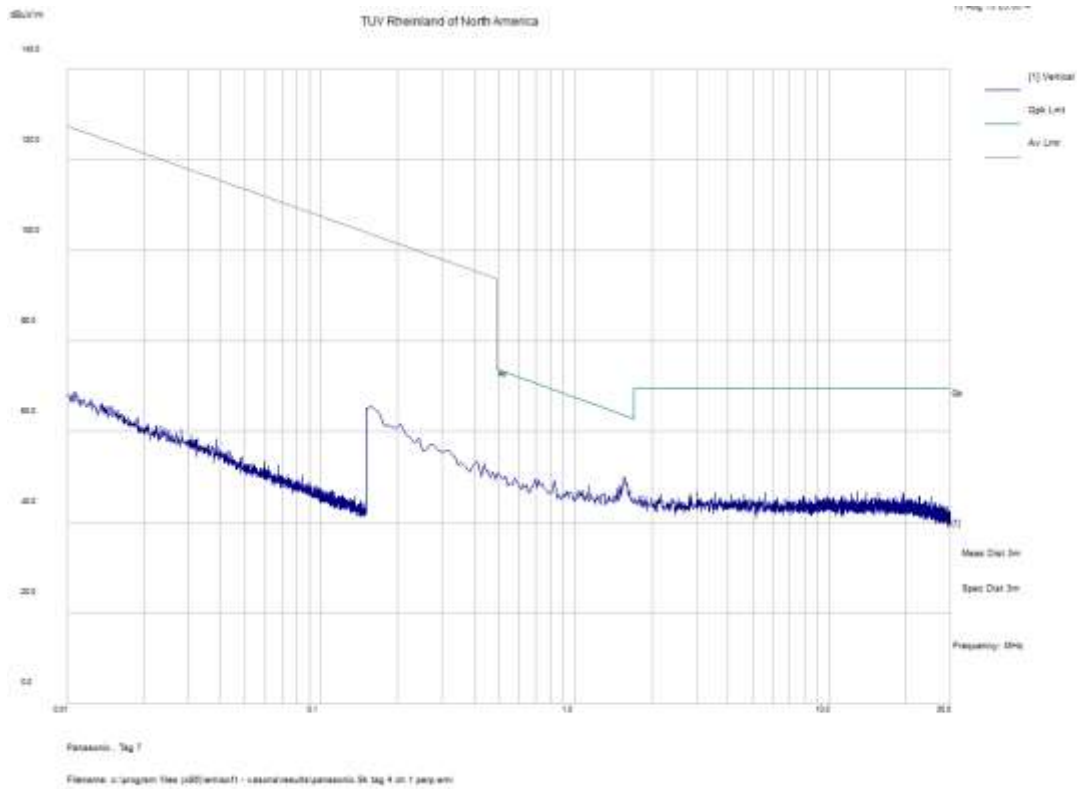


Figure 13: 9 – 30,000 kHz, Perpendicular, 433.272 MHz

Frequency MHz	Level dBuV/m	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB
0.669925	49.89	PA	125	0	71.09	-21.2
8.496653	47.12	PA	125	0	69.5	-22.38
21.97768	45.99	PA	125	0	69.5	-23.51
0.242844	59.86	PA	125	0	83.41	-23.54
0.335688	54.73	PA	125	0	78.98	-24.25
0.15	65.12	PA	125	0	90	-24.88

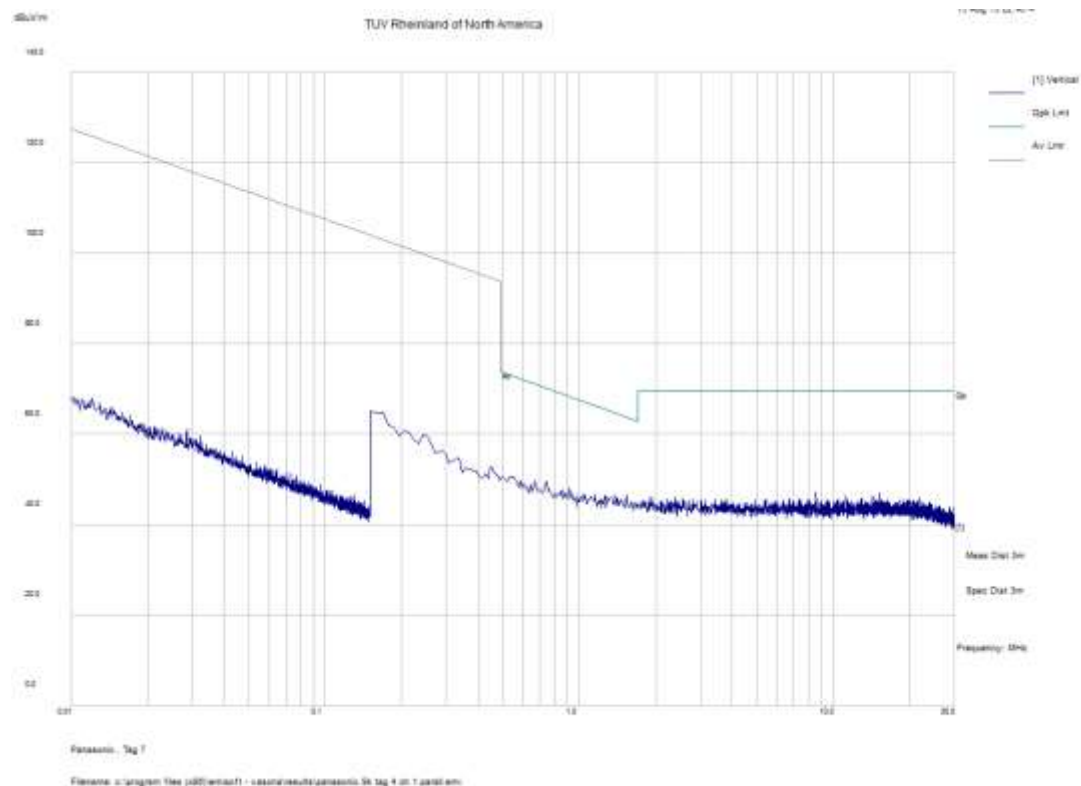


Figure 14: 9 – 30,000 kHz, Parallel, 433.272 MHz

Frequency MHz	Level dBuV/m	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB
1.589078	49.74	PE	125	0	63.58	-13.84
0.716347	49.74	PE	125	0	70.5	-20.76
18.55694	46.57	PE	125	0	69.5	-22.93
0.279981	58.52	PE	125	0	81.46	-22.94
0.400678	52.85	PE	125	0	76.55	-23.7
25.97947	44.72	PE	125	0	69.5	-24.78

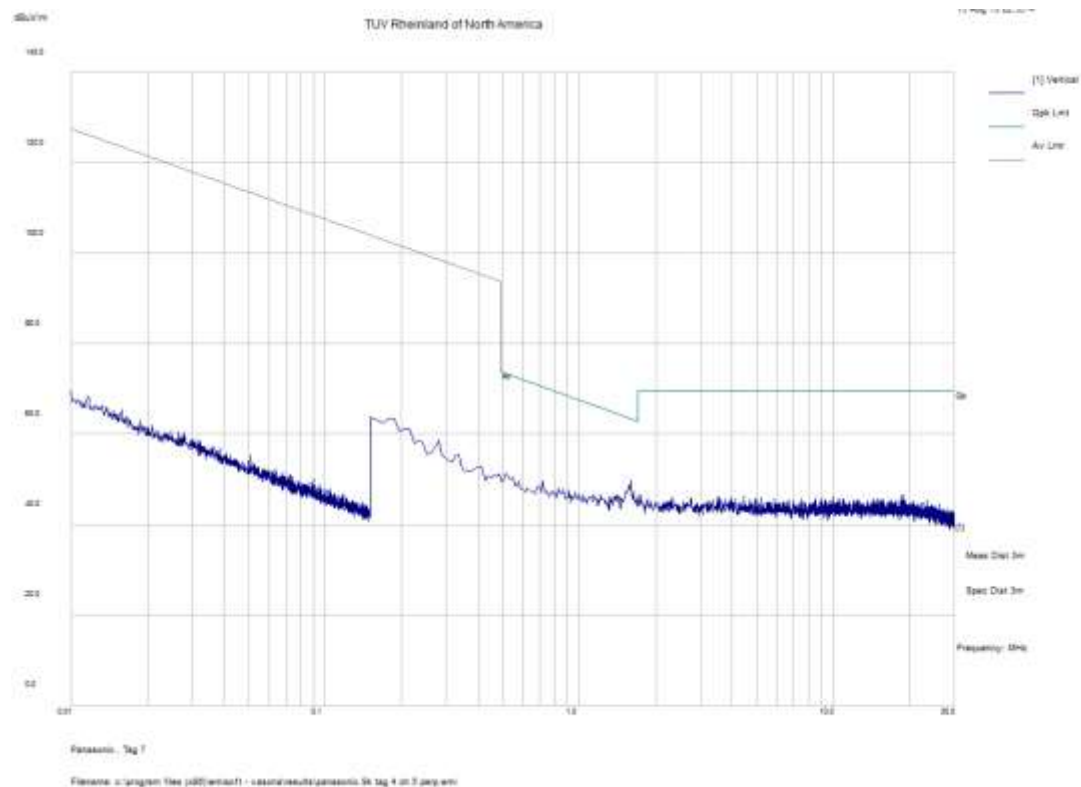


Figure 15: 9 – 30,000 kHz, Perpendicular, 433.704 MHz

Frequency MHz	Level dBuV/m	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB
8.422378	47.75	PA	125	0	69.5	-21.75
0.642072	49.5	PA	125	0	71.46	-21.96
18.2383	46.68	PA	125	0	69.5	-22.82
0.177853	64.53	PA	125	0	87.67	-23.14
27.01974	45.41	PA	125	0	69.5	-24.09
0.242844	59.27	PA	125	0	83.41	-24.14

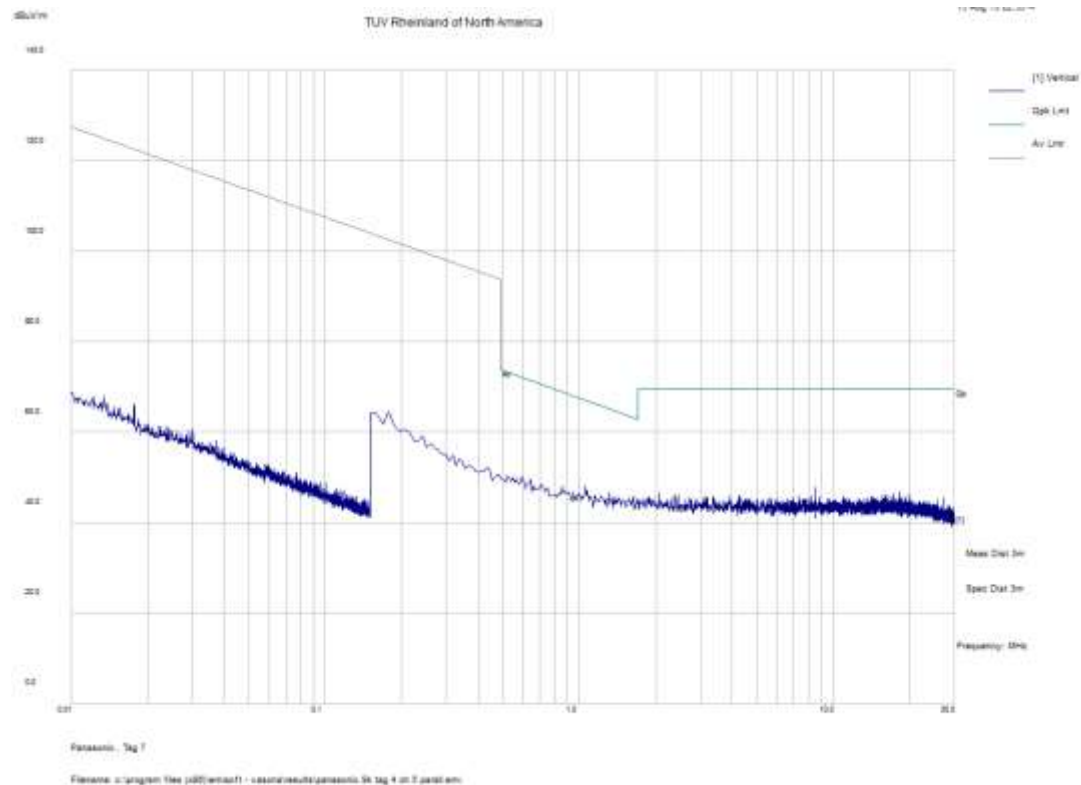


Figure 16: 9 – 30,000 kHz, Parallel, 433.704 MHz

Frequency MHz	Level dBuV/m	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB
1.570509	49.68	PE	125	0	63.68	-14
0.493522	51.67	PE	125	0	73.74	-22.07
8.552359	47.31	PE	125	0	69.5	-22.19
18.52883	46.03	PE	125	0	69.5	-23.48
0.15	65.57	PE	125	0	90	-24.43
27.50708	43.87	PE	125	0	69.5	-25.63

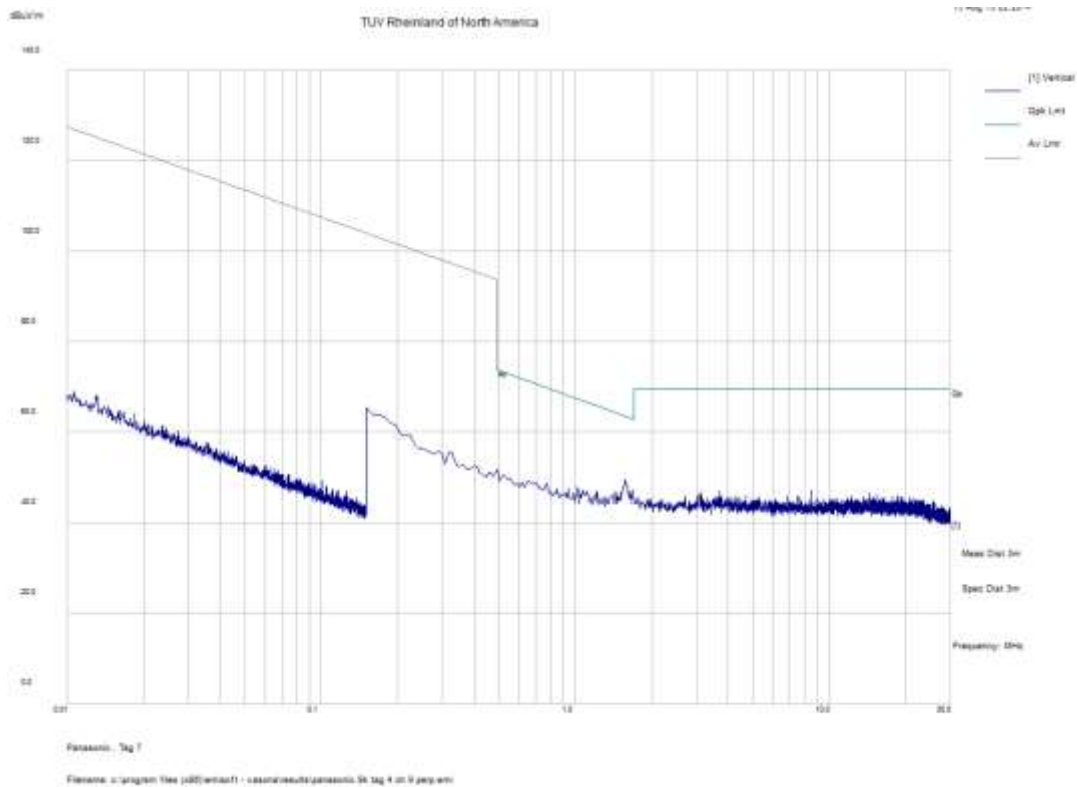


Figure 17: 9 – 30,000 kHz, Perpendicular, 434.568 MHz

Frequency MHz	Level dBuV/m	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB
0.948456	48.22	PA	125	0	68.07	-19.84
0.493522	51.17	PA	125	0	73.74	-22.58
3.770906	46.76	PA	125	0	69.5	-22.74
0.15	66.42	PA	125	0	90	-23.58
0.307834	55.81	PA	125	0	80.16	-24.35
0.214991	60.13	PA	125	0	85.07	-24.95

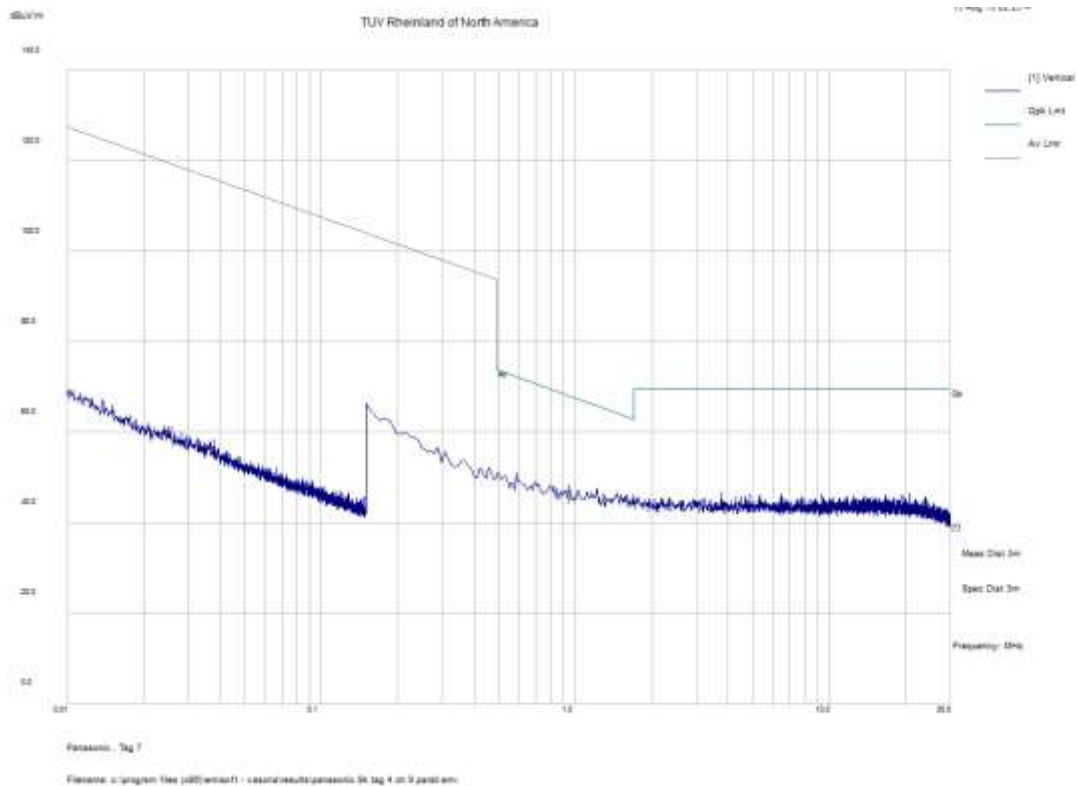


Figure 18: 9 – 30,000 kHz, Parallel, 434.568 MHz

Frequency MHz	QPeak Level dBuV	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB
433.1563	76.7	V	400	0	N/A*	N/A*
866.625	56.04	H	300	0	N/A*	N/A*
951.8031	32.04	H	200	0	60.8	-28.76
431.3375	32.04	H	300	0	60.8	-28.77
427.3969	28.8	H	300	0	60.8	-32
30.30313	24.26	H	200	0	60.8	-36.54
38.79063	18.36	H	100	0	60.8	-42.44

*Note: Fundamental frequency band & first harmonic excluded from spurious emissions measurements.

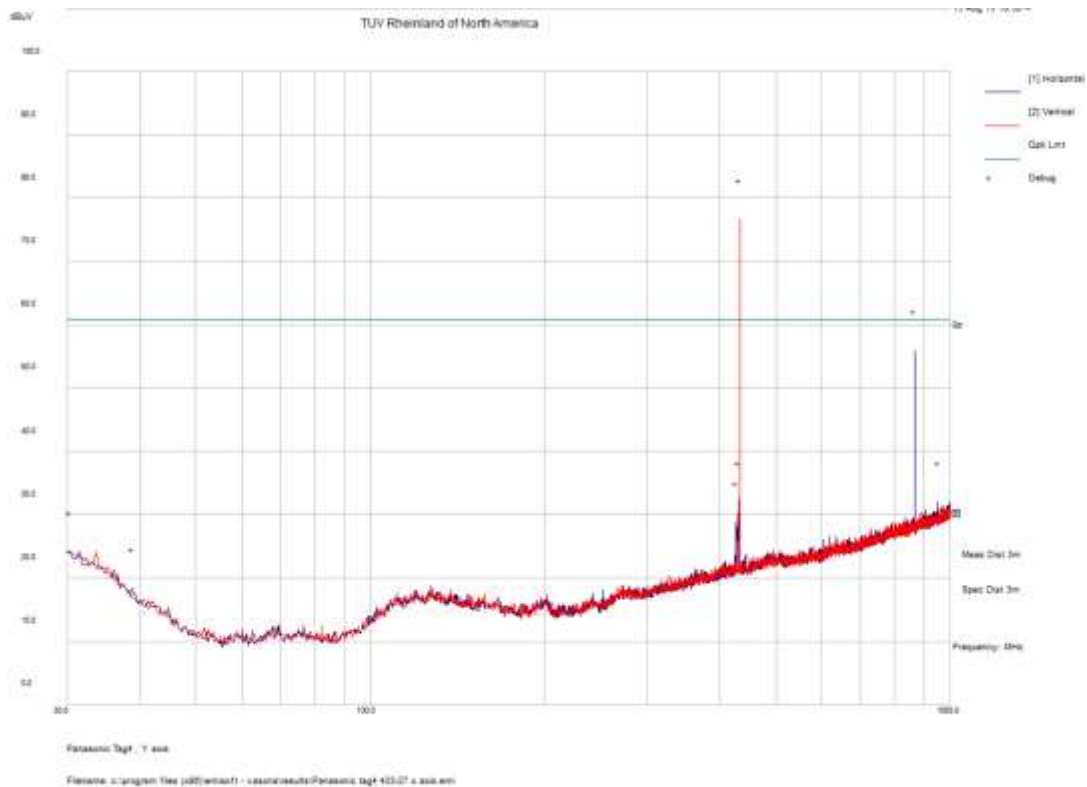


Figure 19: 30MHz-1000MHz, 433.272 MHz

Frequency MHz	Peak Level dBuV	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB
2166.406	41.7	V	100	247	60.8	-19.1
5513.281	40.63	H	100	216	60.8	-20.17
5553.906	40.6	V	200	114	60.8	-20.2
5782.813	40.2	V	200	153	60.8	-20.6
5817.969	40.14	H	200	38	60.8	-20.67
5249.219	40.09	H	100	296	60.8	-20.71

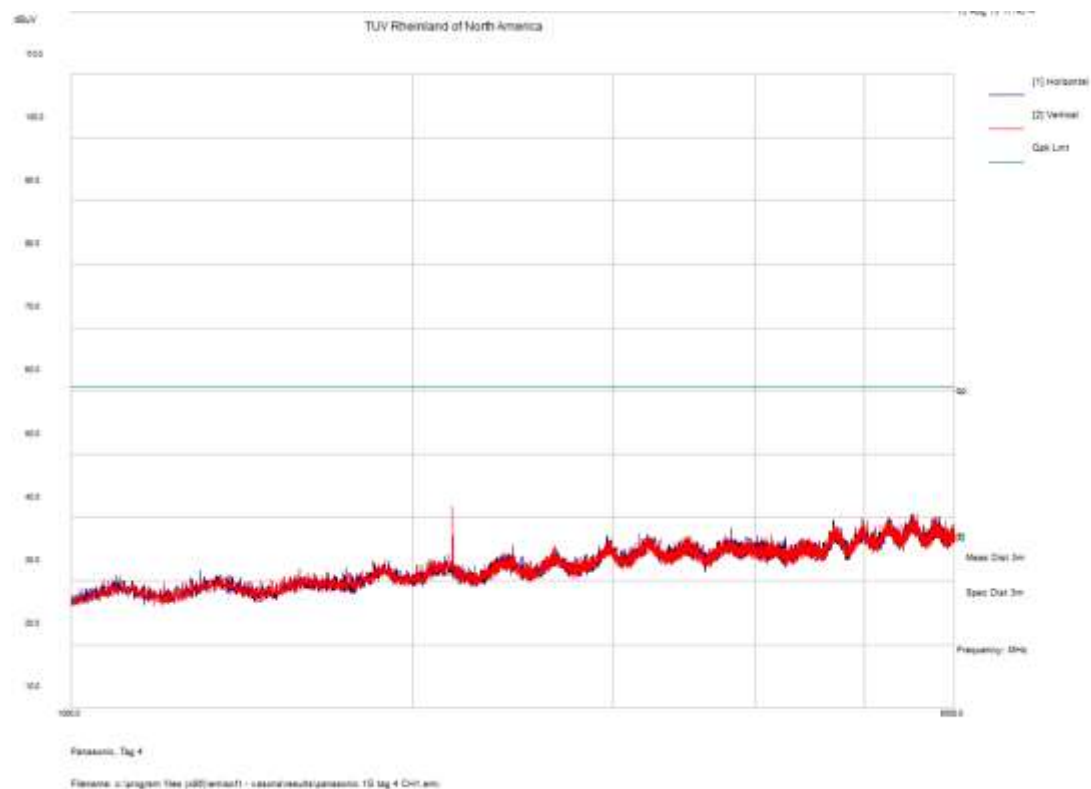


Figure 20: 1-6GHz, 433.272 MHz

Frequency MHz	QPeak Level dBuV	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB
433.7625	91.29	H	400	0	N/A*	N/A*
990.3	31.84	V	200	0	60.8	-28.97
30.30313	25.14	H	400	0	60.8	-35.67
249.1594	21.33	V	300	0	60.8	-39.47
46.67188	20.56	V	300	0	60.8	-40.24
37.57813	19.2	H	300	0	60.8	-41.6

*Note: Fundamental frequency band & first harmonic excluded from spurious emissions measurements.

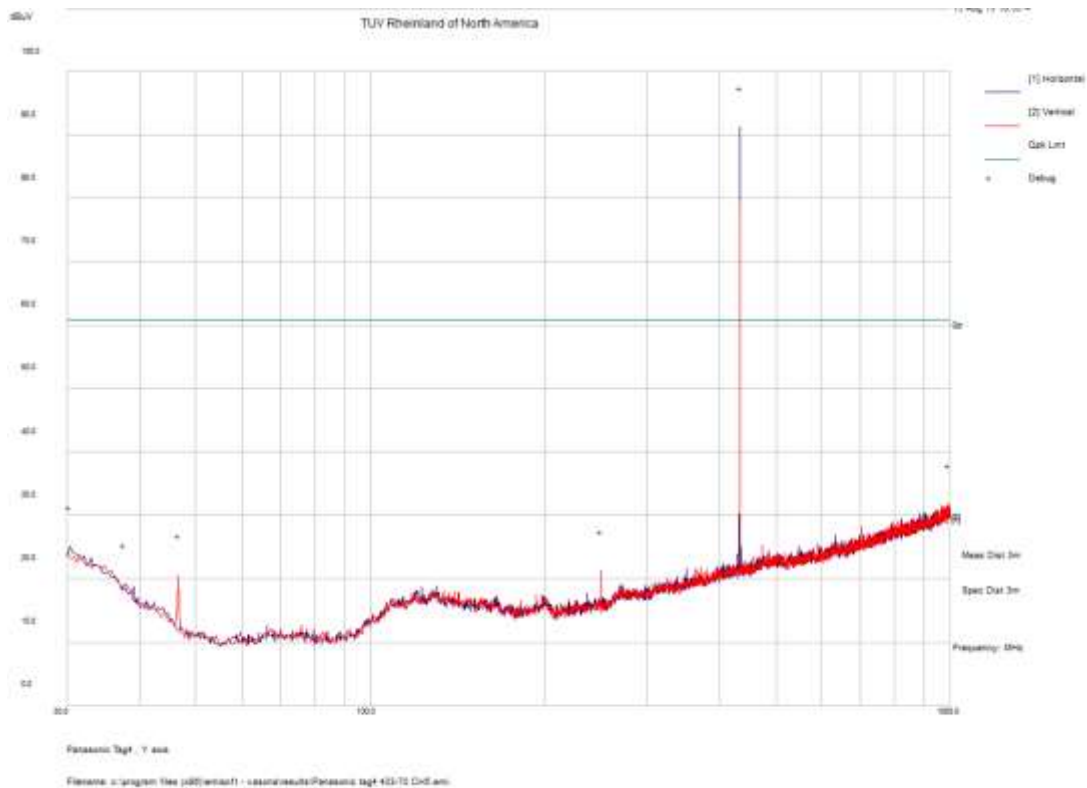


Figure 21: 30-1000 MHz, 433.704 MHz

Frequency MHz	Peak Level dBuV	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB
5514.844	41.16	H	100	319	60.8	-19.64
5215.625	40.73	V	100	2	60.8	-20.07
5567.188	40.53	H	100	2	60.8	-20.27
5260.156	40.5	H	200	122	60.8	-20.3
5292.969	40.35	H	100	88	60.8	-20.45
5762.5	40.32	H	200	2	60.8	-20.48

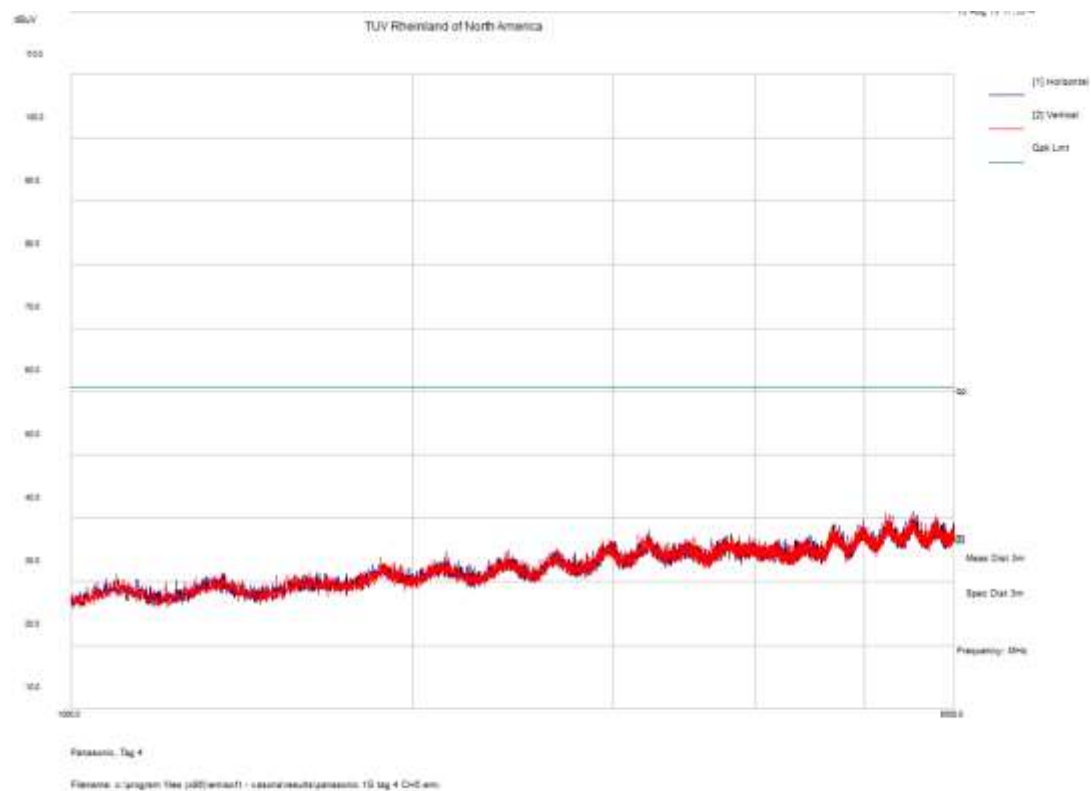


Figure 22: 1-6GHz, 433.704 MHz

Frequency MHz	QPeak Level dBuV	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB
434.0656	92.51	V	300	0	N/A*	N/A*
967.5656	31.98	H	400	0	60.8	-28.82
30	25.96	V	300	0	60.8	-34.84
37.57813	19.18	H	400	0	60.8	-41.62

*Note: Fundamental frequency band & first harmonic excluded from spurious emissions measurements.

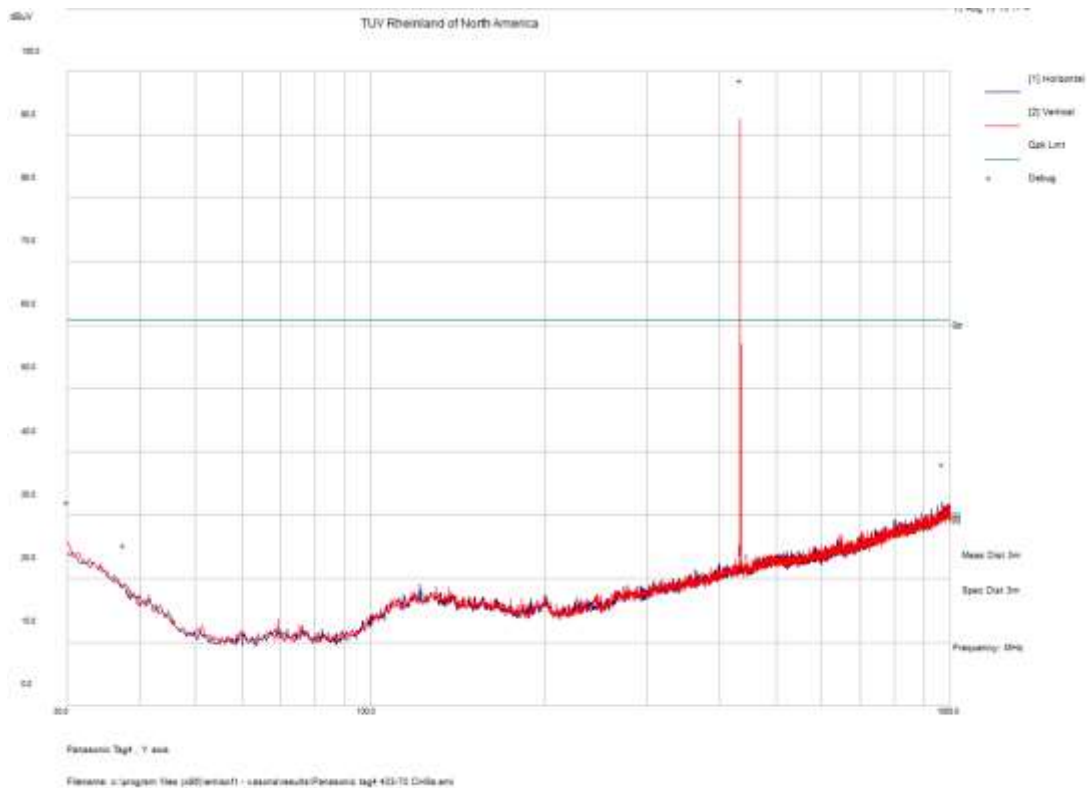


Figure 23: 30-1000 MHz, 434.568 MHz

Frequency MHz	Peak Level dBuV	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB
2170.313	43.05	H	200	344	60.8	-17.75
5517.969	40.43	V	100	349	60.8	-20.37
5279.688	40.34	H	100	0	60.8	-20.46
5314.063	40.08	H	200	355	60.8	-20.72
5784.375	39.83	H	200	280	60.8	-20.97
4950.781	39.64	V	100	76	60.8	-21.16

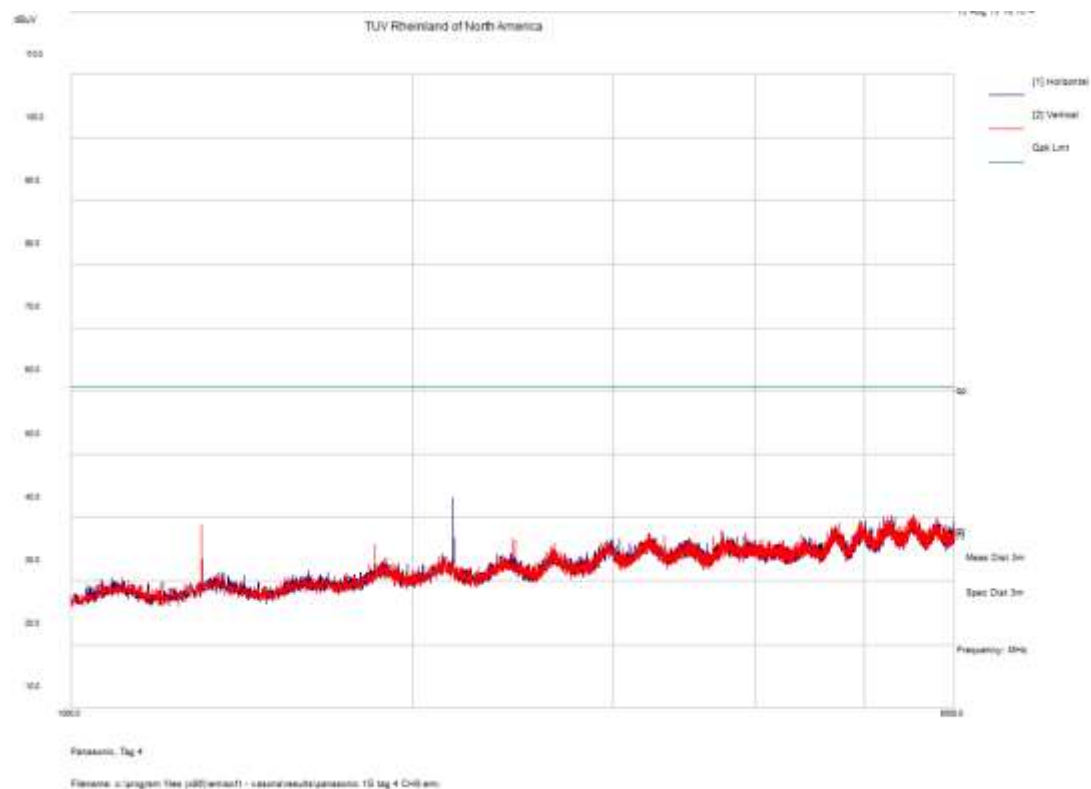


Figure 24: 1-6 GHz, 434.568 MHz

5 Setup Photos

5.1 Conducted Setup

See “Conducted Tabletop Setup.jpg”

Figure 25: Photo of Conducted Tabletop Setup

5.2 Radiated Setup

See “View4 9kRE Setup1.jpg”

Figure 26: 9 – 30,000 kHz Radiated Emission Test Setup – Rear View

See “View4 9kRE Setup2.jpg”

Figure 27: 9 – 30,000 kHz Radiated Emission Test Setup – Front View

See “View4 RE Low Setup1.jpg”

Figure 28: 30 - 1000 MHz Radiated Emission Test Setup – Rear View

See “View4 RE Low Setup2.jpg”

Figure 29: 30 - 1000 MHz Radiated Emission Test Setup – Front View

See “View4 RE High Setup1.jpg”

Figure 30: 1 GHz – 6 GHz Radiated Emission Test Setup – Front View

See “View4 RE High Setup2.jpg”

Figure 31: 1 GHz – 6GHz Radiated Emission Test Setup – Rear View

6 EMC Test Plan

6.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

6.2 Customer

Table 3: Customer Information

Company Name	Panasonic Corporation of North America
Address	28 East Main Street, Suite 2100
City, State, Zip	Rochester NY 14614
Country	United States of America

Table 4: Technical Contact Information

Name	Igor Orlovich
E-mail	Igor.Orlovich@us.panasonic.com
Phone	1 (585) 713-1027

6.3 Equipment Under Test (EUT)

The information provided in the following table should be listed as it should appear in the final report. For those products that have only a model name, list the model number as *non-applicable* and vice-versa.

Table 5: EUT Designation

Product Name	RFID Tag
Model Number	View 4
Product Description	RFID Tag for tracking pallets in warehouse environments
FCC ID	ACJ-VT04-G3
IC ID	216A-VT04-G3

6.4 Product Specifications

Table 6: EUT Specifications

EUT specifications	
Dimensions	5.85" (148.5mm) x 4.04" (102.4mm) x 0.56" (14.1mm)
AC Input	N/A
Environment	indoor
Operating Temperature Range:	-20 to +55 degrees Celsius
Multiple Feeds:	☐ Yes and how many ☒ No
Hardware Version	View 4
Software Version	01.01.08.01
Operating Mode	N/A
Transmitter Frequency Band	433.05 - 434.79
Max. Rated Power Output	11 dBm (E.R.P.)
Power Setting @ Operating Channel	N/A
Antenna Type	Internal pcb print Antenna
Declared Antenna Gain	-5.1 dBi
Modulation Type	☐ AM ☐ FM ☐ DSSS ☐ OFDM ☒ Other describe: GFSK
Data Rate	200 kbits/s
TX/RX Chain (s)	Single Transmitter; no beam forming;
Directional Gain Type	☐ Correlated ☐ Beam-Forming ☒ Other describe: N/A
Type of Equipment	☐ Table Top ☒ Wall-mount ☐ Floor standing cabinet ☐ Other: Door or Window mounted

6.5 Interface Specifications

Table 7: Interface Specifications

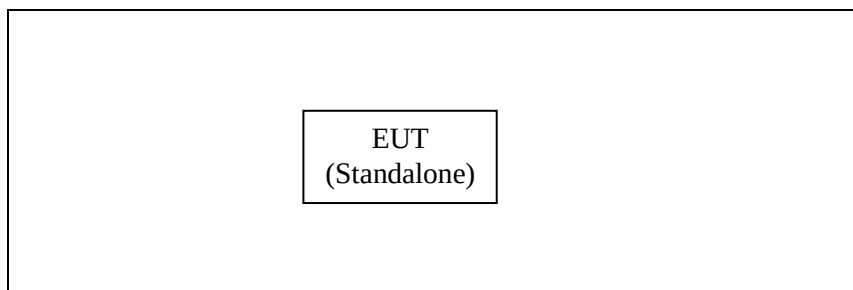
Interface Type	Cabled with what type of cable?	Is the cable shielded?	Maximum potential length of the cable?	Metallic (M), Coax (C), Fiber (F), or Not Applicable?
N/A	N/A	☐ No	☐ Metric: 2 m	☐ N/A
Note: None.				

Table 8: Supported Equipment

Equipment	Manufacturer	Model	Serial	Used for
-	-	-	-	-
Note: None.				

6.6 Configuration(s)

Radiated Test Setup:



Conducted Test Setup:

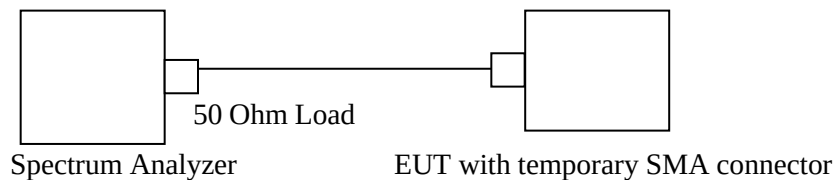


Table 9: Description of Sample used for Testing

Device	I.D.	Configuration	Used For
View 4 PCBA “CH1”	01AF	Continuous Modulated Tx Temporary SMA connector	All conducted test cases
View 4 PCBA “CH5”	0195	Continuous Modulated Tx Temporary SMA connector	All conducted test cases
View 4 PCBA “CH13”	0194	Continuous Modulated Tx Temporary SMA connector	All conducted test cases
Note: None			

Table 10: Description of Test Configuration used for Radiated Measurement.

Device	I.D.	Antenna	Mode	Setup Description
View 4 Tag	0196	Internal	Continuous Modulated Tx/Rx	Positioned along Y-axis as worst case.
Note: None				

6.7 Test Specifications

Table 11: Test Specifications

Emissions and Immunity	
Standard	Requirement
CFR 47 Part 15.231	All
RSS 210 Issue 9 August 2016	All

END OF REPORT