



FCC CFR47 PART 95H REQUIREMENT

TEST REPORT

FOR

TRANSMITTER

MODEL: ZM-531PA

FCC ID: B6BZM-531PAA

REPORT NUMBER: 10989131H-B

ISSUE DATE: October 30, 2015

**Prepared for
NIHON KOHDEN CORPORATION
1-31-4, NISHIOCHIAI SHINJUKU-KU
TOKYO 161-8560, JAPAN**

**Prepared by
UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
TEL: +81 596 24 8999
FAX: +81 596 24 8124**



NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation. *As for the range of Accreditation in NVLAP, you may refer to the WEB address, http://japan.ul.com/resources/emc_accredited/

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	10/30/15	Initial Issue	T. Hatakeda

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. MEASURING INSTRUMENT CALIBRATION	5
4.2. SAMPLE CALCULATION	5
4.3. MEASUREMENT UNCERTAINTY	6
5. EQUIPMENT UNDER TEST	7
5.1. DESCRIPTION OF EUT	7
5.2. DESCRIPTION OF AVAILABLE ANTENNAS	7
5.3. SOFTWARE AND FIRMWARE	7
5.4. WORST-CASE CONFIGURATION AND MODE	7
5.5. DESCRIPTION OF TEST SETUP	8
6. TEST AND MEASUREMENT EQUIPMENT	9
7. ANTENNA PORT TEST RESULTS	10
7.1. 26 dB AND 99% BW	10
7.2. PEAK OUTPUT POWER	14
7.3. AVERAGE POWER	15
7.4. SPURIOUS EMISSIONS AT ANTENNA TERMINAL	16
7.5. FREQUENCY STABILITY MEASUREMENT	19
8. RADIATED EMISSION TEST RESULTS	22
8.1. FUNDAMENTAL OUTPUT POWER	23
8.2. RADIATED EMISSIONS BELOW 960 MHz	24
8.3. RADIATED EMISSIONS ABOVE 960 MHz	28
9. SETUP PHOTOS	32

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: NIHON KOHDEN CORPORATION
1-31-4, NISHIOCHIAI SHINJUKU-KU
TOKYO 161-8560, JAPAN

EUT DESCRIPTION: TRANSMITTER

MODEL: ZM-531PA

SERIAL NUMBER: A00001 (for Spurious emission test)
A00003 (for Antenna terminal conducted tests)

DATE TESTED: OCTOBER 7 TO 19, 2015

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 95 SUBPART H	Pass

UL Japan, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Japan, Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Japan, Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Japan, Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL Japan, Inc. By:

Tested By:



TAKAHIRO HATAKEDA
Leader
Consumer Technology Division
UL Japan, Inc.

TOMOKI MATSUI
Engineer
Consumer Technology Division
UL Japan, Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI/TIA-603-D-2010, FCC CFR 47 Part 2 and FCC CFR 47 Part 95.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN.

UL Japan, Inc. is accredited by NVLAP, Laboratory Code 200572-0
The full scope of accreditation can be viewed at
<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor $k=2$.

Ise EMC Lab.

Test site (semi anechoic chamber)	Conducted emission Uncertainty (+/-)			
	No. 1	No. 2	No. 3	No. 4
150 kHz - 30 MHz	3.5 dB	3.5 dB	3.4 dB	3.5 dB

Test site (semi anechoic chamber)	Radiated emission Uncertainty (+/-)						
	Measurement distance: 3 m				1 m		0.5 m
	9 kHz - 30 MHz	30 MHz - 300 MHz	300 MHz - 1 GHz	1 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz
No. 1	4.3 dB	5.1 dB	6.2 dB	5.5 dB	5.8 dB	5.8 dB	4.3 dB
No. 2	4.2 dB	5.1 dB	6.2 dB	5.4 dB	5.7 dB	5.9 dB	5.6 dB
No. 3	4.4 dB	5.1 dB	6.3 dB	5.2 dB	5.5 dB	5.8 dB	5.5 dB
No. 4	4.7 dB	5.3 dB	6.3 dB	5.3 dB	5.7 dB	5.9 dB	5.5 dB

Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz - 3 GHz	3 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz	
0.7 dB	1.5 dB	1.5 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

- | | | |
|-----|----------------------------|---|
| a). | Type of EUT: | TRANSMITTER |
| b). | Brand Name: | NIHON KOHDEN |
| c). | Model No: | ZM-531PA |
| d). | FCC ID: | B6BZM-531PAA |
| e). | Battery Type: | Two AA (R6) |
| f). | Channel Number: | 1395.0250 MHz (channel number E002) to
1399.9750 MHz (channel number E398), and
1427.0250 MHz (channel number E502) to
1431.9750 MHz (channel number E898) |
| g). | Frequency Range: | 1395.025-1399.975 MHz and
1427.025-1431.975 MHz bands |
| h). | RF Conducted Output Power: | 5mW (factory default setting) or 1mW |
| i). | Channel Spacing: | 50 KHz or 37.5 kHz (12.5 KHz when interleave) |
| j). | Modulation | Frequency Shift Keying |
| k). | Type of Modulation: | F1D |
| l). | Occupied Bandwidth | <20 kHz |
| m). | Antenna Type: | Internal |

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a Helical Monopole antenna, with a maximum gain of 0 dBi.

5.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was Channel Writer, rev. 01-14.

5.4. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

During emission tests the antenna orientations as X, Y, and Z were investigated to determine the worst-case. The outcome showed that Z-orientation for Horizontal and Y-orientation for Vertical as the worst-case.

5.5. DESCRIPTION OF TEST SETUP

DESCRIPTION OF EUT

DESCRIPTION OF EUT					
No.	Description	Manufacturer	Model	Serial Number	FCC ID
A	TRANSMITTER	NIHON KOHDEN CORPORATION	ZM-531PA	A00001(RE) / A00003(AT)	DoC

*RE: Spurious emission test, AT: Antenna terminal conducted tests

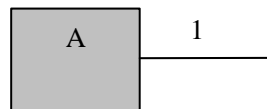
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	ECG Cable	1	ECG	Shielded	0.8m	N/A

TEST SETUP

Test setup is shown below setup diagram.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2015/07/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2015/01/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2015/06/02 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2015/02/05 * 12
MCC-168	Microwave Cable	Junkosha	MWX221	1408S016(1m) / 1409S492(5m)	RE	2015/09/24 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2015/01/28 * 12
MBF-09	Band Pass Filter	M-City	BPF4250-01	UL0004	RE	2015/06/01 * 12
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2015/05/15 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2015/06/08 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2014/10/18 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2014/10/18 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2015/02/06 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2014/11/11 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2015/09/04 * 12
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2015/05/18 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2014/12/22 * 12
MRENT-124	Spectrum Analyzer	KEYSIGHT	E4440A	MY46187750	AT	2015/06/24 * 12
MCH-06	Temperature and Humidity Chamber	Tabai Espec	PL-1KT	14007630	AT	2015/04/29 * 12
MCC-137	Microwave cable	HUBER+SUHNER	SUCOFLEX 102	37954/2	AT	2015/10/08 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2015/10/08 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2015/10/08 * 12
MAT-57	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2015/01/08 * 12
MCC-37	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2015/09/16 * 12

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

7. ANTENNA PORT TEST RESULTS

7.1. 26 dB AND 99% BW

LIMITS

§2.1049, for reporting purposes only, also the 26dB bandwidth shall be less than 20 KHz (F1D).

TEST PROCEDURE

ANSI C63.4

The transmitter output is connected to the spectrum analyzer.

26dB Bandwidth: The RBW is set to 1% to 5% of the 26dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 26dB bandwidth function is utilized.

99% Bandwidth: The RBW is set to 1% to 5% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

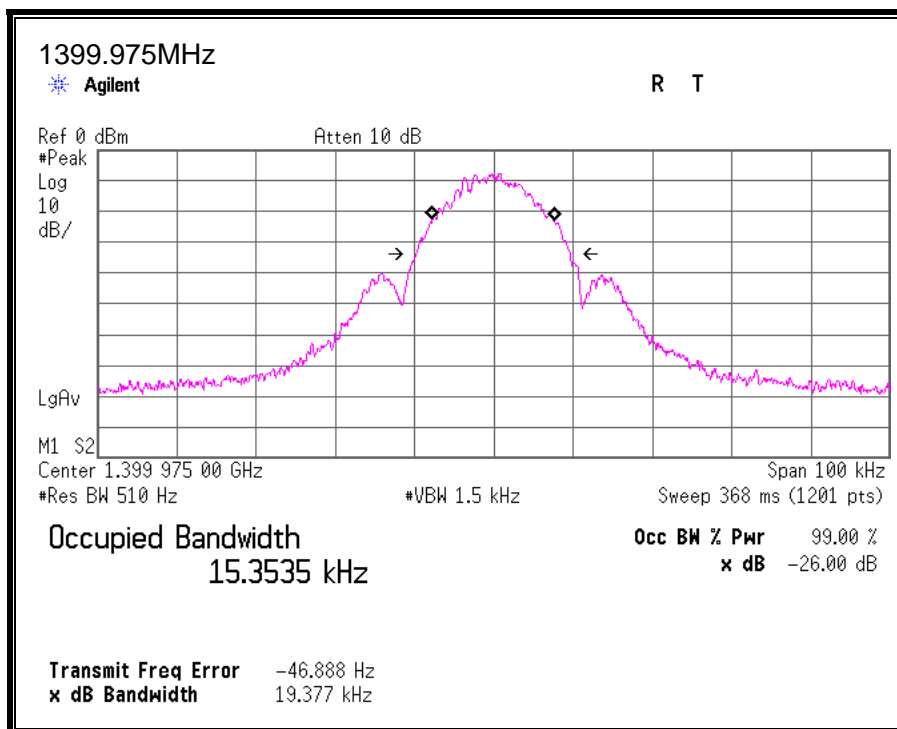
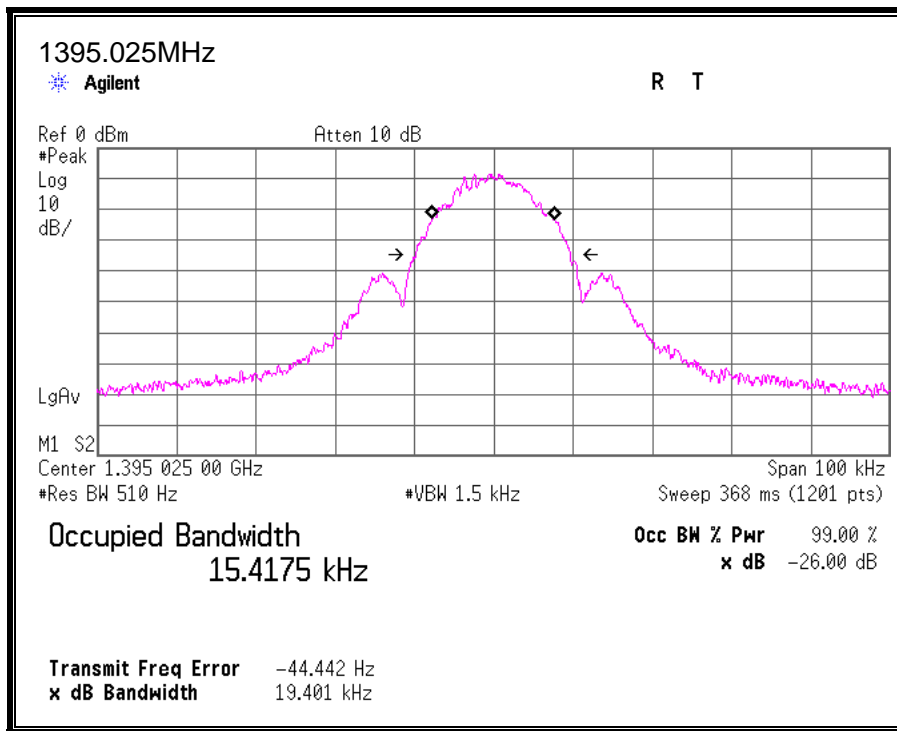
26dB Bandwidth

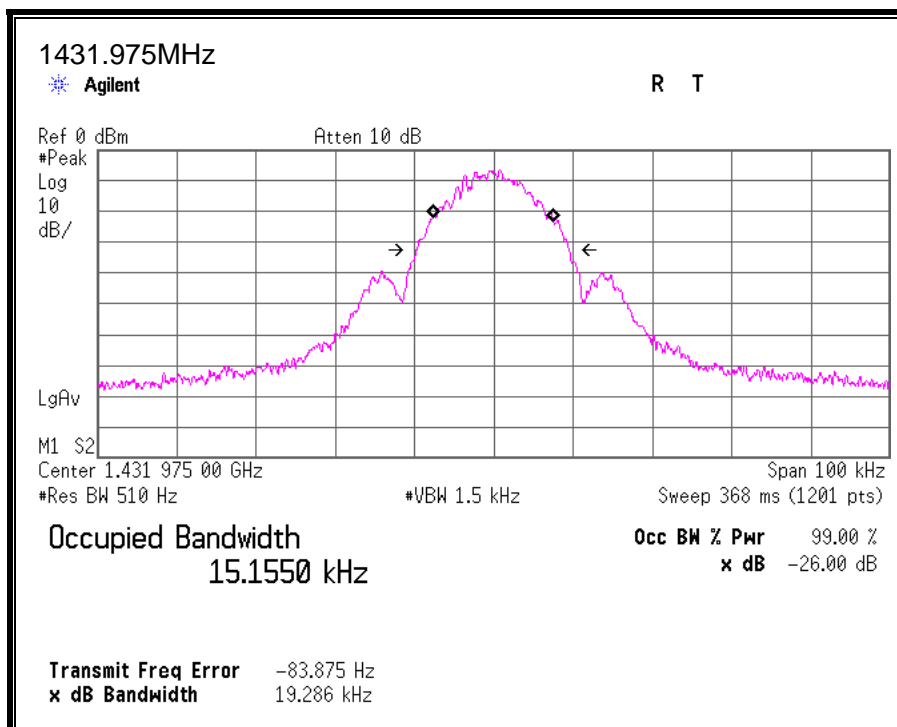
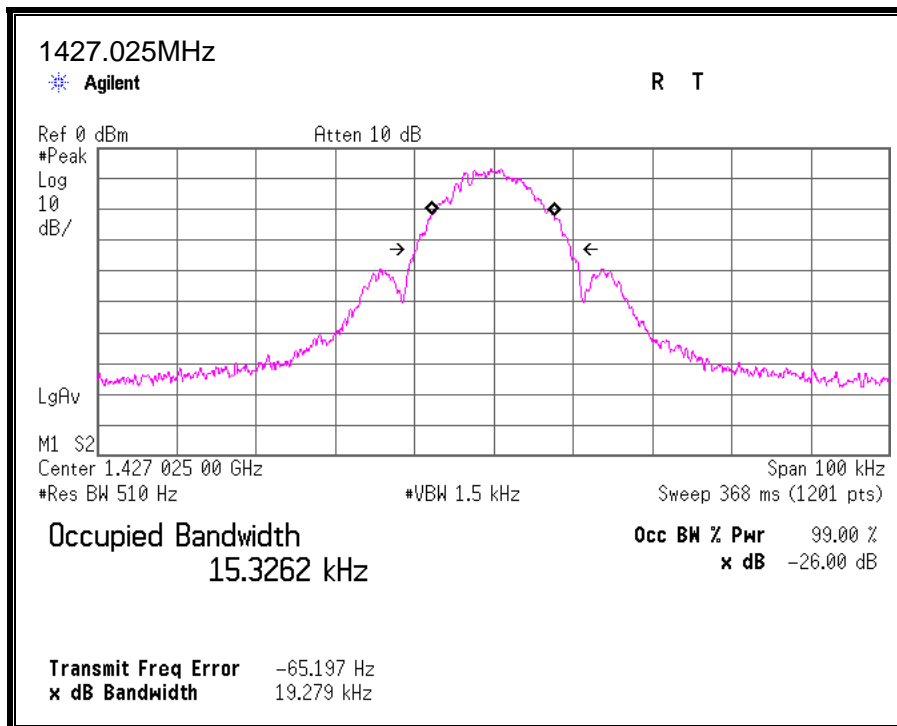
Channel	Frequency (MHz)	26dB Bandwidth (kHz)
E002	1395.025	19.401
E398	1399.975	19.377
E502	1427.025	19.279
E898	1431.975	19.286

99% Bandwidth

Channel	Frequency (MHz)	99% Bandwidth (kHz)
E002	1395.025	15.418
E398	1399.975	15.354
E502	1427.025	15.326
E898	1431.975	15.155

26dB and 99% BANDWIDTH





7.2. PEAK OUTPUT POWER

LIMITS

§2.1046, for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

PK

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
1395.025	-4.99	0.61	10.00	5.62	3.65
1399.975	-4.54	0.61	10.00	6.07	4.05
1427.025	-3.36	0.61	10.01	7.26	5.32
1431.975	-3.56	0.61	10.01	7.06	5.08

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

AV

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
				[dBm]	[mW]
1395.025	-5.10	0.61	10.00	5.51	3.56
1399.975	-4.66	0.61	10.00	5.95	3.94
1427.025	-3.46	0.61	10.01	7.16	5.20
1431.975	-3.65	0.61	10.01	6.97	4.98

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

7.4. SPURIOUS EMISSIONS AT ANTENNA TERMINAL

LIMIT

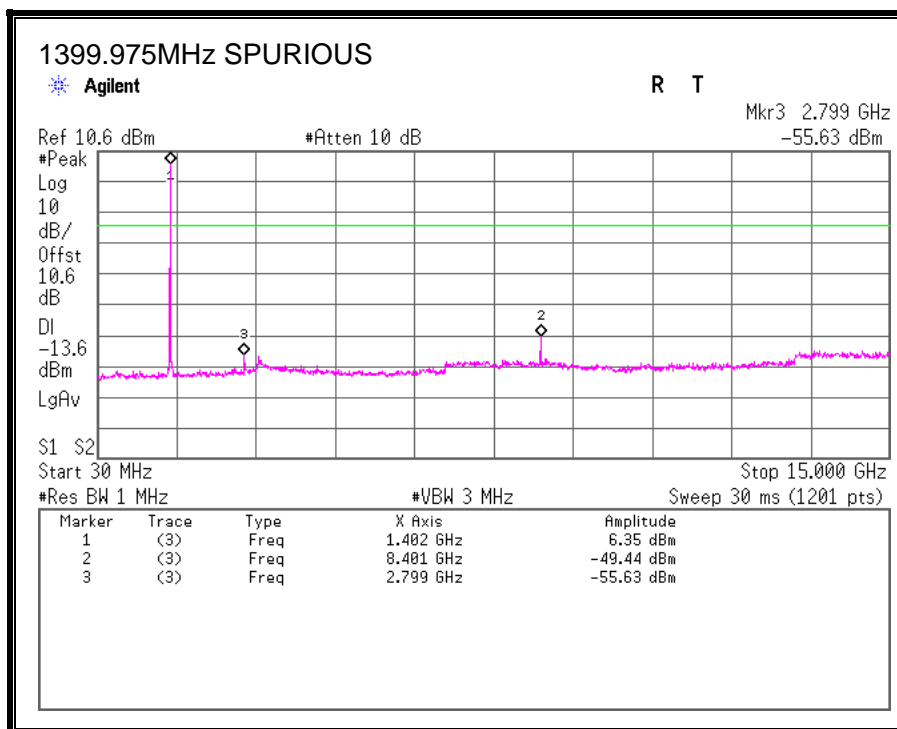
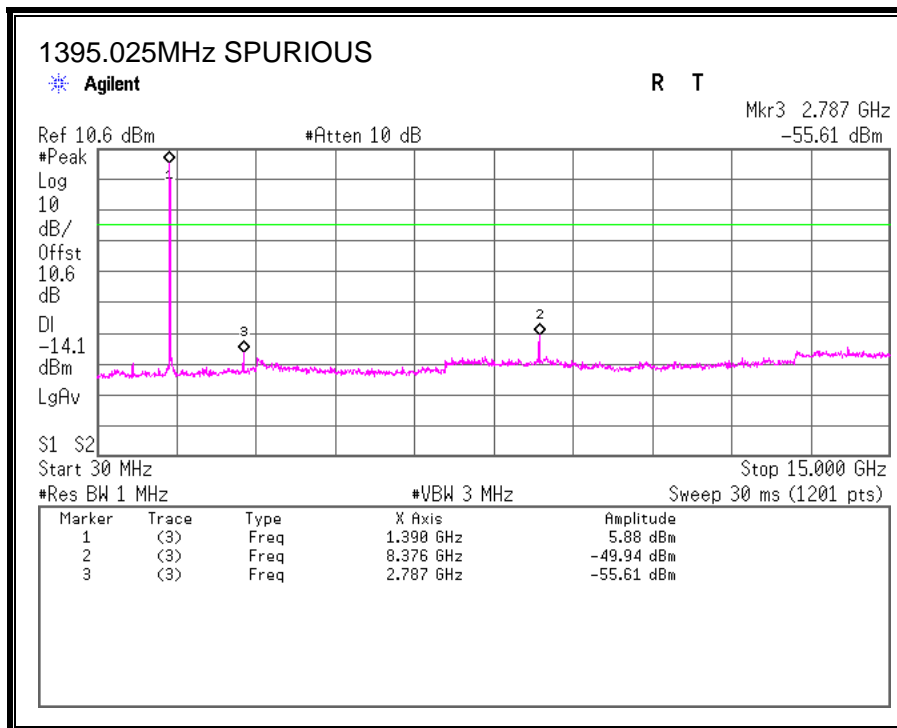
None; for reporting purposes only.

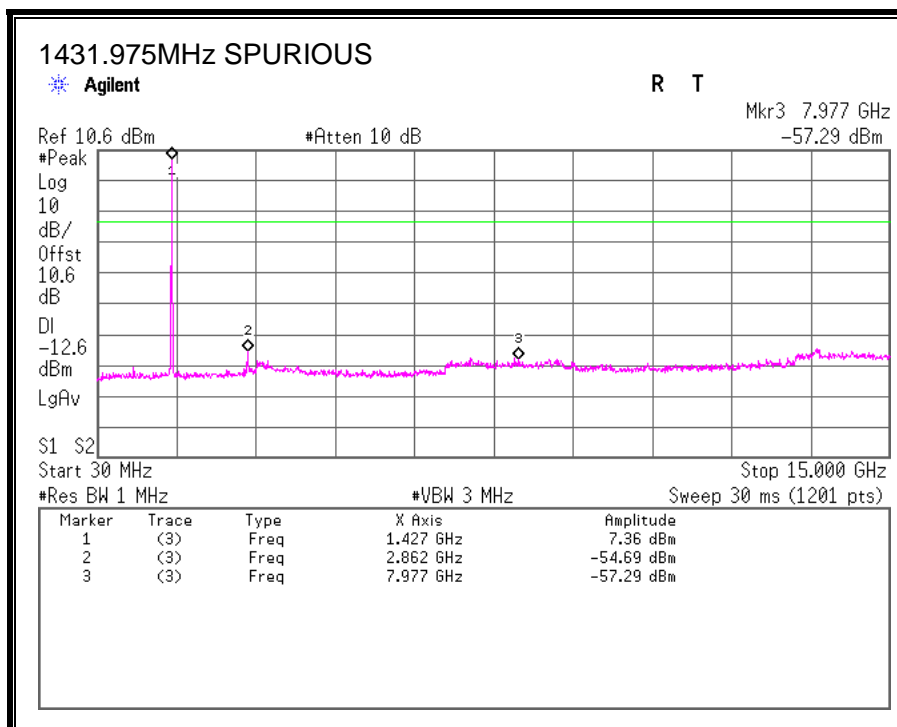
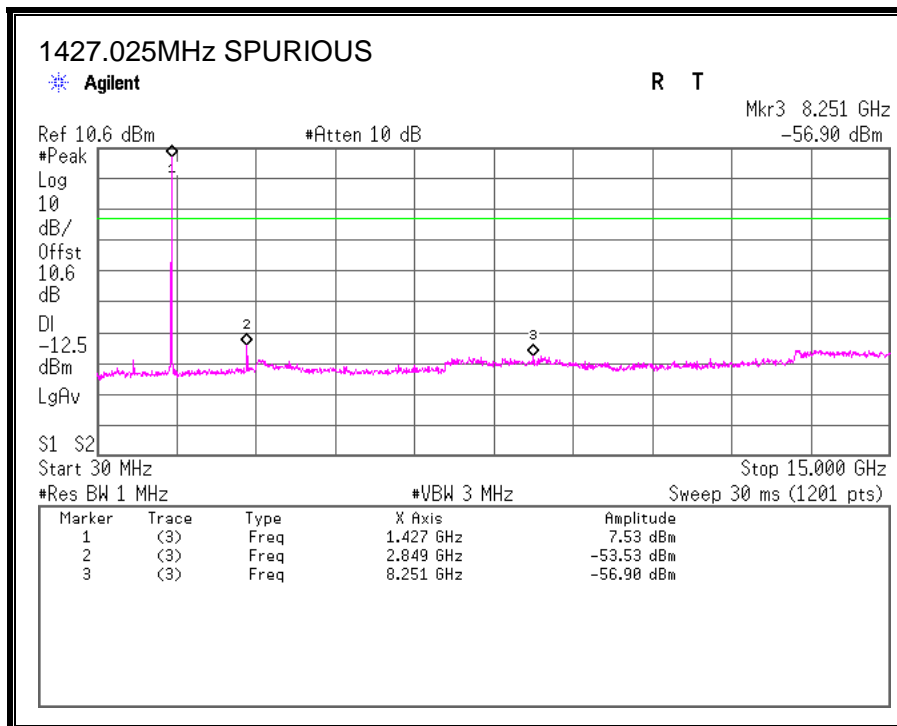
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW=1MHz VBW=3MHz.

The spectrum from 30 MHz to 10th harmonic is investigated with the transmitter set to the lowest and highest channels.

TEST RESULTS





7.5. FREQUENCY STABILITY MEASUREMENT

LIMIT

§95.1115 (e) Frequency stability.

Manufacturers of wireless medical telemetry devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all of the manufacturer's specified conditions.

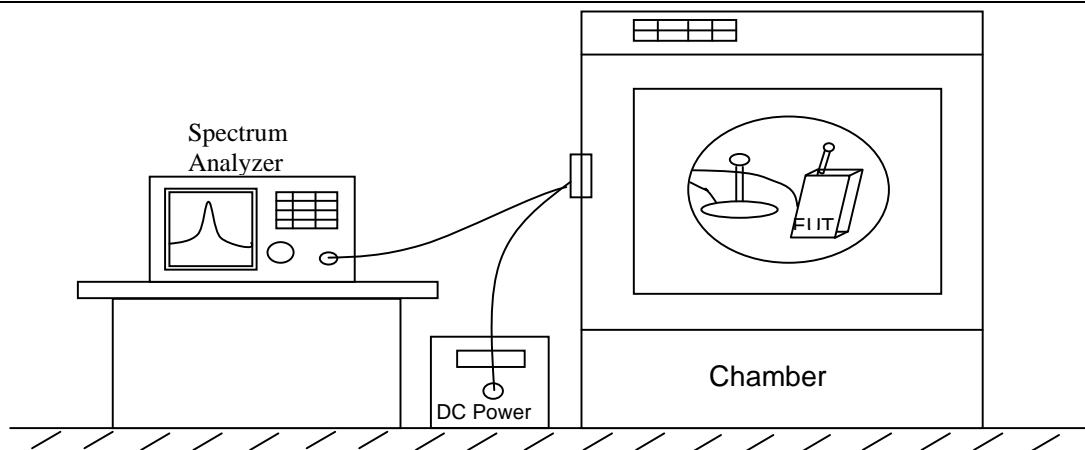
TEST PROCEDURE

Frequency stability versus environmental temperature

- 1) Set the temperature of chamber to 50°C @ low/high channel. Allow sufficient time (approximately 60 min) for the temperature of the chamber to stabilize. While maintaining a set temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.
- 2) Set spectrum analyzer Resolution Bandwidth to 300 Hz and Video Resolution Bandwidth to 300 Hz and Frequency Span to 50 KHz. Record this frequency as reference frequency.
- 3) Repeat step 2 with a 10°C decreased per stage until the lowest temperature -30°C is measured, record all measured frequencies on each temperature step. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.

Frequency stability versus input voltage

- 1). Setup the configuration as shown below for frequencies measured at temperature if it is 20°C.
- 2). Set spectrum analyzer center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 300 Hz and Video Resolution Bandwidth to 300 Hz and Frequency Span to 50 KHz. Record this frequency as reference frequency.
- 3). For battery operated only device, supply the EUT primary voltage at the operating end point which is specified by manufacturer and record the frequency.



Frequency stability measurement configuration

TEST RESULTS

LOW CHANNEL

20°C Reference Frequency:		1395.025000		MHz	
Limit: +/-	10	ppm =	0.013950		
Power Supply		Environment	Frequency	Delta (MHz)	Limit +/- (MHz)
VDC		Temperature (°C)	(MHz)		
3.00	Normal (100%)	50	1395.024935	-0.000065	0.013950
		40	1395.024650	-0.000350	0.013950
		30	1395.024458	-0.000542	0.013950
		20	1395.024720	-0.000280	0.013950
		10	1395.024255	-0.000745	0.013950
		0	1395.024872	-0.000128	0.013950
		-10	1395.025243	0.000243	0.013950
		-20	1395.025366	0.000366	0.013950
		-30	1395.025016	0.000016	0.013950
3.00	Normal		1395.024720	-0.000280	0.013950
1.70	Low		1395.025289	0.000289	0.013950
1.60	End Point				

HIGH CHANNEL

20°C Reference Frequency:		1431.975000		MHz	
Limit: +/- 10 ppm =		0.014320		MHz	
Power Supply	Environment	Frequency	Delta (MHz)	Limit +/- (MHz)	
VDC	Temperature (°C)	(MHz)			
3.00	Normal (100%)	50	1431.974754	-0.000246	0.014320
		40	1431.974650	-0.000350	0.014320
		30	1431.974674	-0.000326	0.014320
		20	1431.974500	-0.000500	0.014320
		10	1431.974538	-0.000462	0.014320
		0	1431.974933	-0.000067	0.014320
		-10	1431.975211	0.000211	0.014320
		-20	1431.975325	0.000325	0.014320
		-30	1431.975108	0.000108	0.014320
3.00	Normal	1431.974500	-0.000500	0.014320	
1.70	Low	1431.975343	0.000343	0.014320	
1.60	End Point				

8. RADIATED EMISSION TEST RESULTS

LIMITS

§95.1115

(a) Field strength limits

(2) In the 1395–1400 MHz and 1427–1432 MHz bands, the maximum allowable field strength is 740 mV/m as measured at a distance of 3 meters, using measuring equipment with an averaging detector and a 1 MHz measurement bandwidth.

(b) Undesired emissions.

(1) Out-of-band emissions below 960 MHz are limited to 200 microvolts/meter, as measured at a distance of 3 meters, using measuring instrumentation with a CISPR quasi-peak detector.

(2) Out-of-band emissions above 960 MHz are limited to 500 microvolts/meter as measured at a distance of 3 meters, using measuring equipment with an averaging detector and a 1 MHz measurement bandwidth.

TEST PROCEDURE

ANSI/TIA-603-D-2010

RESULTS

8.1. FUNDAMENTAL OUTPUT POWER

Report No. : 10989131H
 Test Place : Ise EMC Lab.
 Semi Anechoic Chamber: : No. 2
 Date : 2015/10/07
 Temperature/Humidity : 26 deg.C / 48 % RH
 Engineer: : Tomoki Matsui

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1395.025	AV	70.0	26.2	2.0	0.0	98.2	117.4	19.2	
Vert	1395.025	AV	69.9	26.2	2.0	0.0	98.1	117.4	19.3	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1399.975	AV	69.9	26.2	2.0	0.0	98.1	117.4	19.3	
Vert	1399.975	AV	70.9	26.2	2.0	0.0	99.1	117.4	18.3	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1427.025	AV	72.9	26.2	2.0	0.0	101.1	117.4	16.3	
Vert	1427.025	AV	73.8	26.2	2.0	0.0	102.0	117.4	15.4	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	1431.975	AV	71.8	26.2	2.0	0.0	100.0	117.4	17.4	
Vert	1431.975	AV	73.4	26.2	2.0	0.0	101.6	117.4	15.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

8.2. RADIATED EMISSIONS BELOW 960 MHz

SPURIOUS EMISSIONS 30 TO 960 MHz

1395.025MHz

Report No. : 10989131H
 Test Place : Ise EMC Lab.
 Semi Anechoic Chamber: : No. 2
 Date : 2015/10/15
 Temperature/Humidity : 23 deg.C / 40 % RH
 Engineer: : Keisuke Kawamura
 Mode: : Tx 1395.025MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	31.821	QP	22.9	16.7	6.8	28.5	17.9	46.0	28.1	NS
Hori	184.349	QP	21.9	16.4	8.1	27.8	18.6	46.0	27.4	NS
Hori	242.399	QP	21.9	17.1	8.5	27.5	20.0	46.0	26.0	NS
Hori	416.666	QP	21.9	17.8	9.5	28.2	21.0	46.0	25.0	NS
Hori	605.666	QP	22.1	19.8	10.3	28.4	23.8	46.0	22.2	NS
Hori	834.337	QP	21.4	22.1	11.1	27.7	26.9	46.0	19.1	NS
Vert	31.821	QP	23.1	16.7	6.8	28.5	18.1	46.0	27.9	NS
Vert	184.349	QP	21.8	16.4	8.1	27.8	18.5	46.0	27.5	NS
Vert	242.399	QP	22.1	17.1	8.5	27.5	20.2	46.0	25.8	NS
Vert	416.666	QP	22.0	17.8	9.5	28.2	21.1	46.0	24.9	NS
Vert	605.666	QP	22.1	19.8	10.3	28.4	23.8	46.0	22.2	NS
Vert	834.337	QP	21.4	22.1	11.1	27.7	26.9	46.0	19.1	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

Gain 0.0 dB shows that the pre amplifier was not used to avoid the influence of carrier power.

NS : NosignalDetected

SPURIOUS EMISSIONS 30 TO 960 MHz

1399.975MHz

Report No. : 10989131H
 Test Place : Ise EMC Lab.
 Semi Anechoic Chamber: : No. 2
 Date : 2015/10/15
 Temperature/Humidity : 23 deg.C / 40 % RH
 Engineer: : Keisuke Kawamura
 Mode: : Tx 1399.975MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	31.821	QP	22.9	16.7	6.8	28.5	17.9	46.0	28.1	NS
Hori	184.349	QP	21.9	16.4	8.1	27.8	18.6	46.0	27.4	NS
Hori	242.399	QP	21.9	17.1	8.5	27.5	20.0	46.0	26.0	NS
Hori	416.666	QP	21.9	17.8	9.5	28.2	21.0	46.0	25.0	NS
Hori	605.666	QP	22.1	19.8	10.3	28.4	23.8	46.0	22.2	NS
Hori	834.337	QP	21.4	22.1	11.1	27.7	26.9	46.0	19.1	NS
Vert	31.821	QP	23.1	16.7	6.8	28.5	18.1	46.0	27.9	NS
Vert	184.349	QP	21.8	16.4	8.1	27.8	18.5	46.0	27.5	NS
Vert	242.399	QP	22.1	17.1	8.5	27.5	20.2	46.0	25.8	NS
Vert	416.666	QP	22.0	17.8	9.5	28.2	21.1	46.0	24.9	NS
Vert	605.666	QP	22.1	19.8	10.3	28.4	23.8	46.0	22.2	NS
Vert	834.337	QP	21.4	22.1	11.1	27.7	26.9	46.0	19.1	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

Gain 0.0 dB shows that the pre amplifier was not used to avoid the influence of carrier power.

NS : NotsignalDetected

SPURIOUS EMISSIONS 30 TO 960 MHz

1427.025MHz

Report No. : 10989131H
 Test Place : Ise EMC Lab.
 Semi Anechoic Chamber: : No. 2
 Date : 2015/10/15
 Temperature/Humidity : 23 deg.C / 40 % RH
 Engineer: : Keisuke Kawamura
 Mode: : Tx 1427.025MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	31.821	QP	22.9	16.7	6.8	28.5	17.9	46.0	28.1	NS
Hori	184.349	QP	21.9	16.4	8.1	27.8	18.6	46.0	27.4	NS
Hori	242.399	QP	21.9	17.1	8.5	27.5	20.0	46.0	26.0	NS
Hori	416.666	QP	21.9	17.8	9.5	28.2	21.0	46.0	25.0	NS
Hori	605.666	QP	22.1	19.8	10.3	28.4	23.8	46.0	22.2	NS
Hori	834.337	QP	21.4	22.1	11.1	27.7	26.9	46.0	19.1	NS
Vert	31.821	QP	23.1	16.7	6.8	28.5	18.1	46.0	27.9	NS
Vert	184.349	QP	21.8	16.4	8.1	27.8	18.5	46.0	27.5	NS
Vert	242.399	QP	22.1	17.1	8.5	27.5	20.2	46.0	25.8	NS
Vert	416.666	QP	22.0	17.8	9.5	28.2	21.1	46.0	24.9	NS
Vert	605.666	QP	22.1	19.8	10.3	28.4	23.8	46.0	22.2	NS
Vert	834.337	QP	21.4	22.1	11.1	27.7	26.9	46.0	19.1	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

Gain 0.0 dB shows that the pre amplifier was not used to avoid the influence of carrier power.

NS : NotsignalDetected

SPURIOUS EMISSIONS 30 TO 960 MHz

1431.975MHz

Report No. : 10989131H
 Test Place : Ise EMC Lab.
 Semi Anechoic Chamber: : No. 2
 Date : 2015/10/15
 Temperature/Humidity : 23 deg.C / 40 % RH
 Engineer: : Keisuke Kawamura
 Mode: : Tx 1431.975MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	31.821	QP	22.9	16.7	6.8	28.5	17.9	46.0	28.1	NS
Hori	184.349	QP	21.9	16.4	8.1	27.8	18.6	46.0	27.4	NS
Hori	242.399	QP	21.9	17.1	8.5	27.5	20.0	46.0	26.0	NS
Hori	416.666	QP	21.9	17.8	9.5	28.2	21.0	46.0	25.0	NS
Hori	605.666	QP	22.1	19.8	10.3	28.4	23.8	46.0	22.2	NS
Hori	834.337	QP	21.4	22.1	11.1	27.7	26.9	46.0	19.1	NS
Vert	31.821	QP	23.1	16.7	6.8	28.5	18.1	46.0	27.9	NS
Vert	184.349	QP	21.8	16.4	8.1	27.8	18.5	46.0	27.5	NS
Vert	242.399	QP	22.1	17.1	8.5	27.5	20.2	46.0	25.8	NS
Vert	416.666	QP	22.0	17.8	9.5	28.2	21.1	46.0	24.9	NS
Vert	605.666	QP	22.1	19.8	10.3	28.4	23.8	46.0	22.2	NS
Vert	834.337	QP	21.4	22.1	11.1	27.7	26.9	46.0	19.1	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

Gain 0.0 dB shows that the pre amplifier was not used to avoid the influence of carrier power.

NS : NotsignalDetected

8.3. RADIATED EMISSIONS ABOVE 960 MHz

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 960 MHz

1395.025MHz

Test Place	: Ise EMC Lab.	
Semi Anechoic Chamber:	: No. 2	
Date	: 2015/10/07	: 2015/10/15
Temperature/Humidity	: 26 deg.C / 48 % RH	: 23 deg.C / 40 % RH
Engineer:	: Tomoki Matsui	: Keisuke Kawamura
	1GHz-10GHz	Above 10GHz
Mode:	: Tx 1395.025MHz	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2790.050	AV	37.7	29.5	3.5	34.8	35.9	54.0	18.1	
Hori	4185.075	AV	38.7	31.4	4.0	34.0	40.1	54.0	13.9	
Hori	5580.100	AV	42.8	33.0	4.7	33.9	46.6	54.0	7.4	
Hori	6975.125	AV	39.3	36.7	5.2	34.0	47.2	54.0	6.8	
Hori	8370.150	AV	44.8	36.4	5.6	34.5	52.3	54.0	1.7	
Hori	9765.175	AV	36.5	39.0	5.9	34.7	46.7	54.0	7.3	
Hori	11160.200	AV	34.9	39.9	-3.0	33.9	37.9	54.0	16.1	NS
Hori	12555.230	AV	34.7	40.5	-2.5	33.4	39.3	54.0	14.7	NS
Hori	13950.250	AV	34.8	41.0	-2.5	32.4	40.9	54.0	13.1	NS
Vert	2790.050	AV	40.2	29.5	3.5	34.8	38.4	54.0	15.6	
Vert	4185.075	AV	36.4	31.4	4.0	34.0	37.8	54.0	16.2	
Vert	5580.100	AV	41.1	33.0	4.7	33.9	44.9	54.0	9.1	
Vert	6975.125	AV	38.5	36.7	5.2	34.0	46.4	54.0	7.6	
Vert	8370.150	AV	43.5	36.4	5.6	34.5	51.0	54.0	3.0	
Vert	9765.175	AV	34.7	39.0	5.9	34.7	44.9	54.0	9.1	NS
Vert	11160.200	AV	34.8	39.9	-3.0	33.9	37.8	54.0	16.2	NS
Vert	12555.230	AV	34.6	40.5	-2.5	33.4	39.2	54.0	14.8	NS
Vert	13950.250	AV	34.8	41.0	-2.5	32.4	40.9	54.0	13.1	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

NS: No signal Detected

Distance factor: 10GHz-26.5GHz $20\log(3.0m/1.0m) = 9.5dB$

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 960 MHz
1399.975MHz

Report No. : 10989131H
 Test Place : Ise EMC Lab.
 Semi Anechoic Chamber: : No. 2
 Date : 2015/10/07 : 2015/10/15
 Temperature/Humidity : 26 deg.C / 48 % RH : 23 deg.C / 40 % RH
 Engineer: : Tomoki Matsui : Keisuke Kawamura
 : 1GHz-10GHz : Above 10GHz
 Mode: : Tx 1399.975MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2799.950	AV	38.8	29.6	3.5	34.8	37.1	54.0	16.9	
Hori	4199.925	AV	40.0	31.4	4.0	34.0	41.4	54.0	12.6	
Hori	5599.900	AV	39.9	33.0	4.7	33.9	43.7	54.0	10.3	
Hori	6999.875	AV	36.5	36.7	5.2	34.0	44.4	54.0	9.6	
Hori	8399.850	AV	45.9	36.4	5.6	34.5	53.4	54.0	0.6	
Hori	9799.825	AV	37.0	39.0	5.8	34.7	47.1	54.0	6.9	
Hori	11199.800	AV	34.9	40.0	-3.0	33.8	38.1	54.0	15.9	NS
Hori	12599.780	AV	34.7	40.5	-2.5	33.4	39.3	54.0	14.7	NS
Hori	13999.750	AV	34.8	41.0	-2.5	32.4	40.9	54.0	13.1	NS
Vert	2799.950	AV	40.8	29.6	3.5	34.8	39.1	54.0	14.9	
Vert	4199.925	AV	36.9	31.4	4.0	34.0	38.3	54.0	15.7	
Vert	5599.900	AV	40.0	33.0	4.7	33.9	43.8	54.0	10.2	
Vert	6999.875	AV	38.2	36.7	5.2	34.0	46.1	54.0	7.9	
Vert	8399.850	AV	43.8	36.4	5.6	34.5	51.3	54.0	2.7	
Vert	9799.825	AV	37.1	39.0	5.8	34.7	47.2	54.0	6.8	
Vert	11199.800	AV	34.8	40.0	-3.0	33.8	38.0	54.0	16.0	NS
Vert	12599.780	AV	34.6	40.5	-2.5	33.4	39.2	54.0	14.8	NS
Vert	13999.750	AV	34.8	41.0	-2.5	32.4	40.9	54.0	13.1	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

NS: No signal Detected

Distance factor: 10GHz-26.5GHz $20\log(3.0m/1.0m)= 9.5dB$

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 960 MHz
1427.025MHz

Report No. : 10989131H
 Test Place : Ise EMC Lab.
 Semi Anechoic Chamber: : No. 2
 Date : 2015/10/07 : 2015/10/15
 Temperature/Humidity : 26 deg.C / 48 % RH : 23 deg.C / 40 % RH
 Engineer: : Tomoki Matsui : Keisuke Kawamura
 1GHz-10GHz Above 10GHz
 Mode: : Tx 1427.025MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2854.050	AV	37.0	29.6	3.5	34.8	35.3	54.0	18.7	
Hori	4281.075	AV	38.3	31.6	4.0	34.0	39.9	54.0	14.1	
Hori	5708.100	AV	40.1	33.2	4.9	33.9	44.3	54.0	9.7	
Hori	7135.125	AV	38.5	36.8	5.2	34.0	46.5	54.0	7.5	
Hori	8562.150	AV	39.6	36.5	5.7	34.5	47.3	54.0	6.7	
Hori	9989.175	AV	35.3	39.0	5.8	34.7	45.4	54.0	8.6	NS
Hori	11416.200	AV	34.9	40.3	-2.9	33.7	38.6	54.0	15.4	NS
Hori	12843.230	AV	34.7	40.4	-2.5	33.4	39.2	54.0	14.8	NS
Hori	14270.250	AV	34.8	40.9	-2.3	32.6	40.8	54.0	13.2	NS
Vert	2854.050	AV	37.7	29.6	3.5	34.8	36.0	54.0	18.0	
Vert	4281.075	AV	37.8	31.6	4.0	34.0	39.4	54.0	14.6	
Vert	5708.100	AV	39.1	33.2	4.9	33.9	43.3	54.0	10.7	
Vert	7135.125	AV	36.7	36.8	5.2	34.0	44.7	54.0	9.3	
Vert	8562.150	AV	39.4	36.5	5.7	34.5	47.1	54.0	6.9	
Vert	9989.175	AV	35.4	39.0	5.8	34.7	45.5	54.0	8.5	NS
Vert	11416.200	AV	34.8	40.3	-2.9	33.7	38.5	54.0	15.5	NS
Vert	12843.230	AV	34.6	40.4	-2.5	33.4	39.1	54.0	14.9	NS
Vert	14270.250	AV	34.8	40.9	-2.3	32.6	40.8	54.0	13.2	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

NS: No signal Detected

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 960 MHz
1431.975MHz

Report No. : 10989131H
 Test Place : Ise EMC Lab.
 Semi Anechoic Chamber: : No. 2
 Date : 2015/10/07 : 2015/10/15
 Temperature/Humidity : 26 deg.C / 48 % RH : 23 deg.C / 40 % RH
 Engineer: : Tomoki Matsui : Keisuke Kawamura
 : 1GHz-10GHz : Above 10GHz
 Mode: : Tx 1431.975MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2863.950	AV	35.4	29.6	3.5	34.8	33.7	54.0	20.3	NS
Hori	4295.925	AV	34.8	31.6	4.0	34.0	36.4	54.0	17.6	
Hori	5727.900	AV	38.3	33.2	4.9	33.9	42.5	54.0	11.5	
Hori	7159.875	AV	36.6	36.8	5.2	34.1	44.5	54.0	9.5	
Hori	8591.850	AV	37.0	36.5	5.7	34.5	44.7	54.0	9.3	
Hori	11455.800	AV	34.9	40.4	-2.9	33.7	38.7	54.0	15.3	NS
Hori	12887.780	AV	34.7	40.4	-2.5	33.4	39.2	54.0	14.8	NS
Hori	14319.750	AV	34.8	40.8	-2.2	32.7	40.7	54.0	13.3	NS
Vert	2863.950	AV	35.7	29.6	3.5	34.8	34.0	54.0	20.0	NS
Vert	4295.925	AV	34.8	31.6	4.0	34.0	36.4	54.0	17.6	
Vert	5727.900	AV	37.0	33.2	4.9	33.9	41.2	54.0	12.8	
Vert	7159.875	AV	34.4	36.8	5.2	34.1	42.3	54.0	11.7	NS
Vert	8591.850	AV	35.4	36.5	5.7	34.5	43.1	54.0	10.9	NS
Vert	11455.800	AV	34.8	40.4	-2.9	33.7	38.6	54.0	15.4	NS
Vert	12887.780	AV	34.6	40.4	-2.5	33.4	39.1	54.0	14.9	NS
Vert	14319.750	AV	34.8	40.8	-2.2	32.7	40.7	54.0	13.3	NS

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

NS: No signal Detected

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB