

# **RADIO TEST REPORT**

# Test Report No.: 11701947H-A

Applicant	:	Hosiden Corporation		
Type of Equipment	:	Sensor Beacon		
Model No.	:	TMX-CB10		
FCC ID	:	VIYHRM5087		
Test regulation	:	FCC Part 15 Subpart C: 2016 *Antenna Terminal Conducted Tests only		

### Test Result : Complied

- 1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
- 2. The results in this report apply only to the sample tested.
- 3. This sample tested is in compliance with the above regulation.
- 4. The test results in this report are traceable to the national or international standards.
- 5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
- 6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)

Date of test:

Representative test engineer:

February 16, 2017

Yuta Moriya Engineer Consumer Technology Division

Approved by:

Takayuki Shimada

Engineer Consumer Technology Division

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://ionan.ul.acm/rasouraes/ama\_accredited/

http://japan.ul.com/resources/emc\_accredited/



Test report No.	: 11701947H-A
Page	: 2 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

# **REVISION HISTORY**

# Original Test Report No.: 11701947H-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11701947H-A	April 12, 2017	-	-

# **CONTENTS**

# PAGE

<b>SECTION 1:</b>	Customer information	4
<b>SECTION 2:</b>	Equipment under test (E.U.T.)	4
<b>SECTION 3:</b>	Test specification, procedures & results	5
<b>SECTION 4:</b>	Operation of E.U.T. during testing	7
<b>SECTION 5:</b>	Antenna Terminal Conducted Tests	9
<b>APPENDIX 1:</b>	Test data	10
6dB Ban	dwidth	10
Maximu	n Peak Output Power	12
Average	Output Power	13
Conducte	ed Spurious Emission	15
Power D	ensity	
99%Occ	upied Bandwidth	20
<b>APPENDIX 2:</b>	Test instruments	21

Test report No. Page	: 11701947H-A : 4 of 21
Issued date FCC ID	: April 12, 2017 : VIYHRM5087

# SECTION 1: Customer information

Company Name	:	Hosiden Corporation
Address	:	4-33, Kitakyuhoji1chome, Yao-city, Osaka, 581-0071
Telephone Number	:	+81-72-924-1153
Facsimile Number	:	+81-72-996-4672
Contact Person	:	Tomoki Umeda

## **SECTION 2:** Equipment under test (E.U.T.)

#### 2.1 Identification of E.U.T.

Sensor Beacon
TMX-CB10
Refer to Section 4, Clause 4.2
ACC12V: Typ: DC 14.4 V (DC 10.8 V - 15.1 V)
ACC24V: Typ: DC 28.0 V (DC 21.0 V - 30.0 V)
February 16, 2017
China
Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
No Modification by the test lab

### 2.2 Product Description

Model: TMX-CB10 (referred to as the EUT in this report) is a Sensor Beacon.

#### **General Specification**

Clock frequency(ies) in the system : Main: 32 MHz, Sub: 32.768 kHz

#### **Radio Specification**

#### **Bluetooth Low Energy**

Radio Type	:	Transmitter
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK
Power Supply (radio part input)	:	DC 1.29 V
Antenna type	:	$\lambda/4$ inverted-Fantenna
Antenna Gain	:	0.5 dBi

Page		: 5 of 21
Issue	d date	: April 12, 2017
FCC	ID	: VIYHRM5087

## SECTION 3: Test specification, procedures & results

#### 3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on November 14, 2016 and effective December 14, 2016
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst margin	Results	Remarks
6dB Bandwidth	FCC: KDB 558074 D01 DTS Meas Guidance v03r05	74 D01 DTS Meas <b>FCC:</b> Section 15.247(a)(2)		Complied	Conducted
	IC: -	IC: K55-247 5.2(a)			
Maximum Peak Output Power	FCC: KDB 558074 D01 D1S Meas Guidance v03r05	FCC: Section 15.247(b)(3) See data.		Complied	Conducted
	IC: RSS-Gen 6.12	IC: RSS-247 5.4(d)			
Power Density	FCC: KDB 558074 D01 DTS Meas Guidance v03r05	FCC: Section 15.247(e)		Complied	Conducted
	IC: -	IC: RSS-247 5.2(b)			
Spurious Emission Restricted Band Edges	FCC: KDB 558074 D01 DTS Meas Guidance v03r05	FCC: Section15.247(d)			Conducted
	<b>IC:</b> RSS-Gen 6.13	IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	-	Complied	(below 30 MHz)
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.					

\* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

#### FCC Part 15.31 (e)

The test was performed with the New Battery (DC 1.29 V) and the stable voltage was supplied to the EUT during the tests. Therefore, the EUT complies with the requirement.

#### FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

Test report No.	: 11701947H-A
Page	: 6 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

#### **3.3** Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied	IC: RSS-Gen 6.6	IC: -	N/A	-	Conducted
Bandwidth					

Other than above, no addition, exclusion nor deviation has been made from the standard.

#### 3.4 Uncertainty

#### EMI

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

	Antenna terminal test Uncertainty (+/-)								
Power meter		Conducted emission and Power density Conducted emission				d emission			
Below	Above	Below	1 GHz	3 GHz	18 GHz	26.5 GHz	Channel power		
1 GHz	1 GHz	1 GHz	-3 GHz	-18 GHz	-26.5 GHz	-40 GHz			
0.9 dB	1.0 dB	1.4 dB	1.5 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB		

#### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab. \*NVLAP Lab. code: 200572-0 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	M aximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0m for No.1, No.2, No.3, and No.4 semianechoic chambers and No.3 and No.4 shielded rooms.

#### 3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

Test report No.	: 11701947H-A
Page	: 7 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

# SECTION 4: Operation of E.U.T. during testing

## 4.1 **Operating Mode(s)**

Mode	Remarks*			
Bluetooth Low Energy (BT LE)	Maximum Packet Size, PRBS9			
*Power of the EUT was set by the software as follows;				
Power settings: 4 dBm				
Software: HRM5087 RadioTest NoSoftDevice 161026.hex				
*This setting of software is the worst case.				
Any conditions under the normal use do not exceed th	e condition of setting.			
In addition, end users cannot change the settings of the output power of the product.				

\*The details of Operating mode(s)

Test Item	Operating Mode	Tested frequency
Spurious Emission (Conducted),	BT LE Tx	2402 MHz
6dB Bandwidth,		2440 MHz
Maximum Peak Output Power,		2480 MHz
Power Density,		
99% Occupied Bandwidth		

Test report No. Page	: 11701947H-A : 8 of 21
Issued date FCC ID	: April 12, 2017 : VIYHRM5087

### 4.2 Configuration and peripherals



\* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

#### **Description of EUT**

No.	Item	Model number	Serial number	Manufacturer	Remarks
٨	Sensor Beacon	TMX-CB10	1	Hosiden	EUT
A				Corporation	
В	Laptop PC	CF-N8HWCDPS	OBKSA08702	Panasonic	-
С	AC Adapter	CF-AA6373B M4	6372BM409X21200B	Panasonic	-

#### List of cables used

No.	Name	Length (m)	Shi	Remarks	
			Cable	Connector	
1	DC Cable	0.5	Unshielded	Unshielded	-
2	USB Cable	1.8	Shielded	Shielded	-
3	DC Cable	0.9	Unshielded	Unshielded	-
4	AC Cable	0.8	Unshielded	Unshielded	-

Test report No. Page	: 11701947H-A : 9 of 21
Issued date FCC ID	: April 12, 2017 : VIYHRM5087

## SECTION 5: Antenna Terminal Conducted Tests

### **Test Procedure**

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep	Detector	Trace	Instrument used
				time			
6dB Bandwidth	3 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied	Enough width to display	1 to 5 %	Three times	Auto	Peak	Max Hold	Spectrum Analyzer
Bandwidth *1)	emission skirts	of OBW	of RBW				
Maximum Peak	-	-	-	Auto	Peak/	-	Power Meter
Output Power					Average *2)		(Sensor: 50 MHz BW)
Peak Power Density	1.5 times the	3 kHz	10 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
	6dB Bandwidth						*3)
Conducted Spurious	9kHz to 150kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
Emission *4)	150kHz to 30MHz	9.1 kHz	27 kHz				
*1) Peak hold was app	olied as Worst-case measure	ment.					
<li>*2) Reference data</li>							

\*3) Section 10.2 Method PKPSD (peak PSD) of "KDB 558074 D01 DTS Meas Guidance v03r05".

\*4) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz)

The test results and limit are rounded off to two decimals place, so some differences might be observed.

Test data	: APPENDIX
Test result	: Pass

Test report No.	: 11701947H-A
Page	: 10 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

# APPENDIX 1: Test data

# 6dB Bandwidth

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11701947H
Date	February 16, 2017
Temperature / Humidity	23 deg. C / 36 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE

Mode	Frequency	6dB Bandwidth	Limit
	[MHz]	[MHz]	[kHz]
BTLE	2402	0.726	> 500
	2440	0.693	> 500
	2480	0.701	> 500

## 6dB Bandwidth



Test report No.	: 11701947H-A
Page	: 12 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

# Maximum Peak Output Power

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11701947Н
Date	February 16, 2017
Temperature / Humidity	23 deg. C / 36 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE

Freq.	Reading	Cable	Atten.	Re	sult	Li	mit	Margin
		Loss	Loss					
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
2402	-6.67	1.39	10.05	4.76	2.99	30.00	1000	25.24
2440	-6.74	1.39	10.05	4.70	2.95	30.00	1000	25.30
2480	-6.86	1.40	10.05	4.60	2.88	30.00	1000	25.40

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

\*The equipment and cables were not used for factor 0 dB of the data sheets.

Test report No.	: 11701947H-A
Page	: 13 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

## <u>Average Output Power</u> (Reference data for RF Exposure / SAR testing)

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11701947Н
Date	February 16, 2017
Temperature / Humidity	23 deg. C / 36 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE

Freq.	Reading	Cable	Atten.	Re	sult	Duty	Re	esult
		Loss	Loss	(Time a	werage)	factor	(Burst pov	ver average)
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
2402	-7.07	1.39	10.05	4.36	2.73	0.23	4.59	2.88
2440	-7.14	1.39	10.05	4.30	2.69	0.23	4.53	2.84
2480	-7.19	1.40	10.05	4.27	2.67	0.23	4.50	2.82

Sample Calculation:

Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss Result (Burst power average) = Time average + Duty factor

\*The equipment and cables were not used for factor 0 dB of the data sheets.

Test report No.	: 11701947H-A
Page	: 14 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

## **Burst rate confirmation**

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11701947Н
Date	February 16, 2017
Temperature / Humidity	23 deg. C / 36 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE

#### BTLE Tx on / (Tx on + Tx off) = 0.949 Tx on / (Tx on + Tx off) \* 100 = 94.9 % Duty factor = 10 \* log (2.223 / 2.110) = 0.23 dB 🔆 Agilent R T ▲ Mkr1 2.11 ms -3.49 dB Ref 0 dBm #Peak Log 10 dB/ #Atten 10 dB d d LgAv H1 S2 Center 2.440 000 GHz Res BW 8 MHz Marker Trace 1R (1) 1a (1) 2R (1) 2R (1) 2a (1) Span 0 Hz Sweep 3 ms (8001 pts) ≢VBW 50 MHz X Axis 363.4 µs 2.11 ms 363.4 µs 2.223 ms Amplitude -69.92 dBm -3.49 dB -69.92 dBm -4.19 dB Type Time Time Time Time

\* Since the burst rate is not different between the channels, the data has been obtained on the representative channel.

# **Conducted Spurious Emission**

Test placeIse EMC Lab. No.3 Measurement RoomReport No.11701947HDateFebruary 16, 2017Temperature / Humidity23 deg. C / 36 % RHEngineerYuta MoriyaModeTx BT LE 2402MHz

	9 kHz - 150 kHz										150 kHz - 30 MHz										
* A	gilent							RΤ			* A	gilent							RΤ		
Ref -5	0 dBm		*A1	ten 10 d	в				Mkr1 -9	15.23 kHz 7.82 dBm	Ref -5	0 dBm		#At	ten 10 d	в				Mkr1 -88	200 kHz 3.16 dBm
Peak Log											Peak Log										
10											10										
dB/											dB7										
												1									
												Market Com									
LgAv	шŶш.										LgAv	1. 199494	enter frankra	white provides	and the second second	a social behaviored	heiserige autor	Unio fici - secondaria	e surfaced and and a feature	ninthern before	a through ing
01 00	LA MARY	he he he had	NY HAN THE	ANA MARKAN	ulindation	he artica	hiddhar	with the bit	lah atauh	ما الما	01 00										
M3 FS			1.1.1.1	e e construction de la construcción	1	A AL MARK	adale dedagand	and the second	a ya af Anibya	and the start of the	51 52 M3 FS										
• 10											• • •										
£(†): f<50k											£(†): FTun										
FFT											Swp										
										1											
Start S	9.00 kHz			1	1				Stop 1	50.00 kHz	Start 1	50 kHz	1	1		1	1			Stop 30.	.000 MHz
#Res E	3W 200 Hz	2			#VBW 620	Hz		Sweep 2	.279 s (1	.201 pts)_	#Res E	W 9.1 kH	Z			#VBW 27	kHz	S	weep 344	.8 ms (12	201 pts)_

Frequency	Reading	Cable	Attenuator	Antenna	Ν	EIRP	Distance	Ground	Е	Limit	Margin	Remark
		Loss	Loss	Gain*	(Number			bounce	(field strength)			
[kHz]	[dBm]	[dB]	[dB]	[dBi]	of Output)	[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
15.23	-97.8	0.07	9.9	2.0	1	-85.9	300	6.0	-24.6	43.9	68.5	
200.00	-88.2	0.31	9.9	2.0	1	-76.0	300	6.0	-14.7	21.5	36.2	

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

 $EIRP[dBm] = Reading \ [dBm] + Cable \ loss \ [dB] + Attenuator \ Loss \ [dB] + Antenna \ gain \ [dBi] + 10 * log \ (N)$ 

N: Number of output

\*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

# **Conducted Spurious Emission**

Test placeIse EMC Lab. No.3 Measurement RoomReport No.11701947HDateFebruary 16, 2017Temperature / Humidity23 deg. C / 36 % RHEngineerYuta MoriyaModeTx BT LE 2440MHz

	9 kHz - 150 kHz										150 kHz - 30 MHz										
<b>₩</b> A	gilent							RΤ	LUL A	45.00.111	* A	gilent							RΤ		074.111
Ref -5	60 dBm		#At	tten 10 d	В				Mkr1 -9	15.93 kHz 6.59 dBm	Ref -5	i0 dBm		#At	ten 10 d	В				Mkr1 -88	374 kHz 3.93 dBm
Peak Log											Peak Log										
10 dB/											10 dB/										
uD7											uD/										
												walnut where	A MARINA MARINA		Inchestation		Abundaras	n de cherrade doite	ومعادية والمراجع	للاستانا	monteuch
LgHv	Millely 14	Woodellawa	human	No collected		ulare e	LULL K				LgHv			late to se		1.1.1.1.1.1.1.1.1.1			a de la		
S1 S2 M3 ES		s et offe		r New Ande	as i di And	N. MANANA	MAX A MAN	a a na na na h	an han had	h h h h h h h h h h h h h h h h h h h	S1 S2 M3 ES										
<b>N</b> O 10											<b>A</b> (0)										
£(†): f<50k											E(f): FTun										
FFT											Swp										
Stort (	00 10-							· ·	Stop 1	50.00 10-	Stort '	50 10-								Stop 30	000 MU-
#Res E	3W 200 Hz				#VBW 620	Hz		Sweep 2	.279 s (1	1201 pts)_	#Res E	W 9.1 kH	z			#VBW 27	kHz	<u></u> S	weep 344	1.8 ms (1)	201 pts)_

Frequency	Reading	Cable	Attenuator	Antenna	Ν	EIRP	Distance	Ground	Е	Limit	Margin	Remark
		Loss	Loss	Gain*	(Number			bounce	(field strength)			
[kHz]	[dBm]	[dB]	[dB]	[dBi]	of Output)	[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
15.93	-96.6	0.07	9.9	2.0	1	-84.7	300	6.0	-23.4	43.5	66.9	
374.00	-88.9	0.53	9.9	2.0	1	-76.5	300	6.0	-15.2	16.1	31.3	

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

 $EIRP[dBm] = Reading \ [dBm] + Cable \ loss \ [dB] + Attenuator \ Loss \ [dB] + Antenna \ gain \ [dBi] + 10 * log \ (N)$ 

N: Number of output

\*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

Test report No.	: 11701947H-A
Page	: 17 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

## **Conducted Spurious Emission**

Test placeIse EMC Lab. No.3 Measurement RoomReport No.11701947HDateFebruary 16, 2017Temperature / Humidity23 deg. C / 36 % RHEngineerYuta MoriyaModeTx BT LE 2480MHz

	9 kHz - 150 kHz													15	) kH	[z - 3	80 M	Hz			
* *	gilent							RT	Mkr1	9 35 kHz	* A	gilent							RT	Mkr1	150 kHz
Ref -5	50 dBm		#At	ten 10 d	В				-90	6.00 dBm	Ref -5	0 dBm		#At	ten 10 d	В				-88	3.03 dBm
Log											Log										
10 dB/											10 dB/										
												•									
LaAv	•										LaAv	and the life	Propheter	valuotinatio	www.whyte.wh	alphinesested	unuted by the	where the second	Hunger	and the stand and	en frank a derivation
01 02	ALL AND	MININA	MANYAMA	Huberhup	ulmun	Manuall	da adab	a dista a site	ander	lementer	C1 C1										
M3 FS				1 1 1 1	l di si di si	an sudu nann	a Alakon Na .	thu white	e dad wither lade	LANA DAD	M3 FS										
<b>£</b> (f):											£(f):										
f<50k											FTun Swp										
											Jub										
· ·																					
Start	9.00 kHz	1				1		1	Stop 15	50.00 kHz	Start 3	L50 kHz	1			1	1		1	Stop 30	.000 MHz
#Res E	3W 200 Hz	!			#VBW 620	Hz		Sweep 2	.279 s (1	201 pts)_	#Res E	3W 9.1 kH	Z		1	+VBW 27 I	(Hz	S	weep 34	1.8 ms (1	201 pts)_

Frequency	Reading	Cable	Attenuator	Antenna	Ν	EIRP	Distance	Ground	Е	Limit	Margin	Remark
		Loss	Loss	Gain*	(Number			bounce	(field strength)			
[kHz]	[dBm]	[dB]	[dB]	[dBi]	of Output)	[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
9.35	-96.0	0.06	9.8	2.0	1	-84.1	300	6.0	-22.8	48.1	70.9	
150.00	-88.0	0.26	9.9	2.0	1	-75.9	300	6.0	-14.6	24.0	38.6	

E [dBuV/m] = EIRP [dBm] - 20 log (Distance [m]) + Ground bounce [dB] + 104.8 [dBuV/m]

 $EIRP[dBm] = Reading \ [dBm] + Cable \ loss \ [dB] + Attenuator \ Loss \ [dB] + Antenna \ gain \ [dBi] + 10 * log \ (N)$ 

N: Number of output

\*2.0 dBi was applied to the test result based on KDB 558074 since antenna gain was less than 2.0 dBi.

## **Power Density**

Test placeIse EMC Lab. No.3 Measurement RoomReport No.11701947HDateFebruary 16, 2017Temperature / Humidity23 deg. C / 36 % RHEngineerYuta MoriyaModeTx BT LE

Freq.	Reading	Cable	Atten.	Result	Limit	Margin
		Loss	Loss			
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[dBm]	[dB]
2402.00	-18.45	1.39	10.05	-7.02	8.00	15.02
2440.00	-19.40	1.39	10.05	-7.96	8.00	15.96
2480.00	-20.14	1.40	10.05	-8.68	8.00	16.68

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

## **Power Density**



Test report No.	: 11701947H-A
Page	: 20 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

## 99%Occupied Bandwidth

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11701947H
Date	February 16, 2017
Temperature / Humidity	23 deg. C / 36 % RH
Engineer	Yuta Moriya
Mode	Tx BT LE



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

Test report No.	: 11701947H-A
Page	: 21 of 21
Issued date	: April 12, 2017
FCC ID	: VIYHRM5087

# **APPENDIX 2:** Test instruments

#### **Test equipment**

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2016/05/19 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2016/10/17 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2016/10/17 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	AT	2016/04/18 * 12
MAT-57	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2016/12/15 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2016/03/10 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2016/11/28 * 12
MOS-29	Thermo-Hygrometer	Custom	CTH-201	2901	AT	2017/01/20 * 12
MMM-08	DIGITAL HITESTER	Hioki	3805	051201197	AT	2017/01/19 * 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.

Test Item: AT: Antenna Terminal Conducted test

## **End of Report**