

## TEST REPORT

Issued: March 13 2017

Name and Address  
of the Customer: You I Robo Co., Ltd  
4-31-2-402 Nishigotanda, Shinagawa-ku, Tokyo 141-0031, Japan

Test Item: Wireless Sensor Unit

Identification: AR2016

Serial No.: E161215, E170119-1

FCC ID: 2AK2V-YOUIROBO

Sample No.: 1

Sample Receipt Date: December 15, 2016

Test Specification: 47 CFR Part 15 Subpart C  
RSS-Gen Issue 4, RSS-247 Issue 1

Period of Testing: January 17 – February 9, 2017

Test Result: PASS

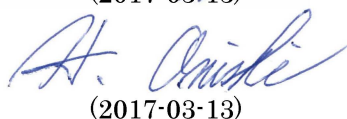
Representative  
Test Personnel:



(2017-03-13)

K. Miyaji (EMC Dept.)  
iNARTE : EMC-003627-NE

Reviewed by:



(2017-03-13)

H. Onishi (EMC Dept.)  
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Other Aspects:

Abbreviations: PASS = passed  
FAIL = failed  
N/A = not applicable

Note:

This Test Report should not be reproduced except in full, without the written approval of Cosmos Corporation.  
The test result of this Test Report is based on the tests made for sample provided, and it is not applicable to individual product identical to the sample or similar product.  
The judgment of this test report validates the test item only specified in "4. Summary of Test Results".  
This test report is not things that be accredited by VLAC regarding the products and also ensured.  
Therefore, this report must not be used for advocating them.



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## 1. Description of the Tested Sample

### 1.1 Product Description

Manufacturer	You I Robo Co., Ltd
Model (referred to as the EUT)	AR2016
Hardware Version	AR2016
Software Version	nRF51_SDK_10.0.0
Type of the Equipment	<input type="checkbox"/> Stand-alone <input checked="" type="checkbox"/> Combined Equipment <input type="checkbox"/> Plug-in Radio Device <input type="checkbox"/> Other ( )
Transmitter Type	<input type="checkbox"/> WLAN <input checked="" type="checkbox"/> Bluetooth (Ver 4.2 Low Energy ) <input type="checkbox"/> ZigBee <input type="checkbox"/> RFID <input type="checkbox"/> Other ( )
Nominal Voltage	DC 3 V (Battery)
Type of Modulation	GFSK
Antenna Type	<input checked="" type="checkbox"/> Integral Antenna <input type="checkbox"/> Dedicated External Antenna
Operating Frequency	2402 MHz to 2480 MHz
Type of Power Source	<input type="checkbox"/> AC Mains <input type="checkbox"/> Dedicated AC Adaptor <input type="checkbox"/> DC Voltage <input checked="" type="checkbox"/> Battery
Type of Battery (if applicable)	Coin-Cell Battery
Thermal Limitation	0°C to 40°C

### 1.2 Antenna Description

Model	Gain	Antenna Type	Remarks
Un-specified *	-0.42 dBi	Monopole Antenna	---

Note:

\*: The antenna does not have model name, because the antenna is a part of EUT.



### 1.3 EUT Description

Equipment under test is as follow:

<b>Instrument</b>	<b>Model</b>	<b>Serial No.</b>	<b>Rating</b>
Wireless Sensor Unit (EUT1)	AR2016	E161215 * <sup>1</sup>	DC 3 V (Battery)
Wireless Sensor Unit (EUT2)	AR2016	E170119-1 * <sup>2</sup>	DC 3 V (Battery)

Note:

\*<sup>1</sup>: This equipment was used during the following tests;

6 dB Bandwidth, Maximum Peak Conducted Output Power and E.I.R.P.,  
Conducted Spurious Emission and Power Spectral Density.

\*<sup>2</sup>: This equipment was used during the following tests;

Transmitter Spurious Emissions (Radiated) and Band Edge Measurement.



## 2. General Information

### 2.1 Test Methodology

All measurement subject to the present test report is carried out according to the procedures in ANSI C63.10-2013.

### 2.2 Test Facility

The measurement was carried out at the following facility.

Cosmos Corporation EMC Lab. Oonoki  
3571-2 Oonoki, Watarai-cho, Watarai-gun, Mie-ken 516-2102, Japan

- ☒ Semi anechoic Chamber 3 m (COAC3M-01)
- ☐ Shielded Room (COSR-01)
- ☒ Measurement Room

Cosmos Corporation EMC Lab. Oonoki is accredited in accordance with the International Standard ISO/IEC 17025 by the following accreditation bodies and the test facility is registered by the following bodies.

Accreditation: A2LA Accredited Laboratory No. 2900.01  
VLAC Accredited Laboratory No. VLAC-039-2  
FCC Designation No. JP5182

Registration: Industry Canada Registration No. 3958B  
Nemko Laboratory Authorisation. No. ELA 621

### 2.3 Traceability

The calibration of measurement equipment used in the test subject to the present report is designed and operated to ensure that the measurement is traceable to national standards of measurement or equivalent abroad.



### 3. Test Condition (Manufacturer's Specification)

#### 3.1 Mode of Operation

Mode of operation : Bluetooth LE Operating

Note:

The following parameters were used for the measurement. These settings cannot be changed by end user. Parameters: 0dBm and 1Mbit.

The EUT makes communication emission with the maximum RF power by a special test settings.

The EUT was operated with following duty cycle to simulate the actual operation.

Cycle: 20 ms, on-time: 2.1ms

#### 3.2 Additional Equipment

The equipment was tested together with additional peripherals.

The following peripherals were used during the tests:

Instrument	Model	Serial No.	Manufacturer	FCC ID
Jig	---	---	You I Robo	---
J-Link Lite Board	---	---	SEGGER	---

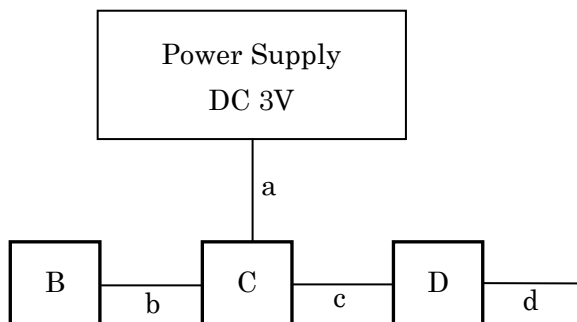


### 3.3 Configuration

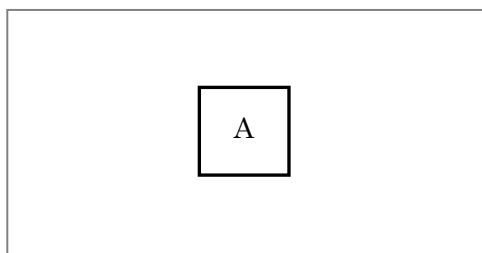
	Instrument	Model		Cable	Length	Shield
A	EUT1 (Wireless Sensor Unit)	AR2016 (S/N:E161215)	a	DC power cord	2.0 m	×
			b	Jig Cable	0.2 m	×
B	EUT2 (Wireless Sensor Unit)	AR2016 (S/N:E170119-1)	c	J-Link Lite Cable	0.1 m	×
			d	USB Cable	1.0 m	○
C	Jig	---				
D	J-Link Lite Board	---				

### 3.3 Configuration (Continued)

6 dB Bandwidth / Maximum Peak Conducted Output Power and E.I.R.P.  
Conducted Spurious Emission / Power Spectral Density

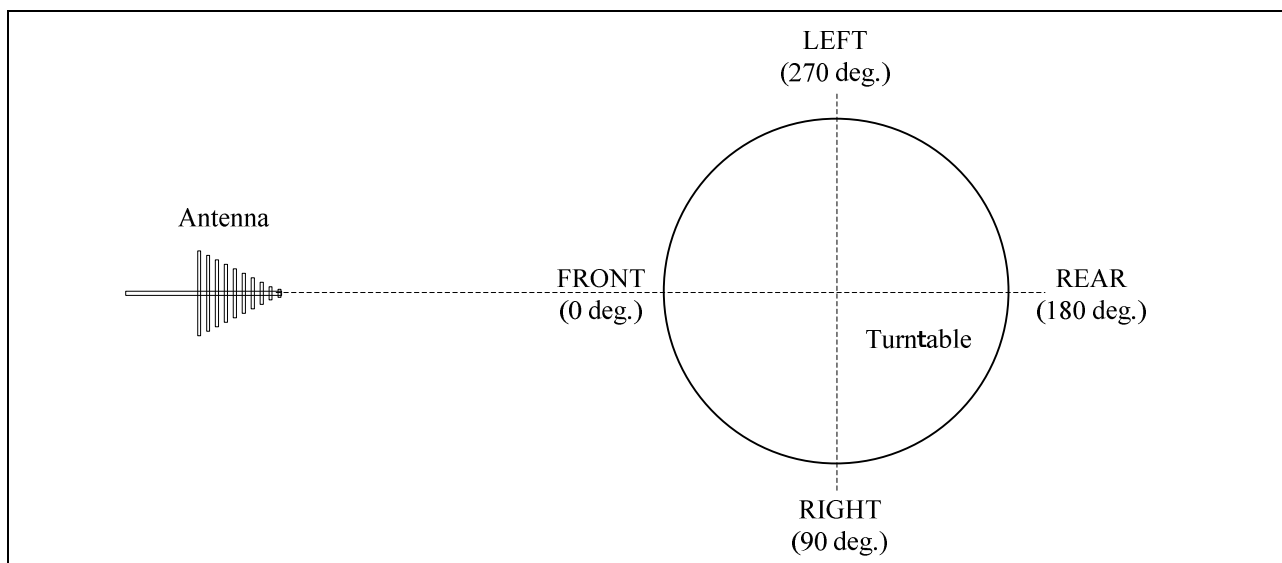


Transmitter Spurious Emission (Radiated) / Band Edge Measurement



Non-conductive table, 0.8 m high (Below 1 GHz)  
Non-conductive table, 1.5 m high (Above 1 GHz)

### 3.4 EUT Angle



## 4. Summary of Test Results

These test results are the test results of the condition specified with “3. Test Condition”.

FCC Section	IC Section	Test Item	FCC Result	IC Result
15.207	RSS-Gen 8.8	AC Power Line Conducted Emission	N/A *	---
15.209	RSS-Gen 8.9	Transmitter Spurious Emission (Radiated)	PASS	---
15.247(a)	RSS-247 5.2(1)	6 dB Bandwidth	PASS	---
15.247(b)	RSS-247 5.4	Maximum Peak Conducted Output Power and E.I.R.P.	PASS	---
15.247(d)	RSS-247	Conducted Spurious Emission	PASS	---
15.247(d)	---	Band Edge Measurement	PASS	---
15.247(e)	RSS-247 5.2(2)	Power Spectral Density	PASS	---
---	RSS-Gen Annex A	Occupied Bandwidth	---	---
---	RSS-Gen 7.1	Receiver Spurious Emission (Radiated)	---	---

Note:

\*: The EUT is battery-operated equipment.





## 5. Test Result

### 5.1 Transmitter Spurious Emission (Radiated) (15.209, RSS-Gen 8.9)

#### 5.1.1 Setting Remarks

In the frequency range from 30 MHz to 25 GHz (as 10th harmonics), the electric field strength was measured in accordance with ANSI C63.10-2013.

The test setup was made in accordance with ANSI C63.10-2013 on the table installed in a semi-anechoic chamber. The non-conductive table, 0.8 / 1.5 m high, was placed on the turntable, and the EUT was put on the non-conductive table. The EUT was measured at 1 m to 4 m height of the antenna above 30 MHz. The turntable was fully rotated. The highest radiation from the equipment was recorded. The measurement above 30 MHz was carried out with both horizontal and vertical antenna polarization. The test receiver with Peak, Quasi Peak and Average detector is in accordance with CISPR 16-1-1. The measurement was carried out with the measuring distance of 3 m.

Setting Condition of Test receiver

Frequency range	Detector	RBW
30 MHz to 1 GHz	Quasi peak	120 kHz
1 GHz to 25 GHz	Peak	1 MHz
	Average	1 MHz

#### 5.1.2 Limit

Frequency range	Field Strength (Distance)	
	[ $\mu$ V/m]	[dB $\mu$ V/m]
30 MHz to 88 MHz	100 (3 m)	40.0 (3 m)
88 MHz to 216 MHz	150 (3 m)	43.5 (3 m)
216 MHz to 960 MHz	200 (3 m)	46.0 (3 m)
Above 960 MHz	500 (3 m)	53.9 (3 m)



### 5.1.3 Test Detail

**Result: PASS**

Uncertainty of measurement result	: $\pm 3.97$ dB	
Date of testing	: February 1, 2017	February 2, 2017
Room temperature	: 20°C	20°C
Relative humidity	: 47%	49%
Date of testing	: February 3, 2017	February 7, 2017
Room temperature	: 21°C	20°C
Relative humidity	: 51%	45%
Date of testing	: February 9, 2017	
Room temperature	: 19°C	
Relative humidity	: 52%	

#### Sample Calculation

$$\begin{aligned}\text{Result} &= \text{Reading} + \text{c.f} \\ &= 63.6 + (-1.3) \\ &= 64.9\end{aligned}$$

$$\begin{aligned}\text{Margin} &= \text{Limit} - \text{Result} \\ &= 73.9 - 63.9 \\ &= 9.0\end{aligned}$$

Note:

c.f (Correction Factor) = Cable Attenuation Factor + Antenna Factor + Amplifier Gain



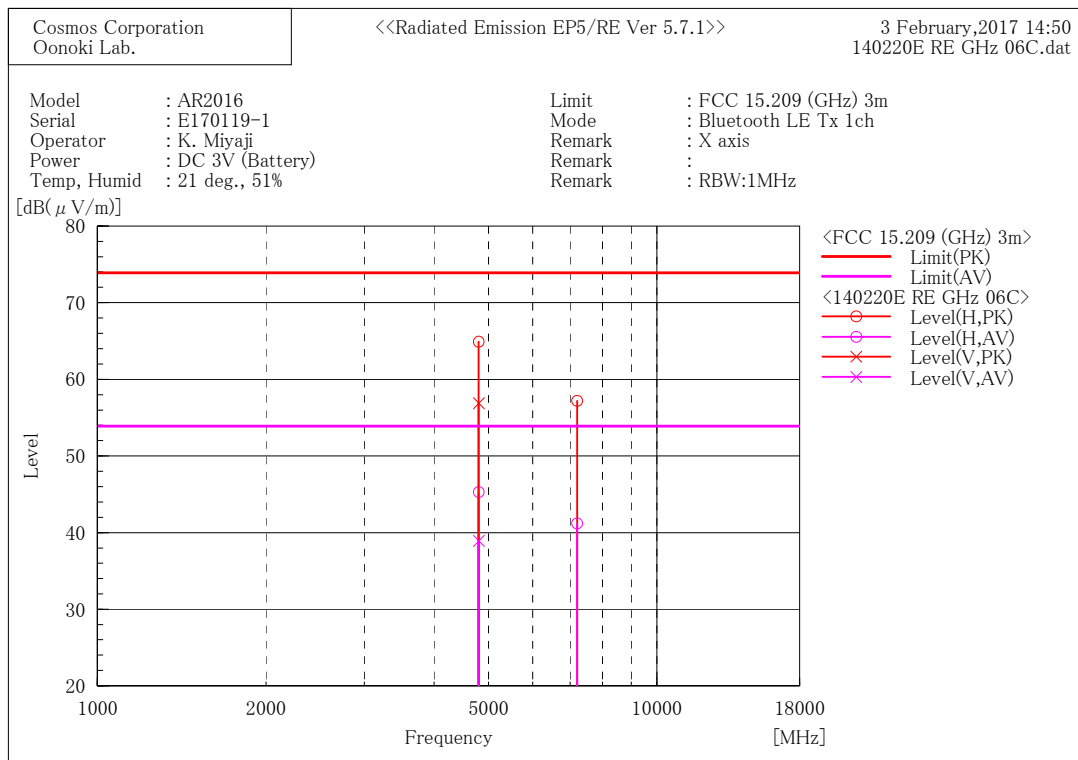
### 5.1.3 Test Detail (Continued)

<30 MHz to 1 GHz>

No spurious emission for RF module was found in 30 MHz to 1 GHz.

<1 GHz to 18 GHz>

#### Worst Test Data (Tx 1ch)



#### Final Result

##### --- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB( $\mu$ V)]	c.f [dB(1/m)]	Result [dB( $\mu$ V/m)]	Limit [dB( $\mu$ V/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4804.000	63.6	1.3	64.9	73.9	9.0	100.0	216.0
2	7206.000	46.6	10.6	57.2	73.9	16.7	100.0	145.0

##### --- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB( $\mu$ V)]	c.f [dB(1/m)]	Result [dB( $\mu$ V/m)]	Limit [dB( $\mu$ V/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4804.000	44.0	1.3	45.3	53.9	8.6	100.0	216.0
2	7206.000	30.6	10.6	41.2	53.9	12.7	100.0	145.0

##### --- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB( $\mu$ V)]	c.f [dB(1/m)]	Result [dB( $\mu$ V/m)]	Limit [dB( $\mu$ V/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4804.000	55.6	1.3	56.9	73.9	17.0	250.0	132.0

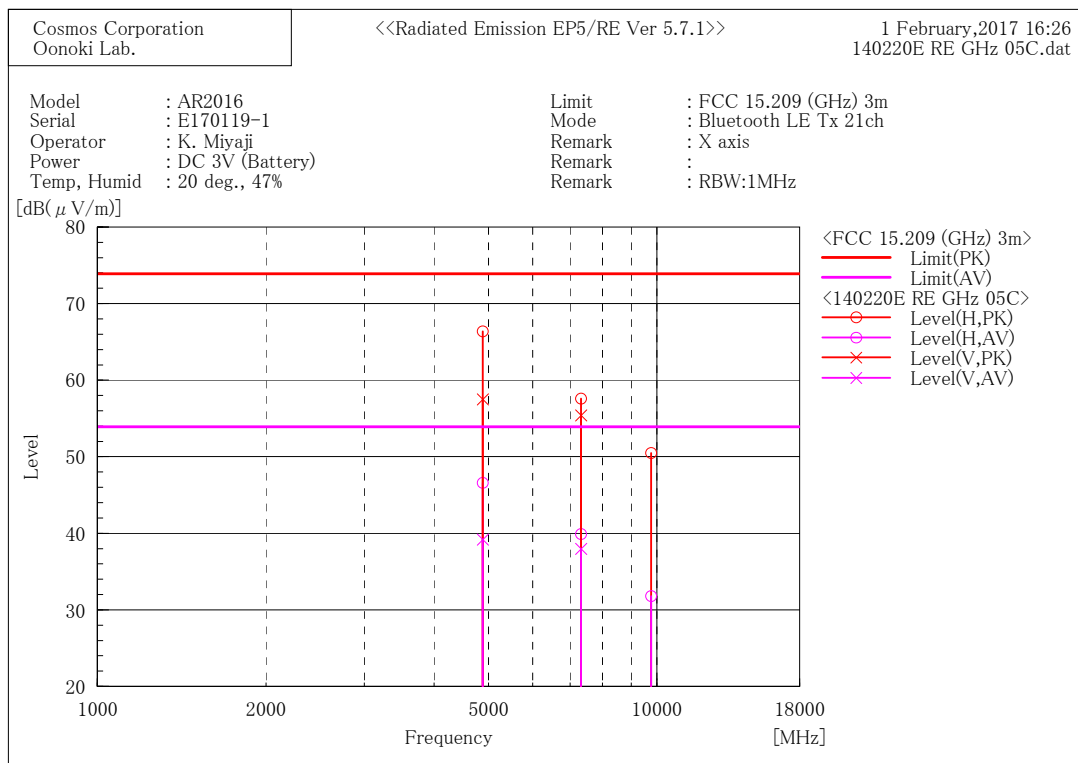
##### --- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB( $\mu$ V)]	c.f [dB(1/m)]	Result [dB( $\mu$ V/m)]	Limit [dB( $\mu$ V/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4804.000	37.6	1.3	38.9	53.9	15.0	250.0	132.0



### 5.1.3 Test Detail (Continued)

#### <1 GHz to 18 GHz> Worst Test Data (Tx 21ch)



#### Final Result

##### --- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4884.000	64.9	1.5	66.4	73.9	7.5	100.0	216.0
2	7326.000	47.0	10.6	57.6	73.9	16.3	100.0	219.0
3	9768.000	45.8	4.7	50.5	73.9	23.4	100.0	256.0

##### --- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4884.000	45.1	1.5	46.6	53.9	7.3	100.0	216.0
2	7326.000	29.3	10.6	39.9	53.9	14.0	100.0	219.0
3	9768.000	27.1	4.7	31.8	53.9	22.1	100.0	256.0

##### --- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4884.000	56.0	1.5	57.5	73.9	16.4	250.0	150.0
2	7326.000	44.8	10.6	55.4	73.9	18.5	250.0	182.0

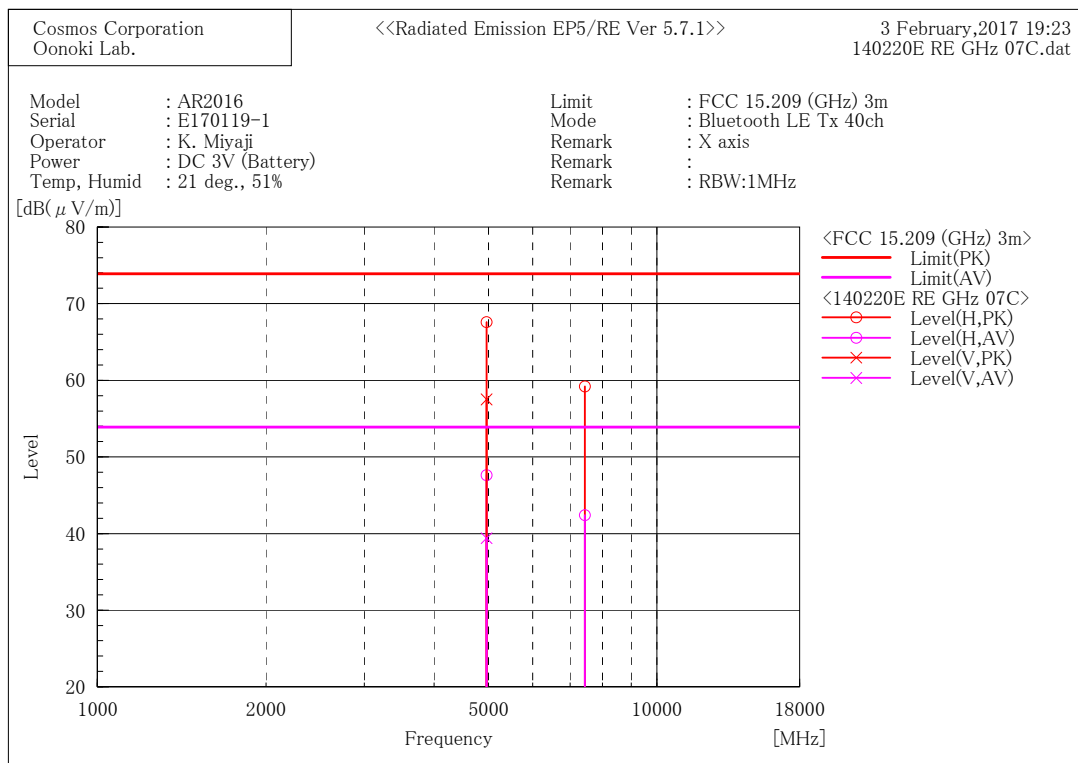
##### --- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4884.000	37.7	1.5	39.2	53.9	14.7	250.0	150.0
2	7326.000	27.4	10.6	38.0	53.9	15.9	250.0	182.0



### 5.1.3 Test Detail (Continued)

#### <1 GHz to 18 GHz> Worst Test Data (Tx 40ch)



#### Final Result

##### --- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c. f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4960.000	65.9	1.7	67.6	73.9	6.3	100.0	215.0
2	7440.000	48.1	11.1	59.2	73.9	14.7	100.0	145.0

##### --- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c. f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4960.000	45.9	1.7	47.6	53.9	6.3	100.0	215.0
2	7440.000	31.3	11.1	42.4	53.9	11.5	100.0	145.0

##### --- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c. f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4960.000	55.8	1.7	57.5	73.9	16.4	212.0	167.0

##### --- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c. f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	4960.000	37.7	1.7	39.4	53.9	14.5	212.0	167.0

#### <18 GHz to 25 GHz>

No spurious emission for RF module was found in 18 GHz to 25 GHz.



## 5.2 6 dB Bandwidth (15.247(a), RSS-247 5.2(1))

### 5.2.1 Setting Remarks

The both side of 6 dB down value from peak power were measured by using 6 dB bandwidth measurement function.

The spectrum analyzer is set as following:

· Frequency Span	: 3 MHz
· Resolution Bandwidth	: 100 kHz
· Video Bandwidth	: 300 kHz
· Detector Mode	: Peak
· Trace Mode	: Max Hold

### 5.2.2 Limit

Systems using digital modulation techniques may operate in the 902 MHz to 928 MHz, 2400 MHz to 2483.5 MHz, and 5725 MHz to 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 5.2.3 Test Detail

**Result: PASS**

Uncertainty of measurement result	: $\pm 0.025\%$
Date of testing	: January 17, 2017
Room temperature	: 22°C
Relative humidity	: 36%

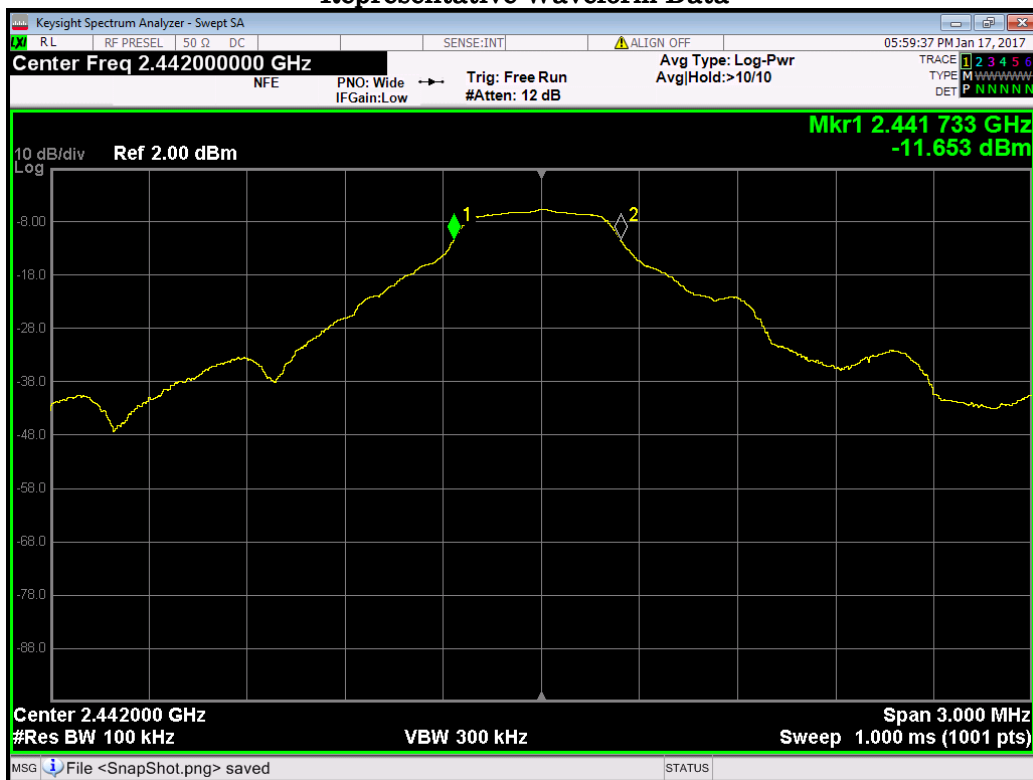


### 5.2.3 Test Detail (Continued)

Test Data

Frequency	Measured Bandwidth [MHz]
2402 MHz	0.648
2442 MHz	0.510
2480 MHz	0.510

Representative Waveform Data





### 5.3 Maximum Peak Conducted Output Power and E.I.R.P. (15.247(b), RSS-247 5.4)

#### 5.3.1 Setting Remarks

The spectrum analyzer is set as following:

·Frequency Span	: 2.25 MHz
·Resolution Bandwidth	: 750 kHz
·Video Bandwidth	: 2.2 MHz
·Detector Mode	: Peak
·Trace Mode	: Max Hold

#### 5.3.2 Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz bands: 1 Watt.

#### 5.3.3 Test Detail

**Result: PASS**

Uncertainty of measurement result	: $\pm 1.72$ dB
Date of testing	: January 17, 2017
Room temperature	: 22°C
Relative humidity	: 36%





### 5.3.3 Test Detail (Continued)

Sample Calculation

$$\begin{aligned}\text{Margin} &= \text{Limit} - \text{Peak Power} \\ &= 30 - (-3.12) \\ &= 33.1\end{aligned}$$

**Conducted Output Power**

Frequency	Peak Power [dBm]	Limit [dBm]	Margin [dB]
2402 MHz	-3.12	30	33.1
2442 MHz	-2.81	30	32.8
2480 MHz	-2.23	30	32.2

**E.I.R.P. Data**

Frequency	E.I.R.P [dBm]	Limit [dBm]	Margin [dB]
2402 MHz	-3.54	36	39.54
2442 MHz	-3.23	36	39.23
2480 MHz	-2.65	36	38.65



## 5.4 Conducted Spurious Emission (15.247(d), RSS-247 5.5)

### 5.4.1 Setting Remarks

The Spectrums are scanned from the lowest generated frequency of EUT up to the 10th harmonics by using the spectrum analyzer.

The spectrum analyzer is set as following:

·Resolution Bandwidth	: 100 kHz
·Video Bandwidth	: 300 kHz
·Detector Mode	: Peak
·Trace Mode	: Max Hold

### 5.4.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

### 5.4.3 Test Detail

**Result: PASS**

Uncertainty of measurement result	: $\pm 1.72$ dB
Date of testing	: January 17, 2017
Room temperature	: 22°C
Relative humidity	: 36%

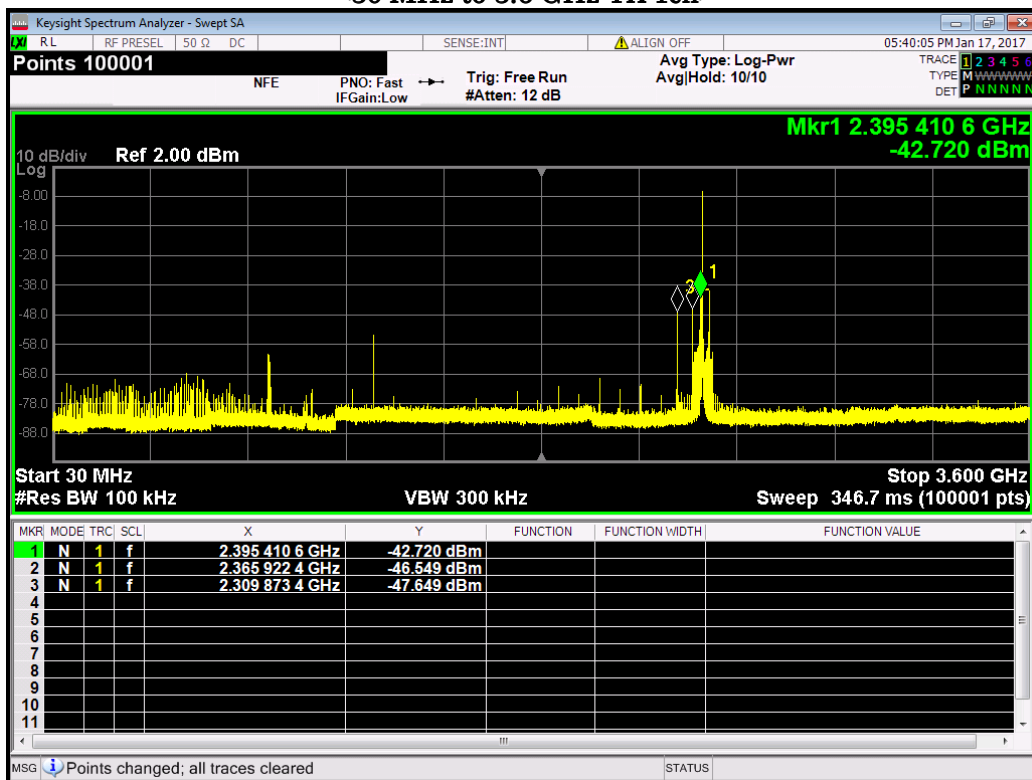


### 5.4.3 Test Detail (Continued)

#### Worst Test Data (Limit Level)

Fundamental Level(Reading) [dBm]	Spurious Limit[dBm]
-6.04	-26.04

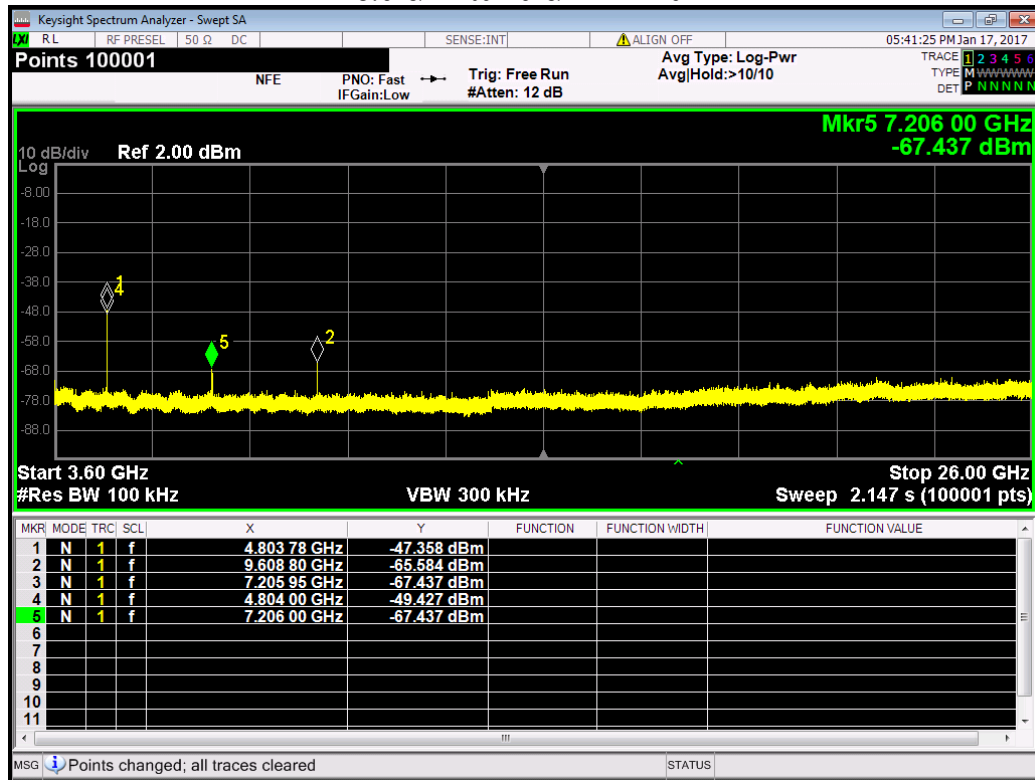
#### Worst Test Data <30 MHz to 3.6 GHz TX 1ch>





### 5.4.3 Test Detail (Continued)

#### Worst Test Data <3.6 GHz to 26 GHz TX 1ch>





## 5.5 Band Edge Measurement (15.247(d))

### 5.5.1 Setting Remarks

The test setup was made in accordance with ANSI C63.10-2013 on the table installed in a semi-anechoic chamber. The non-conductive table, 0.8 m high, was placed on the turntable, and the EUT was put on the non-conductive table. The EUT was measured at 1 m to 4 m height of the antenna. The turntable was fully rotated. The highest radiation from the equipment was recorded. The measurement was carried out with both horizontal and vertical antenna polarization. This measurement is repeated in both side of the spectrum. The test receiver with Peak, Quasi Peak and Average detector is in accordance with CISPR 16-1-1. The measurement was carried out with the measuring distance of 3 m.

Setting Condition of Analyzer

Detector	RBW
Peak	1 MHz
Average	1 MHz

### 5.5.2 Test Detail

**Result: PASS**

Uncertainty of measurement result :  $\pm 3.36$  dB  
Date of testing : February 3, 2017  
Room temperature :  $21^{\circ}\text{C}$   
Relative humidity : 51%

Sample Calculation

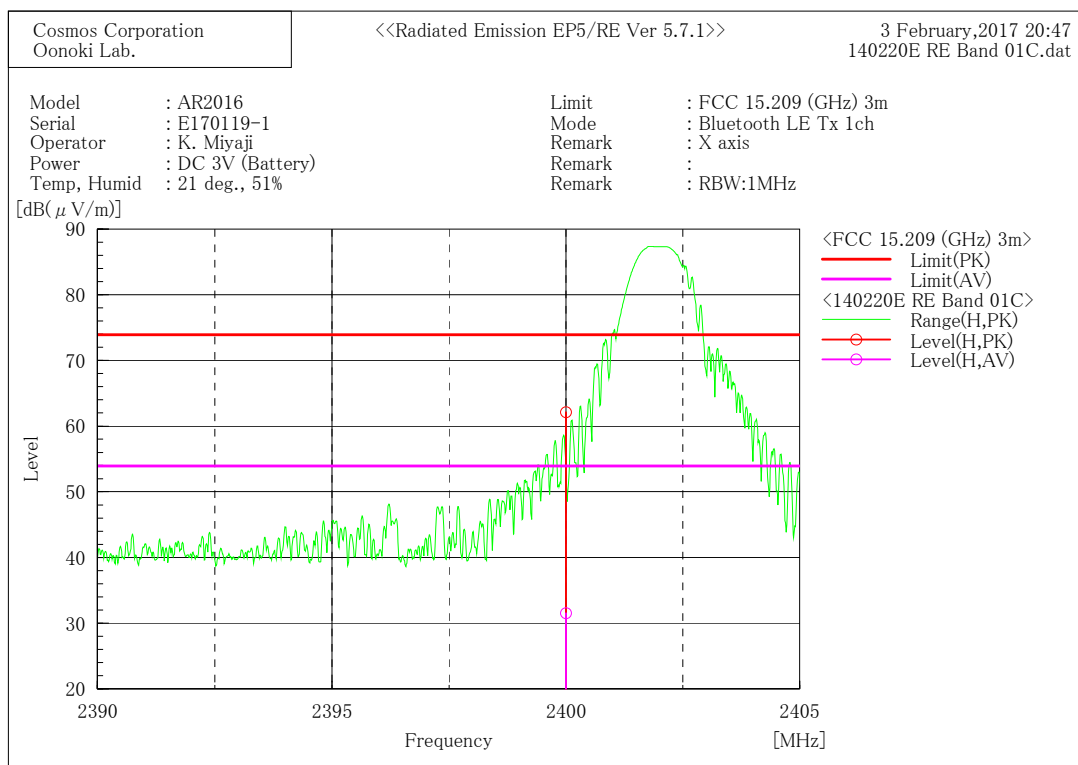
Result = Reading + c.f  
=  $60.5 + 1.6$   
= 62.1

Margin = Limit – Result  
=  $73.9 - 62.1$   
= 11.8



## 5.5.2 Test Detail (Continued)

### Test Data



#### Final Result

##### --- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	2400.000	60.5	1.6	62.1	73.9	11.8	185.0	272.0

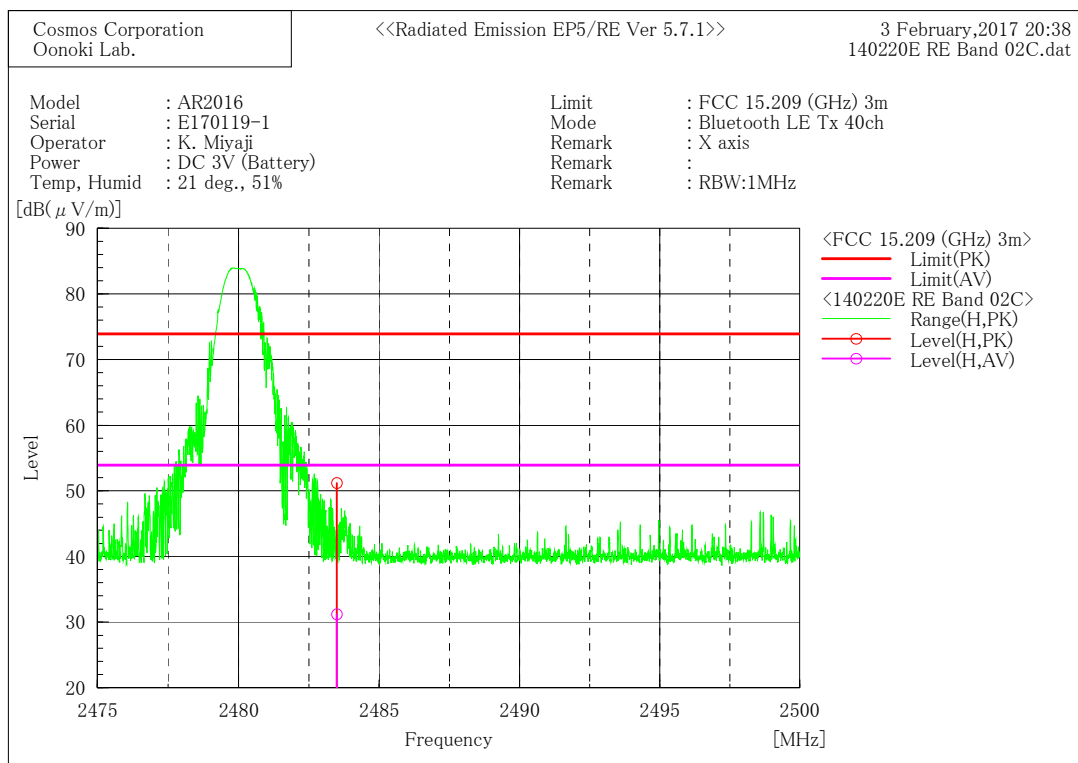
##### --- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	2400.000	29.9	1.6	31.5	53.9	22.4	185.0	272.0



## 5.5.2 Test Detail (Continued)

### Test Data



### Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	2483.500	49.6	1.6	51.2	73.9	22.7	166.0	257.0

--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	2483.500	29.6	1.6	31.2	53.9	22.7	166.0	257.0



## 5.6 Power Spectral Density (15.247(e), RSS-247 5.2(2))

### 5.6.1 Setting Remarks

The spectrum analyzer is set as following:

·Frequency Span	: Approx. $1.5 \times 6$ dB Bandwidth
·Resolution Bandwidth	: 3 kHz
·Video Bandwidth	: 10 kHz
·Detector Mode	: Peak
·Trace Mode	: Max Hold

### 5.6.2 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### 5.6.3 Test Detail

**Result: PASS**

Uncertainty of measurement result	: $\pm 1.72$ dB
Date of testing	: January 17, 2017
Room temperature	: 22°C
Relative humidity	: 36%

Sample Calculation

$$\begin{aligned}\text{Power Spectral Density} &= \text{Reading} + \text{Correction Factor} \\ &= -15.716 + 2.8347 \\ &= -12.88\end{aligned}$$

$$\begin{aligned}\text{Margin} &= \text{Limit} - \text{Power Spectral Density} \\ &= 8.0 - (-12.88) \\ &= 20.9\end{aligned}$$





### 5.6.3 Test Detail (Continued)

Test Data

Frequency	Reading [dBm]	Correction Factor [dB]	Power Spectral Density [dBm]	Limit [dBm]	Margin [dB]
2402 MHz	-15.716	2.8347	-12.88	8.0	20.9
2442 MHz	-15.662	2.8237	-12.84	8.0	20.8
2480 MHz	-13.688	2.6757	-11.01	8.0	19.0

Worst Waveform Data





## 6. List of Test and Measurement Instruments

### Transmitter Spurious Emissions (Radiated) (Below 1 GHz)

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	KEYSIGHT TECHNOLOGIES	N9038A	MY55330106	2016/10/03 2017/10/02
Pre-Amplifier (30 MHz to 1 GHz)	HEWLETT PACKARD	8447D OPT 010	2944A 07891	2016/04/08 2017/04/07
Biconical Antenna (30 MHz to 300 MHz)	SCHWARZBECK	VHBB9124 / BBA9106	9124-311	2016/09/05 2017/09/04
Log-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP9108-A	0645	2016/09/05 2017/09/04
Anechoic Chamber 3 m	JSE	COAC3M-01	---	2016/04/20 2017/04/19
Attenuator 3 dB	JFW	50FP-003-H2	---	2016/04/06 2017/04/05
RF Cable RF Selector (30 MHz to 1 GHz)	Fujikura	8D-2W	OC14	2016/04/18 2017/04/17
	SUHNER	RG223/U	OC11	
		RG214/U	OC15 OC16	
		RG400/U	OC17	
	TSJ	RFM-E121	03149	
Software	TOYO	EP5/RE (ver 5.7.1)	---	---



## 6. List of Test and Measurement Instruments (Continued)

### Transmitter Spurious Emission (Radiated) (Above 1 GHz) / Band Edge Measurement

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	KEYSIGHT TECHNOLOGIES	N9038A	MY55330106	2016/10/03 2017/10/02
Pre-Amplifier	TSJ	MLA-0120AML -34	---	2016/11/28 2017/11/27
Double Ridged Broadband Horn Antenna (1 GHz to 18 GHz)	SCHWARZBECK	BBHA9120D	443	2015/11/19 2018/11/18
Standard Gain Horn Antenna (8.2 GHz to 12.4 GHz)	MI Technologies	12-8.2 093290	22856NL	2016/10/24 2017/10/23
Standard Gain Horn Antenna (12.4 GHz to 18 GHz)	MI Technologies	12-12 093275	22857NL	2016/10/24 2017/10/23
Standard Gain Horn Antenna (18 GHz to 26.5 GHz)	ETS LINDGREN / TSJ	3160-09 / MLA- 1826POM-30	00034723 / ---	2015/11/05 2018/11/04
Anechoic Chamber 3 m	JSE	COAC3M-01	---	2016/04/20 2017/04/19
Attenuator 3 dB	JFW INDUSTRIES	50HF-003 N	1401	2016/12/13 2017/12/12
Attenuator 10 dB	JFW INDUSTRIES	50HF-010N	1324	2016/09/02 2017/09/01
RF Cable (1 GHz to 18 GHz)	STORM	TRUE BLUE 290	OC18 OC19 OC20	2016/04/18 2017/04/17
RF Cable (18 GHz to 40 GHz)	SUHNER	SUCOFLEX 102A	OC39	2016/02/13 2017/02/12
Notch Filter	MICRO -TRONICS	BRM50702	027	2016/04/26 2017/04/30
Software	TOYO	EP5/RE (ver 5.7.1)	---	---



## 6. List of Test and Measurement Instruments (Continued)

### Maximum Peak Conducted Output Power and E.I.R.P.

#### 6 dB Bandwidth / Conducted Spurious Emission / Power Spectral Density

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	KEYSIGHT TECHNOLOGIES	N9038A	MY55330106	2016/10/03 2017/10/02
RF TEST SET	Agilent Technologies (MORITA TECH Co., Ltd.)	MT-747	13326	2016/12/12 2017/12/11
RF Cable	HUBER + SUHNER	SUCOFLEX 102	OC30 OC34	2016/12/12 2017/12/11
Software	KEYSIGHT TECHNOLOGIES	JPJ5A1NN14100 (Ver 1.60)	---	---

## 7. Appendix

Refer to separated files for the following appendixes.

Appendix 1: Angle of EUT

Appendix 2: Photographs of the Test Setup

Appendix 3: Photographs of EUT