



# TEST REPORT

Report Number : A-005-15-C

Date of Issue: 17 December 2015

FCC Rules and Regulations Part 15 Subpart C Intentional Radiators.

This test report is to certify that the device was tested according to the requirements of the above.  
The results of this report should not be construed to imply compliance of devices other than the sample tested.  
Without the laboratory approval by the documents, this report should not be copied in part.

## 1. Applicant

Company Name : TAIYO YUDEN CO.,LTD.

Mailing Address : 8-1, Sakae-cho, Takasaki-shi, Gunma, 370-8522, Japan

## 2. Identification of Tested Device

Type of Device : Transmitter

FCC ID : RYYWYSAAVDXB-E

Device Name : Wireless Module

Model Number : WYSAAVDXB-E

Serial Number : 01

Trade Name : EPSON

Type of Test :  Production  Pre-production  Prototype

## 3. Test Items

AC Power Line Conducted Emission	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A (*4)
20dB Bandwidth and Carrier Frequency Separation (FHSS only)	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A (*4)
Time of Occupancy (Dwell Time) (FHSS only)	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A (*4)
Number of Hopping Frequency (FHSS only)	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A (*4)
6dB Bandwidth (DTS only)	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A (*4)
Peak Conducted Output Power	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> N/A
Power Spectral Density (DTS only)	<input type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input checked="" type="checkbox"/> N/A (*4)
Spurious Emission	<input checked="" type="checkbox"/> Pass	<input type="checkbox"/> Fail	<input type="checkbox"/> N/A

Refer the below reason(s) with respect to the decision and justification not to test.

(\*1) EUT Specifications (\*2) Request of Applicant (\*3) According to Test Plan

(\*4) The test was not performed because it had already been tested in the test report: A-001-15-C.

KEC Electronic Industry Development Center Testing Division  
3-2-2, Hikari-dai, Seika-cho, Soraku-gun, Kyoto 619-0237 Japan

### Test Engineer(s)

Naoki Norimoto



Approved by

Ikuya Minematsu / Group Manager



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## 1. LABORATORY INFORMATION

### 1.1. Laboratory Accreditation

The KEC has been accredited by the following organizations based on their criteria for testing laboratory (ISO/IEC 17025).

- (1) Japan Accreditation Board for Conformity Assessment (JAB) : Accreditation Number: RTL02810  
 (2) Voluntary EMC Laboratory Accreditation Center Inc. (VLAC) : Accreditation Number: VLAC-005

### 1.2. Test Facility

All tests described in this report were performed by:

Name: KEC Electronic Industry Development Center  
 Testing Division

Address: 3-2-2, Hikari-dai, Seika-cho, Soraku-gun, Kyoto 619-0237 Japan

Anechoic Chamber :  No.1  No.2  No.3  No.6  No.7  
 No.8  No.9  No.10  No.11  No.12  
 Shielded Room :  No.1  No.7  No.8  No.9  No.10  
 Harmonic Current Meas. Room :

This test facility has been filed with the FCC under the criteria of ANSI C63.4-2009.

Registered Test Site Number : 174872

### 1.3. Measurement Uncertainty

The result of a measurement is only an approximation or estimate of the value of a specific quantity.

And thus the measurand is complete only when a statement of uncertainty is given.

KEC quotes Measurement Uncertainty (U) as follows.

Conducted Disturbance at Mains Port (150kHz-30MHz)	+2.5 / -2.8 dB
Conducted Disturbance at Mains Port (9kHz-30MHz)	+2.9 / -3.5 dB
Conducted Disturbance at Telecommunication Ports ISN method (None-Shield type)	+2.5 / -2.7 dB
Conducted Disturbance at Telecommunication Ports ISN method (Shield type)	+2.5 / -2.7 dB
Conducted Disturbance at Telecommunication Ports Current Probe method	+2.3 / -2.8 dB
Conducted Disturbance at Telecommunication Ports 150Ω Load voltage method	+2.0 / -2.6 dB
Conducted Disturbance at Telecommunication Ports None Invasive method	+2.9 / -3.9 dB
Conducted Disturbance at Lead Terminals and Additional Terminals	+1.8 / -2.1 dB
Disturbance Power (30MHz -300MHz )	+3.3 / -3.4 dB
Radiated Disturbance at Frequency Range from 9kHz up to 30MHz 60cm Loop Antenna method	+3.7 / -4.4 dB
Radiated Disturbance at Frequency Range from 9kHz up to 30MHz LLA method	+1.4 / -1.5 dB
Radiated Disturbance at Frequency Range from 30MHz up to 300MHz 3m method	+3.4 / -3.9 dB
Radiated Disturbance at Frequency Range from 300MHz up to 1GHz 3m method	+3.5 / -3.9 dB
Radiated Disturbance at Frequency Range from 30MHz up to 300MHz 10m method	+3.2 / -3.9 dB
Radiated Disturbance at Frequency Range from 300MHz up to 1GHz 10m method	+3.6 / -4.5 dB
Radiated Disturbance at Frequency Range from 30MHz up to 1GHz 10m method (Hybrid Antenna used measurement)	+4.1 / -4.6 dB
Radiated Disturbance at Frequency Range from 1GHz up to 6GHz 3m method	+4.7 / -6.0 dB
Radiated Disturbance at Frequency Range from 6GHz up to 26.5GHz 3m method	+4.5 / -5.1 dB
Harmonics Currents Emissions	+/- 5.7 %
Voltage Change, Voltage Fluctuations and Flicker	+/- 5.3 %

Expiration Date : 2016/9/30

The above values are calculated as Expanded Uncertainty (k=2 [95%]).

[Note]

If the measured result is below the specification limit and a margin is less than the above measurement uncertainty, it is impossible to determine compliance at a level of confidence of 95%. However, the measured result indicates high probability that the tested device complies with the specification limit.

## 2. GENERAL INFORMATION

### 2.1. Product Description

#### a. EUT

##### (1) Technical Specifications

· Wireless LAN + Bluetooth	: IEEE802.11a/b/g/n + Bluetooth3.0
· Transmit speed	: 11/5.5/2/1 Mbps(11b), 54/48/36/24/18/12/9/6Mbps(11a/g), 72.2 ~ 6.5 Mbps (11n20), 150 ~ 13.5 Mbps (11n40)
· Type of Modulation	: DSSS(11b), OFDM(11a/g/n) FHSS(Bluetooth)
· Frequency of Operation	: 2412-2462MHz(11b/g/n) 5180-5825MHz(11a/n) 2402-2480MHz(Bluetooth)
· Bandwidth	: 20MHz(11a/b/g/n20) 40MHz(11n40) 79MHz(Bluetooth)
· Channel Number	: 1 to 11ch (11b/g/n), 36 to 64ch, 100 to 140ch, 149 to 165ch(11a/n), 0 to 78ch (Bluetooth)
· Antenna Type	: Monopole Antenna
· Antenna Gain	: 2.1dBi(2.4GHz), 2.4dBi(5GHz)
· Tx Output Power	: 12dBm (Typ.) (11a/b/g/n), 0dBm (Typ.) (Bluetooth)
· Operating temperature range	: -30 to 85 deg.C.

##### (2) Maximum Oscillators Frequency

· Crystal oscillator	: 38.4MHz
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##### (3) Software Version

· LABTOOL	: 1.0.7.38
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##### (4) Firmware Version

: 1.0.7.40

##### (5) Interface and Provide Terminal

· SD_DATA 0~3	: SDIO data
· SD_CLK	: SDIO Clock
· SD_CMD	: SDIO Command
· VIO	: Digital I/O Power Supply
· VDD3.3	: Power Supply
· PDn	: Power Down
· PCM_CLK	: PCM Clock
· PCM_SYNC	: PCM Sync
· PCM_DOUT	: PCM Data Output
· PCM_DIN	: PCM Data Input
· GND	: GND

##### (6) Rated Power Supply

: DC 3.0 to 3.6V (Test for DC 3.3V)  
supplied from Smart Headset



## b. co-located radio device

## (1) Radio Specifications

- Type of Radio : Transceiver
- Type of Equipment : Bluetooth Low Energy Module
- Frequency of Operation : 2402-2480MHz
- Type of Modulation : GFSK
- Channel spacing : 2MHz
- Antenna type : Monopole Antenna
- Antenna gain : 1.3dBi

## (2) Maximum Oscillators Frequency

- Reference clock (NX1612AA) : 32MHz (Crystal)

## (3) Software Version

- nRFgo Studio : 1.20.0

## (4) Firmware Version

: s110\_nrf51822\_6.0.0\_softdevice

## (5) Interface and Provide Terminal

: -

## (6) Rated Power Supply

: DC 3.0 to 3.6V (Test for DC 3.3V)  
supplied from Smart Headset



### 3. TESTED SYSTEM

#### 3.1. Reference Rule and Specification

(1) Reference Rule and Regulation	: FCC Rule Part 15 Subpart C, Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, 5725-5850MHz <input checked="" type="checkbox"/> Section 15.205 <input type="checkbox"/> Section 15.207 <input checked="" type="checkbox"/> Section 15.209 <input type="checkbox"/> Section 15.247 (a)(1) <input type="checkbox"/> Section 15.247 (a)(2) <input checked="" type="checkbox"/> Section 15.247 (b)(1) <input checked="" type="checkbox"/> Section 15.247 (b)(3) <input checked="" type="checkbox"/> Section 15.247 (d) <input type="checkbox"/> Section 15.247 (e)
(2) Test Procedure	: ANSI C63.10-2013 FCC Public Notice DA 00-705 KDB Publication No.558074 D01 DTS Meas Guidance V03r03

#### 3.2. Date of Test

Receipt of Test Sample : 13 November 2015  
Condition of Test Sample :  Damage is not found on the set.  
 Damage is found on the set. (Details are described in this report)

Test Completed on : 11 December 2015  
Condition of Test Sample :  Damage is not found on the set.  
 Damage is found on the set. (Details are described in this report)

#### 3.3. Deviation of Standard

without deviation,  with deviation (details are found inside of this report)

### 3.4. Test Mode

•Wireless LAN + Bluetooth Low Energy

Test Item	Operating Mode	Test Frequency	Parameter Setting of Power
Peak Conducted Output Power	802.11b/g/n-20, BLE	W-LAN 2412MHz + BLE 2412MHz W-LAN 2442MHz + BLE 2442MHz W-LAN 2462MHz + BLE 2462MHz	12(W-LAN)
	802.11n-40, BLE	W-LAN 2422MHz + BLE 2422MHz W-LAN 2442MHz + BLE 2442MHz W-LAN 2452MHz + BLE 2452MHz	
Spurious Emissions / Restricted Band Edges	802.11b/g/n-20, BLE	W-LAN 2412MHz + BLE 2412MHz W-LAN 2412MHz + BLE 2402MHz(*1) W-LAN 2442MHz + BLE 2442MHz W-LAN 2462MHz + BLE 2462MHz W-LAN 2462MHz + BLE 2480MHz(*1)	12(W-LAN)
	802.11n-40, BLE	W-LAN 2422MHz + BLE 2422MHz W-LAN 2422MHz + BLE 2402MHz(*1) W-LAN 2442MHz + BLE 2442MHz W-LAN 2452MHz + BLE 2452MHz W-LAN 2452MHz + BLE 2480MHz(*1)	

Worst Data Rate			
Operating Mode	Transmitter Chain	Data Rate / MCS	Worst Data Rate
802.11b	1	1-11 Mbps	1 Mbps
802.11g	1	6-54 Mbps	6 Mbps
802.11n-20	1	MCS 0-7	MCS 1
802.11n-40	1	MCS 0-7	MCS 4

•Bluetooth + Bluetooth Low Energy

Test Item	Operating Mode	Test Frequency	Parameter Setting of Power
Peak Conducted Output Power	DH5 / 2DH5 / 3DH5, BLE	BT 2402MHz + BLE 2402MHz BT 2442MHz + BLE 2442MHz BT 2480MHz + BLE 2480MHz	2(BT)
Spurious Emissions / Restricted Band Edges	DH5 / 3DH5, BLE	BT 2402MHz + BLE 2402MHz BT 2442MHz + BLE 2442MHz BT 2480MHz + BLE 2480MHz	2(BT)

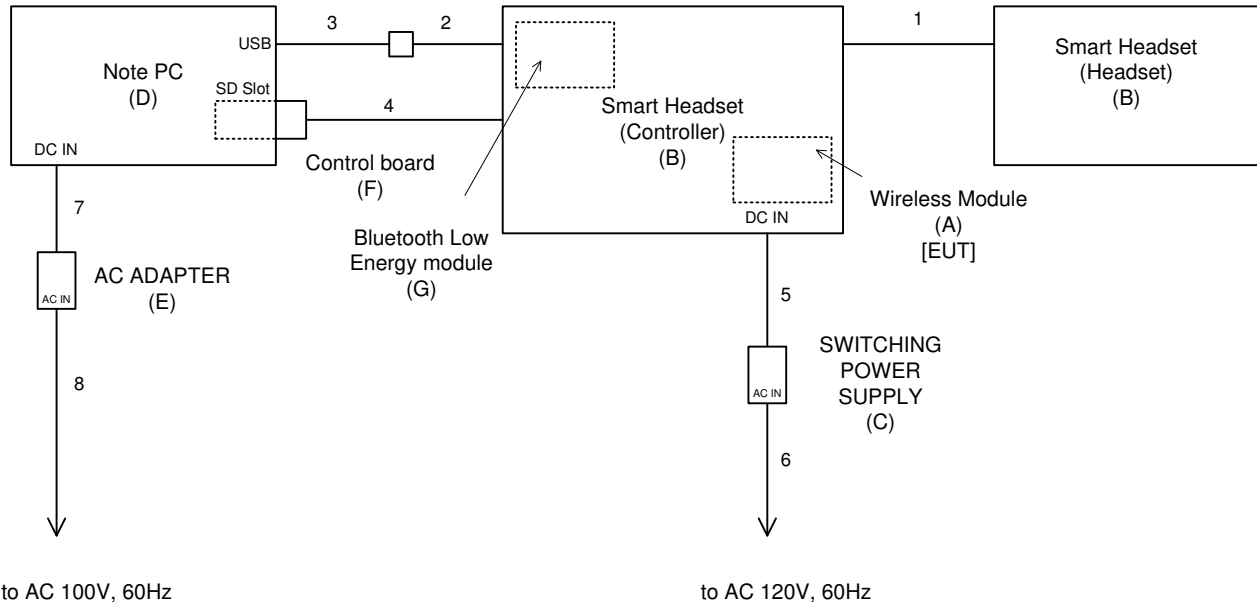
[Note]

- (1) The test program was prepared by the applicant.
- (2) The power setting was determined by the applicant.
- (3) The spurious emissions data of the each modes were checked in three orthogonal axes, and the data of the producing the maximum emissions were reported at each frequency.
- (4) (\*1) Restricted Band Edges measurement only.

(\* ) Purpose of test: The test is performed to confirm the Peak Conducted Output Power and Spurious Emission at simultaneous transmission of EUT and Bluetooth Low Energy Module (FCC ID: RYYEYSFCN) to combine them within a host. The EUT and BLE module are installed in the Smart Headset (Model No.: H725A) manufactured by Seiko Epson Corporation.



### 3.5. Block Diagram of TEST System



### 3.6. List of Test System

No.	Device Name	Model Number	Serial Number	Trade Name	Note
A	Wireless Module	WYSAAVDXB-E	01	EPSON	EUT
B	Smart Headset	H725A	Co-Location01	EPSON	
C	SWITCHING POWER SUPPLY	AST1116Z1-1	P50800277A1	EPSON	
D	Note PC	NA104A9L59	TE8000024	EPSON	(2)
E	AC ADAPTER	ADP-50HH	KIW0847009240	DELTA ELECTRONIC, Inc.	(2)
F	Control board	-	-	-	
G	Bluetooth Low Energy module	EYSFCN	1	TAIYO YUDEN	

[Note]

- (1): Option of EUT
- (2): Spurious Emission measurement was performed without Note PC.

### 3.7. List of Cables

No.	Cable Name	Shielded (Y/N)	Length (m)	Note
1	Cable	Y	1.1	(1)
2	Cable	N	0.25	(1)
3	USB Cable	Y	1.5	
4	SDIO Cable	N	0.15	(1)
5	DC Power Cord	N	1.0	(1)
6	AC Power Cord	N	2.0	(4)
7	DC Power Cord	N	1.8	(1)
8	AC Power Cord	N	2.0	(4)

[Note]

- (1) : Undetachable cable type
- (2) : Accessories cable of EUT
- (3) : 3-wires type, earth plug is grounded
- (4) : 2-wires type



## 4. PEAK CONDUCTED OUTPUT POWER

### 4.1. Test Procedure

- (1) Connect the EUT RF output port to peak power meter via calibrated coaxial cable and suitable attenuator (if necessary).
- (2) Activates the EUT System and execute the software prepared for test, if necessary.
- (3) To find out the worst condition, the transmitting data rate of EUT is changed.
- (4) Measurement is started using the peak power meter.

### 4.2. Test Results

#### W-LAN 11b + BLE

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Peak Output Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin for Limit (dB)	Note
2412	10.30	1.15	11.45	11.62	30.00	18.38	W-LAN
	3.52	-6.19	-2.67				BLE
2442	10.30	1.05	11.35	11.50	30.00	18.50	W-LAN
	3.52	-6.62	-3.10				BLE
2462	10.30	1.31	11.61	11.75	30.00	18.25	W-LAN
	3.52	-6.80	-3.28				BLE

#### W-LAN 11g + BLE

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Peak Output Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin for Limit (dB)	Note
2412	10.30	8.85	19.15	19.18	30.00	10.82	W-LAN
	3.52	-6.16	-2.64				BLE
2442	10.30	8.97	19.27	19.29	30.00	10.71	W-LAN
	3.52	-6.64	-3.12				BLE
2462	10.30	9.04	19.34	19.37	30.00	10.63	W-LAN
	3.52	-6.42	-2.90				BLE

#### W-LAN 11n-20 + BLE

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Peak Output Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin for Limit (dB)	Note
2412	10.30	8.03	18.33	18.36	30.00	11.64	W-LAN
	3.52	-6.11	-2.59				BLE
2442	10.30	7.98	18.28	18.31	30.00	11.69	W-LAN
	3.52	-6.73	-3.21				BLE
2462	10.30	8.23	18.53	18.56	30.00	11.44	W-LAN
	3.52	-7.06	-3.54				BLE



W-LAN 11n-40 + BLE

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Peak Output Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin for Limit (dB)	Note
2422	10.30	10.90	21.20	21.22	30.00	8.78	W-LAN
	3.52	-6.04	-2.52				BLE
2442	10.30	11.11	21.41	21.43	30.00	8.57	W-LAN
	3.52	-6.63	-3.11				BLE
2452	10.30	10.86	21.16	21.18	30.00	8.82	W-LAN
	3.52	-6.80	-3.28				BLE

BT DH5 + BLE

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Peak Output Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin for Limit (dB)	Note
2402	3.12	-5.44	-2.32	0.61	20.96	20.35	BT
	3.52	-6.00	-2.48				BLE
2442	3.12	-6.05	-2.93	0.02	20.96	20.94	BT
	3.52	-6.58	-3.06				BLE
2480	3.12	-6.66	-3.54	-0.74	20.96	21.70	BT
	3.52	-7.49	-3.97				BLE

BT 2DH5 + BLE

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Peak Output Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin for Limit (dB)	Note
2402	3.12	-7.25	-4.13	-0.25	20.96	21.21	BT
	3.52	-6.05	-2.53				BLE
2442	3.12	-7.96	-4.84	-0.86	20.96	21.82	BT
	3.52	-6.59	-3.07				BLE
2480	3.12	-8.51	-5.39	-1.58	20.96	22.54	BT
	3.52	-7.44	-3.92				BLE

BT 3DH5 + BLE

Measured Frequency (MHz)	Correction Factor (dB)	Meter Reading (dBm)	Peak Output Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin for Limit (dB)	Note
2402	3.12	-6.65	-3.53	0.03	20.96	20.93	BT
	3.52	-6.02	-2.50				BLE
2442	3.12	-7.37	-4.25	-0.61	20.96	21.57	BT
	3.52	-6.59	-3.07				BLE
2480	3.12	-8.00	-4.88	-1.37	20.96	22.33	BT
	3.52	-7.46	-3.94				BLE

[Note]  
Correction Factor includes the cable loss and attenuator loss.

[Calculation method]  
Peak Output Power (dBm) = Meter Reading (dBm) + Correction Factor (dB)  
Total Power (dBm) = P1 + P2 + ... + Pn  
(calculated in linear unit (mW) and transfer to log unit (dBm))

Tested Date	Environment	
	Temperature	Humidity
18 November 2015	23 °C	34 %

## 5. SPURIOUS EMISSION

### 5.1. Test Procedure

<p>Radiated measurement</p> <p>(1) The EUT is placed in accordance with ANSI C63.10.</p> <p>(2) The EUT is activated as to simulate an worst datarate.</p> <p>(3) To find out the maximum emission of the configuration of the EUT System, the position of the cables are changed, then preliminary radiated measurement are performed using the spectrum analyzer ,the broad band antenna and the horn antenna.</p> <p>(4) The spectrums are scanned from 30MHz to 1GHz, and collect the highest emissions on the spectrum analyzer (*1) relative to the limits in the whole range. In the frequency above 1GHz, it is performed using the spectrum analyzer (*1) and the horn antenna.</p> <p>(5) The highest emissions are measured at the specified distance using the test receiver (*2) and the broad band antenna or the tuned dipole. In the frequency above 1GHz, the measurements are performed by Bore-sight method using the spectrum analyzer (*3) and the horn antenna (*4).</p>														
<p>[Note]</p> <p>(*1) Spectrum Analyzer Set Up Conditions (Pre-measurement)</p> <p style="padding-left: 20px;">Frequency range : 30MHz – 1GHz / 1GHz – Upper frequency of measurement range</p> <p style="padding-left: 20px;">Resolution bandwidth : 100kHz / 1MHz</p> <p style="padding-left: 20px;">Detector function : Peak</p> <p>(*2) Test Receiver Set Up Conditions</p> <p style="padding-left: 20px;">Detector function : Quasi – Peak</p> <p style="padding-left: 20px;">IF bandwidth : 120kHz</p> <hr/> <p>(*3) Peak measurement Set Up Conditions</p> <p style="padding-left: 20px;">Resolution bandwidth : 1MHz</p> <p style="padding-left: 20px;">Video bandwidth : 3 x RBW</p> <p style="padding-left: 20px;">Detector function : Peak</p> <p style="padding-left: 20px;">Average measurement Set Up Conditions</p> <p style="padding-left: 40px;">Resolution bandwidth : 1MHz</p> <p style="padding-left: 40px;">Video bandwidth : 3 x RBW (DTS) / 10Hz (FHSS)</p> <p style="padding-left: 40px;">Detector function : RMS (DTS) / Peak (FHSS)</p> <p style="padding-left: 40px;">Trace : Trace Average 100 times (DTS)</p> <p style="padding-left: 40px;">Y axis : Linear (FHSS)</p> <p style="padding-left: 20px;">Non-Restricted Band measurement Set Up Conditions</p> <p style="padding-left: 40px;">Resolution bandwidth : 100kHz</p> <p style="padding-left: 40px;">Video bandwidth : 3 x RBW</p> <p style="padding-left: 40px;">Detector function : Peak</p> <hr/> <p>(*4) Cover Area of Horn Antenna (3dB Beamwidth)</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Frequency [GHz]</th> <th>Cover Area [m] at distance 3m</th> <th>Cover Area [m] at distance 1m</th> </tr> </thead> <tbody> <tr> <td>1.0-6.0</td> <td>1.89</td> <td>-</td> </tr> <tr> <td>5.8-12.4</td> <td>0.63</td> <td>0.21</td> </tr> <tr> <td>12.4-40.0</td> <td>0.47</td> <td>0.16</td> </tr> </tbody> </table>			Frequency [GHz]	Cover Area [m] at distance 3m	Cover Area [m] at distance 1m	1.0-6.0	1.89	-	5.8-12.4	0.63	0.21	12.4-40.0	0.47	0.16
Frequency [GHz]	Cover Area [m] at distance 3m	Cover Area [m] at distance 1m												
1.0-6.0	1.89	-												
5.8-12.4	0.63	0.21												
12.4-40.0	0.47	0.16												

### 5.2. Test Software List

KEC No.	Software Name	Version	Manufacture
TF-059	TEPTO Radiated emission automatic measurement	2.3.0321	TSJ
TF-110	Junction sheet	1.6H	KEC



5.3. Test Results

11b 2412MHz + BLE2412MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2390.00	5.2	50.7	48.0	-	55.9	74.0	18.1
4824.00	1.5	51.5	50.5	-	53.0	74.0	21.0
7236.00	-4.0	53.8	52.9	-	49.8	74.0	24.2
9648.00	-0.9	<45.0	<45.0	-	<44.1	74.0	>29.9
12060.00	2.1	<45.0	<45.0	-	<47.1	74.0	>26.9
24120.00	11.5	<45.0	<45.0	9.5	<47.0	74.0	>27.0
Average measurement							
2390.00	5.2	35.2	38.1	-	43.3	54.0	10.7
4824.00	1.5	49.0	48.0	-	50.5	54.0	3.5
7236.00	-4.0	52.1	50.9	-	48.1	54.0	5.9
9648.00	-0.9	<35.0	<35.0	-	<34.1	54.0	>19.9
12060.00	2.1	<35.0	<35.0	-	<37.1	54.0	>16.9
24120.00	11.5	<35.0	<35.0	9.5	<37.0	54.0	>17.0

[20dBc Data Sheet]

11b 2412MHz + BLE 2412MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2412.00	5.3	90.4	-	95.7	-	-
2400.00	5.3	35.9	-	41.2	75.7	34.5
2397.50	5.3	45.0	-	50.3	75.7	25.4
*1) 2412.00	5.3	-	89.9	95.2	-	-
2400.00	5.3	-	36.1	41.4	75.2	33.8
2397.10	5.3	-	43.6	48.9	75.2	26.3

11b 2412MHz + BLE 2402MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2412.00	5.3	88.8	-	94.1	-	-
2400.00	5.3	37.5	-	42.8	74.1	31.3
2397.50	5.3	45.7	-	51.0	74.1	23.1
*1) 2412.00	5.3	-	87.2	92.5	-	-
2400.00	5.3	-	37.4	42.7	72.5	29.8
2397.10	5.3	-	45.1	50.4	72.5	22.1



11b 2442MHz + BLE2442MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
4884.00	1.7	49.6	50.5	-	52.2	74.0	21.8
7326.00	-3.9	52.0	51.3	-	48.1	74.0	25.9
9768.00	-0.8	<45.0	<45.0	-	<44.2	74.0	>29.8
12210.00	2.4	<45.0	<45.0	-	<47.4	74.0	>26.6
24420.00	11.8	<45.0	<45.0	9.5	<47.3	74.0	>26.7
Average measurement							
4884.00	1.7	46.0	47.1	-	48.8	54.0	5.2
7326.00	-3.9	49.3	48.7	-	45.4	54.0	8.6
9768.00	-0.8	<35.0	<35.0	-	<34.2	54.0	>19.8
12210.00	2.4	<35.0	<35.0	-	<37.4	54.0	>16.6
24420.00	11.8	<35.0	<35.0	9.5	<37.3	54.0	>16.7



11b 2462MHz + BLE2462MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2483.50	5.3	46.1	46.7	-	52.0	74.0	22.0
4924.00	1.7	55.4	55.6	-	57.3	74.0	16.7
7386.00	-3.7	51.5	50.6	-	47.8	74.0	26.2
9848.00	-0.7	<45.0	<45.0	-	<44.3	74.0	>29.7
12310.00	2.7	<45.0	<45.0	-	<47.7	74.0	>26.3
24620.00	12.2	<45.0	<45.0	9.5	<47.7	74.0	>26.3
Average measurement							
2483.50	5.3	35.2	36.1	-	41.4	54.0	12.6
4924.00	1.7	42.5	43.7	-	45.4	54.0	8.6
7386.00	-3.7	49.2	48.0	-	45.5	54.0	8.5
9848.00	-0.7	<35.0	<35.0	-	<34.3	54.0	>19.7
12310.00	2.7	<35.0	<35.0	-	<37.7	54.0	>16.3
24620.00	12.2	<35.0	<35.0	9.5	<37.7	54.0	>16.3

[20dBc Data Sheet]

11b 2462MHz + BLE 2462MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2462.00	5.4	88.3	-	93.7	-	-
2483.50	5.3	34.5	-	39.8	73.7	33.9
*1) 2462.00	5.4	-	88.8	94.2	-	-
2483.50	5.3	-	36.1	41.4	74.2	32.8

11b 2462MHz + BLE 2480MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2462.00	5.4	87.6	-	93.0	-	-
2483.50	5.3	35.5	-	40.8	73.0	32.2
*1) 2462.00	5.4	-	88.3	93.7	-	-
2483.50	5.3	-	36.0	41.3	73.7	32.4



11g 2412MHz + BLE2412MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBµV/m )	Limit ( dBµV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBµV )	Vertical Polarization ( dBµV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2390.00	5.2	50.8	51.0	-	56.2	74.0	17.8
4824.00	1.5	47.7	47.6	-	49.2	74.0	24.8
7236.00	-4.0	51.1	50.1	-	47.1	74.0	26.9
9648.00	-0.9	<45.0	<45.0	-	<44.1	74.0	>29.9
12060.00	2.1	<45.0	<45.0	-	<47.1	74.0	>26.9
24120.00	11.5	<45.0	<45.0	9.5	<47.0	74.0	>27.0
Average measurement							
2390.00	5.2	37.8	37.7	-	43.0	54.0	11.0
4824.00	1.5	37.7	38.3	-	39.8	54.0	14.2
7236.00	-4.0	48.5	47.6	-	44.5	54.0	9.5
9648.00	-0.9	<35.0	<35.0	-	<34.1	54.0	>19.9
12060.00	2.1	<35.0	<35.0	-	<37.1	54.0	>16.9
24120.00	11.5	<35.0	<35.0	9.5	<37.0	54.0	>17.0

[20dBc Data Sheet]

11g 2412MHz + BLE 2412MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBµV/m )	Limit ( dBµV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBµV )	Vertical Polarization ( dBµV )			
Peak measurement						
*1) 2412.00	5.3	88.8	-	94.1	-	-
2400.00	5.3	46.8	-	52.1	74.1	22.0
*1) 2412.00	5.3	-	88.0	93.3	-	-
2400.00	5.3	-	46.7	52.0	73.3	21.3

11g 2412MHz + BLE 2402MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBµV/m )	Limit ( dBµV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBµV )	Vertical Polarization ( dBµV )			
Peak measurement						
*1) 2402.00	5.3	87.3	-	92.6	-	-
2400.00	5.3	46.9	-	52.2	72.6	20.4
*1) 2402.00	5.3	-	86.9	92.2	-	-
2400.00	5.3	-	46.6	51.9	72.2	20.3





11g 2442MHz + BLE2442MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
4884.00	1.7	47.0	47.8	-	49.5	74.0	24.5
7326.00	-3.9	53.4	51.2	-	49.5	74.0	24.5
9768.00	-0.8	<45.0	<45.0	-	<44.2	74.0	>29.8
12210.00	2.4	<45.0	<45.0	-	<47.4	74.0	>26.6
24420.00	11.8	<45.0	<45.0	9.5	<47.3	74.0	>26.7
Average measurement							
4884.00	1.7	36.4	37.5	-	39.2	54.0	14.8
7326.00	-3.9	49.6	47.9	-	45.7	54.0	8.3
9768.00	-0.8	<35.0	<35.0	-	<34.2	54.0	>19.8
12210.00	2.4	<35.0	<35.0	-	<37.4	54.0	>16.6
24420.00	11.8	<35.0	<35.0	9.5	<37.3	54.0	>16.7



11g 2462MHz + BLE2462MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2483.50	5.3	51.8	51.4	-	57.1	74.0	16.9
4924.00	1.7	43.9	45.0	-	46.7	74.0	27.3
7386.00	-3.7	51.3	49.7	-	47.6	74.0	26.4
9848.00	-0.7	<45.0	<45.0	-	<44.3	74.0	>29.7
12310.00	2.7	<45.0	<45.0	-	<47.7	74.0	>26.3
24620.00	12.2	<45.0	<45.0	9.5	<47.7	74.0	>26.3
Average measurement							
2483.50	5.3	37.8	36.9	-	43.1	54.0	10.9
4924.00	1.7	37.0	37.8	-	39.5	54.0	14.5
7386.00	-3.7	47.3	46.7	-	43.6	54.0	10.4
9848.00	-0.7	<35.0	<35.0	-	<34.3	54.0	>19.7
12310.00	2.7	<35.0	<35.0	-	<37.7	54.0	>16.3
24620.00	12.2	<35.0	<35.0	9.5	<37.7	54.0	>16.3

[20dBc Data Sheet]

11g 2462MHz + BLE 2462MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2462.00	5.4	88.0	-	93.4	-	-
2483.50	5.3	39.8	-	45.1	73.4	28.3
*1) 2462.00	5.4	-	87.3	92.7	-	-
2483.50	5.3	-	38.3	43.6	72.7	29.1

11g 2462MHz + BLE 2480MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2480.00	5.3	86.4	-	91.7	-	-
2483.50	5.3	37.4	-	42.7	71.7	29.0
*1) 2480.00	5.3	-	84.9	90.2	-	-
2483.50	5.3	-	38.8	44.1	70.2	26.1



11n-20 2412MHz + BLE2412MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2390.00	5.2	55.2	55.6	-	60.8	74.0	13.2
4824.00	1.5	48.4	48.7	-	50.2	74.0	23.8
7236.00	-4.0	52.3	51.7	-	48.3	74.0	25.7
9648.00	-0.9	<45.0	<45.0	-	<44.1	74.0	>29.9
12060.00	2.1	<45.0	<45.0	-	<47.1	74.0	>26.9
24120.00	11.5	<45.0	<45.0	9.5	<47.0	74.0	>27.0
Average measurement							
2390.00	5.2	39.4	40.1	-	45.3	54.0	8.7
4824.00	1.5	38.0	38.2	-	39.7	54.0	14.3
7236.00	-4.0	50.0	48.6	-	46.0	54.0	8.0
9648.00	-0.9	<35.0	<35.0	-	<34.1	54.0	>19.9
12060.00	2.1	<35.0	<35.0	-	<37.1	54.0	>16.9
24120.00	11.5	<35.0	<35.0	9.5	<37.0	54.0	>17.0

[20dBc Data Sheet]

11n-20 2412MHz + BLE 2412MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2412.00	5.3	90.1	-	95.4	-	-
2400.00	5.3	46.4	-	51.7	75.4	23.7
*1) 2412.00	5.3	-	88.6	93.9	-	-
2400.00	5.3	-	46.6	51.9	73.9	22.0

11n-20 2412MHz + BLE 2402MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2402.00	5.3	88.0	-	93.3	-	-
2400.00	5.3	47.6	-	52.9	73.3	20.4
*1) 2402.00	5.3	-	87.6	92.9	-	-
2400.00	5.3	-	48.1	53.4	72.9	19.5



11n-20 2442MHz + BLE2442MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
4884.00	1.7	47.8	47.2	-	49.5	74.0	24.5
7326.00	-3.9	52.0	51.6	-	48.1	74.0	25.9
9768.00	-0.8	<45.0	<45.0	-	<44.2	74.0	>29.8
12210.00	2.4	<45.0	<45.0	-	<47.4	74.0	>26.6
24420.00	11.8	<45.0	<45.0	9.5	<47.3	74.0	>26.7
Average measurement							
4884.00	1.7	37.5	36.4	-	39.2	54.0	14.8
7326.00	-3.9	49.3	49.1	-	45.4	54.0	8.6
9768.00	-0.8	<35.0	<35.0	-	<34.2	54.0	>19.8
12210.00	2.4	<35.0	<35.0	-	<37.4	54.0	>16.6
24420.00	11.8	<35.0	<35.0	9.5	<37.3	54.0	>16.7



11n-20 2462MHz + BLE2462MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2483.50	5.3	51.5	50.9	-	56.8	74.0	17.2
4924.00	1.7	47.0	46.5	-	48.7	74.0	25.3
7386.00	-3.7	50.7	50.1	-	47.0	74.0	27.0
9848.00	-0.7	<45.0	<45.0	-	<44.3	74.0	>29.7
12310.00	2.7	<45.0	<45.0	-	<47.7	74.0	>26.3
24620.00	12.2	<45.0	<45.0	9.5	<47.7	74.0	>26.3
Average measurement							
2483.50	5.3	37.2	37.2	-	42.5	54.0	11.5
4924.00	1.7	36.8	36.6	-	38.5	54.0	15.5
7386.00	-3.7	46.4	46.5	-	42.8	54.0	11.2
9848.00	-0.7	<35.0	<35.0	-	<34.3	54.0	>19.7
12310.00	2.7	<35.0	<35.0	-	<37.7	54.0	>16.3
24620.00	12.2	<35.0	<35.0	9.5	<37.7	54.0	>16.3

[20dBc Data Sheet]

11n-20 2462MHz + BLE 2462MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2462.00	5.4	88.5	-	93.9	-	-
2483.50	5.3	38.0	-	43.3	73.9	30.6
*1) 2462.00	5.4	-	88.3	93.7	-	-
2483.50	5.3	-	39.3	44.6	73.7	29.1

11n-20 2462MHz + BLE 2480MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2480.00	5.3	85.9	-	91.2	-	-
2483.50	5.3	39.2	-	44.5	71.2	26.7
*1) 2480.00	5.3	-	85.9	91.2	-	-
2483.50	5.3	-	39.8	45.1	71.2	26.1



11n-40 2422MHz + BLE2422MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2390.00	5.2	56.6	59.7	-	64.9	74.0	9.1
4844.00	1.6	45.8	46.9	-	48.5	74.0	25.5
7266.00	-4.0	53.1	51.6	-	49.1	74.0	24.9
9688.00	-0.9	<45.0	<45.0	-	<44.1	74.0	>29.9
12110.00	2.2	<45.0	<45.0	-	<47.2	74.0	>26.8
24220.00	11.6	<45.0	<45.0	9.5	<47.1	74.0	>26.9
Average measurement							
2390.00	5.2	43.6	44.8	-	50.0	54.0	4.0
4844.00	1.6	36.9	37.4	-	39.0	54.0	15.0
7266.00	-4.0	50.8	49.6	-	46.8	54.0	7.2
9688.00	-0.9	<35.0	<35.0	-	<34.1	54.0	>19.9
12110.00	2.2	<35.0	<35.0	-	<37.2	54.0	>16.8
24220.00	11.6	<35.0	<35.0	9.5	<37.1	54.0	>16.9

[20dBc Data Sheet]

11n-40 2422MHz + BLE 2422MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2422.00	5.3	88.0	-	93.3	-	-
2400.00	5.3	46.1	-	51.4	73.3	21.9
*1) 2422.00	5.3	-	88.7	94.0	-	-
2400.00	5.3	-	46.9	52.2	74.0	21.8

11n-40 2422MHz + BLE 2402MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2402.00	5.3	86.1	-	91.4	-	-
2400.00	5.3	47.1	-	52.4	71.4	19.0
*1) 2402.00	5.3	-	87.4	92.7	-	-
2400.00	5.3	-	48.1	53.4	72.7	19.3



11n-40 2442MHz + BLE2442MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
4884.00	1.7	45.6	47.1	-	48.8	74.0	25.2
7326.00	-3.9	52.0	51.0	-	48.1	74.0	25.9
9768.00	-0.8	<45.0	<45.0	-	<44.2	74.0	>29.8
12210.00	2.4	<45.0	<45.0	-	<47.4	74.0	>26.6
24420.00	11.8	<45.0	<45.0	9.5	<47.3	74.0	>26.7
Average measurement							
4884.00	1.7	36.4	37.1	-	38.8	54.0	15.2
7326.00	-3.9	49.0	48.7	-	45.1	54.0	8.9
9768.00	-0.8	<35.0	<35.0	-	<34.2	54.0	>19.8
12210.00	2.4	<35.0	<35.0	-	<37.4	54.0	>16.6
24420.00	11.8	<35.0	<35.0	9.5	<37.3	54.0	>16.7



11n-40 2452MHz + BLE2452MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2483.50	5.3	60.1	62.2	-	67.5	74.0	6.5
4904.00	1.7	45.8	46.8	-	48.5	74.0	25.5
7356.00	-3.7	52.2	50.9	-	48.5	74.0	25.5
9808.00	-0.8	<45.0	<45.0	-	<44.2	74.0	>29.8
12260.00	2.5	<45.0	<45.0	-	<47.5	74.0	>26.5
24520.00	12.1	<45.0	<45.0	9.5	<47.6	74.0	>26.4
Average measurement							
2483.50	5.3	42.3	43.8	-	49.1	54.0	4.9
4904.00	1.7	36.7	37.5	-	39.2	54.0	14.8
7356.00	-3.7	49.1	47.7	-	45.4	54.0	8.6
9808.00	-0.8	<35.0	<35.0	-	<34.2	54.0	>19.8
12260.00	2.5	<35.0	<35.0	-	<37.5	54.0	>16.5
24520.00	12.1	<35.0	<35.0	9.5	<37.6	54.0	>16.4

[20dBc Data Sheet]

11n-40 2452MHz + BLE 2452MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2452.00	5.4	87.1	-	92.5	-	-
2483.50	5.3	43.2	-	48.5	72.5	24.0
*1) 2452.00	5.4	-	86.8	92.2	-	-
2483.50	5.3	-	43.1	48.4	72.2	23.8

11n-40 2452MHz + BLE 2480MHz

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2480.00	5.3	84.7	-	90.0	-	-
2483.50	5.3	43.2	-	48.5	70.0	21.5
*1) 2480.00	5.3	-	84.9	90.2	-	-
2483.50	5.3	-	43.6	48.9	70.2	21.3





DH5 2402MHz + BLE2402MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2390.00	5.2	<45.0	<45.0	-	<50.2	74.0	>23.8
4804.00	1.3	<45.0	<45.0	-	<46.3	74.0	>27.7
7206.00	-4.1	51.6	52.0	-	47.9	74.0	26.1
9608.00	-0.9	<45.0	<45.0	-	<44.1	74.0	>29.9
12010.00	2.0	<45.0	<45.0	-	<47.0	74.0	>27.0
14412.00	4.0	47.8	48.0	9.5	39.5	74.0	34.5
24020.00	11.3	<45.0	<45.0	9.5	<46.8	74.0	>27.2
Average measurement							
2390.00	5.2	<35.0	<35.0	-	<40.2	54.0	>13.8
4804.00	1.3	<35.0	<35.0	-	<36.3	54.0	>17.7
7206.00	-4.1	49.7	48.8	-	45.6	54.0	8.4
9608.00	-0.9	<35.0	<35.0	-	<34.1	54.0	>19.9
12010.00	2.0	<35.0	<35.0	-	<37.0	54.0	>17.0
14412.00	4.0	<35.0	<35.0	9.5	<29.5	54.0	>24.5
24020.00	11.3	<35.0	<35.0	9.5	<36.8	54.0	>17.2

[20dBc Data Sheet]

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2402.00	5.3	92.8	-	98.1	-	-
2400.00	5.3	35.3	-	40.6	78.1	37.5
*1) 2402.00	5.3	-	90.4	95.7	-	-
2400.00	5.3	-	36.2	41.5	75.7	34.2



DH5 2442MHz + BLE2442MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
4884.00	1.7	<45.0	<45.0	-	<46.7	74.0	>27.3
7326.00	-3.9	52.0	52.1	-	48.2	74.0	25.8
9768.00	-0.8	<45.0	<45.0	-	<44.2	74.0	>29.8
12210.00	2.4	<45.0	<45.0	-	<47.4	74.0	>26.6
14652.00	4.0	47.5	47.8	9.5	42.3	74.0	31.7
24420.00	11.8	<45.0	<45.0	9.5	<47.3	74.0	>26.7
Average measurement							
4884.00	1.7	<35.0	<35.0	-	<36.7	54.0	>17.3
7326.00	-3.9	49.7	49.8	-	45.9	54.0	8.1
9768.00	-0.8	<35.0	<35.0	-	<34.2	54.0	>19.8
12210.00	2.4	<35.0	<35.0	-	<37.4	54.0	>16.6
14652.00	4.0	<35.0	<35.0	9.5	<29.5	54.0	>24.5
24420.00	11.8	<35.0	<35.0	9.5	<37.3	54.0	>16.7



DH5 2480MHz + BLE2480MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2483.50	5.3	<45.0	<45.0	-	<50.3	74.0	>23.7
4960.00	1.7	45.1	45.9	-	47.6	74.0	26.4
7440.00	-3.7	49.4	49.1	-	45.7	74.0	28.3
9920.00	-0.6	<45.0	<45.0	-	<44.4	74.0	>29.6
12400.00	2.8	46.2	45.8	-	49.0	74.0	25.0
14880.00	4.2	47.1	47.2	9.5	41.9	74.0	32.1
24800.00	12.4	<45.0	<45.0	9.5	<47.9	74.0	>26.1
Average measurement							
2483.50	5.3	<35.0	<35.0	-	<40.3	54.0	>13.7
4960.00	1.7	37.5	39.8	-	41.5	54.0	12.5
7440.00	-3.7	46.6	45.8	-	42.9	54.0	11.1
9920.00	-0.6	<35.0	<35.0	-	<34.4	54.0	>19.6
12400.00	2.8	<35.0	<35.0	-	<37.8	54.0	>16.2
14880.00	4.2	<35.0	<35.0	9.5	<29.7	54.0	>24.3
24800.00	12.4	<35.0	<35.0	9.5	<37.9	54.0	>16.1

[20dBc Data Sheet]

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2480.00	5.3	89.6	-	94.9	-	-
2483.50	5.3	33.5	-	38.8	74.9	36.1
*1) 2480.00	5.3	-	86.8	92.1	-	-
2483.50	5.3	-	33.8	39.1	72.1	33.0



3DH5 2402MHz + BLE2402MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBµV/m )	Limit ( dBµV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBµV )	Vertical Polarization ( dBµV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2390.00	5.2	<45.0	<45.0	-	<50.2	74.0	>23.8
4804.00	1.3	<45.0	<45.0	-	<46.3	74.0	>27.7
7206.00	-4.1	49.6	48.9	-	45.5	74.0	28.5
9608.00	-0.9	46.2	46.5	-	45.6	74.0	28.4
12010.00	2.0	<45.0	<45.0	-	<47.0	74.0	>27.0
14412.00	4.0	48.8	49.0	9.5	39.5	74.0	34.5
24020.00	11.3	<45.0	<45.0	9.5	<46.8	74.0	>27.2
Average measurement							
2390.00	5.2	<35.0	<35.0	-	<40.2	54.0	>13.8
4804.00	1.3	<35.0	<35.0	-	<36.3	54.0	>17.7
7206.00	-4.1	45.2	45.1	-	41.1	54.0	12.9
9608.00	-0.9	35.4	35.5	-	34.6	54.0	19.4
12010.00	2.0	<35.0	<35.0	-	<37.0	54.0	>17.0
14412.00	4.0	<35.0	<35.0	9.5	<29.5	54.0	>24.5
24020.00	11.3	<35.0	<35.0	9.5	<36.8	54.0	>17.2

[20dBc Data Sheet]

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBµV/m )	Limit ( dBµV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBµV )	Vertical Polarization ( dBµV )			
Peak measurement						
*1) 2402.00	5.3	87.8	-	93.1	-	-
2400.00	5.3	34.3	-	39.6	73.1	33.5
*1) 2402.00	5.3	-	86.9	92.2	-	-
2400.00	5.3	-	34.2	39.5	72.2	32.7



3DH5 2442MHz + BLE2442MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
4884.00	1.7	<45.0	<45.0	-	<46.7	74.0	>27.3
7326.00	-3.9	51.4	51.3	-	47.5	74.0	26.5
9768.00	-0.8	<45.0	<45.0	-	<44.2	74.0	>29.8
12210.00	2.4	<45.0	<45.0	-	<47.4	74.0	>26.6
14652.00	4.0	49.1	49.3	9.5	43.8	74.0	30.2
24420.00	11.8	<45.0	<45.0	9.5	<47.3	74.0	>26.7
Average measurement							
4884.00	1.7	<35.0	<35.0	-	<36.7	54.0	>17.3
7326.00	-3.9	47.6	48.6	-	44.7	54.0	9.3
9768.00	-0.8	<35.0	<35.0	-	<34.2	54.0	>19.8
12210.00	2.4	<35.0	<35.0	-	<37.4	54.0	>16.6
14652.00	4.0	<35.0	<35.0	9.5	<29.5	54.0	>24.5
24420.00	11.8	<35.0	<35.0	9.5	<37.3	54.0	>16.7



3DH5 2480MHz + BLE2480MHz

Measured Frequency ( MHz )	Correction Factor ( dB/m )	Meter Reading		Distance Factor from 1m to 3m ( dB )	Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )				
147.19	19.2	12.7	5.2	-	31.9	43.5	11.6
368.00	18.1	22.7	10.0	-	40.8	46.0	5.2
772.80	23.9	16.7	16.4	-	40.6	46.0	5.4
809.60	24.5	15.0	16.2	-	40.7	46.0	5.3
846.39	25.2	19.4	19.5	-	44.7	46.0	1.3
920.00	26.5	15.2	13.3	-	41.7	46.0	4.3
Peak measurement							
2483.50	5.3	<45.0	<45.0	-	<50.3	74.0	>23.7
4960.00	1.7	<45.0	46.5	-	48.2	74.0	25.8
7440.00	-3.7	48.0	47.7	-	44.3	74.0	29.7
9920.00	-0.6	<45.0	<45.0	-	<44.4	74.0	>29.6
12400.00	2.8	<45.0	<45.0	-	<47.8	74.0	>26.2
14880.00	4.2	47.2	47.3	9.5	42.0	74.0	32.0
24800.00	12.4	<45.0	<45.0	9.5	<47.9	74.0	>26.1
Average measurement							
2483.50	5.3	<35.0	<35.0	-	<40.3	54.0	>13.7
4960.00	1.7	37.0	39.1	-	40.8	54.0	13.2
7440.00	-3.7	43.4	42.1	-	39.7	54.0	14.3
9920.00	-0.6	<35.0	<35.0	-	<34.4	54.0	>19.6
12400.00	2.8	<35.0	<35.0	-	<37.8	54.0	>16.2
14880.00	4.2	<35.0	<35.0	9.5	<29.7	54.0	>24.3
24800.00	12.4	<35.0	<35.0	9.5	<37.9	54.0	>16.1

[20dBc Data Sheet]

Measured Frequency ( MHz )	Antenna Factor ( dB/m )	Meter Reading		Maximum Field Strength ( dBμV/m )	Limit ( dBμV/m )	Margin for Limit ( dB )
		Horizontal Polarization ( dBμV )	Vertical Polarization ( dBμV )			
Peak measurement						
*1) 2480.00	5.3	88.9	-	94.2	-	-
2483.50	5.3	33.7	-	39.0	74.2	35.2
*1) 2480.00	5.3	-	87.5	92.8	-	-
2483.50	5.3	-	34.3	39.6	72.8	33.2

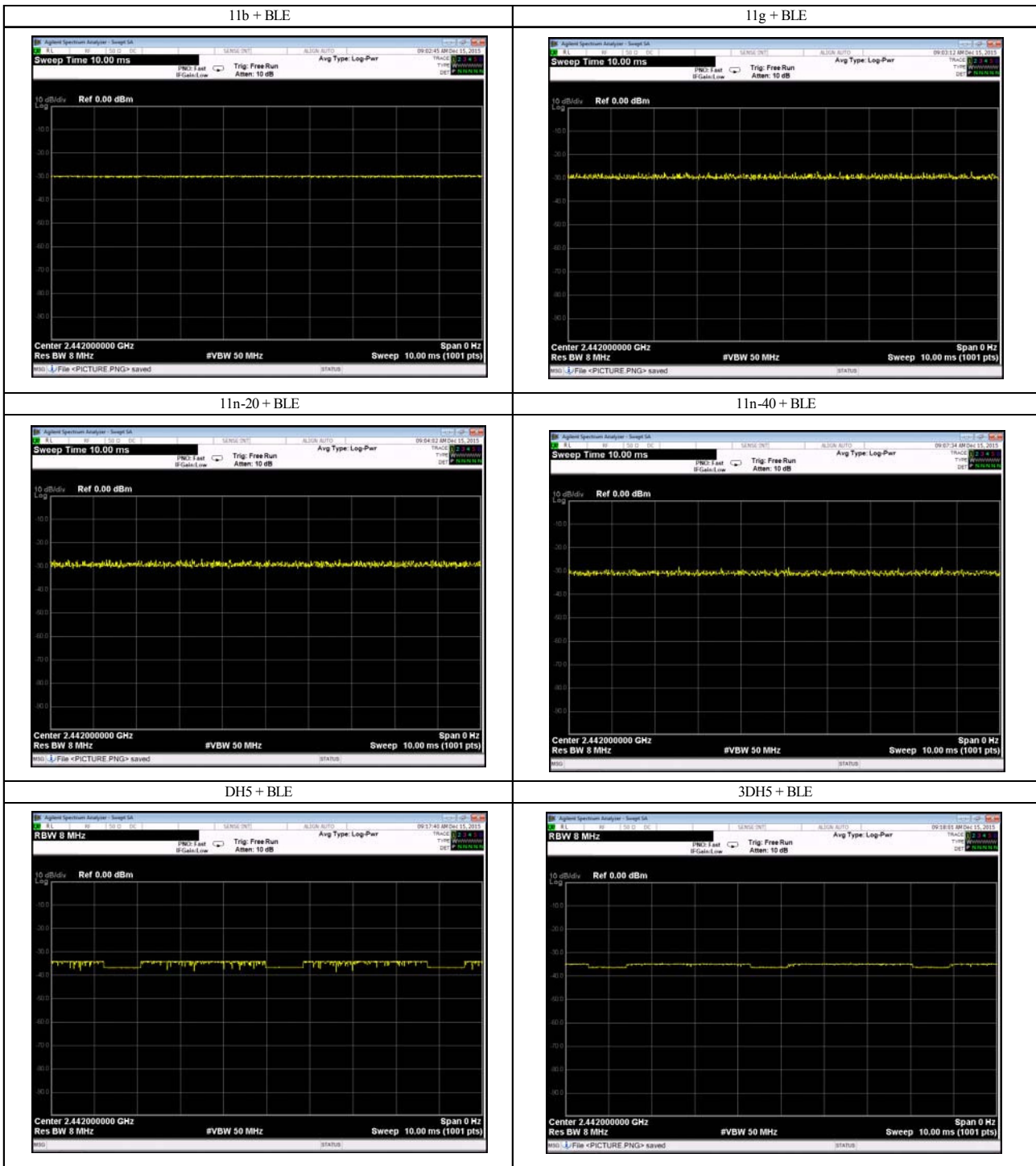


<p>[Remark]</p> <p>*1) : Carrier</p>
<p>[Note]</p> <p>(1) <input type="checkbox"/> Correction Factor includes the antenna factor, cable loss, attenuator loss and pre-amplifier gain.  <input checked="" type="checkbox"/> Correction Factor includes the cable loss and attenuator loss.  Above 1000MHz, the antenna factor includes the cable loss, pre-amplifier gain and attenuator loss (if necessary).</p> <p>(2) * mark in Measured Frequency : Measured with the tuned dipole antenna.  no mark in Measured Frequency : Measured with the broadband antenna.</p> <p>(3) Upper Frequency : <input checked="" type="checkbox"/> Transmitter Frequency (TX): TX &lt; 10GHz  <input type="checkbox"/> 1GHz <input checked="" type="checkbox"/> 10th harmonic of the highest frequency / <input type="checkbox"/> Up to 40GHz  <input type="checkbox"/> Transmitter Frequency (TX): 10GHz ≤ TX &lt; 30GHz  <input type="checkbox"/> 10th harmonic of the highest frequency / <input type="checkbox"/> Up to 100GHz  <input type="checkbox"/> Transmitter Frequency (TX): 30GHz ≤ TX  <input type="checkbox"/> 10th harmonic of the highest frequency / <input type="checkbox"/> Up to 200GHz</p> <p>The emissions were checked to the upper frequency, and the lower emissions than the listed emissions in the above tables were omitted.</p> <p>(4) Measurement Distance : &lt;below 1GHz&gt; <input checked="" type="checkbox"/> 3m <input type="checkbox"/> 10m  &lt;above 1GHz&gt; <input checked="" type="checkbox"/> 3m <input type="checkbox"/> 10m  &lt;above 12.4GHz&gt; 1m</p> <p>(5) Bore-sight method setting: horn antenna orientation was center of Turn Table</p>
<p>[Calculation method]</p> <p>Maximum Field Strength (dBμV/m)  = Meter Reading (at maximum level of Horizontal or Vertical) (dBμV) + Correction Factor (dB/m) – Distance factor (*)</p> <p>(*) Applied for Radiated Emission Measurement (above 12.4GHz) only.  Distance factor : <math>20 \times \log_{10} (3\text{m}/1\text{m}) = 9.5\text{dB}</math></p>

Tested Date	Environment	
	Temperature	Humidity
11 December 2015	21°C	38%



### Duty Cycle







## 6. TEST EQUIPMENT

## • Peak Conducted Output Power

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AT-148	Fixed Attenuator	Anritsu	41KC-10	2015/06	2016/04
VV-061	Power Meter	Agilent	N1912A	2015/06	2016/04
VV-061-1	Wideband Power Sensor	Agilent	N1921A	2015/06	2016/04

## • Spurious Emission (Radiated)

KEC No.	Equipment	Manufacturer	Model No.	Last Cal.	Next Cal.
AM-060	Pre-Amplifier	HP	8449B	2015/12	2016/12
AM-098	Pre-Amplifier	SONOMA	SONOMA 310N	2015/04	2016/04
AN-104	Std. Gain Horn Antenna	Scientific-Atlanta	12-5.8	2015/04	2017/04
AN-107	Std. Gain Horn Antenna	Scientific-Atlanta	12A-18	2013/12	2015/12
AN-145	Std. Gain Horn Antenna	Scientific-Atlanta	12-12	2015/04	2017/04
AN-210	Std. Gain Horn Antenna	Scientific-Atlanta	12-8.2	2015/04	2017/04
AN-220	LPDA Antenna	Schwarzbeck	UHALP 9108A	2015/04	2016/04
AN-296	Biconical Antenna	Schwarzbeck	VHBB9124	2015/04	2016/04
AN-298	DRG Horn Antenna	Schwarzbeck	BBHA9120LF(A )	2015/04	2016/04
AT-148	Fixed Attenuator	Anritsu	41KC-10	2015/06	2016/04
AT-158	Fixed Attenuator	Anritsu	MP721B	2015/04	2016/04
FL-222	Band-stop Filter	TOYO	8BRM2442/T300	2015/04	2016/04
FS-099	Test Receiver	ROHDE & SCHWARZ	ESS	2015/11	2016/11
MM-302	RF Selector	TOYO	NS4900	2015/04	2016/04
SA-065	Signal Analyzer	Agilent	N9030A	2015/10	2016/11
SA-058	Spectrum Analyzer	Agilent	N9010A	2015/04	2016/04

Note : (\*1) We check the performance, before using this device.

The overall program of calibration and verification of equipment is designed and operated so as to ensure that measurements made by KEC are traceable to national standards of measurement or equivalent abroad.