

TEST REPORT



CTK Co., Ltd.
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Report No.:
CTK-2017-02204
Page (1) / (26) Pages

1. Client

- Name : DEKIST Co., Ltd.
- Address : #A1403, 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Korea
- Date of Receipt : 2017-10-18

2. Manufacturer

- Name : DEKIST Co., Ltd.
- Address : #A1403, 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Korea

3. Use of Report : For FCC

4. Test Sample / Model: Wireless Data Logger / RN400 H2-EX

5. Date of Test : 2017-11-20 to 2017-11-21

6. Test Standard(method) used : FCC 47 CFR part 15 subpart C 15.247

7. Testing Environment: Temp.: (25 ± 5) °C, Humidity: (50 ± 3) % R.H.

8. Test Results : Compliance

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This Test Report cannot be reproduced, except in full.

Affirmation	Tested by	Technical Manager
	Ji-Hye Kim: (Signature)	Won-Jae, Hwang. (Signature)

2017-11-22

Republic of KOREA **CTK Co., Ltd.**



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REPORT REVISION HISTORY

Date	Revision	Page No
2017-11-22	Issued (CTK-2017-02204)	all

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1. General Product Description

1.1 Client Information

Company	DEKIST Co., Ltd.
Contact Point	#A1403, 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, Korea
Contact Person	Name : Hwang Inchan E-mail : hich@dekist.com Tel : +82-70-7600-2427

1.2 Product Information

FCC ID	2ABC3-RN400
Product Description	Wireless Data Logger
Model name	RN400 H2-EX
Variant Model name	RN400 H2-PS, RN400 T2-EX and RN400 T2-PS
Operating Frequency	2 412 MHz – 2 462 MHz
Antenna Specification	Antenna type : Chip Antenna Peak Gain : 1.9 dBi
Number of channels	11
Type of Modulation	802.11b : DSSS 802.11g/n : OFDM
Data Rate	802.11b : 11 / 5.5 / 2 / 1 Mbps 802.11g : 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6 Mbps 802.11n: MCS0-7, up to 72.2 Mbps
Power Source	DC 3 V (1.5V C type Battery * 2EA), DC 5 V ~ DC 30 V (DC Power supply)
Hardware Rev	2.0
Software Rev	20171116

1.3 Model Differences

RN400 H2-EX and RN400 T2-EX are no technical difference from each model only except for model name because of marketing purposes.

RN400 H2-PS is similar to the basic model RN400 H2-EX except without Temperature Sensor function and detecting open state of door function.

RN400 H2-PS and RN400 T2-PS are no technical difference from each model only except for model name because of marketing purposes.

1.4 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Note Computer	HP	15-bs563TU	CND7253R6N
AC/DC Adapter	HP	HSTNN-CA40	-

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2. Facility and Accreditations

2.1 Test Facility

The measurement facility is located at (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yong-in-si, Gyeonggi-do, Korea.

2.2 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Registration Number	Logo
USA	FCC	FCC Part 15 & 18 EMI (Electromagnetic Interference / Emission)	805871	
CANADA	ISED	ISED EMI (3/10m test site)	8737A-2	
JAPAN	VCCI	VCCI V-3 EMI (Electromagnetic Interference / Emission)	C-986 T-1843 R-3627 G-387	
KOREA	MSIP	EMI (Electromagnetic Interference / Emission) EMS (Electromagnetic Susceptibility / Immunity)	KR0025	

2.3 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

3. Test Specifications

3.1 Standards

FCC Part Section(s)	Requirement(s)	Status (Note 1)	Test Condition
15.247(a)	6 dB Bandwidth	NT(Note 5)	Conducted
15.247(b)	Maximum Output Power	NT(Note 5)	
15.247(d)	Conducted Spurious emission	NT(Note 5)	
15.247(d)	Unwanted Emission(Conducted)	NT(Note 5)	
15.247(e)	Power Spectral Density	NT(Note 5)	
15.209	Radiated Emissions	C	Radiated
15.207	AC Conducted Emission	C	Line Conducted
<u>Note 1</u> : C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable			
<u>Note 2</u> : The data in this test report are traceable to the national or international standards.			
<u>Note 3</u> : The sample was tested according to the following specification: FCC Part 15.247, ANSI C63.10-2013			
<u>Note 4</u> : The tests were performed according to the method of measurements prescribed in KDB No.558074.			
<u>Note 5</u> : The conformity assessment of this item was confirmed by the RF module installed in the device. Refer to module test report. Test was performed by modular transmitter. (FCC ID:Z64-CC3200MODR1, Test Report No.264561-1TRFWL issued on Sep.25,2014 by Nemko Canada Inc.)			

3.2 Mode of operation during the test

The EUT is operated in a manner representative of the typical of the equipments.
During at testing, system components were manipulated within the confines of typical usage to maximize each emission. All modulation modes were tests.
The results are only attached worst cases.

Test Frequency

Lowest channel	Middle channel	Highest channel
2 412 MHz	2 437 MHz	2 462 MHz

Test mode

Test mode	Modulation	Data rate	Duty Cycle	Duty Cycle Factor
802.11b	DSSS	1 Mbps	96.3%	0.165 dB
802.11g	OFDM	6 Mbps	93.5%	0.291 dB
802.11n	OFDM	MCS 0	94.6%	0.242 dB

3.3 Maximum Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.
Coverage factor $k = 2$, Confidence levels of 95 %

Description	Uncertainty
Radiated Emissions ($f \leq 1$ GHz)	± 4.0 dB
Radiated Emissions ($f > 1$ GHz)	± 5.0 dB

3.4 Test Software

Radiated Test	TOYO EMI software EP5RE Ver. 5.1.0
Line Conducted Test	ESCI7, ESCI3 : EMC32 Ver. 8.50.0 ESR7 : EMC32 Ver. 8.53.0

4. Technical Characteristic Test

4.1 Radiated Emission

Test Location

- ☒ 10 m SAC (test distance : ☐ 10 m, ☒ 3 m)
☒ 3 m SAC (test distance : 3 m)

Test Procedures

- 1) In the frequency range of 9 kHz to 30 MHz, magnetic field is measured with Loop Antenna. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
- 2) In the frequency range above 30 MHz, Bi-Log Test Antenna(30 MHz to 1 GHz) and Horn Test Antenna(above 1 GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is carried from 1m to 4m above the ground to determine the maximum value of the field strength. The emissions levels at both horizontal and vertical polarizations should be tested.

Test Settings:

Frequency Range = 9 kHz ~ 1 GHz

- a) RBW = 100 kHz for $f < 1$ GHz, 9 kHz for $f < 30$ MHz
b) VBW $\geq$ RBW
c) Detector = CISPR Quasi-peak
d) Sweep time = auto couple

- Peak

Frequency Range = 1 GHz ~ 25 GHz (2.4 GHz 10th harmonic)

- a) RBW = 1 MHz
b) VBW $\geq 3 \times$ RBW
c) Detector = Peak
d) Sweep time = auto
e) Trace mode = max hold

- Average (duty cycle $\geq 98\%$)

Frequency Range = 1 GHz ~ 25 GHz (2.4 GHz 10th harmonic)

- a) RBW = 1 MHz
b) VBW $\geq 3 \times$ RBW
c) Detector = RMS
d) Sweep time = auto
e) Averaging type = power (i.e., RMS)
f) Trace mode = average (at least 100 traces)

- Average (duty cycle < 98%, duty cycle variations are less than $\pm 2\%$)

Frequency Range = 1 GHz ~ 25 GHz (2.4 GHz 10th harmonic)

a) RBW = 1 MHz

b) VBW $\geq 3 \times$ RBW

c) Detector = RMS

d) Sweep time = auto

e) Averaging type = power (i.e., RMS)

f) Trace mode = average (at least 100 traces)

A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 % duty cycle.

If power averaging (RMS) mode, then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.

Limit :

FCC Part 15 § 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	MHz	GHz
0.09-0.11	8.37626-8.38675	73-74.6	399.9-410	2690-2900	10.6-12.7
¹ 0.495-0.505	8.41425-8.41475	74.8-75.2	608-614	3260-3267	13.25-13.4
2.1735-2.1905	12.29-12.293	108-121.94	960-1240	3332-3339	14.47-14.5
4.125-4.128	12.51975-12.52025	123-138	1300-1427	3345.8-3358	15.35-16.2
4.17725-4.17775	12.57675-12.57725	149.9-150.05	1435-1626.5	3600-4400	17.7-21.4
4.20725-4.20775	13.36-13.41	156.52475-156.52525	1645.5-1646.5	4500-5150	22.01-23.12
6.215-6.218	16.42-16.423	156.7-156.9	1660-1710	5350-5460	23.6-24
6.26775-6.26825	16.69475-16.69525	162.0125-167.17	1718.8-1722.2	7250-7750	31.2-31.8
6.31175-6.31225	16.80425-16.80475	167.72-173.2	2200-2300	8025-8500	36.43-36.5
8.291-8.294	25.5-25.67	240-285	2310-2390	9000-9200	² Above 38.6
8.362-8.366	37.5-38.25	322-335.4	2483.5-2500	9300-9500	

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

FCC Part 15 § 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency(MHz)	Field Strength uV/m@3m	Field Strength dBuV/m@3m	Deasurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	30
1.705-30	30	-	30
30-88	100**	40	3
88-216	150**	43.5	3
216-960	200**	46	3
Above 960	500	54	3

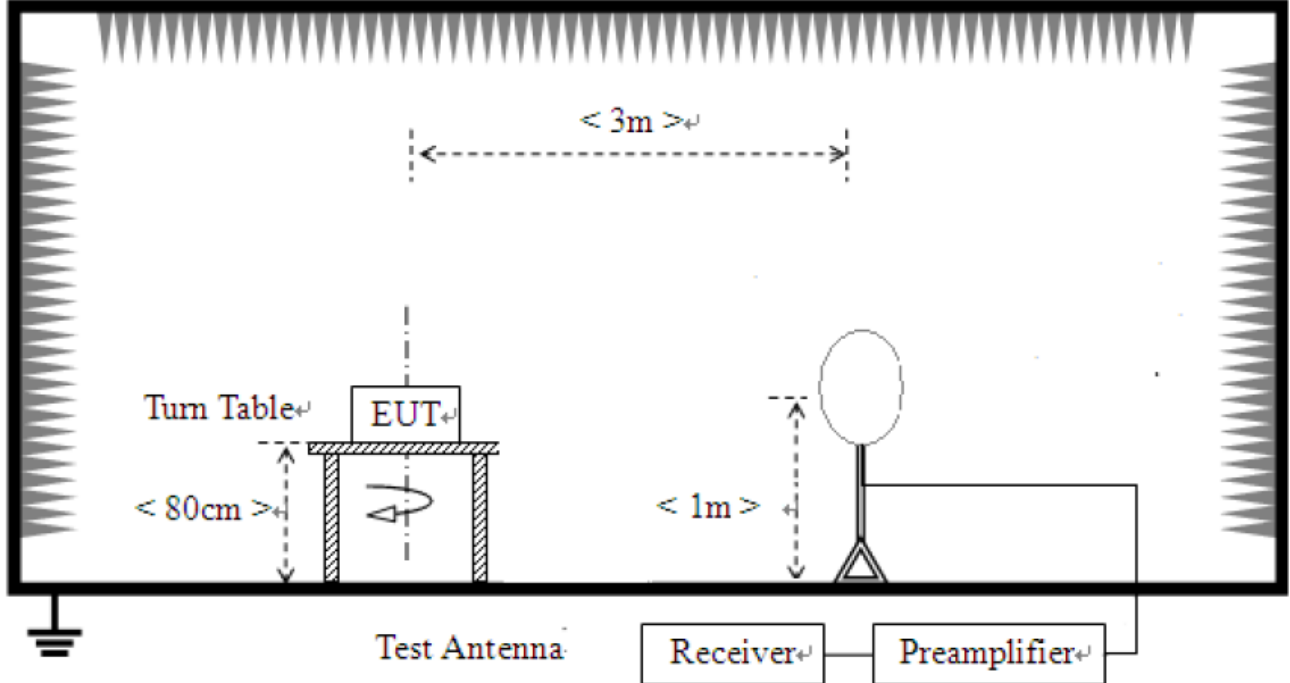
** Except as provided in 15.209(g).fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72MHz, 76-88MHz, 174-216MHz, 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g.15.231 and 15.241.

Note :

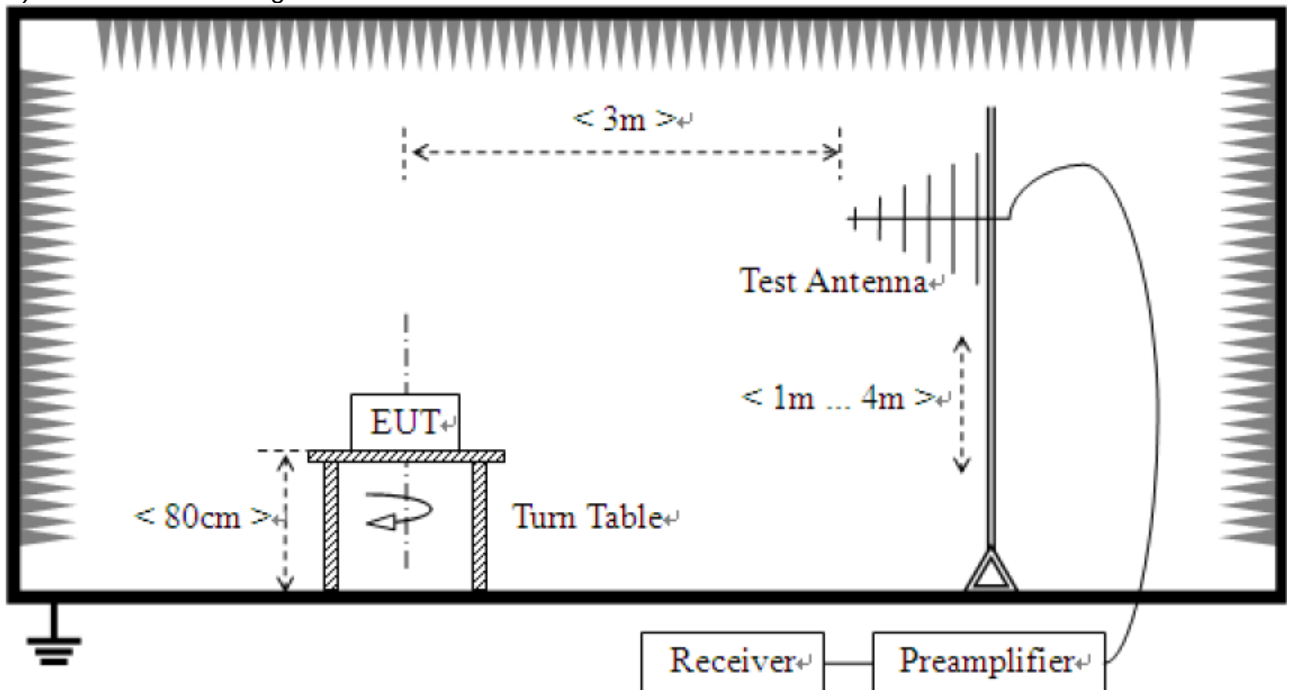
- 1) For above 1 GHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- 2) For above 1 GHz, limit field strength of harmonics : 54 dBuV/m@3m (AV) and 74 dBuV/m@3m (PK)
- 3) This EUT is supported the DC 3 V and DC 5 V ~ DC 30 V. We have done all test mode. Worst case is DC 3 V. So the worst data of DC 3 V are shown.

Test Setup:

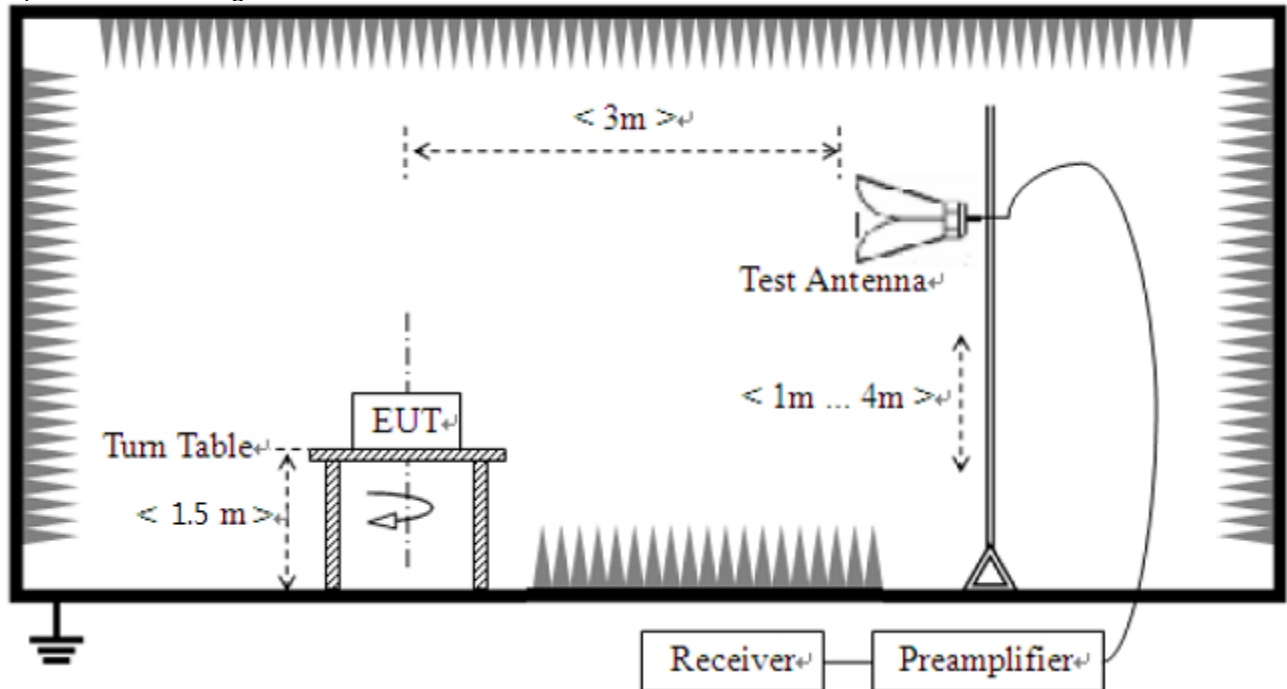
- 1) For field strength of emissions from 9 kHz to 30 MHz



- 2) For field strength of emissions from 30 MHz to 1 GHz



3) For field strength of emissions above 1 GHz



Test results

1) 9 kHz to 30 MHz

Test mode : 802.11b, 802.11g, 802.11n (Worst case)

The requirements are:

☒ Complies

Frequency (MHz)	Measured Data (dBuV/m)	Margin (dB)	Remark
-	-	-	See note

Note :

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB)

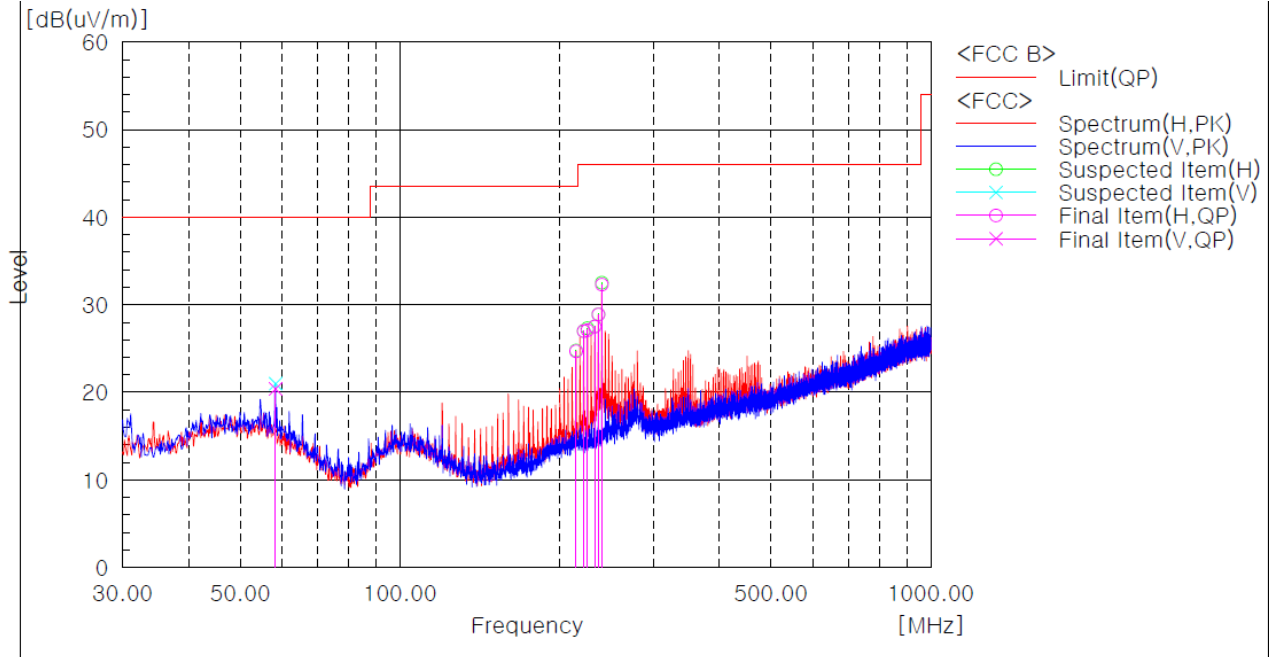
2) 30 MHz to 1 GHz

Test mode : 802.11n, Middle Channel(Worst Case)

The requirements are:

☒ Complies

Test Data



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Angle [deg]	Remark
1	58.255	V	33.9	-13.5	20.4	40.0	19.6	283.1	
2	214.566	H	38.6	-13.9	24.7	43.5	18.8	296.6	
3	221.841	H	40.7	-13.7	27.0	46.0	19.0	315.1	
4	225.479	H	40.7	-13.6	27.1	46.0	18.9	315.1	
5	232.755	H	40.9	-13.4	27.5	46.0	18.5	296.6	
6	236.393	H	42.2	-13.3	28.9	46.0	17.1	183.9	
7	240.031	H	45.5	-13.2	32.3	46.0	13.7	315.1	

Remark :

1. The worst emission was found in li-down position(X axis) and the worst case was recorded.
2. Result = Reading + c.f(Correction factor)
3. Correction factor = Antenna factor + Cable loss + 6 dB attenuator - Amp Gain

3) above 1 GHz

Test mode : 802.11b

The requirements are:

☒ Complies

Test Data

Low(2 412 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 330.00	H	54.00	74.00	42.17	51.02	11.84	22.98
2 330.00	V	54.00	74.00	37.28	47.06	16.73	26.94
2 494.00	H	54.00	74.00	39.96	49.74	14.05	24.26
2 492.00	V	54.00	74.00	39.37	48.65	14.64	25.35
3 216.00	H	54.00	74.00	44.55	49.70	9.46	24.30
3 216.00	V	54.00	74.00	44.62	49.51	9.39	24.49
4 020.00	H	54.00	74.00	42.04	48.76	11.97	25.24
4 020.00	V	54.00	74.00	44.57	50.65	9.44	23.35
4 824.00	H	54.00	74.00	47.48	50.72	6.53	23.28
4 824.00	V	54.00	74.00	47.20	51.76	6.81	22.24
6 432.00	H	54.00	74.00	50.93	53.92	3.08	20.08
6 432.00	V	54.00	74.00	48.88	53.16	5.13	20.84

Mid(2 437 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 355.00	H	54.00	74.00	42.67	52.09	11.34	21.91
2 355.00	V	54.00	74.00	38.07	47.55	15.94	26.45
2 497.00	H	54.00	74.00	39.22	48.68	14.79	25.32
2 497.00	V	54.00	74.00	38.35	48.49	15.66	25.51
3 249.00	H	54.00	74.00	43.25	47.73	10.76	26.27
3 249.00	V	54.00	74.00	43.76	49.95	10.25	24.05
4 061.00	H	54.00	74.00	45.77	50.40	8.24	23.60
4 061.00	V	54.00	74.00	48.34	52.88	5.67	21.12
4 874.00	H	54.00	74.00	50.87	54.29	3.14	19.71
4 874.00	V	54.00	74.00	49.54	54.33	4.47	19.67
6 499.00	H	54.00	74.00	51.26	54.00	2.75	20.00
6 499.00	V	54.00	74.00	46.95	52.30	7.06	21.70

High(2 462 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 322.00	H	54.00	74.00	43.06	52.10	10.95	21.90
2 322.00	V	54.00	74.00	38.27	47.26	15.74	26.74
2 486.00	H	54.00	74.00	40.75	50.50	13.26	23.50
2 486.00	V	54.00	74.00	39.76	49.51	14.25	24.49
3 282.00	H	54.00	74.00	40.59	46.95	13.42	27.05
3 282.00	V	54.00	74.00	42.58	48.21	11.43	25.79
4 103.00	H	54.00	74.00	44.70	50.01	9.31	23.99
4 103.00	V	54.00	74.00	48.62	53.06	5.39	20.94
4 924.00	H	54.00	74.00	49.76	53.46	4.25	20.54
4 924.00	V	54.00	74.00	51.71	54.58	2.30	19.42
6 565.00	H	54.00	74.00	48.60	52.26	5.41	21.74
6 565.00	V	54.00	74.00	48.81	52.43	5.20	21.57

Remarks

1. The worst emission was found in li-down position(X axis) and the worst case was recorded.

Test mode : 802.11g

The requirements are:

☒ Complies

Test Data

Low(2 412 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 390.00	H	54.00	74.00	43.23	55.76	10.77	18.24
2 390.00	V	54.00	74.00	38.59	50.47	15.41	23.53
3 216.00	H	54.00	74.00	44.91	48.53	9.09	25.47
3 216.00	V	54.00	74.00	44.88	48.82	9.12	25.18
4 020.00	H	54.00	74.00	38.01	47.32	15.99	26.68
4 020.00	V	54.00	74.00	39.96	49.21	14.04	24.79
4 824.00	H	54.00	74.00	35.84	47.54	18.16	26.46
4 824.00	V	54.00	74.00	36.32	49.23	17.68	24.77
6 432.00	H	54.00	74.00	51.03	54.45	2.97	19.55
6 432.00	V	54.00	74.00	49.19	52.55	4.81	21.45

Mid(2 437 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 354.00	H	54.00	74.00	40.55	51.12	13.45	22.88
3 249.00	H	54.00	74.00	43.60	48.33	10.40	25.67
3 249.00	V	54.00	74.00	43.36	48.55	10.64	25.45
4 061.00	H	54.00	74.00	41.65	50.12	12.35	23.88
4 061.00	V	54.00	74.00	43.78	52.65	10.22	21.35
4 874.00	H	54.00	74.00	41.39	52.58	12.61	21.42
4 874.00	V	54.00	74.00	40.55	53.49	13.45	20.51
6 499.00	H	54.00	74.00	50.92	53.68	3.08	20.32
6 499.00	V	54.00	74.00	47.53	51.81	6.47	22.19

High(2 462 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 322.00	H	54.00	74.00	39.73	49.81	14.27	24.19
2 483.50	H	54.00	74.00	42.83	54.28	11.17	19.72
2 483.50	V	54.00	74.00	41.71	54.40	12.29	19.60
3 282.00	H	54.00	74.00	41.87	47.11	12.13	26.89
3 282.00	V	54.00	74.00	43.73	47.75	10.27	26.25
4 103.00	H	54.00	74.00	39.74	47.90	14.26	26.10
4 103.00	V	54.00	74.00	43.06	51.76	10.94	22.24
4 924.00	H	54.00	74.00	35.59	47.65	18.41	26.35
4 924.00	V	54.00	74.00	37.01	47.81	16.99	26.19
6 565.00	H	54.00	74.00	47.82	52.01	6.18	21.99
6 565.00	V	54.00	74.00	47.91	51.90	6.09	22.10

Remarks

1. The worst emission was found in li-down position(X axis) and the worst case was recorded.

Test mode : 802.11n

The requirements are:

☒ Complies

Test Data

Low(2 412 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 390.00	H	54.00	74.00	43.58	57.52	10.42	16.48
2 390.00	V	54.00	74.00	37.55	50.92	16.45	23.08
3 216.00	H	54.00	74.00	45.34	49.17	8.66	24.83
3 216.00	V	54.00	74.00	44.99	48.86	9.01	25.14
4 020.00	H	54.00	74.00	37.67	47.18	16.33	26.82
4 020.00	V	54.00	74.00	39.02	47.16	14.98	26.84
4 824.00	H	54.00	74.00	34.80	47.44	19.20	26.56
4 824.00	V	54.00	74.00	35.52	48.29	18.48	25.71
6 432.00	H	54.00	74.00	50.81	54.08	3.19	19.92
6 432.00	V	54.00	74.00	49.38	52.89	4.62	21.11

Mid(2 437 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 324.00	H	54.00	74.00	50.54	39.80	50.54	14.20
3 249.00	H	54.00	74.00	43.95	48.62	10.05	25.38
3 249.00	V	54.00	74.00	44.72	49.85	9.28	24.15
4 061.00	H	54.00	74.00	40.80	49.60	13.20	24.40
4 061.00	V	54.00	74.00	43.47	52.09	10.53	21.91
4 874.00	H	54.00	74.00	39.44	52.45	14.56	21.55
4 874.00	V	54.00	74.00	39.79	52.78	14.21	21.22
6 499.00	H	54.00	74.00	50.74	54.29	3.26	19.71
6 499.00	V	54.00	74.00	47.65	52.11	6.35	21.89

High(2 462 MHz)

Frequency [MHz]	(P)	Limit AV [dBuV / m]	Limit PK [dBuV / m]	Result AV [dBuV / m]	Result PK [dBuV / m]	Margin AV [dB]	Margin PK [dB]
2 322.00	H	54.00	74.00	39.29	49.35	14.71	24.65
2 483.50	H	54.00	74.00	42.68	57.79	11.32	16.21
2 483.50	V	54.00	74.00	41.44	55.22	12.56	18.78
3 282.00	H	54.00	74.00	41.66	47.05	12.34	26.95
3 282.00	V	54.00	74.00	44.01	48.49	9.99	25.51
4 103.00	H	54.00	74.00	38.85	47.93	15.15	26.07
4 103.00	V	54.00	74.00	42.38	50.94	11.62	23.06
4 924.00	H	54.00	74.00	34.63	47.73	19.37	26.27
4 924.00	V	54.00	74.00	35.88	48.82	18.12	25.18
6 565.00	H	54.00	74.00	48.28	52.35	5.72	21.65
6 565.00	V	54.00	74.00	47.17	52.02	6.83	21.98

Remarks

1. The worst emission was found in li-down position(X axis) and the worst case was recorded.

4.2 AC Power Line Conducted Emissions

A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz-30 MHz, shall not exceed the limits.

Instrument Settings

IF Band Width: 9 kHz

Test Procedures

The EUT was placed on a non-metallic table 0.8m above the metallic, grounded floor and 0.4m from the reference ground plane wall. The distance to other metallic surfaces was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

Limit

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average**
0.15 ~ 0.5	66 to 56*	56 to 46*
0.5 ~ 5	56	46
5 ~ 30	60	50

* The level decreases linearly with the logarithm of the frequency.

** A linear average detector is required.

Test Results

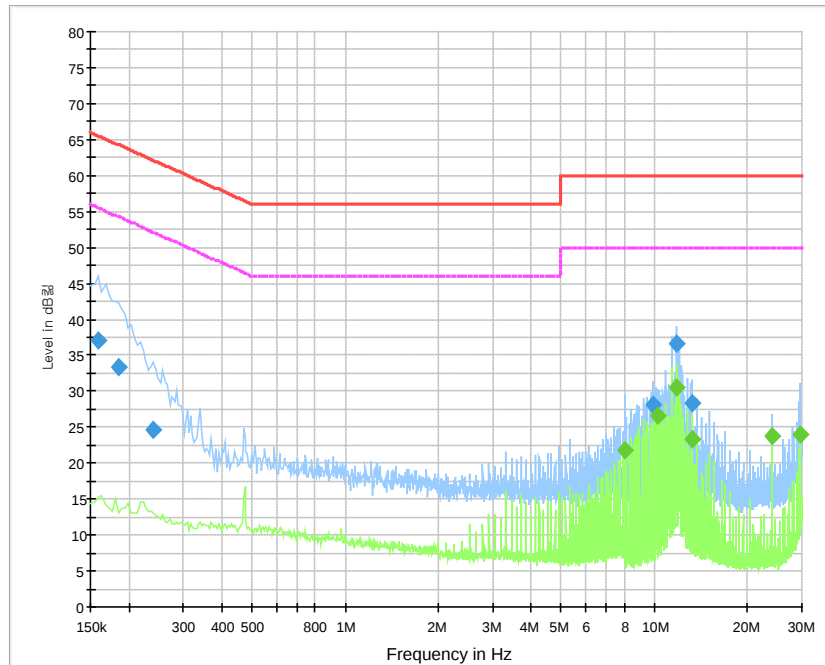
The requirements are:

☒ Complies

Test Data

[LINE – DC 5 V]

Class B_L1



Final Result 1

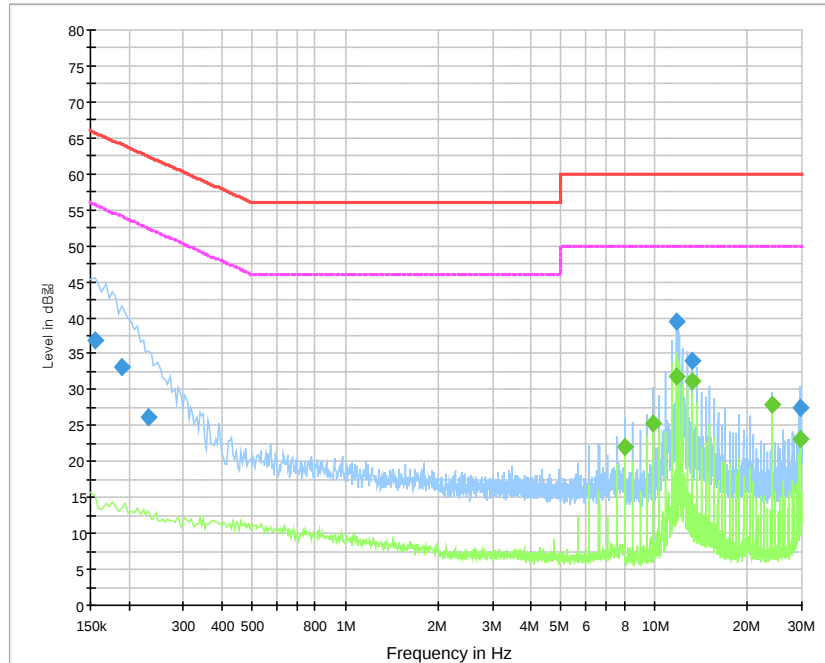
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	37.0	1000.0	9.000	On	L1	9.8	28.6	65.5
0.186000	33.3	1000.0	9.000	On	L1	9.9	30.9	64.2
0.240000	24.6	1000.0	9.000	On	L1	9.7	37.5	62.1
9.919500	28.1	1000.0	9.000	On	L1	9.9	31.9	60.0
11.809500	36.6	1000.0	9.000	On	L1	9.9	23.4	60.0
13.227000	28.3	1000.0	9.000	On	L1	9.9	31.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
8.029500	21.9	1000.0	9.000	On	L1	9.9	28.1	50.0
10.284000	26.6	1000.0	9.000	On	L1	9.9	23.4	50.0
11.809500	30.5	1000.0	9.000	On	L1	9.9	19.5	50.0
13.227000	23.4	1000.0	9.000	On	L1	9.9	26.6	50.0
24.000000	23.8	1000.0	9.000	On	L1	10.0	26.2	50.0
29.769000	24.1	1000.0	9.000	On	L1	10.0	25.9	50.0

[NEUTRAL – DC 5 V]

Class B_N



Final Result 1

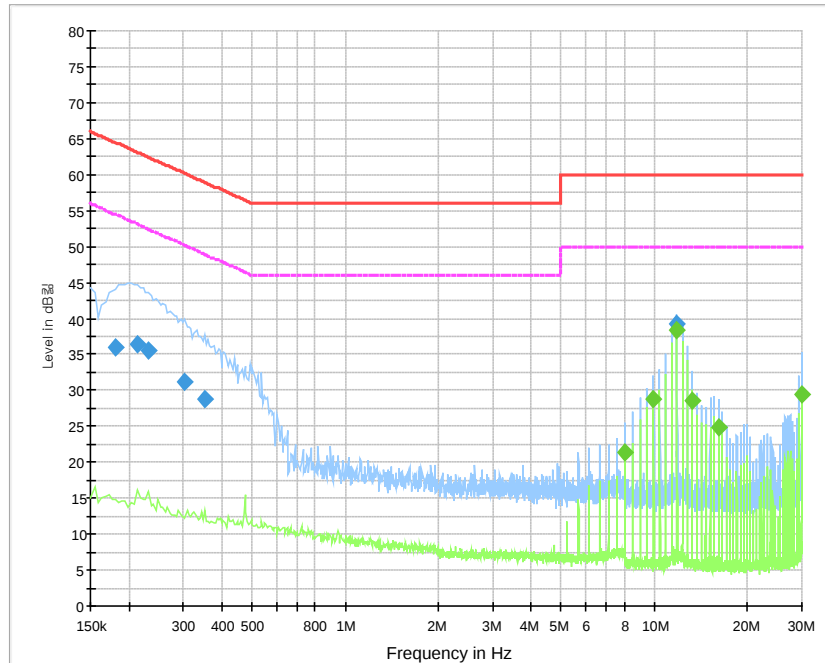
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.154500	36.9	1000.0	9.000	On	N	9.8	28.9	65.8
0.190500	33.0	1000.0	9.000	On	N	9.9	31.0	64.0
0.231000	26.3	1000.0	9.000	On	N	9.7	36.2	62.4
11.818500	39.5	1000.0	9.000	On	N	9.9	20.5	60.0
13.236000	34.1	1000.0	9.000	On	N	10.0	25.9	60.0
29.778000	27.5	1000.0	9.000	On	N	10.1	32.5	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
8.034000	21.9	1000.0	9.000	On	N	9.9	28.1	50.0
9.928500	25.3	1000.0	9.000	On	N	9.9	24.7	50.0
11.814000	31.9	1000.0	9.000	On	N	9.9	18.1	50.0
13.236000	31.1	1000.0	9.000	On	N	10.0	18.9	50.0
24.000000	27.9	1000.0	9.000	On	N	10.1	22.1	50.0
29.778000	23.0	1000.0	9.000	On	N	10.1	27.0	50.0

[LINE – DC 30 V]

Class B_L1



Final Result 1

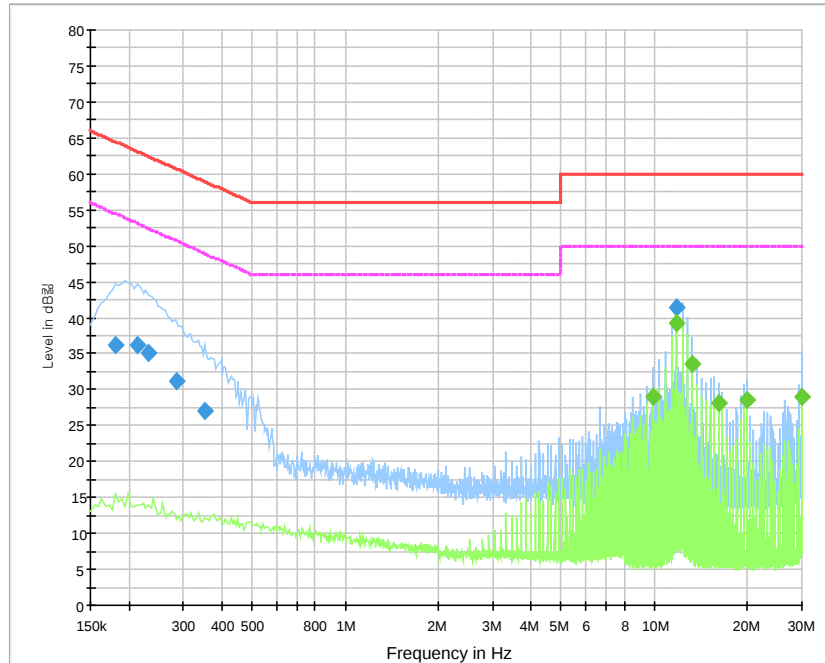
Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	36.0	1000.0	9.000	On	L1	9.9	28.4	64.4
0.213000	36.5	1000.0	9.000	On	L1	9.8	26.6	63.1
0.231000	35.6	1000.0	9.000	On	L1	9.7	26.8	62.4
0.303000	31.2	1000.0	9.000	On	L1	9.7	29.0	60.2
0.352500	28.8	1000.0	9.000	On	L1	9.8	30.1	58.9
11.845500	39.2	1000.0	9.000	On	L1	9.9	20.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
8.056500	21.3	1000.0	9.000	On	L1	9.9	28.7	50.0
9.951000	28.8	1000.0	9.000	On	L1	9.9	21.2	50.0
11.850000	38.3	1000.0	9.000	On	L1	9.9	11.7	50.0
13.267500	28.6	1000.0	9.000	On	L1	9.9	21.4	50.0
16.111500	24.9	1000.0	9.000	On	L1	9.9	25.1	50.0
29.854500	29.4	1000.0	9.000	On	L1	10.0	20.6	50.0

[NEUTRAL – DC 30 V]

Class B_N



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.181500	36.2	1000.0	9.000	On	N	9.9	28.2	64.4
0.213000	36.3	1000.0	9.000	On	N	9.8	26.8	63.1
0.231000	35.2	1000.0	9.000	On	N	9.7	27.2	62.4
0.285000	31.2	1000.0	9.000	On	N	9.7	29.5	60.7
0.352500	27.0	1000.0	9.000	On	N	9.8	31.9	58.9
11.845500	41.3	1000.0	9.000	On	N	9.9	18.7	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
9.951000	29.0	1000.0	9.000	On	N	9.9	21.0	50.0
11.845500	39.2	1000.0	9.000	On	N	9.9	10.8	50.0
13.267500	33.5	1000.0	9.000	On	N	10.0	16.5	50.0
16.111500	28.0	1000.0	9.000	On	N	10.0	22.0	50.0
19.905000	28.4	1000.0	9.000	On	N	10.0	21.6	50.0
29.854500	29.0	1000.0	9.000	On	N	10.1	21.0	50.0

APPENDIX A – Test Equipment Used For Tests

	Name of Equipment	Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date
1	Signal Analyzer	Agilent	N9020A	MY48011598	2017-11-01	2018-11-01
2	EMI Test Receiver	Rohde & Schwarz	ESCI7	100814	2017-10-25	2018-10-25
3	Bilog Antenna	Schaffner	CBL6111C	2551	2016-05-13	2018-05-13
4	Active Loop Antenna	SCHWARZBECK	FMZB 1513	1513-125	2016-05-16	2018-05-16
5	6dB Attenuator	R&S	DNF	272.4110.50-2	2017-10-25	2018-10-25
6	6dB Attenuator	R&S	DNF	272.4110.50-1	2017-02-03	2018-02-03
7	AMPLIFIER	SONOMA	310	291721	2017-02-02	2018-02-02
8	EMI Test Receiver	Rohde & Schwarz	ESU40	100336	2017-05-12	2018-05-12
9	Preamplifier	Agilent	8449B	3008A02011	2016-12-01	2017-12-01
10	Horn Antenna	ETS-Lindgren	3116	00062504	2017-04-25	2019-04-25
11	Horn Antenna	ETS-Lindgren	3117	00154525	2017-09-14	2019-09-14
12	Band Reject Filter	Micro Tronics	BRM50702	G233	2017-02-03	2018-02-03
13	LISN	Rohde & Schwarz	ENV216	101760	2017-02-03	2018-02-03
14	Dual-Tracking DC Power Supply	Topward Electric Instruments	6303D	711196	2017-02-02	2018-02-02

APPENDIX B – EUT Photographs

