

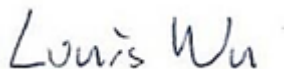


FCC EMI TEST REPORT

FCC ID : 2AAAS-US01
Equipment : NFC dongle
Brand Name : Vivint
Model Name : US01
Applicant : Vivint, Inc.
4931 N. 300 W.Provo, UT 84604, United States
Manufacturer : Vivint, Inc.
4931 N. 300 W.Provo, UT 84604, United States
Standard : FCC 47 CFR FCC Part 15 Subpart B Class B

The product was received on Nov. 15, 2022 and testing was performed from Dec. 22, 2022 to Dec. 26, 2022. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.



Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FC2N0920	01	Initial issue of report	Jan. 13, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	3.39 dB under the limit at 27.119 MHz
3.2	15.109	Radiated Emission	Pass	5.69 dB under the limit at 664.000 MHz for Quasi-Peak

Declaration of Conformity:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Danny Lee

Report Producer: Doris Chen

1. General Description

1.1. Product Feature of Equipment Under Test

NFC

Product Feature	
Antenna Type	NFC: Loop Antenna

Remark: The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations in report summary.

1.2. Modification of EUT

No modifications made to the EUT during the testing.

1.3. Test Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. CO05-HY
Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No. 03CH10-HY (TAF Code: 3786)
Remark	The Radiated Emission test item subcontracted to Sporton International Inc. Wensan Laboratory

FCC designation No.: TW1093 and TW1132

1.4. Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC 47 CFR FCC Part 15 Subpart B Class B
- ♦ ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

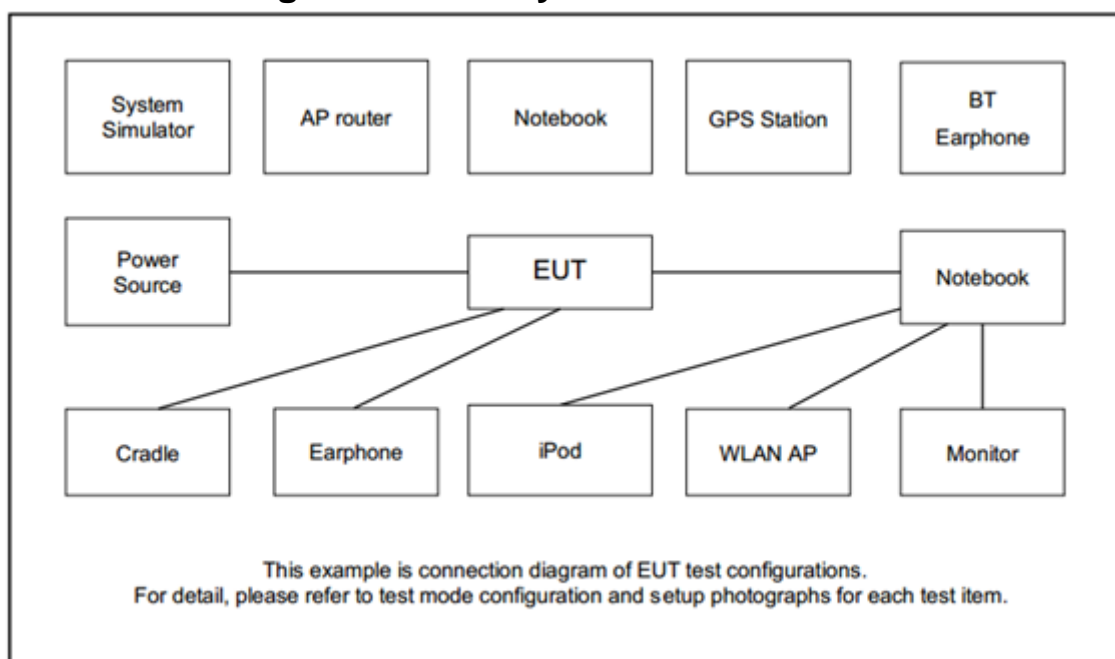
2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT is tested along with the peripherals, operating under possible configurations in compliant with normal operation. The maximum emissions can be identified by a pre-scan carried out in different orientations of placement pursuant to ANSI C63.4-2014. Frequency range covered: Conduction Emission (150 kHz to 30 MHz), Radiation Emission (30 MHz to the 5th harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Functions Enabled
AC Conducted Emission	Mode 1 : NFC On + USB Cable (Charging from Notebook)
Radiated Emissions	Mode 1 : NFC On + USB Cable (Charging from Notebook)

2.2. Connection Diagram of Test System



2.3. Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8m
2.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
4.	USB Cable	i-wiz	US-121	N/A	Shielded, 1.5m	N/A

2.4. EUT Operation Test Setup

The EUT are programmed during the test:

1. Turn on NFC functions.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1. Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

<Class B>

Frequency of emission (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

*Decreases with the logarithm of the frequency.

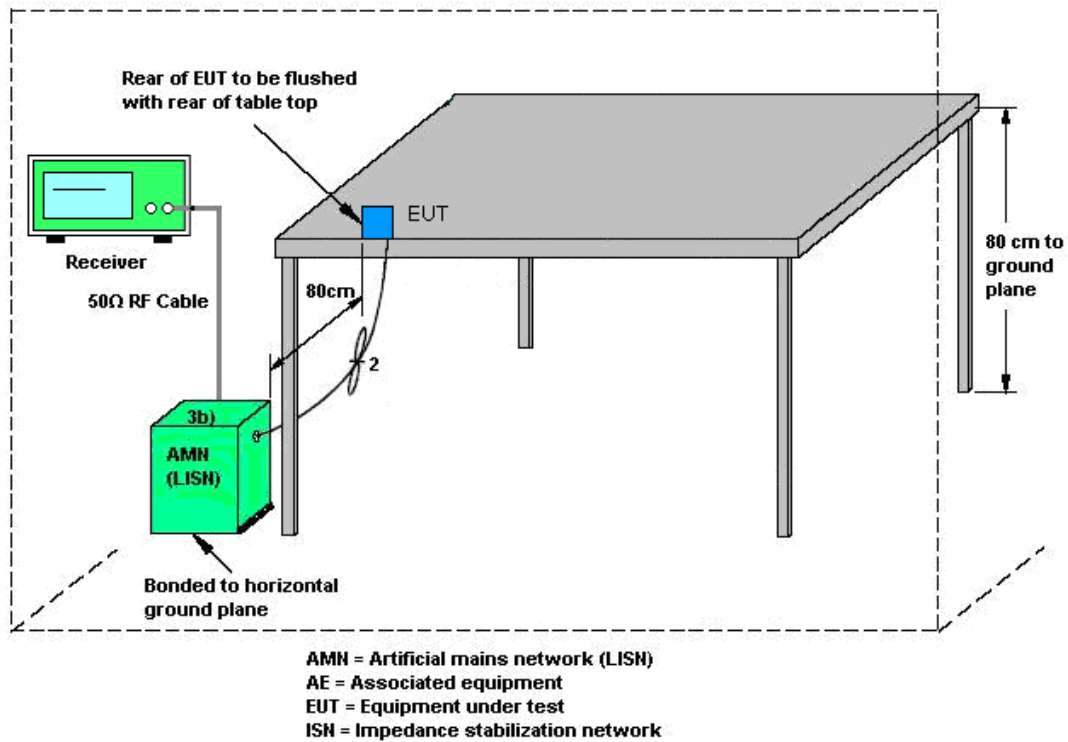
3.1.2. Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3. Test Procedure

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (If Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.1.4. Test Setup



3.1.5. Test Result of AC Conducted Emission

Please refer to Appendix A.

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

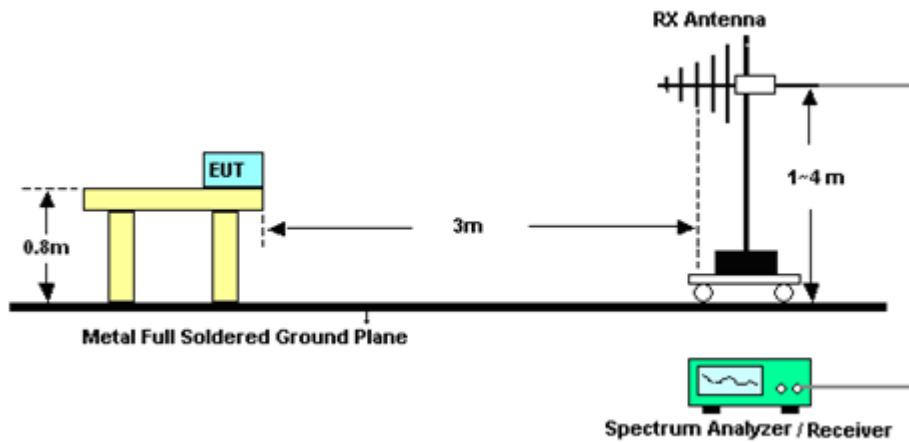
Please refer to the measuring equipment list in this test report.

3.2.3. Test Procedures

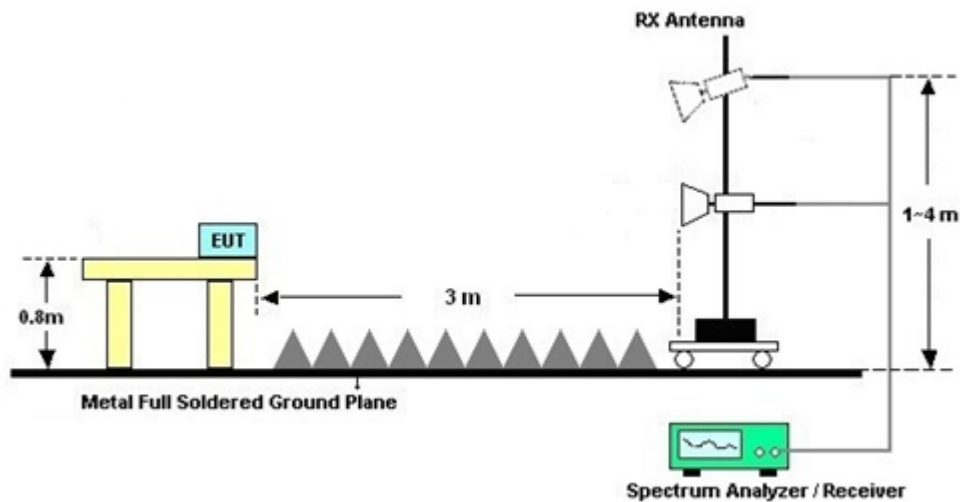
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120 kHz/VBW=300 kHz for frequency below 1 GHz; RBW=1 MHz VBW=3 MHz (Peak), RBW=1 MHz/VBW=10 Hz (Average) for frequency above 1 GHz).
7. If the emission level of the EUT in peak mode is 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.

3.2.4. Test Setup of Radiated Emission

For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions above 1GHz



3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.



4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Dec. 22, 2022	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2022	Dec. 22, 2022	Nov. 30, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 01, 2022	Dec. 22, 2022	Nov. 30, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 17, 2022	Dec. 22, 2022	Nov. 16, 2023	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Dec. 22, 2022	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Aug. 01, 2022	Dec. 22, 2022	Jul. 31, 2023	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 30, 2021	Dec. 22, 2022	Dec. 29, 2022	Conduction (CO05-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 19, 2022	Dec. 26, 2022	Oct. 18, 2023	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	35413 & 02	30MHz~1GHz	Nov. 06, 2022	Dec. 26, 2022	Nov. 05, 2023	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz~18GHz	Oct. 27, 2022	Dec. 26, 2022	Oct. 26, 2023	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JAP00101800-30-10P	160118550004	1GHz~18GHz	Feb. 27, 2022	Dec. 26, 2022	Feb. 26, 2023	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Dec. 26, 2022	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Dec. 26, 2022	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Dec. 26, 2022	N/A	Radiation (03CH10-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290045	20MHz~8.4GHz	Jan. 13, 2022	Dec. 26, 2022	Jan. 12, 2023	Radiation (03CH10-HY)
Signal Analyzer	Keysight	N9010B	MY60241055	10Hz~44GHz	Jul. 22, 2022	Dec. 26, 2022	Jul. 21, 2023	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519226/2, 804014/2, 804026/2	30MHz~40GHz	Nov. 02, 2022	Dec. 26, 2022	Nov. 01, 2023	Radiation (03CH10-HY)

5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.5 dB
--	--------

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.9 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.5 dB
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Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.3 dB
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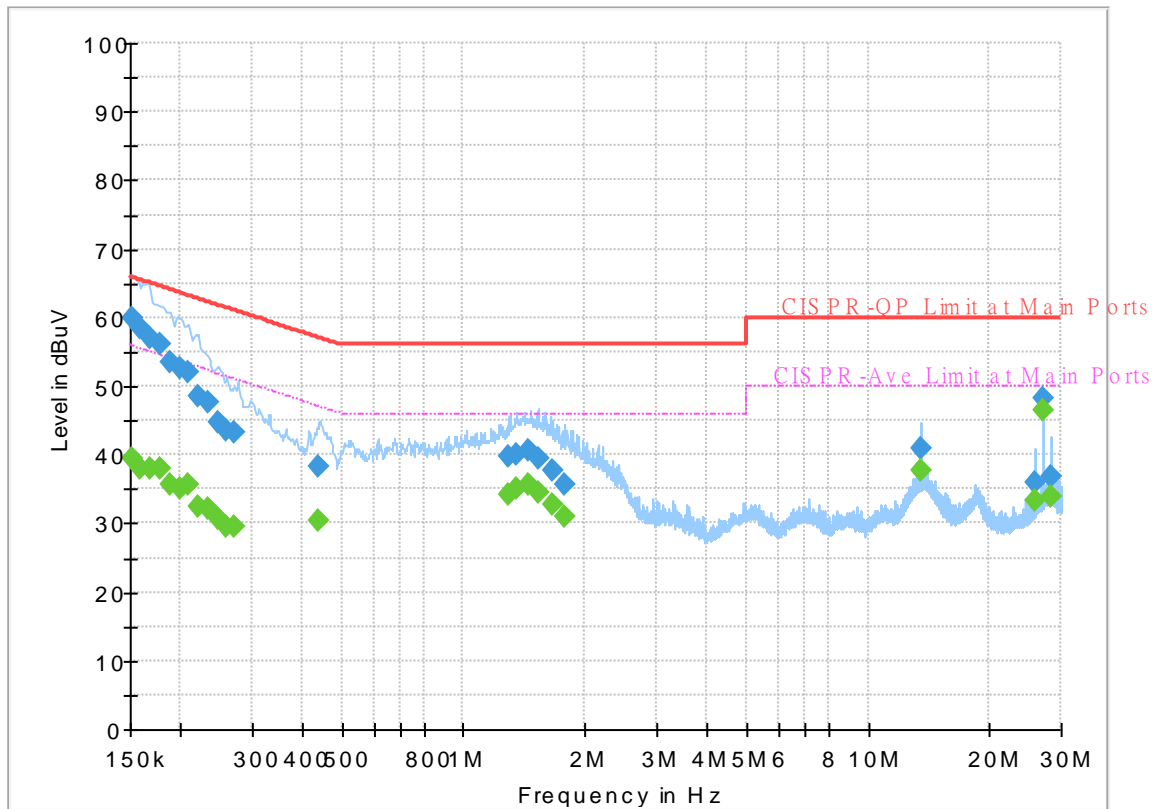
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang	Temperature :	23~26°C
		Relative Humidity :	45~55%

EUT Information

Report NO : 2N0920
 Test Mode : Mode 1
 Test Voltage : Power From System
 Phase : Line

Full Spectrum



Final_Result

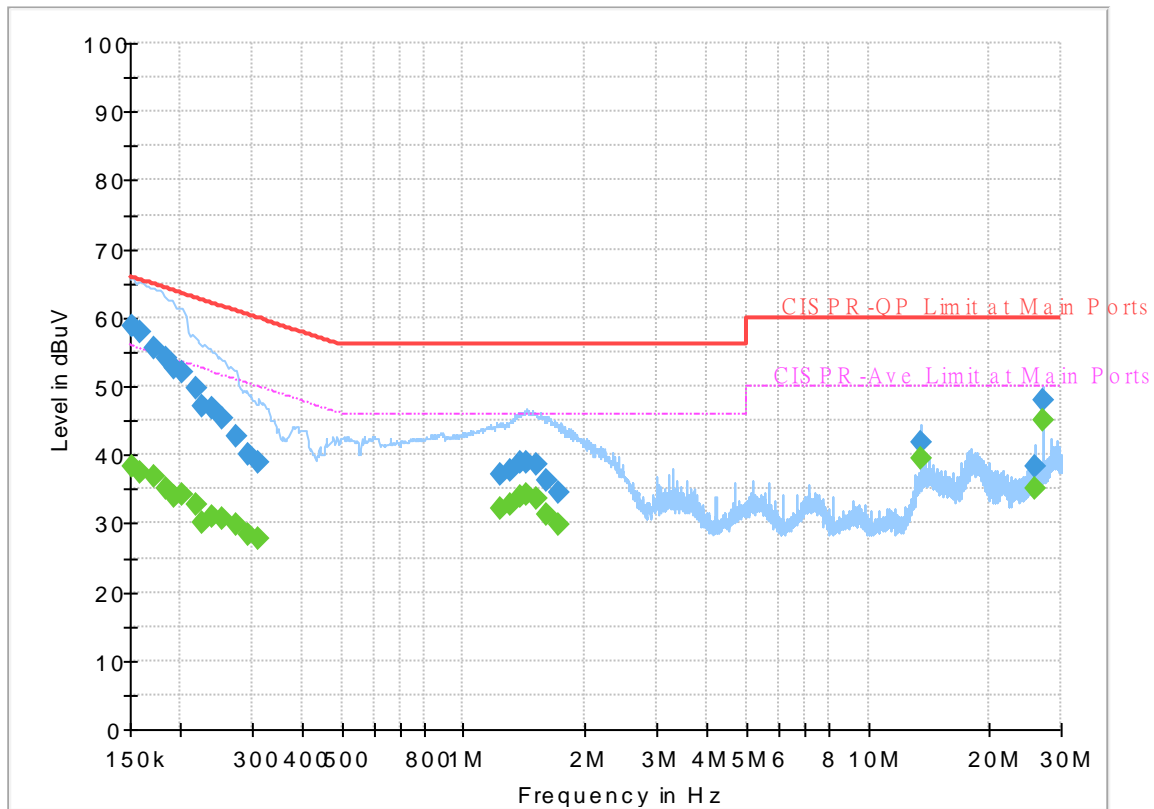
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	39.50	55.88	16.38	L1	OFF	19.8
0.152250	60.08	---	65.88	5.80	L1	OFF	19.8
0.159000	---	38.13	55.52	17.39	L1	OFF	19.8
0.159000	58.43	---	65.52	7.09	L1	OFF	19.8
0.168000	---	38.06	55.06	17.00	L1	OFF	19.8
0.168000	57.00	---	65.06	8.06	L1	OFF	19.8
0.177000	---	38.09	54.63	16.54	L1	OFF	19.8
0.177000	56.18	---	64.63	8.45	L1	OFF	19.8
0.188250	---	35.54	54.11	18.57	L1	OFF	19.8
0.188250	53.41	---	64.11	10.70	L1	OFF	19.8
0.199500	---	35.22	53.63	18.41	L1	OFF	19.8
0.199500	52.76	---	63.63	10.87	L1	OFF	19.8
0.208500	---	35.71	53.27	17.56	L1	OFF	19.8
0.208500	52.05	---	63.27	11.22	L1	OFF	19.8
0.222000	---	32.51	52.74	20.23	L1	OFF	19.8
0.222000	48.46	---	62.74	14.28	L1	OFF	19.8
0.233250	---	32.08	52.33	20.25	L1	OFF	19.8
0.233250	47.72	---	62.33	14.61	L1	OFF	19.8
0.249000	---	30.84	51.79	20.95	L1	OFF	19.8
0.249000	44.67	---	61.79	17.12	L1	OFF	19.8
0.260250	---	29.64	51.42	21.78	L1	OFF	19.8

0.260250	43.55	---	61.42	17.87	L1	OFF	19.8
0.271500	---	29.58	51.07	21.49	L1	OFF	19.8
0.271500	43.28	---	61.07	17.79	L1	OFF	19.8
0.440250	---	30.43	47.06	16.63	L1	OFF	19.8
0.440250	38.28	---	57.06	18.78	L1	OFF	19.8
1.297500	---	34.27	46.00	11.73	L1	OFF	19.8
1.297500	39.72	---	56.00	16.28	L1	OFF	19.8
1.349250	---	35.19	46.00	10.81	L1	OFF	19.8
1.349250	40.19	---	56.00	15.81	L1	OFF	19.8
1.446000	---	35.64	46.00	10.36	L1	OFF	19.8
1.446000	40.56	---	56.00	15.44	L1	OFF	19.8
1.524750	---	34.58	46.00	11.42	L1	OFF	19.8
1.524750	39.50	---	56.00	16.50	L1	OFF	19.8
1.655250	---	32.76	46.00	13.24	L1	OFF	19.8
1.655250	37.59	---	56.00	18.41	L1	OFF	19.8
1.779000	---	30.96	46.00	15.04	L1	OFF	19.8
1.779000	35.77	---	56.00	20.23	L1	OFF	19.8
13.560000	---	37.69	50.00	12.31	L1	OFF	20.0
13.560000	40.89	---	60.00	19.11	L1	OFF	20.0
25.885500	---	33.25	50.00	16.75	L1	OFF	20.0
25.885500	36.06	---	60.00	23.94	L1	OFF	20.0
27.118500	---	46.61	50.00	3.39	L1	OFF	20.0
27.118500	48.13	---	60.00	11.87	L1	OFF	20.0
28.351500	---	33.94	50.00	16.06	L1	OFF	20.1
28.351500	36.73	---	60.00	23.27	L1	OFF	20.1

EUT Information

Report NO : 2N0920
Test Mode : Mode 1
Test Voltage : Power From System
Phase : Neutral

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	38.19	55.88	17.69	N	OFF	19.8
0.152250	58.75	---	65.88	7.13	N	OFF	19.8
0.159000	---	37.42	55.52	18.10	N	OFF	19.8
0.159000	57.78	---	65.52	7.74	N	OFF	19.8
0.172500	---	36.90	54.84	17.94	N	OFF	19.8
0.172500	55.58	---	64.84	9.26	N	OFF	19.8
0.183750	---	34.98	54.31	19.33	N	OFF	19.8
0.183750	54.22	---	64.31	10.09	N	OFF	19.8
0.192750	---	33.95	53.92	19.97	N	OFF	19.8
0.192750	52.49	---	63.92	11.43	N	OFF	19.8
0.201750	---	34.28	53.54	19.26	N	OFF	19.8
0.201750	51.95	---	63.54	11.59	N	OFF	19.8
0.217500	---	32.68	52.91	20.23	N	OFF	19.8
0.217500	49.61	---	62.91	13.30	N	OFF	19.8
0.226500	---	30.03	52.58	22.55	N	OFF	19.8
0.226500	47.11	---	62.58	15.47	N	OFF	19.8
0.240000	---	30.98	52.10	21.12	N	OFF	19.8
0.240000	46.69	---	62.10	15.41	N	OFF	19.8
0.253500	---	30.66	51.64	20.98	N	OFF	19.8
0.253500	45.43	---	61.64	16.21	N	OFF	19.8
0.273750	---	29.87	51.00	21.13	N	OFF	19.8

0.273750	42.62	---	61.00	18.38	N	OFF	19.8
0.294000	---	28.41	50.41	22.00	N	OFF	19.8
0.294000	40.06	---	60.41	20.35	N	OFF	19.8
0.312000	---	27.84	49.92	22.08	N	OFF	19.8
0.312000	38.88	---	59.92	21.04	N	OFF	19.8
1.232250	---	32.13	46.00	13.87	N	OFF	19.8
1.232250	37.17	---	56.00	18.83	N	OFF	19.8
1.313250	---	32.82	46.00	13.18	N	OFF	19.8
1.313250	37.68	---	56.00	18.32	N	OFF	19.8
1.380750	---	33.92	46.00	12.08	N	OFF	19.8
1.380750	38.90	---	56.00	17.10	N	OFF	19.8
1.439250	---	34.20	46.00	11.80	N	OFF	19.8
1.439250	39.03	---	56.00	16.97	N	OFF	19.8
1.511250	---	33.53	46.00	12.47	N	OFF	19.8
1.511250	38.59	---	56.00	17.41	N	OFF	19.8
1.608000	---	31.40	46.00	14.60	N	OFF	19.8
1.608000	36.31	---	56.00	19.69	N	OFF	19.8
1.716000	---	29.91	46.00	16.09	N	OFF	19.8
1.716000	34.61	---	56.00	21.39	N	OFF	19.8
13.557750	---	39.33	50.00	10.67	N	OFF	20.0
13.557750	41.82	---	60.00	18.18	N	OFF	20.0
25.881000	---	35.09	50.00	14.91	N	OFF	20.2
25.881000	38.19	---	60.00	21.81	N	OFF	20.2
27.118500	---	44.97	50.00	5.03	N	OFF	20.2
27.118500	47.94	---	60.00	12.06	N	OFF	20.2



Appendix B. Radiated Emission Test Result

