

RF TEST REPORT

Test item : ID Card Printer
Model No. : TP-9100
Order No. : 09111214019
Date of receipt : 2009-11-12
Test duration : 2010-09-12~2010-09-27
Date of issue : 2010-10-18
Use of report : FCC Original Grant

Applicant : TIT ENG Co.,Ltd.

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Test laboratory : Digital EMC Co., Ltd.

683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Kyunggi-Do, 449-080, Korea

Test specification : FCC Part 15.225 Subpart C
ANSI C63.4-2003

Test environment : See appended test report

Test result : ☒ Pass ☐ Fail

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DIGITAL EMC CO., LTD.

Tested by:

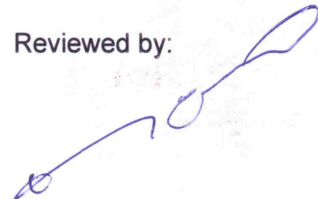


Engineer
B.G.HAN

Witnessed by:

N/A

Reviewed by:



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W.J. Lee

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1. Equipment information

1.1 Equipment description

FCC Equipment Class	Low Power Communications Device Transmitter(DXX)
Equipment type	ID Card Printer
Equipment model name	TP-9100
Equipment add model name	Javelin J230i
Equipment serial no.	Identical prototype
Frequency band	13.56MHz
Modulation type	ASK
Channel	1
Supplied tag type	14443A, 14443B, Mifare
Power	AC 120V
Antenna type	PCB Loop antenna ^{Note 1}

Note 1: This device has 3 PCB Loop antennas.(Top, Internal, Ribbon)
But this device does not support a simultaneous transmission mode.

1.2 Ancillary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
AC Adapter	KPA-060M	20090324	Ning Bo Iso Electronic Co., Ltd.	Output DC 24V
RFID Tag	14443A	N/A	SuremRFID Co., Ltd.	-
RFID Tag	14443B	N/A	SuremRFID Co., Ltd.	-
RFID Tag	Mifare	N/A	SuremRFID Co., Ltd.	-
RFID Tag	Tag(Mifare)	N/A	Cobis Co., Ltd.	-

2. Information about test items

2.1 Test mode

Test Case 1	Top Antenna
Test Case 2	Internal Antenna
Test Case 3	Ribbon Antenna

2.2 Auxiliary equipment

Equipment	Model No.	Serial No.	Manufacturer	Note
-	-	-	-	-
-	-	-	-	-

2.3 Tested frequency

	TX Frequency (MHz)	RX Frequency (MHz)
Lowest Channel	13.56	13.56
Middle Channel	-	-
Highest Channel	-	-

2.4 Tested environment

Temperature	: 24 ~ 25 °C
Relative humidity content	: 35 ~ 58 % R.H.
Details of power supply	: AC 120 V (Output: DC 24V)

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing

→ The manufacturer carried out modifications to the EUT in order to meet the requirements

Of the standard applied.

✓ Below ferrites fitted to adapter cable.(refer to external photo.)

- 85R142806-00A
- 85R142806-00A

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status Note 1
I. Test Items				
2.1049	20 dB Bandwidth	N/A	Radiated	C Note. 2
15.225 (a)	In-Band Emissions	15.848 $\mu V/m$ @ 30m 15.553 – 13.567 MHz		C Note. 2
15.225 (b)	In-Band Emissions	334 $\mu V/m$ @ 30m 13.410 – 13.553 MHz 13.567 – 13.710 MHz		C Note. 2
15.225 (c)	In-Band Emissions	106 $\mu V/m$ @ 30m 13.110 – 13.410 MHz 13.710 – 14.010 MHz		C Note. 2
15.225 (d) 15.205 15.209	Out-of Band Emissions	Emissions outside of the specified band (13.110-14.010 MHz) must meet the radiated limits detailed in 15.209		C Note. 2
15.225 (e)	Frequency Stability Tolerance	$\pm 0.001\%$ of operating frequency	Conducted	C Note. 2
15.207	AC Conducted Emissions	EN 55022	AC Line Conducted	C Note. 2
<p>Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable</p> <p>Note 2: Top and Internal RFID of 3 RFID tags were used for all test items.</p> <p>Ribbon RFID of 1 RFID tags were used for all test items.</p> <p>And Top(Tag: Mifare), Internal(Tag: 14443B) and Ribbon(Tag: Mifare) worst case data was reported.</p>				

The sample was tested according to the following specification:
FCC Part 15.225; ANSI C-63.4-2003

3.2 Transmitter requirements

3.2.1 20dB Bandwidth Measurement (§2.1049)

- Procedure:

The 20dB Bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

- Measurement Data: Comply

Note 1: See next pages for actual measured data.

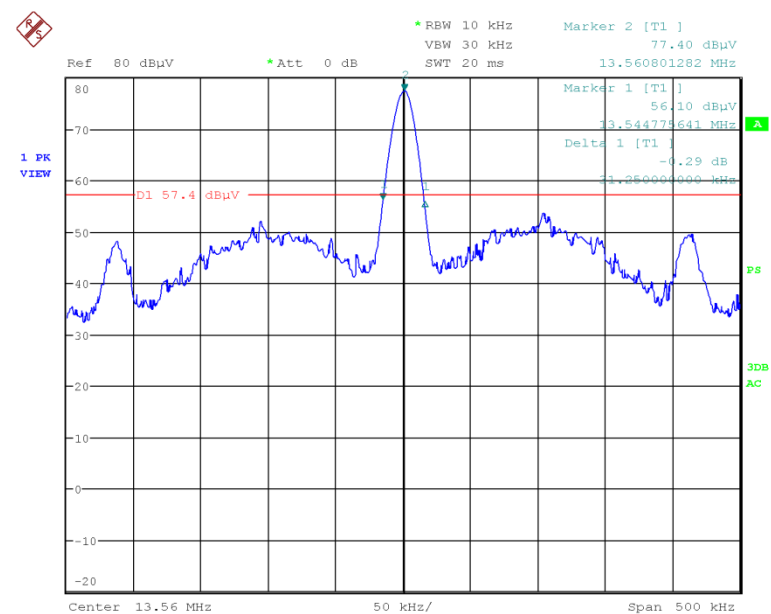
Note 2: This test item was performed in all the test cases.

- Minimum Standard:

None

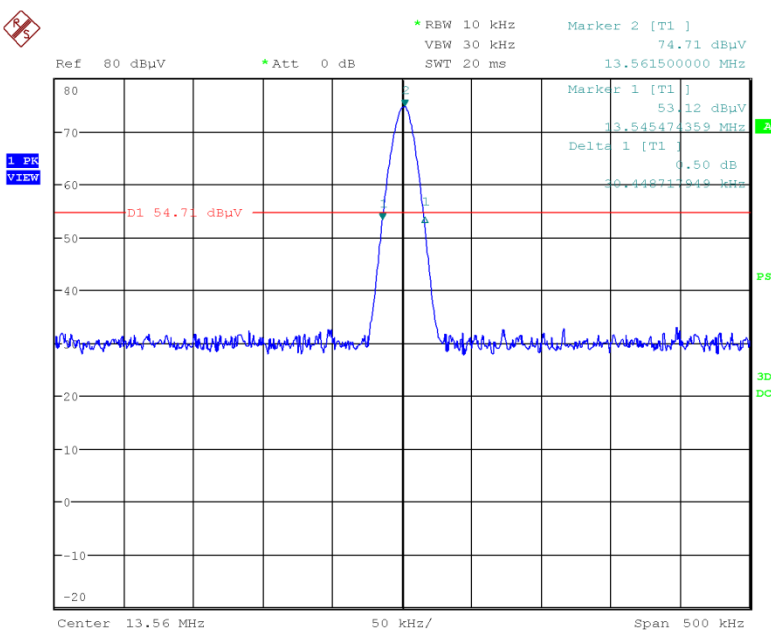
- Measurement Data: Test Case 1

Tested Frequency(MHz)	Test Results(KHz)
13.56	31.250



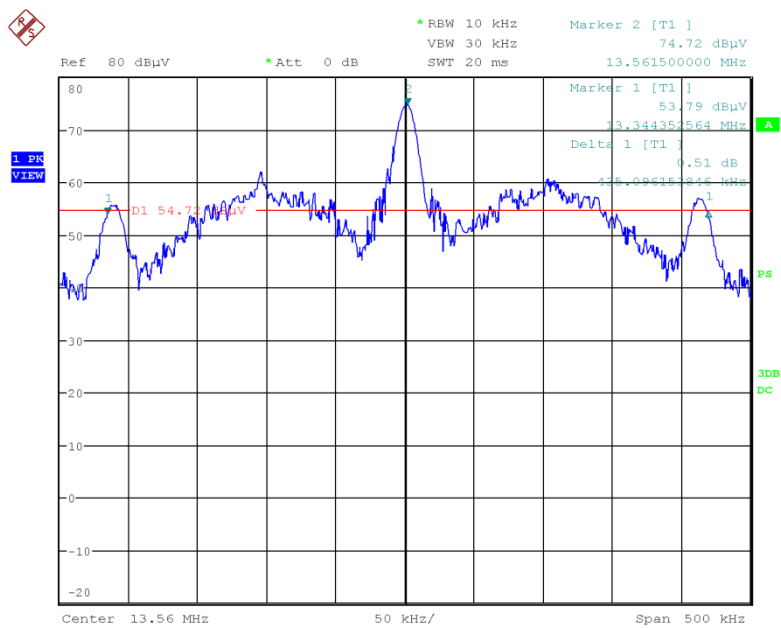
- Measurement Data: Test Case 2

Tested Frequency(MHz)	Test Results(KHz)
13.56	30.449



- Measurement Data: Test Case 3

Tested Frequency(MHz)	Test Results(KHz)
13.56	435.096



3.2.2 In-Band Radiated Spurious Emission (§15.225(a), (b), (c))

- Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

- Measurement Data: **Comply**

Note 1: See next pages for actual measured data.

Note 2: This test item was performed in all the test cases.

- Minimum Standard

Frequency Band [MHz]	Limit	
	[uV/m]	[dBuV/m]
13.553-13.567	15,848	84.00
13.410-13.553 13.567-13.710	334	50.47
13.110-13.410 13.710-14.010	106	40.51

- Measurement Data: Test Case 1

Frequency Band [MHz]	Frequency [MHz]	ANT Pol	Reading [dBuV]	T.F [dB/m]	Field Strength @ 3m [dBuV/m]	Field Strength @ 30m [dBuV/m]	Limit [dBuV/m]	Margin [dB]
13.110 ~ 13.410	13.345	V	39.40	-12.88	26.52	-13.48	40.51	53.99
13.410 ~ 13.553	13.553	V	61.00	-12.90	48.10	8.10	50.47	42.37
13.553 ~ 13.567	13.560	V	77.20	-12.90	64.30	24.30	84.00	59.70
13.567 ~ 13.710	13.567	V	65.70	-12.90	52.80	12.80	50.47	37.67
13.710 ~ 14.010	13.770	V	41.70	-12.92	28.78	-11.22	40.51	51.73

Note 1. This test item was performed using a loop antenna.

Note 2. This test item was performed at 3m and the data were extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)2.

$$\text{Extrapolation Factor} = 20 \log_{10}(30/3)^2 = 40\text{dB}$$

Note 3. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Field Strength @ 30m} \quad / \quad \text{Field Strength @ 30m} = \text{Field Strength @ 3m} - 40$$

$$\text{Field Strength @ 3m} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

- Measurement Data: Test Case 2

Frequency Band [MHz]	Frequency [MHz]	ANT Pol	Reading [dBuV]	T.F [dB/m]	Field Strength @ 3m [dBuV/m]	Field Strength @ 30m [dBuV/m]	Limit [dBuV/m]	Margin [dB]
13.110 ~ 13.410	13.326	V	25.40	-12.88	12.52	-27.48	40.51	67.99
13.410 ~ 13.553	13.553	V	55.40	-12.90	42.50	2.50	50.47	47.97
13.553 ~ 13.567	13.560	V	74.50	-12.90	61.60	21.60	84.00	62.40
13.567 ~ 13.710	13.567	V	64.31	-12.90	51.41	11.41	50.47	39.06
13.710 ~ 14.010	13.771	V	25.90	-12.91	12.99	-27.01	40.51	67.52

Note 1. This test item was performed using a loop antenna.

Note 2. This test item was performed at 3m and the data were extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)2.

$$\text{Extrapolation Factor} = 20 \log_{10}(30/3)^2 = 40\text{dB}$$

Note 3. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Field Strength @ 30m} \quad / \quad \text{Field Strength @ 30m} = \text{Field Strength @ 3m} - 40$$

$$\text{Field Strength @ 3m} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

- Measurement Data: Test Case 3

Frequency Band [MHz]	Frequency [MHz]	ANT Pol	Reading [dBuV]	T.F [dB/m]	Field Strength @ 3m [dBuV/m]	Field Strength @ 30m [dBuV/m]	Limit [dBuV/m]	Margin [dB]
13.110 ~ 13.410	13.348	V	51.00	-12.87	38.13	-1.87	40.51	42.38
13.410 ~ 13.553	13.553	V	55.00	-12.90	42.10	2.10	50.47	48.37
13.553 ~ 13.567	13.561	V	74.00	-12.90	61.10	21.10	84.00	62.90
13.567 ~ 13.710	13.567	V	63.80	-12.90	50.90	10.90	50.47	39.57
13.710 ~ 14.010	13.774	V	52.60	-12.92	39.68	-0.32	40.51	40.83

Note 1. This test item was performed using a loop antenna.

Note 2. This test item was performed at 3m and the data were extrapolated to the specified measurement distance of 30m using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)2.

▪ Extrapolation Factor = $20 \log_{10}(30/3)^2 = 40\text{dB}$

Note 3. Sample Calculation.

Margin = Limit – Field Strength @ 30m / Field Strength @ 30m = Field Strength @ 3m – 40

Field Strength @ 3m = Reading + T.F / T.F = AF + CL – AG

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

3.2.3 Radiated Spurious Emission Measurements, Out-of-Band (§15.225(d) / §15.205 and 209)

- Procedure:

The EUT was tested from 9kHz up to the 1GHz excluding the band 13.110-14.010MHz. All measurements were recorded with spectrum analyzer employing a peak detector for emissions below 30MHz. Above 30MHz a Quasi-peak detector was used. All out-of-band emissions must not exceed the limits §15.209. A loop antenna was used for searching for emissions below 30MHz.

- Measurement Data: **Comply**

Note 1: See next pages for actual measured data.

Note 2: This test item was performed in all the test cases.

- Minimum Standard

• FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	3.6 ~ 4.4	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	4.5 ~ 5.15	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	5.35 ~ 5.46	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	7.25 ~ 7.75	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	8.025 ~ 8.5	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.0 ~ 9.2	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	9.3 ~ 9.5	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	10.6 ~ 12.7	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900	13.25 ~ 13.4	
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		

• FCC Part 15.205(b):

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

• FCC Part 15.209(a):

Frequency [MHz]	Field Strength [uV/m]	Measurement 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 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	200	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 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

• FCC Part 15.209(b):

In the emission table above, the tighter limit applies at the band edges.

- Measurement Data: Test Case 1

Operating Frequency : 13.56MHz
 Measurement Distance : 3 meters

Frequency [MHz]	ANT Pol	Reading [dBuV]	T.F [dB/m]	Distance factor	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
40.673	H	39.40	-8.60	N/A	30.80	40.00	9.20
59.990	H	50.40	-15.90	N/A	34.50	40.00	5.50
60.000	V	46.80	-15.90	N/A	30.90	40.00	9.10
110.016	V	49.40	-10.70	N/A	38.70	43.50	4.80
122.056	V	46.70	-10.10	N/A	36.60	43.50	6.90
132.043	V	49.40	-10.40	N/A	39.00	43.50	4.50
132.065	H	46.10	-10.40	N/A	35.70	43.50	7.80
154.001	V	49.40	-11.40	N/A	38.00	43.50	5.50
189.847	V	50.30	-11.20	N/A	39.10	43.50	4.40
189.857	H	51.80	-11.20	N/A	40.60	43.50	2.90
216.953	H	49.80	-10.10	N/A	39.70	46.00	6.30
231.354	H	52.40	-9.30	N/A	43.10	46.00	2.90
263.993	H	51.70	-8.20	N/A	43.50	46.00	2.50
285.926	H	47.90	-8.00	N/A	39.90	46.00	6.10
287.314	V	45.70	-7.90	N/A	37.80	46.00	8.20
329.991	H	49.70	-7.30	N/A	42.40	46.00	3.60
383.975	V	43.10	-6.30	N/A	36.80	46.00	9.20
383.982	H	44.50	-6.30	N/A	38.20	46.00	7.80
431.998	H	44.80	-5.40	N/A	39.40	46.00	6.60
455.969	V	43.60	-5.10	N/A	38.50	46.00	7.50
455.980	H	43.70	-5.10	N/A	38.60	46.00	7.40
480.008	V	41.80	-4.60	N/A	37.20	46.00	8.80
483.995	H	42.70	-4.50	N/A	38.20	46.00	7.80
659.972	H	40.80	-2.30	N/A	38.50	46.00	7.50
659.985	V	38.40	-2.30	N/A	36.10	46.00	9.90
671.959	V	40.70	-2.30	N/A	38.40	46.00	7.60
791.700	H	39.40	-0.70	N/A	38.70	46.00	7.30
923.990	H	40.70	1.30	N/A	42.00	46.00	4.00
924.000	V	38.10	1.30	N/A	39.40	46.00	6.60

Note 1. Both Vertical and Horizontal polarities of the receiver antenna were evaluated with the worst case emissions being reported.

Note 2. The worst-case emissions are reported.

Note 3. Emissions were not reported greater than below 10dB of the limit.

Note 4. Sample calculation

Margin = Limit – Field Strength / T.F = AF + CL – AG

Distance factor = 20log(Measurement distance / The measured distance)

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

- Measurement Data: Test Case 2

Operating Frequency : 13.56MHz
 Measurement Distance : 3 meters

Frequency [MHz]	ANT Pol	Reading [dBuV]	T.F [dB/m]	Distance factor	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
40.657	V	42.20	-8.60	N/A	33.60	40.00	6.40
40.682	H	42.80	-8.60	N/A	34.20	40.00	5.80
59.996	H	52.90	-15.90	N/A	37.00	40.00	3.00
60.000	V	51.70	-15.90	N/A	35.80	40.00	4.20
109.967	H	44.80	-10.60	N/A	34.20	43.50	9.30
110.031	V	49.10	-10.70	N/A	38.40	43.50	5.10
122.033	V	48.10	-10.10	N/A	38.00	43.50	5.50
132.011	V	50.50	-10.40	N/A	40.10	43.50	3.40
141.209	H	49.00	-10.80	N/A	38.20	43.50	5.30
145.250	V	49.30	-11.10	N/A	38.20	43.50	5.30
176.279	V	48.40	-11.50	N/A	36.90	43.50	6.60
186.860	V	47.50	-11.20	N/A	36.30	43.50	7.20
189.849	H	52.40	-11.20	N/A	41.20	43.50	2.30
216.974	H	53.10	-10.10	N/A	43.00	46.00	3.00
230.050	V	46.10	-9.30	N/A	36.80	46.00	9.20
230.548	H	52.00	-9.30	N/A	42.70	46.00	3.30
263.991	H	51.00	-8.20	N/A	42.80	46.00	3.20
286.008	H	49.00	-8.00	N/A	41.00	46.00	5.00
329.919	H	50.10	-7.30	N/A	42.80	46.00	3.20
383.976	V	42.40	-6.30	N/A	36.10	46.00	9.90
383.995	H	46.10	-6.30	N/A	39.80	46.00	6.20
431.976	H	46.90	-5.40	N/A	41.50	46.00	4.50
431.978	V	43.10	-5.40	N/A	37.70	46.00	8.30
455.987	H	46.90	-5.10	N/A	41.80	46.00	4.20
455.990	V	41.50	-5.10	N/A	36.40	46.00	9.60
479.977	V	42.30	-4.60	N/A	37.70	46.00	8.30
479.980	H	40.70	-4.60	N/A	36.10	46.00	9.90
528.000	V	40.50	-3.80	N/A	36.70	46.00	9.30
660.020	H	38.90	-2.30	N/A	36.60	46.00	9.40
661.000	V	41.40	-2.30	N/A	39.10	46.00	6.90
671.987	H	38.40	-2.30	N/A	36.10	46.00	9.90
671.993	V	39.60	-2.30	N/A	37.30	46.00	8.70
924.000	H	40.00	1.30	N/A	41.30	46.00	4.70
924.076	V	38.40	1.30	N/A	39.70	46.00	6.30

Note 1. Both Vertical and Horizontal polarities of the receiver antenna were evaluated with the worst case emissions being reported.

Note 2. The worst-case emissions are reported.

Note 3. Emissions were not reported greater than below 10dB of the limit.

Note 4. Sample calculation

Margin = Limit – Field Strength / T.F = AF + CL – AG

Distance factor = 20log(Measurement distance / The measured distance)

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

- Measurement Data: Test Case 3

Operating Frequency : 13.56MHz
 Measurement Distance : 3 meters

Frequency [MHz]	ANT Pol	Reading [dBuV]	T.F [dB/m]	Distance factor	Field Strength [dBuV/m]	Limit [dBuV/m]	Margin [dB]
39.525	V	41.30	-8.00	N/A	33.30	40.00	6.70
59.999	H	54.20	-15.90	N/A	38.30	40.00	1.70
60.000	V	52.00	-15.90	N/A	36.10	40.00	3.90
71.896	H	47.40	-15.20	N/A	32.20	40.00	7.80
108.809	V	48.40	-10.70	N/A	37.70	43.50	5.80
141.200	H	45.20	-10.80	N/A	34.40	43.50	9.10
176.290	V	47.50	-11.50	N/A	36.00	43.50	7.50
189.849	H	51.70	-11.20	N/A	40.50	43.50	3.00
189.850	V	48.40	-11.20	N/A	37.20	43.50	6.30
216.980	H	54.80	-10.10	N/A	44.70	46.00	1.30
230.538	H	53.50	-9.30	N/A	44.20	46.00	1.80
230.541	V	49.30	-9.30	N/A	40.00	46.00	6.00
265.365	H	45.60	-8.20	N/A	37.40	46.00	8.60
288.000	H	43.90	-7.90	N/A	36.00	46.00	10.00
330.000	H	50.50	-7.30	N/A	43.20	46.00	2.80
384.000	H	43.60	-6.30	N/A	37.30	46.00	8.70
395.993	H	44.30	-6.10	N/A	38.20	46.00	7.80
407.997	H	43.00	-5.90	N/A	37.10	46.00	8.90
575.990	V	39.20	-3.00	N/A	36.20	46.00	9.80
660.000	V	40.20	-2.30	N/A	37.90	46.00	8.10
671.959	V	42.30	-2.30	N/A	40.00	46.00	6.00
672.003	H	42.50	-2.30	N/A	40.20	46.00	5.80
791.974	H	37.70	-0.70	N/A	37.00	46.00	9.00
923.978	V	39.10	1.30	N/A	40.40	46.00	5.60
924.000	H	41.20	1.30	N/A	42.50	46.00	3.50

Note 1. Both Vertical and Horizontal polarities of the receiver antenna were evaluated with the worst case emissions being reported.

Note 2. The worst-case emissions are reported.

Note 3. Emissions were not reported greater than below 10dB of the limit.

Note 4. Sample calculation

Margin = Limit – Field Strength / T.F = AF + CL – AG

Distance factor = 20log(Measurement distance / The measured distance)

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

3.2.4 Frequency Stability (§15.225(e))

- Procedure:

Part 15.225 requires that devices operating in the 13.553 – 13.567 MHz shall maintain the carrier frequency within 0.01% of the operating frequency over the temperature variation of -20 degrees to + 50 degrees C at normal supply voltage.

- Measurement Data: Comply

Note 1: See next pages for actual measured data.

Note 2: This test item was performed in all the test cases.

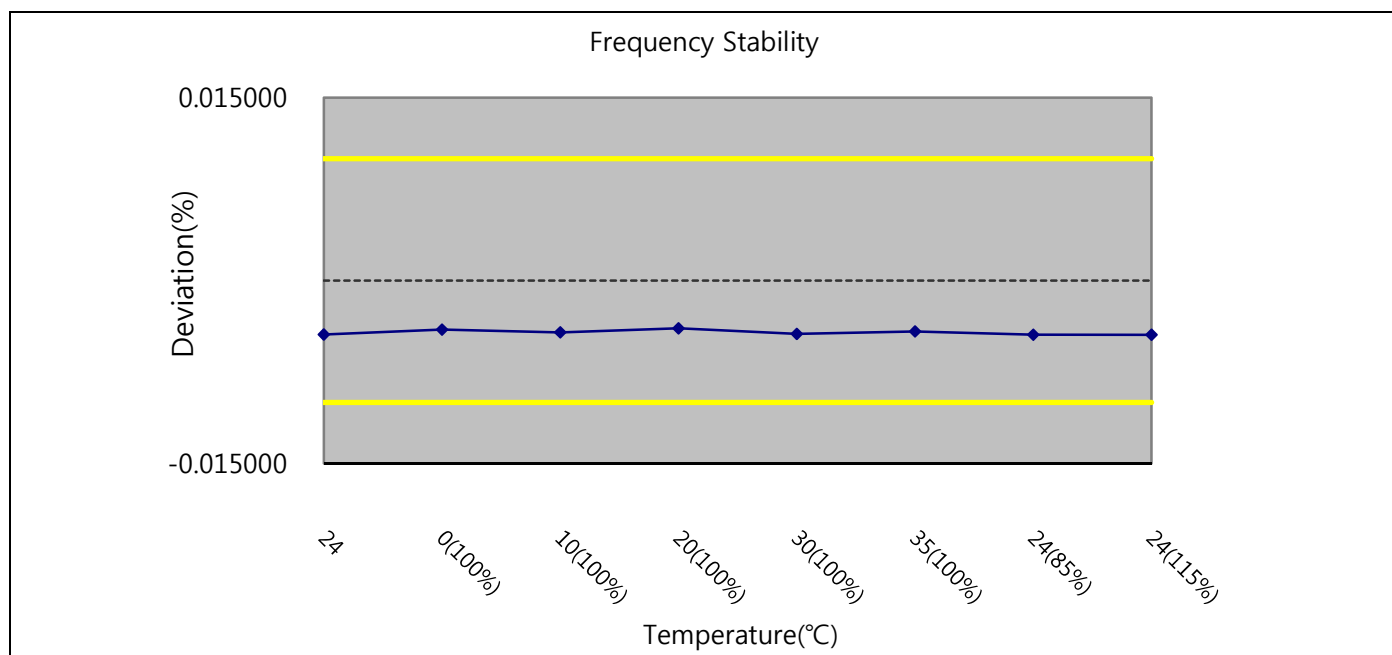
- Minimum Standard

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ of the operating frequency.

- Measurement Data: Test Case 1

Operating Frequency : 13560000 Hz
 Reference Voltage : 220 V DC

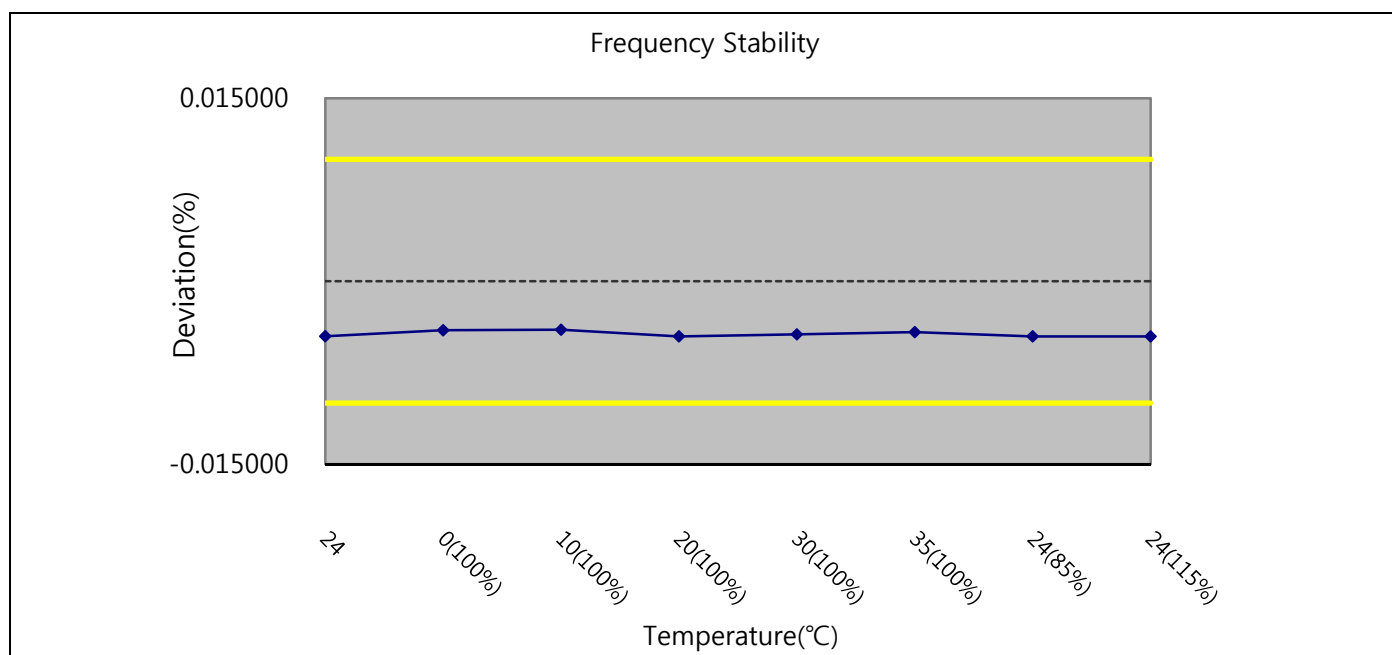
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100%	220	+24(ref)	13,559,400	-600	-0.004425
100%		-20	-	-	-
100%		-10	-	-	-
100%		0	13,559,455	-545	-0.004019
100%		+10	13,559,424	-576	-0.004248
100%		+20	13,559,469	-531	-0.003916
100%		+30	13,559,407	-593	-0.004373
100%		+35	13,559,434	-566	-0.004174
100%		+50	-	-	-
85%	187	+24	13,559,398	-602	-0.004440
115%	253	+24	13,559,397	-603	-0.004447
BATT.ENDPOINT	-	+24	-	-	-



- Measurement Data: Test Case 2

Operating Frequency : 13560000 Hz
 Reference Voltage : 220 V DC

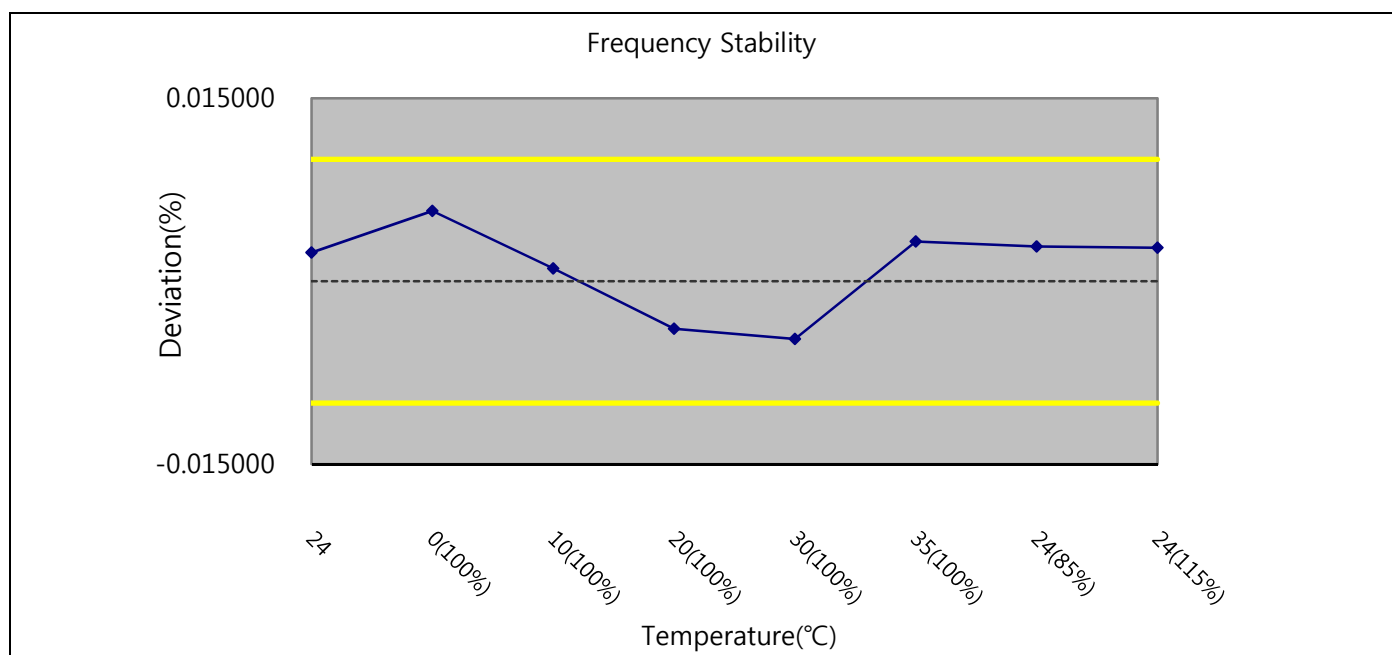
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100%	220	+24(ref)	13,559,388	-612	-0.004513
100%		-20	-	-	-
100%		-10	-	-	-
100%		0	13,559,455	-545	-0.004019
100%		+10	13,559,461	-539	-0.003975
100%		+20	13,559,387	-613	-0.004521
100%		+30	13,559,409	-591	-0.004359
100%		+35	13,559,434	-566	-0.004174
100%		+50	-	-	-
85%	187	+24	13,559,387	-613	-0.004521
115%	253	+24	13,559,386	-614	-0.004528
BATT.ENDPOINT	-	+24	-	-	-



- Measurement Data: Test Case 3

Operating Frequency : 13560000 Hz
 Reference Voltage : 220 V DC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100%	220	+24(ref)	13,560,319	1,319	0.002352
100%		-20	-	-	-
100%		-10	-	-	-
100%		0	13,560,782	782	0.005767
100%		+10	13,560,142	142	0.001047
100%		+20	13,559,472	-528	-0.003894
100%		+30	13,559,358	-642	-0.004735
100%		+35	13,560,442	1,442	0.003259
100%		+50	-	-	-
85%	187	+24	13,560,386	1,386	0.000220
115%	253	+24	13,560,373	1,373	0.000124
BATT.ENDPOINT	-	+24	-	-	-



3.2.5 AC Line Conducted Emissions (§15.207/EN 55022)

- Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.21(m). Emissions closest to the limit are measured in the quasi-peak and average detector mode with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

- Measurement Data: Comply

Note 1: See next pages for actual measured data.

Note 2: This test item was performed in all the test cases.

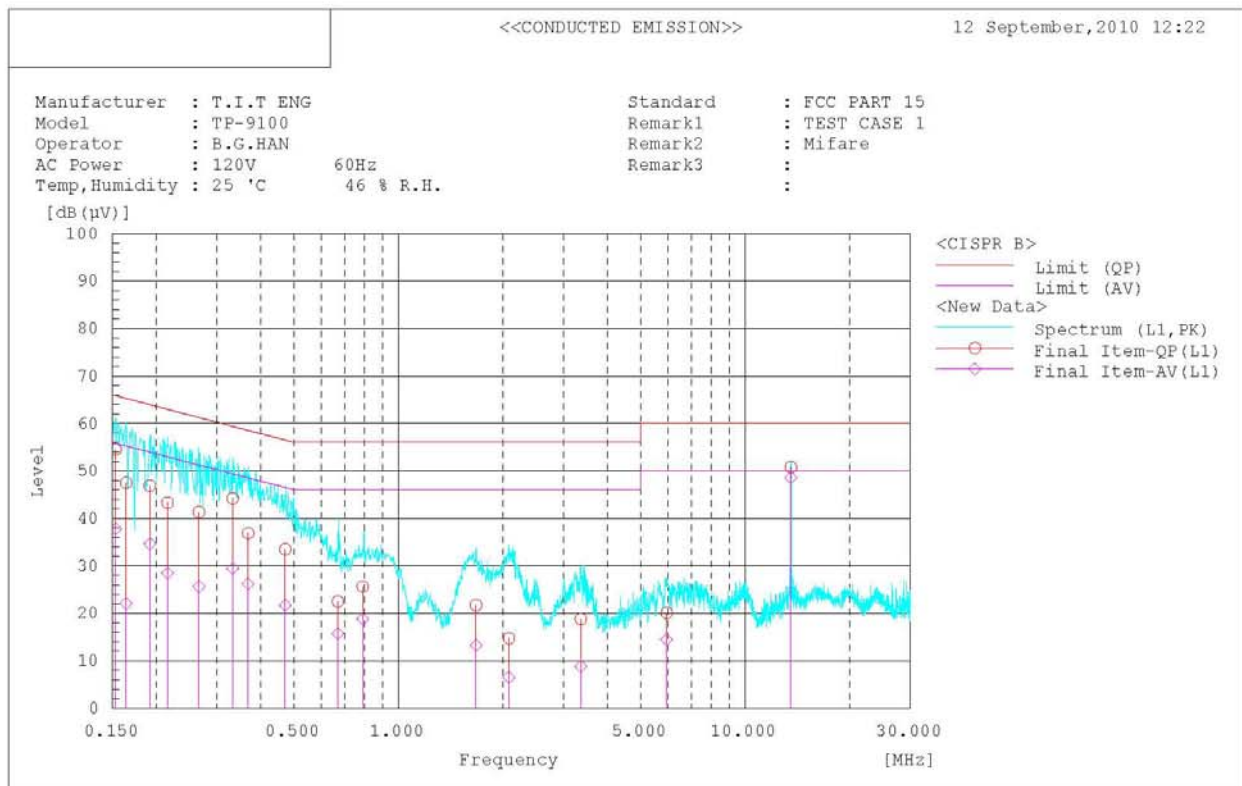
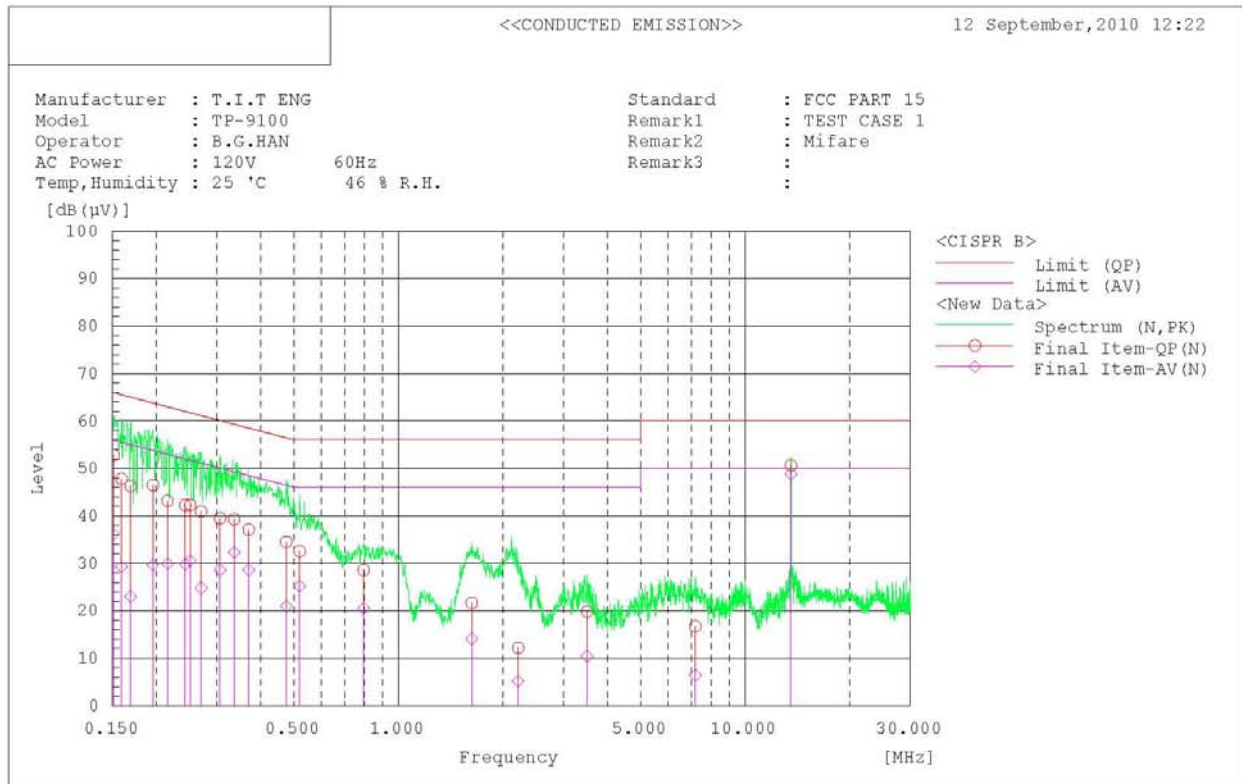
- Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (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

AC Line Conducted Emissions (Graph)

Test Case 1



AC Line Conducted Emissions (Data List)

Test Case 1

<<CONDUCTED EMISSION>>

12 September, 2010 12:22

Standard : FCC PART 15

Manufacturer : T.I.T ENG

Model : TP-9100

Operator : B.G.HAN

AC Power : 120V 60Hz

Temp, Humidity : 25 °C 46 % R.H.

Remark1 : TEST CASE 1

Remark2 : Mifare

Remark3 :

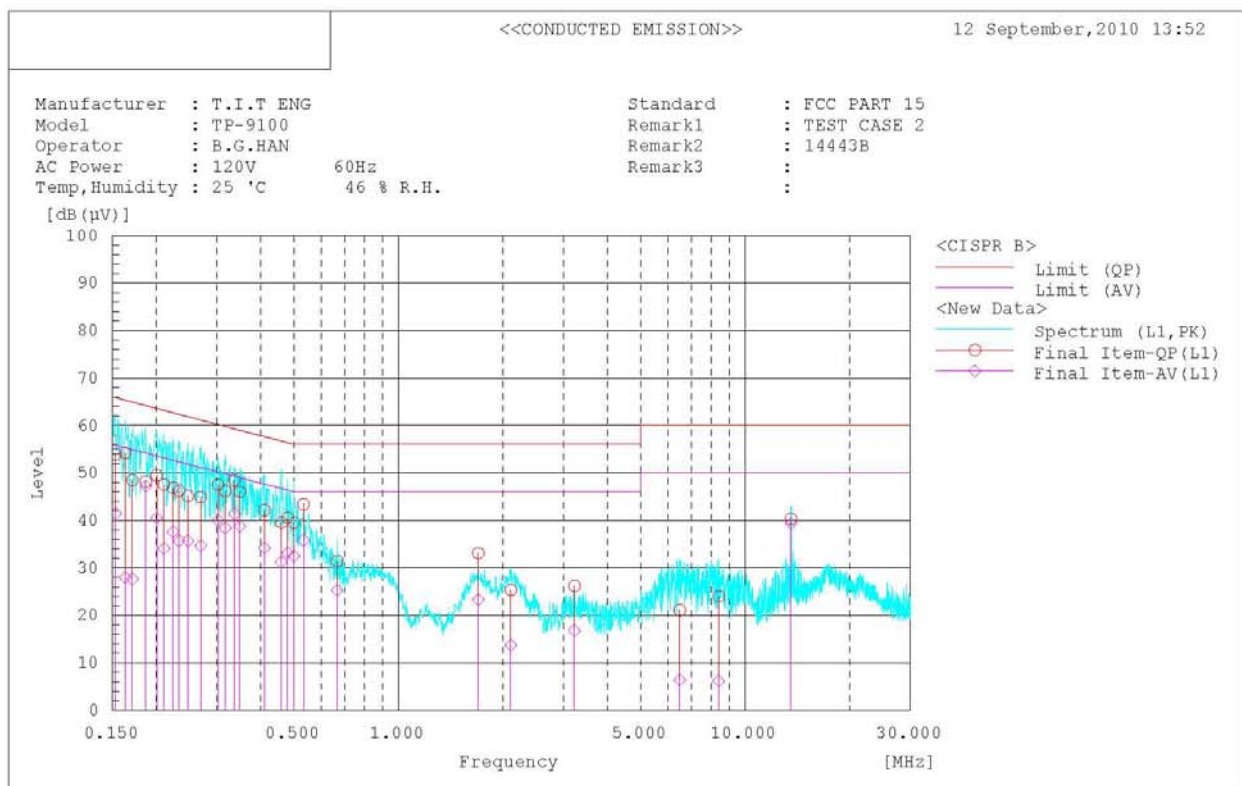
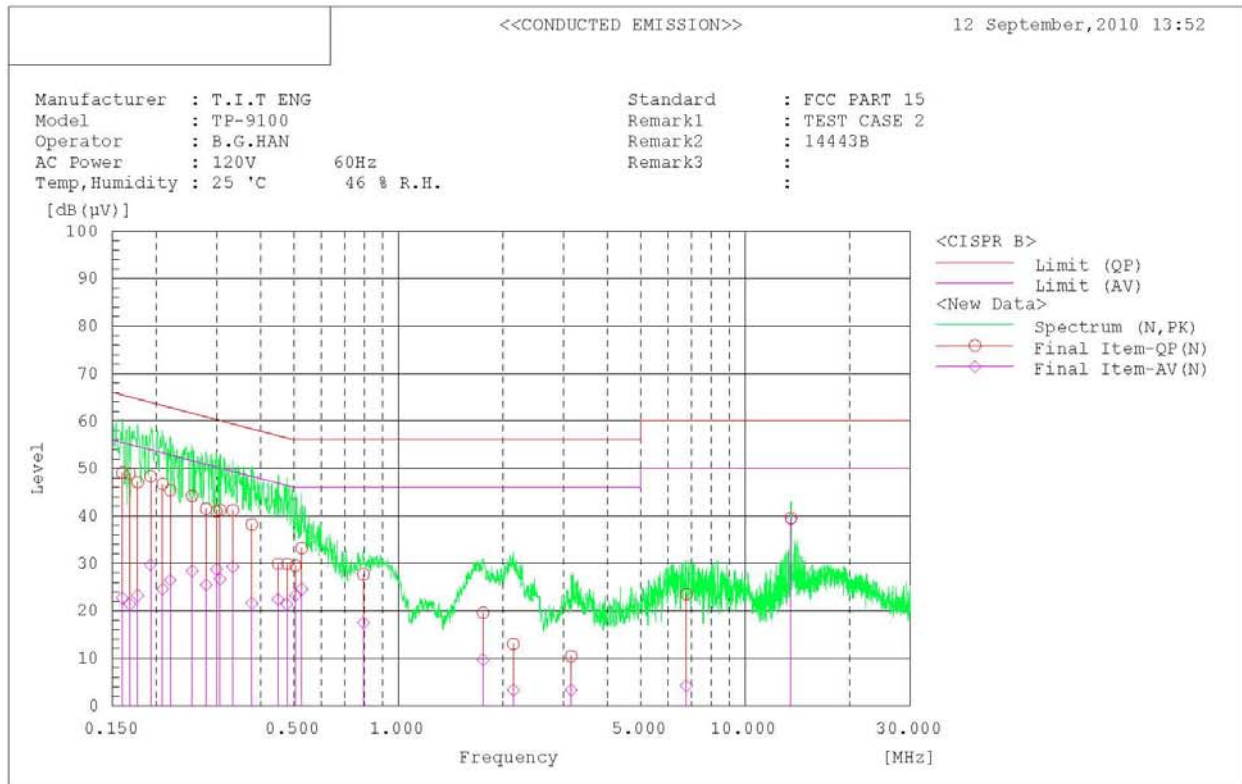
Final Result

--- N Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (µV)]	[dB (µV)]		[dB (µV)]	[dB (µV)]	[dB (µV)]	[dB (µV)]	[dB]	[dB]	
1	0.151	52.7	36.1	0.1	52.8	36.2	65.9	55.9	13.1	19.7	
2	0.159	47.7	29.2	0.1	47.8	29.3	65.5	55.5	17.7	26.2	
3	0.169	46.2	22.9	0.1	46.3	23.0	65.0	55.0	18.7	32.0	
4	0.196	46.4	29.6	0.1	46.5	29.7	63.8	53.8	17.3	24.1	
5	0.216	43.1	29.8	0.1	43.2	29.9	63.0	53.0	19.8	23.1	
6	0.243	42.2	29.7	0.1	42.3	29.8	62.0	52.0	19.7	22.2	
7	0.251	42.2	30.4	0.1	42.3	30.5	61.7	51.7	19.4	21.2	
8	0.270	40.8	24.7	0.1	40.9	24.8	61.1	51.1	20.2	26.3	
9	0.306	39.4	28.5	0.1	39.5	28.6	60.1	50.1	20.6	21.5	
10	0.336	39.2	32.2	0.1	39.3	32.3	59.3	49.3	20.0	17.0	
11	0.370	37.0	28.5	0.1	37.1	28.6	58.5	48.5	21.4	19.9	
12	0.475	34.4	20.9	0.1	34.5	21.0	56.4	46.4	21.9	25.4	
13	0.519	32.5	25.1	0.1	32.6	25.2	56.0	46.0	23.4	20.8	
14	0.794	28.5	20.4	0.1	28.6	20.5	56.0	46.0	27.4	25.5	
15	1.628	21.4	13.9	0.2	21.6	14.1	56.0	46.0	34.4	31.9	
16	2.215	12.0	5.0	0.2	12.2	5.2	56.0	46.0	43.8	40.8	
17	3.501	19.5	10.1	0.3	19.8	10.4	56.0	46.0	36.2	35.6	
18	7.185	16.3	6.0	0.4	16.7	6.4	60.0	50.0	43.3	43.6	
19	13.559	49.8	48.0	0.8	50.6	48.8	60.0	50.0	9.4	1.2	

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (µV)]	[dB (µV)]		[dB (µV)]	[dB (µV)]	[dB (µV)]	[dB (µV)]	[dB]	[dB]	
1	13.559	50.0	47.8	0.8	50.8	48.6	60.0	50.0	9.2	1.4	
2	0.153	54.2	37.5	0.3	54.5	37.8	65.8	55.8	11.3	18.0	
3	0.164	47.2	21.8	0.3	47.5	22.1	65.3	55.3	17.8	33.2	
4	0.192	46.6	34.4	0.3	46.9	34.7	63.9	53.9	17.0	19.2	
5	0.216	43.0	28.2	0.3	43.3	28.5	63.0	53.0	19.7	24.5	
6	0.266	41.0	25.3	0.3	41.3	25.6	61.2	51.2	19.9	25.6	
7	0.333	43.9	29.2	0.3	44.2	29.5	59.4	49.4	15.2	19.9	
8	0.369	36.6	25.9	0.3	36.9	26.2	58.5	48.5	21.6	22.3	
9	0.472	33.2	21.4	0.3	33.5	21.7	56.5	46.5	23.0	24.8	
10	0.669	22.2	15.4	0.3	22.5	15.7	56.0	46.0	33.5	30.3	
11	0.789	25.3	18.5	0.3	25.6	18.8	56.0	46.0	30.4	27.2	
12	1.675	21.4	12.9	0.3	21.7	13.2	56.0	46.0	34.3	32.8	
13	2.084	14.4	6.2	0.3	14.7	6.5	56.0	46.0	41.3	39.5	
14	3.360	18.4	8.4	0.4	18.8	8.8	56.0	46.0	37.2	37.2	
15	5.936	19.6	13.9	0.5	20.1	14.4	60.0	50.0	39.9	35.6	

AC Line Conducted Emissions (Graph)**Test Case 2**

AC Line Conducted Emissions (Data List)

Test Case 2

<<CONDUCTED EMISSION>>

12 September, 2010 13:52

Standard : FCC PART 15
 Manufacturer : T.I.T ENG
 Model : TP-9100
 Operator : B.G.HAN
 AC Power : 120V 60Hz
 Temp, Humidity : 25 °C 46 % R.H.
 Remark1 : TEST CASE 2
 Remark2 : 14443B
 Remark3 :

Final Result

--- N Phase ---

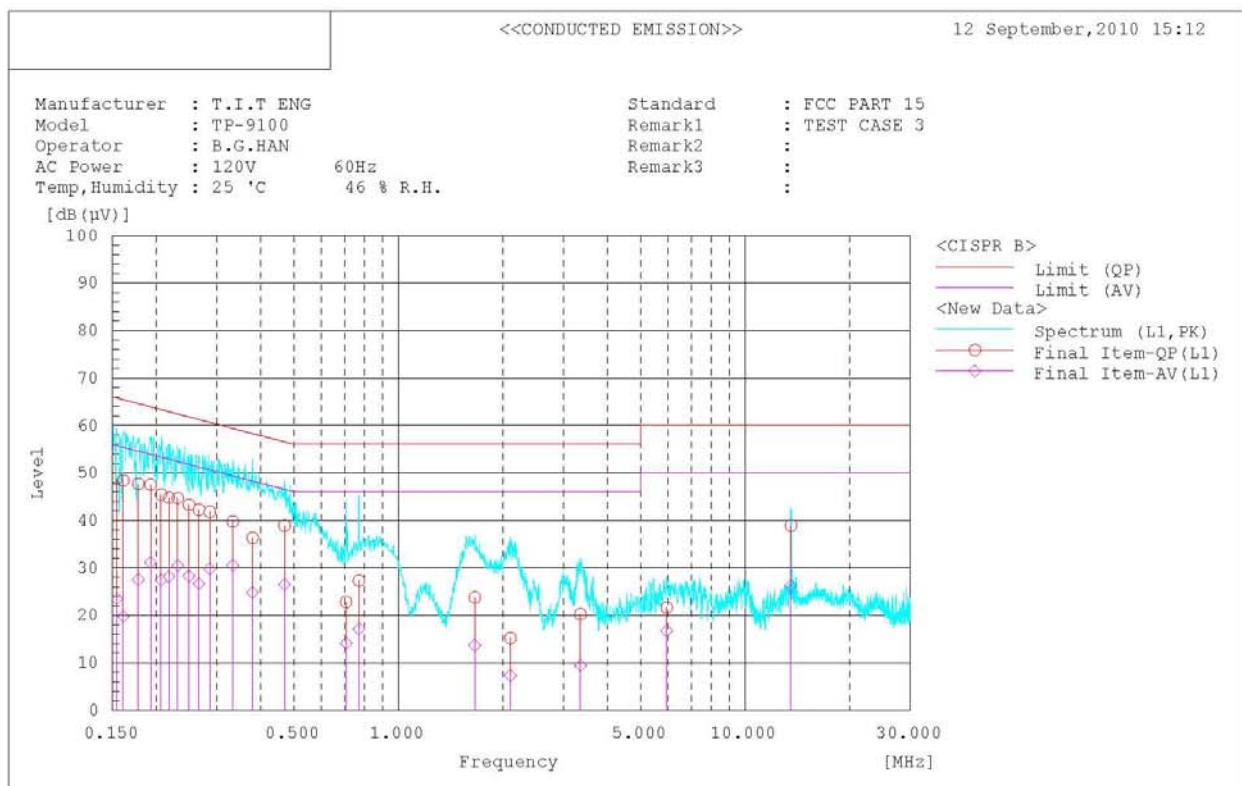
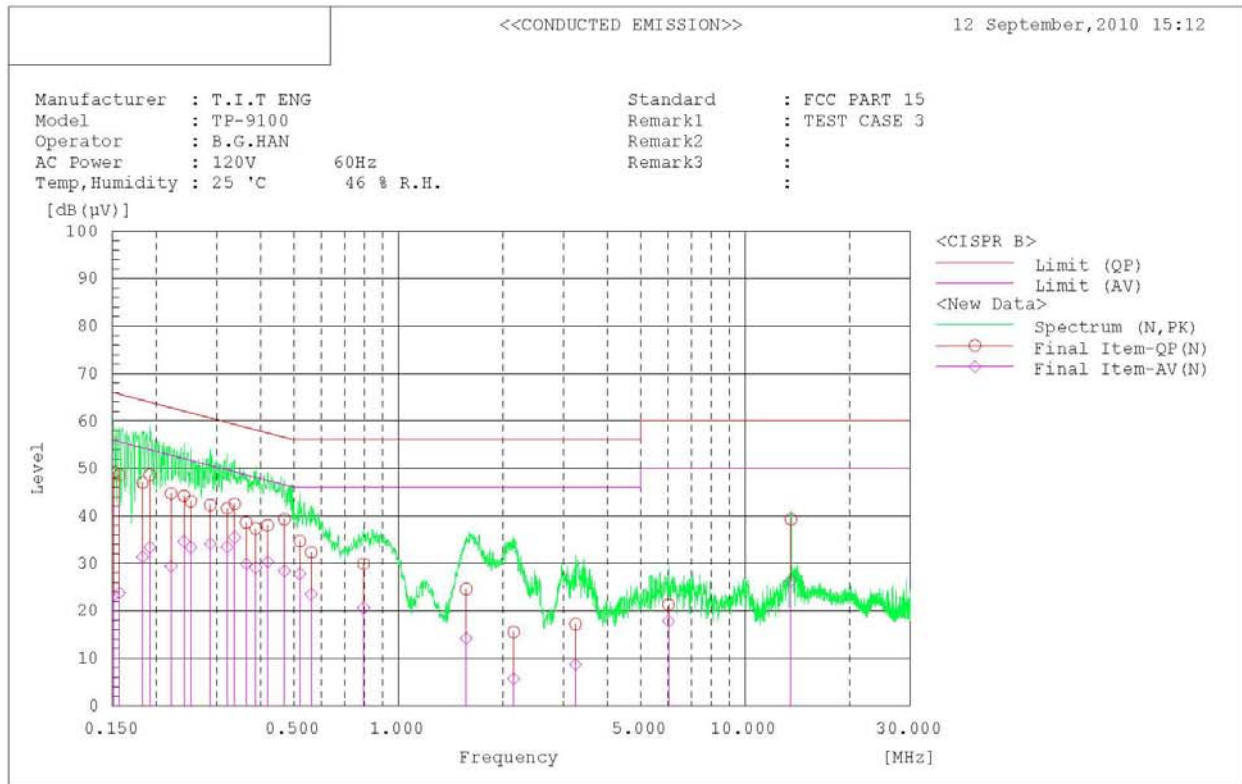
No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]	[dB]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.160	49.0	22.6	0.1	49.1	22.7	65.5	55.5	16.4	32.8	
2	0.168	48.8	21.3	0.1	48.9	21.4	65.1	55.1	16.2	33.7	
3	0.177	47.0	23.1	0.1	47.1	23.2	64.6	54.6	17.5	31.4	
4	0.193	48.2	29.6	0.1	48.3	29.7	63.9	53.9	15.6	24.2	
5	0.209	46.6	24.5	0.1	46.7	24.6	63.2	53.2	16.5	28.6	
6	0.220	45.3	26.4	0.1	45.4	26.5	62.8	52.8	17.4	26.3	
7	0.254	44.1	28.3	0.1	44.2	28.4	61.6	51.6	17.4	23.2	
8	0.279	41.4	25.4	0.1	41.5	25.5	60.8	50.8	19.3	25.3	
9	0.299	40.8	28.7	0.1	40.9	28.8	60.3	50.3	19.4	21.5	
10	0.306	41.1	26.6	0.1	41.2	26.7	60.1	50.1	18.9	23.4	
11	0.333	41.1	29.1	0.1	41.2	29.2	59.4	49.4	18.2	20.2	
12	0.378	38.1	21.5	0.1	38.2	21.6	58.3	48.3	20.1	26.7	
13	0.450	29.8	22.3	0.1	29.9	22.4	56.9	46.9	27.0	24.5	
14	0.477	29.8	21.3	0.1	29.9	21.4	56.4	46.4	26.5	25.0	
15	0.505	29.4	23.1	0.1	29.5	23.2	56.0	46.0	26.5	22.8	
16	0.526	33.1	24.5	0.1	33.2	24.6	56.0	46.0	22.8	21.4	
17	0.793	27.6	17.4	0.1	27.7	17.5	56.0	46.0	28.3	28.5	
18	1.755	19.4	9.5	0.2	19.6	9.7	56.0	46.0	36.4	36.3	
19	2.145	12.8	3.1	0.2	13.0	3.3	56.0	46.0	43.0	42.7	
20	3.150	10.2	3.1	0.2	10.4	3.3	56.0	46.0	45.6	42.7	
21	6.762	23.1	3.8	0.4	23.5	4.2	60.0	50.0	36.5	45.8	
22	13.561	38.7	38.5	0.8	39.5	39.3	60.0	50.0	20.5	10.7	

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]	[dB]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.153	53.6	41.2	0.3	53.9	41.5	65.8	55.8	11.9	14.3	
2	0.163	53.9	27.7	0.3	54.2	28.0	65.3	55.3	11.1	27.3	
3	0.171	48.2	27.4	0.3	48.5	27.7	64.9	54.9	16.4	27.2	
4	0.187	47.9	46.9	0.3	48.2	47.2	64.2	54.2	16.0	7.0	
5	0.201	49.2	40.2	0.3	49.5	40.5	63.6	53.6	14.1	13.1	
6	0.211	47.2	33.8	0.3	47.5	34.1	63.2	53.2	15.7	19.1	
7	0.224	46.6	37.3	0.3	46.9	37.6	62.7	52.7	15.8	15.1	
8	0.233	45.9	35.4	0.3	46.2	35.7	62.3	52.3	16.1	16.6	
9	0.247	44.9	35.4	0.3	45.2	35.7	61.9	51.9	16.7	16.2	
10	0.269	44.6	34.4	0.3	44.9	34.7	61.1	51.1	16.2	16.4	
11	0.302	47.2	39.8	0.3	47.5	40.1	60.2	50.2	12.7	10.1	
12	0.317	45.9	38.1	0.3	46.2	38.4	59.8	49.8	13.6	11.4	
13	0.337	48.2	41.1	0.3	48.5	41.4	59.3	49.3	10.8	7.9	
14	0.349	45.7	38.5	0.3	46.0	38.8	59.0	49.0	13.0	10.2	
15	0.411	41.8	33.9	0.3	42.1	34.2	57.6	47.6	15.5	13.4	
16	0.460	39.3	30.9	0.3	39.6	31.2	56.7	46.7	17.1	15.5	
17	0.479	40.2	32.9	0.3	40.5	33.2	56.4	46.4	15.9	13.2	
18	0.500	39.2	32.2	0.3	39.5	32.5	56.0	46.0	16.5	13.5	
19	0.533	43.1	35.5	0.3	43.4	35.8	56.0	46.0	12.6	10.2	
20	0.666	31.1	25.0	0.3	31.4	25.3	56.0	46.0	24.6	20.7	
21	1.701	32.8	23.0	0.3	33.1	23.3	56.0	46.0	22.9	22.7	
22	2.110	25.0	13.4	0.3	25.3	13.7	56.0	46.0	30.7	32.3	
23	3.220	25.8	16.4	0.4	26.2	16.8	56.0	46.0	29.8	29.2	
24	6.476	20.6	5.9	0.5	21.1	6.4	60.0	50.0	38.9	43.6	
25	8.389	23.4	5.6	0.6	24.0	6.2	60.0	50.0	36.0	43.8	
26	13.561	39.5	38.6	0.8	40.3	39.4	60.0	50.0	19.7	10.6	

AC Line Conducted Emissions (Graph)

Test Case 3



AC Line Conducted Emissions (Data List)

Test Case 3

<<CONDUCTED EMISSION>>

12 September, 2010 15:12

Standard : FCC PART 15

Manufacturer : T.I.T ENG

Model : TP-9100

Operator : B.G.HAN

AC Power : 120V 60Hz

Temp, Humidity : 25 °C 46 % R.H.

Remark1 : TEST CASE 3

Remark2 :

Remark3 :

Final Result

--- N Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]	[dB]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.151	49.1	23.1	0.1	49.2	23.2	65.9	55.9	16.7	32.7	
2	0.157	48.5	23.7	0.1	48.6	23.8	65.6	55.6	17.0	31.8	
3	0.183	46.9	31.2	0.1	47.0	31.3	64.3	54.3	17.3	23.0	
4	0.192	48.5	33.3	0.1	48.6	33.4	63.9	53.9	15.3	20.5	
5	0.221	44.6	29.3	0.1	44.7	29.4	62.8	52.8	18.1	23.4	
6	0.241	44.1	34.5	0.1	44.2	34.6	62.1	52.1	17.9	17.5	
7	0.252	43.0	33.3	0.1	43.1	33.4	61.7	51.7	18.6	18.3	
8	0.287	42.2	34.0	0.1	42.3	34.1	60.6	50.6	18.3	16.5	
9	0.321	41.5	33.4	0.1	41.6	33.5	59.7	49.7	18.1	16.2	
10	0.337	42.4	35.4	0.1	42.5	35.5	59.3	49.3	16.8	13.8	
11	0.364	38.5	29.8	0.1	38.6	29.9	58.6	48.6	20.0	18.7	
12	0.388	37.2	29.0	0.1	37.3	29.1	58.1	48.1	20.8	19.0	
13	0.420	37.9	30.2	0.1	38.0	30.3	57.4	47.4	19.4	17.1	
14	0.469	39.2	28.3	0.1	39.3	28.4	56.5	46.5	17.2	18.1	
15	0.520	34.6	27.7	0.1	34.7	27.8	56.0	46.0	21.3	18.2	
16	0.561	32.2	23.4	0.1	32.3	23.5	56.0	46.0	23.7	22.5	
17	0.794	29.8	20.5	0.1	29.9	20.6	56.0	46.0	26.1	25.4	
18	1.569	24.4	14.0	0.2	24.6	14.2	56.0	46.0	31.4	31.8	
19	2.150	15.3	5.5	0.2	15.5	5.7	56.0	46.0	40.5	40.3	
20	3.245	17.0	8.5	0.2	17.2	8.7	56.0	46.0	38.8	37.3	
21	6.012	20.9	17.4	0.4	21.3	17.8	60.0	50.0	38.7	32.2	
22	13.560	38.5	25.6	0.8	39.3	26.4	60.0	50.0	20.7	23.6	

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV	Remark
	[MHz]	[dB (μV)]	[dB (μV)]	[dB]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB (μV)]	[dB]	[dB]	
1	0.154	48.5	23.2	0.3	48.8	23.5	65.8	55.8	17.0	32.3	
2	0.161	48.1	19.5	0.3	48.4	19.8	65.4	55.4	17.0	35.6	
3	0.178	47.4	27.2	0.3	47.7	27.5	64.6	54.6	16.9	27.1	
4	0.193	47.2	30.8	0.3	47.5	31.1	63.9	53.9	16.4	22.8	
5	0.207	45.1	27.1	0.3	45.4	27.4	63.3	53.3	17.9	25.9	
6	0.218	44.5	27.8	0.3	44.8	28.1	62.9	52.9	18.1	24.8	
7	0.231	44.4	30.2	0.3	44.7	30.5	62.4	52.4	17.7	21.9	
8	0.249	43.0	28.0	0.3	43.3	28.3	61.8	51.8	18.5	23.5	
9	0.266	41.9	26.3	0.3	42.2	26.6	61.2	51.2	19.0	24.6	
10	0.286	41.5	29.5	0.3	41.8	29.8	60.6	50.6	18.8	20.8	
11	0.333	39.5	30.2	0.3	39.8	30.5	59.4	49.4	19.6	18.9	
12	0.380	36.0	24.5	0.3	36.3	24.8	58.3	48.3	22.0	23.5	
13	0.470	38.6	26.2	0.3	38.9	26.5	56.5	46.5	17.6	20.0	
14	0.707	22.5	13.8	0.3	22.8	14.1	56.0	46.0	33.2	31.9	
15	0.770	27.0	16.8	0.3	27.3	17.1	56.0	46.0	28.7	28.9	
16	1.662	23.4	13.4	0.3	23.7	13.7	56.0	46.0	32.3	32.3	
17	2.105	14.9	7.0	0.3	15.2	7.3	56.0	46.0	40.8	38.7	
18	3.350	19.8	9.0	0.4	20.2	9.4	56.0	46.0	35.8	36.6	
19	5.940	21.1	16.2	0.5	21.6	16.7	60.0	50.0	38.4	33.3	
20	13.561	38.1	25.4	0.8	38.9	26.2	60.0	50.0	21.1	23.8	

APPENDIX

TEST EQUIPMENT FOR TESTS

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment.

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
<input checked="" type="checkbox"/>	Spectrum Analyzer	Agilent	E4440A	30/09/10	30/09/11	MY45304199
<input type="checkbox"/>	Spectrum Analyzer	Rohde Schwarz	FSQ26	25/02/10	25/02/11	200445
<input type="checkbox"/>	Spectrum Analyzer(RE)	H.P	8563E	04/10/10	04/10/11	3551A04634
<input type="checkbox"/>	Power Meter	H.P	EPM-442A	01/07/10	01/07/11	GB37170413
<input type="checkbox"/>	Power Sensor	H.P	8481A	01/07/10	01/07/11	3318A96332
<input type="checkbox"/>	Power Divider	Agilent	11636B	05/10/10	05/10/11	56471
<input type="checkbox"/>	Power Splitter	Anritsu	K241B	05/10/10	05/10/11	020611
<input type="checkbox"/>	Power Splitter	Anritsu	K241B	01/07/10	01/07/11	017060
<input type="checkbox"/>	Frequency Counter	H.P	5342A	01/07/10	01/07/11	2119A04450
<input checked="" type="checkbox"/>	TEMP & HUMIDITY Chamber	JISCO	KR-100/J-RHC2	04/10/10	04/10/11	30604493/021031
<input type="checkbox"/>	Digital Multimeter	H.P	34401A	12/03/10	12/03/11	3146A13475, US36122178
<input type="checkbox"/>	Multifunction Synthesizer	HP	8904A	11/10/10	11/10/11	3633A08404
<input type="checkbox"/>	Signal Generator	Rohde Schwarz	SMR20	12/03/10	12/03/11	101251
<input type="checkbox"/>	Signal Generator	H.P	ESG-3000A	01/07/10	01/07/11	US37230529
<input type="checkbox"/>	Vector Signal Generator	Rohde Schwarz	SMJ100A	11/01/10	11/01/11	100148
<input type="checkbox"/>	Vector Signal Generator	Rohde Schwarz	SMBV100A	23/02/10	23/02/11	255571
<input type="checkbox"/>	Audio Analyzer	H.P	8903B	02/07/10	02/07/11	3011A09448
<input type="checkbox"/>	Modulation Analyzer	H.P	8901B	01/07/10	01/07/11	3028A03029
<input type="checkbox"/>	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	02/07/10	02/07/11	GB43461134
<input type="checkbox"/>	Universal Radio communication Tester	Rohde Schwarz	CMU 200	12/03/10	12/03/11	106760
<input type="checkbox"/>	Bluetooth Tester	TESCOM	TC-3000B	01/07/10	01/07/11	3000B000268
<input type="checkbox"/>	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-3
<input type="checkbox"/>	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-2
<input type="checkbox"/>	Thermo hygrometer	BODYCOM	BJ5478	28/01/10	28/01/11	090205-4
<input checked="" type="checkbox"/>	AC Power supply	DAEKWANG	5KVA	12/03/10	12/03/11	20060321-1
<input type="checkbox"/>	DC Power Supply	HP	6622A	12/03/10	12/03/11	3448A03760
<input type="checkbox"/>	DC Power Supply	HP	6633A	12/03/10	12/03/11	3524A06634
<input type="checkbox"/>	DC Power Supply	Protek	PWS-3010D	04/10/10	04/10/11	4072702
<input type="checkbox"/>	BAND Reject Filter	Microwave Circuits	N0308372	05/10/10	05/10/11	3125-01DC0352
<input type="checkbox"/>	BAND Reject Filter	Wainwright	WRCG1750	05/10/10	05/10/11	2
<input type="checkbox"/>	High-Pass Filter	ANRITSU	MP526D	04/10/10	04/10/11	M27756
<input type="checkbox"/>	High-pass filter	Wainwright	WHNX2.1	N/A	N/A	1
<input type="checkbox"/>	High-pass filter	Wainwright	WHNX3.0	N/A	N/A	9
<input type="checkbox"/>	High-pass filter	Wainwright	WHNX5.0	N/A	N/A	8
<input type="checkbox"/>	High-Pass Filter	Wainwright	WHKX8.5	N/A	N/A	1
<input type="checkbox"/>	Tunable Notch Filter	Wainwright	WRCT800.0 /960.0-0.2/40-8SSK	N/A	N/A	32
<input type="checkbox"/>	Tunable Notch Filter	Wainwright	WRCD1700.0 /2000.0-0.2/40-10SSK	N/A	N/A	53
<input type="checkbox"/>	Tunable Notch Filter	Wainwright	WRCT1900.0/ 2200.0-5/40-10SSK	N/A	N/A	30
<input type="checkbox"/>	HORN ANT	ETS	3115	04/10/10	04/10/11	21097
<input type="checkbox"/>	HORN ANT	ETS	3115	14/07/10	14/07/11	6419
<input type="checkbox"/>	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/11	154
<input type="checkbox"/>	HORN ANT	A.H.Systems	SAS-574	10/06/09	10/06/11	155

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	Next.Due.Date (dd/mm/yy)	S/N
<input type="checkbox"/>	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	Calibrating	2116
<input type="checkbox"/>	Dipole Antenna	Schwarzbeck	VHA9103	06/10/09	Calibrating	2117
<input type="checkbox"/>	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	Calibrating	2261
<input type="checkbox"/>	Dipole Antenna	Schwarzbeck	UHA9105	05/10/09	Calibrating	2262
<input checked="" type="checkbox"/>	LOOP Antenna	ETS	6502	05/11/09	05/11/10	3471
<input type="checkbox"/>	Coaxial Fixed Attenuators	Agilent	8491B	01/07/10	01/07/11	MY39260700
<input type="checkbox"/>	Attenuator (3dB)	WEINSCHTEL	56-3	05/10/10	05/10/11	Y2342
<input type="checkbox"/>	Attenuator (3dB)	WEINSCHTEL	56-3	05/10/10	05/10/11	Y2370
<input type="checkbox"/>	Attenuator (10dB)	WEINSCHTEL	23-10-34	01/10/10	01/10/11	BP4386
<input type="checkbox"/>	Attenuator (10dB)	WEINSCHTEL	23-10-34	11/01/10	11/01/11	BP4387
<input type="checkbox"/>	Attenuator (10dB)	WEINSCHTEL	31696	05/10/10	05/10/11	446
<input type="checkbox"/>	Attenuator (10dB)	WEINSCHTEL	31696	05/10/10	05/10/11	408
<input type="checkbox"/>	Attenuator (20dB)	WEINSCHTEL	86-20-11	05/10/10	05/10/11	432
<input type="checkbox"/>	Attenuator (30dB)	JFW	50FH-030-300	12/03/10	12/03/11	060320-1
<input type="checkbox"/>	Attenuator (40dB)	WEINSCHTEL	57-40-33	01/10/10	01/10/11	NN837
<input type="checkbox"/>	Termination	H.P	HP-909D	02/07/10	02/07/11	02750
<input type="checkbox"/>	Termination	H.P	HP-909D	02/07/10	02/07/11	02702
<input type="checkbox"/>	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0088CAN	01/07/10	01/07/11	788
<input type="checkbox"/>	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0185CAN	01/07/10	01/07/11	790
<input type="checkbox"/>	Type N Coaxial CIRCULATOR	NOVA MICROWAVE	0215CAN	01/07/10	01/07/11	112
<input type="checkbox"/>	Amplifier (30dB)	Agilent	8449B	23/04/10	23/04/11	3008A01590
<input type="checkbox"/>	Amplifier (30dB)	H.P	8449B	13/05/10	13/05/11	3008A00370
<input type="checkbox"/>	Amplifier	EMPOWER	BBS3Q7ELU	04/10/10	04/10/11	1020
<input type="checkbox"/>	RF Power Amplifier	OPHIRRF	5069F	01/07/10	01/07/11	1006
<input checked="" type="checkbox"/>	EMI TEST RECEIVER	R&S	ESU	29/01/10	29/01/11	100014
<input checked="" type="checkbox"/>	BILOG ANTENNA	SCHAFFNER	CBL 6112D	28/10/09	28/10/10	22609
<input checked="" type="checkbox"/>	Amplifier (22dB)	H.P	8447E	29/01/10	29/01/11	2945A02865
<input type="checkbox"/>	EMI TEST RECEIVER	R&S	ESCI	12/05/10	12/05/11	100364
<input type="checkbox"/>	LOG-PERIODIC ANT.	Schwarzbeck	UHALP 9108 A-1	07/10/09	07/10/11	1098
<input type="checkbox"/>	BICONICAL ANT.	Schwarzbeck	VHA 9103	06/10/09	06/10/11	91031946
<input type="checkbox"/>	LOG-PERIODIC ANT.	Schwarzbeck	UHALP9108A	07/07/10	07/07/11	590
<input type="checkbox"/>	Low Noise Pre Amplifier	TSJ	MLA-100K01-B01-2	12/03/10	12/03/11	1252741
<input type="checkbox"/>	Amplifier (25dB)	Agilent	8447D	12/03/10	12/03/11	2944A10144
<input type="checkbox"/>	Amplifier (25dB)	Agilent	8447D	01/07/10	01/07/11	2648A04922
<input checked="" type="checkbox"/>	Spectrum Analyzer(CE)	H.P	8591E	12/03/10	12/03/11	3649A05889
<input checked="" type="checkbox"/>	LISN	Kyoritsu	KNW-407	29/01/10	29/01/11	8-317-8
<input checked="" type="checkbox"/>	LISN	Kyoritsu	KNW-242	29/01/10	29/01/11	8-654-15
<input checked="" type="checkbox"/>	CVCF	NF Electronic	4420	12/03/10	12/03/11	304935/337980
<input checked="" type="checkbox"/>	50 ohm Terminator	HME	CT-01	12/01/10	12/01/11	N/A
<input checked="" type="checkbox"/>	RFI/FIELD Intensity Meter	Kyoritsu	KNM-2402	02/07/10	02/07/11	4N-170-3