

# FCC TEST REPORT

Reference No. : G-45-2010-02225

Applicant : M3 Mobile

Equipment Under Test (EUT) :

Product Name : Industrial PDA phone

Model Name : M3 ORANGE

Alt. Model Name : CR4100

Applied Standards : FCC Part 15 : 2009, Subpart B, Class B

ANSI C63.4 : 2003

CISPR 22 : 2006

Date of Receipt : August 02, 2010

Date of Test : November 12, 2010 ~ November 17, 2010

Date of Issue : December 08, 2010

Test Results : Complied

Tested by :



Paul Kang

Reviewed by :



Forest Lee

Note : Alternative model has been added.

## Remarks :

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or Testing done by SGS International Electrical Approvals in connection with distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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## 1. General Information

### 1.1 Client Information

Applicant : M3 Mobile  
Address of Applicant : Dongwon-Bldg, 725-30 Yeoksam-Dong, Gangnam-Gu, Seoul, Korea  
Manufacturer : M3 Mobile  
Address of Manufacturer : Dongwon-Bldg, 725-30 Yeoksam-Dong, Gangnam-Gu, Seoul, Korea

### 1.2 Test Laboratory

Name and Address : SGS Testing Korea Co., Ltd.  
18-34, Sanbon-dong, Gunpo, Gyeonggi-do, Korea  
435-041

### 1.3 General Information of E.U.T.

Product Name : Industrial PDA phone  
Model Name : M3 ORANGE  
Alt. Model Name : CR4100  
Model Difference : Only model name is different.  
Serial No. : N/A  
Highest Internal Frequency : Max. 807 MHz  
Test Voltage : Input (100 ~ 240) V a.c., (47 ~ 63) Hz, 0.7 A  
Output 5 V d.c., 5 A

### 1.4 Operating Modes and Conditions

Operating mode	Operating condition
Mode 1 USB	USB(Active Sync) Mode
Mode 2 Camera	Camera View Mode
Mode 3 MP3 Player	MP3 Play Mode
Mode 4 MP4 Player	MP4 Play Mode
Mode 5 Barcode	Barcode Scan Mode
Mode 6 GPS	GPS Receiver Mode

### 1.5 Peripheral Equipments

Description	Model	Serial No.	Manufacturer
Personal Computer	DC8CMF	CWDKKBX	DELL INC.
LCD Monitor	CR22KS	N843H1KP902165L	Samsung Electronics
USB Keyboard	SK-3325	N/A	Silitek Electronics(Donguan) Co., Ltd.
USB MOUSE	Wheel Mouse Optical	0447	Microsoft Corporation
Local Area Network	N/A	N/A	N/A

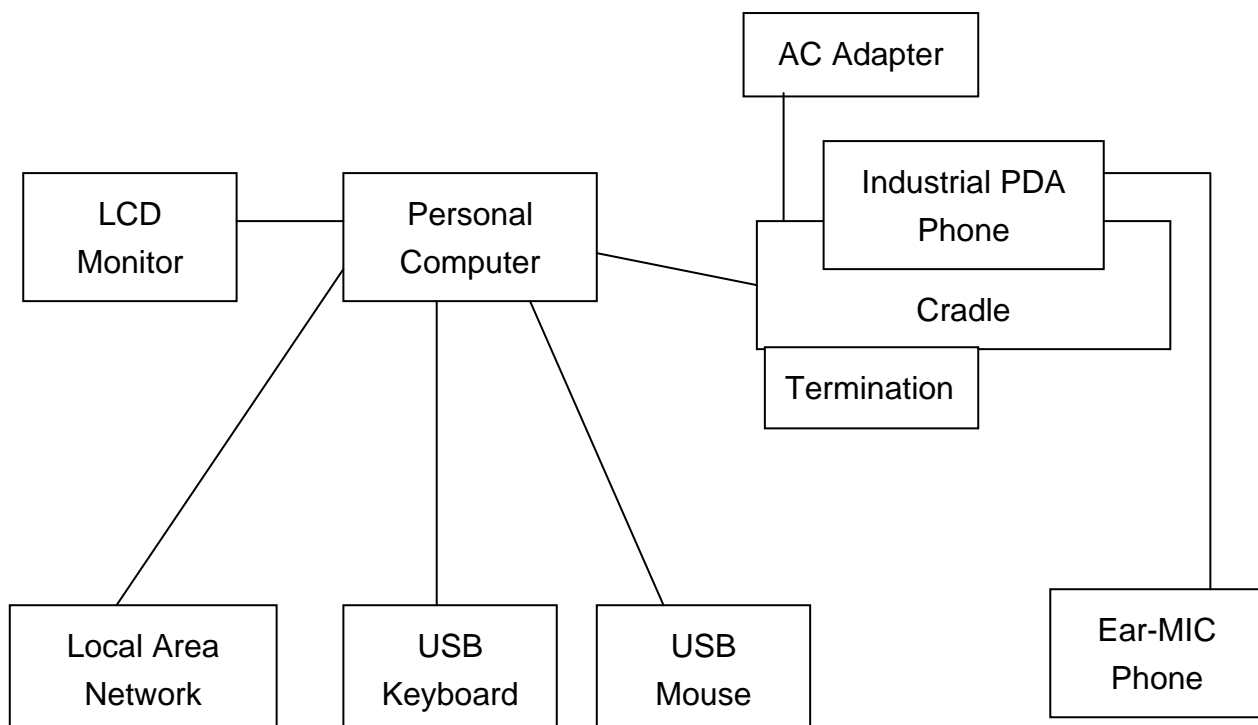
### 1.6 Cable List

Start		END		Cable Spec.	
Name	I/O Port	Name	I/O Port	Length	Shield
Industrial PDA Phone	-	Cradle	-	-	-
	Ear-MIC Phone	Ear-MIC phone	-	1.7	Unshield
Cradle	DC IN	AC Adatper	DC OUT	1.5	Unshield
	COM	Termination	-	-	-
	USB CLIENT or USB HOST	Personal Computer	USB	1.8	Shield
Personal Computer	RGB	LCD Monitor	RGB	1.8	Shield
	LAN	Local Area Network	-	6.0	Unshield
	USB	USB Keyboard	USB	2.0	Shield
	USB	USB Mouse	USB	1.8	Shield
AC Adapter	AC IN	AC SOURCE	-	1.8	Unshield

### 1.7 System Configurations

Description	Model	Serial No.	Manufacturer
Camera Board	N/A	N/A	N/A
CPU Module	M3 Orange TS V1.0	N/A	N/A
GSM Module	N/A	N/A	N/A
Keypad Board	M3 Orange KEY Orange PP V1.0	N/A	M3 Mobile
LCD Panel	UT035QVP-011	10060703644Y	N/A
Main Board	M3 Orange TS V1.0	N/A	N/A
WLAN Module	N/A	N/A	N/A
Battery	M3 Orange	N/A	M3 Mobile
Cradle	N/A	N/A	M3 Mobile
Cradle Board	M3 Orange CRADLE PP V1.0	N/A	N/A
AC Adapter	STD-0505P	N/A	BoaYang Electronics Co.,Ltd.

### 1.8 Test System Layout



### 1.9 Applicable Standards for Testing

Standards	Status	Deviation
FCC Part 15 : 2009, Subpart B ANSI C63.4 : 2003 CISPR 22 : 2006	Applicable	No Deviation

### 1.10 Summary of Test Results

Test Item	Standards	Results
Conducted Emission	FCC Part 15 : 2009, Subpart B ANSI C63.4 : 2003 CISPR 22 : 2006	Complied
Radiated Emission	FCC Part 15 : 2009, Subpart B ANSI C63.4 : 2003 CISPR 22 : 2006	Complied

## EMISSION

### 2.1 Test Results

Test Items	Standards	Test Results
Conducted Emission	FCC Part 15 : 2009, Subpart B ANSI C63.4 : 2003 CISPR 22 : 2006	<b>Complied</b>
Radiated Emission	FCC Part 15 : 2009, Subpart B ANSI C63.4 : 2003 CISPR 22 : 2006	<b>Complied</b>

### 2.2 Test Equipments

Equipment	Model	Manufacturer	Last Cal. Date
Two-Line V-Network	ENV216	R&S	2010.01.06
Test Receiver	ESHS10	R&S	2010.07.12
LISN	L3-25	PMM	2010.07.09
Test Receiver	ESU26	R&S	2010.04.08
Amplifier	8447F	HP	2010.07.05
Bi-Log Antenna	VULB9163	SCHWARZBECK MESS-ELEKTRONIK	2009.07.22
Preamplifier	8449B	Agilent	2010.03.31
Horn Antenna	HF906	R&S	2009.10.08

Note : Only the calibration period of Antennas is 2 years but the period of every equipment is 1 year.

### 2.3 Test Site

Conducted Emission: Shield Room in Gunpo Laboratory

Radiated Emission: 3m Semi-Anechoic Chamber in Gunpo Laboratory

## 2.4 Conducted Emission Test Data

The initial preliminary exploratory scans were performed using a max hold mode incorporating a Peak detector. The final test data was measured using a Quasi-Peak detector and Average detector.

Temperature : 21.5

Humidity : 36.0 % RH

Atmospheric Pressure : 100.4 kPa

### -Mode 1 USB

FREQ. (MHz)	LINE	LEVEL(dB $\mu$ V)		LIMIT(dB $\mu$ V)		MARGIN(dB)	
		Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
0.21	N	40.70	33.00	63.41	53.41	22.71	20.41
0.41	N	32.10	31.20	57.75	47.75	25.65	16.55
0.48	H	34.10	33.70	56.43	46.43	22.33	12.73
0.55	N	36.40	35.60	56.00	46.00	19.60	10.40
0.68	H	33.50	33.50	56.00	46.00	22.50	12.50
24.31	H	33.80	28.30	60.00	50.00	26.20	21.70

### -Mode 2 Camera

FREQ. (MHz)	LINE	LEVEL(dB $\mu$ V)		LIMIT(dB $\mu$ V)		MARGIN(dB)	
		Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
0.20	N	42.00	32.30	63.61	53.61	21.61	21.31
0.27	H	37.00	32.10	61.12	51.12	24.12	19.02
0.48	N	35.70	35.60	56.43	46.43	20.73	10.83
0.61	N	35.70	34.60	56.00	46.00	20.30	11.40
0.68	H	35.20	35.20	56.00	46.00	20.80	10.80
1.09	H	35.10	35.10	56.00	46.00	20.90	10.90



### -Mode 3 MP3

FREQ. (MHz)	LINE	LEVEL(dB $\mu$ V)		LIMIT(dB $\mu$ V)		MARGIN(dB)	
		Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
0.20	H	40.70	34.40	63.61	53.61	22.91	19.21
0.34	N	35.00	32.50	59.20	49.20	24.20	16.70
0.68	N	36.50	36.30	56.00	46.00	19.50	9.70
0.82	H	36.30	36.20	56.00	46.00	19.70	9.80
1.09	H	35.70	35.50	56.00	46.00	20.30	10.50
1.22	N	34.40	34.10	56.00	46.00	21.60	11.90

### -Mode 4 MP4

FREQ. (MHz)	LINE	LEVEL(dB $\mu$ V)		LIMIT(dB $\mu$ V)		MARGIN(dB)	
		Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
0.20	H	40.60	34.60	63.61	53.61	23.01	19.01
0.21	N	42.30	34.00	63.41	53.41	21.11	19.41
0.61	H	36.40	36.40	56.00	46.00	19.60	9.60
0.68	N	37.20	35.30	56.00	46.00	18.80	10.70
0.82	H	36.50	36.40	56.00	46.00	19.50	9.60
0.95	N	35.60	35.40	56.00	46.00	20.40	10.60

### -Mode 5 Barcode

FREQ. (MHz)	LINE	LEVEL(dB $\mu$ V)		LIMIT(dB $\mu$ V)		MARGIN(dB)	
		Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
0.21	N	40.70	32.80	63.41	53.41	22.71	20.61
0.54	N	35.90	34.80	56.00	46.00	20.10	11.20
0.61	N	31.60	30.90	56.00	46.00	24.40	15.10
0.75	H	30.50	30.10	56.00	46.00	25.50	15.90
0.95	H	29.10	29.00	56.00	46.00	26.90	17.00
23.36	N	33.20	26.80	60.00	50.00	26.80	23.20

**-Mode 6 GPS**

FREQ. (MHz)	LINE	LEVEL(dB $\mu$ V)		LIMIT(dB $\mu$ V)		MARGIN(dB)	
		Q-Peak	Average	Q-Peak	Average	Q-Peak	Average
0.21	N	41.00	32.60	63.41	53.41	22.41	20.81
0.27	H	35.70	31.10	61.12	51.12	25.42	20.02
0.55	H	32.40	32.20	56.00	46.00	23.60	13.80
0.61	N	34.50	33.50	56.00	46.00	21.50	12.50
0.75	H	34.80	34.70	56.00	46.00	21.20	11.30
0.88	N	33.30	33.00	56.00	46.00	22.70	13.00

Note : • Line ( H ) : Hot  
• Line ( N ) : Neutral  
• Margin = Limit - Level

**See Appendix A (Conducted Emission)**

## 2.5 Radiated Emission Test Data

The initial preliminary exploratory scans were performed using a max hold mode incorporating a Peak detector. The final test data was measured using a Quasi-Peak detector below 1GHz and a Average detector above 1GHz.

### Below 1GHz (3m method)

Temperature : 22.4

Humidity : 30 % RH

Atmospheric Pressure : 100.5 kPa

#### -Mode 1 USB

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
68.60	47.90	H	253.0	1.60	7.98	0.83	28.18	28.53	40.00	11.47
240.01	48.20	H	135.1	2.00	12.10	1.53	27.42	34.41	46.00	11.59
409.51	51.80	H	16.0	1.20	15.84	2.00	28.21	41.43	46.00	4.57
487.52	48.60	V	90.0	1.10	17.00	2.22	28.71	39.11	46.00	6.89
520.01	47.40	V	326.5	1.60	17.51	2.25	28.75	38.41	46.00	7.59
598.02	47.30	V	140.0	1.50	19.24	2.39	28.87	40.06	46.00	5.94

#### -Mode 2 Camera

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
100.41	46.60	H	162.5	3.20	11.87	0.99	28.06	31.40	43.50	12.10
202.86	47.90	H	53.2	2.60	10.37	1.40	27.62	32.05	43.50	11.45
205.93	46.80	H	62.7	1.60	10.41	1.41	27.60	31.02	43.50	12.48
571.99	46.80	V	16.9	1.40	18.32	2.33	28.84	38.61	46.00	7.39
598.02	46.10	V	153.4	1.10	19.24	2.39	28.87	38.86	46.00	7.14
624.00	47.60	V	133.5	1.30	19.44	2.44	28.83	40.65	46.00	5.35
649.99	48.90	V	155.4	1.20	19.57	2.49	28.78	42.18	46.00	3.82

#### -Mode 3 MP3

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
96.04	45.80	H	122.0	1.30	11.65	0.97	28.09	30.33	43.50	13.17
198.34	46.90	V	19.0	1.10	10.30	1.38	27.64	30.94	43.50	12.56
624.00	46.20	V	148.5	1.10	19.44	2.44	28.83	39.25	46.00	6.75
702.01	45.20	V	129.3	1.00	19.80	2.59	28.83	38.76	46.00	7.24
753.98	43.60	V	135.4	1.00	20.90	2.68	28.62	38.56	46.00	7.44

#### -Mode 4 MP4

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
96.00	43.10	V	69.1	1.00	11.65	0.97	28.09	27.63	43.50	15.87
192.03	47.90	H	46.0	1.00	10.23	1.36	27.67	31.82	43.50	11.68
213.29	46.20	H	91.3	2.60	10.68	1.44	27.56	30.76	43.50	12.74
598.02	45.40	V	115.2	1.60	19.24	2.39	28.87	38.16	46.00	7.84
614.00	47.10	V	113.2	1.40	19.37	2.43	28.84	40.06	46.00	5.94
649.99	46.10	V	159.3	1.00	19.57	2.49	28.78	39.38	46.00	6.62
676.02	45.80	V	359.4	1.00	19.73	2.54	28.81	39.26	46.00	6.74

#### -Mode 5 Barcode

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
120.05	48.80	V	268.7	1.60	9.22	1.08	27.98	31.12	43.50	12.38
202.00	44.20	H	67.7	1.20	10.35	1.40	27.62	28.33	43.50	15.17
275.86	43.30	H	155.4	1.30	12.69	1.65	27.37	30.27	46.00	15.73
624.00	46.40	H	155.2	2.40	19.44	2.44	28.83	39.45	46.00	6.55
649.99	47.30	V	147.2	2.10	19.57	2.49	28.78	40.58	46.00	5.42
676.02	45.90	V	60.1	1.10	19.73	2.54	28.81	39.36	46.00	6.64

#### -Mode 6 GPS

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
34.12	49.60	V	189.6	1.10	11.06	0.60	28.31	32.95	40.00	7.05
95.96	47.90	V	252.0	1.00	11.64	0.97	28.09	32.42	43.50	11.08
120.01	51.60	V	199.5	1.20	9.23	1.08	27.98	33.93	43.50	9.57
131.94	50.40	V	1.3	1.00	7.75	1.13	27.94	31.34	43.50	12.16
624.05	46.50	V	191.4	1.60	19.44	2.44	28.83	39.55	46.00	6.45
649.99	46.20	V	155.9	1.50	19.57	2.49	28.78	39.48	46.00	6.52
676.02	45.30	V	123.4	1.90	19.73	2.54	28.81	38.76	46.00	7.24

Note : • AF = Antenna Factor  
• POL H = Horizontal  
• Margin = Limit – F/S  
• A : Angle

• CL = Cable Loss  
• POL V = Vertical  
• F/S = Level + AF + CL – Amp  
• H : Height

• F/S = Field Strength  
• Amp = Amplifier Gain

### Above 1GHz (3m method)

Temperature : 23.6

Humidity : 31.0 % RH

Atmospheric Pressure : 100.6 kPa

#### -Mode 1 USB

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
Average Detector										
1494.38	39.50	V	1.0	1.10	25.32	3.79	35.78	32.83	54.00	21.17
1787.50	46.20	H	166.0	1.40	26.74	4.12	34.74	42.31	54.00	11.69
2148.33	37.40	H	172.4	1.00	27.78	4.67	35.15	34.71	54.00	19.29
2358.33	35.90	H	198.4	1.50	28.15	4.76	35.35	33.46	54.00	20.54

#### -Mode 2 Camera

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
Average Detector										
1787.50	36.20	H	155.2	1.10	26.74	4.12	34.74	32.31	54.00	21.69
2132.08	35.40	H	102.3	2.00	27.82	4.60	35.07	32.75	54.00	21.25

#### -Mode 3 MP3

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
Average Detector										
1867.29	33.60	H	177.4	1.10	27.35	4.31	34.80	30.46	54.00	23.54
2132.08	46.50	H	169.0	1.30	27.82	4.60	35.07	43.85	54.00	10.15
2358.33	41.90	H	125.5	1.50	28.15	4.76	35.35	39.46	54.00	14.54

#### -Mode 4 MP4

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
Average Detector										
2148.96	47.10	H	121.5	1.10	27.78	4.68	35.15	44.40	54.00	9.60
2357.92	36.90	H	176.5	1.50	28.15	4.76	35.35	34.46	54.00	19.54

#### -Mode 5 Barcode

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A (°)	H (m)	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
Average Detector										
1867.50	36.20	H	43.2	1.20	27.35	4.30	34.80	33.06	54.00	20.94
2132.92	41.80	H	177.4	1.40	27.82	4.61	35.08	39.15	54.00	14.85

### -Mode 6 GPS

FREQ. (MHz)	LEVEL (dBμV)	POL (H/V)	A ( ° )	H ( m )	AF (dB)	CL (dB)	Amp (dB)	F/S (dBμV/m)	LIMIT (dBμV/m)	MARGIN (dB)
Average Detector										
2133.96	35.60	H	181.0	1.20	27.82	4.61	35.08	32.95	54.00	21.05
2358.52	34.70	H	133.6	1.40	28.15	4.76	35.35	32.26	54.00	21.74

Note : • AF = Antenna Factor      • CL = Cable Loss      • F/S = Field Strength  
• POL H = Horizontal      • POL V = Vertical      • Amp = Amplifier Gain  
• Margin = Limit – F/S      • F/S = Level + AF + CL – Amp  
• A : Angle      • H : Height

## 2.6 Modifications

There was no modified item during the test.

## 2.7 Photograph of Conducted Emission





## 2.8 Photographs of Radiated Emission (3m method below 1GHz)





## 2.9 Photographs of Radiated Emission (3m method above 1GHz)



### 3. Photographs of EUT

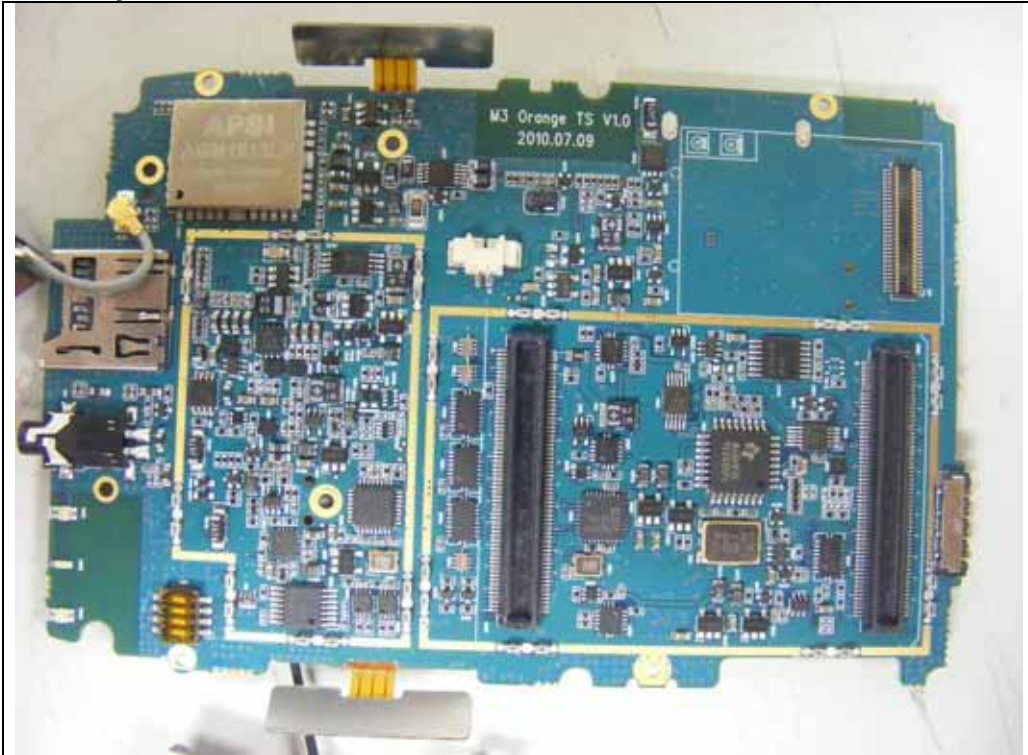
- Front View



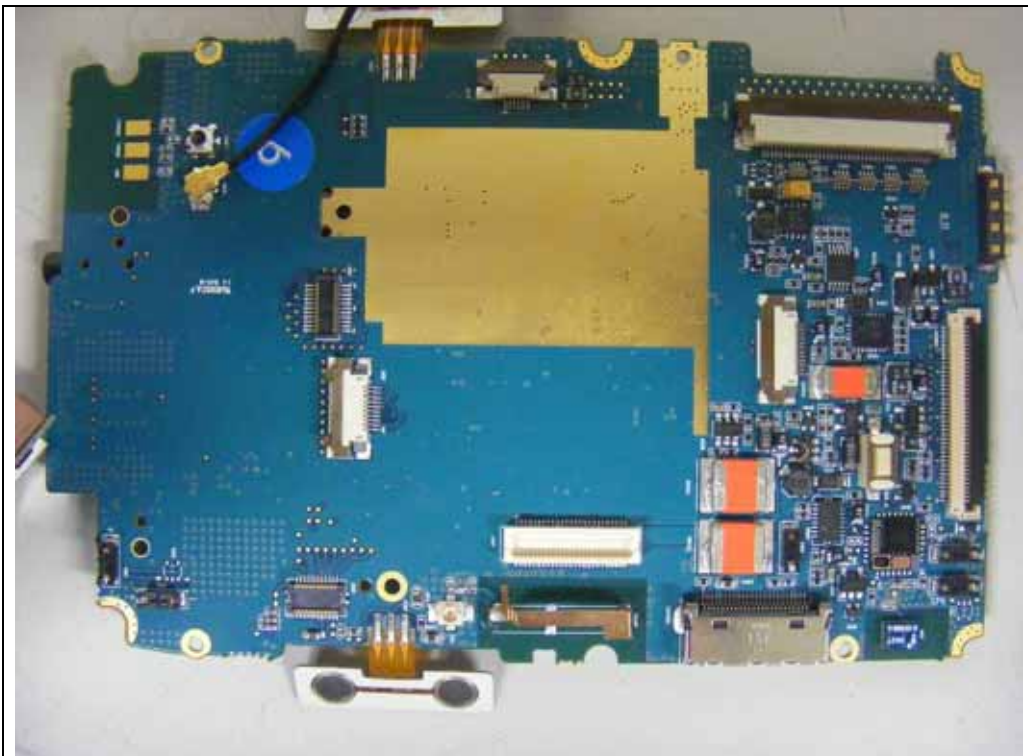
- Rear View



- Top View of Main Board

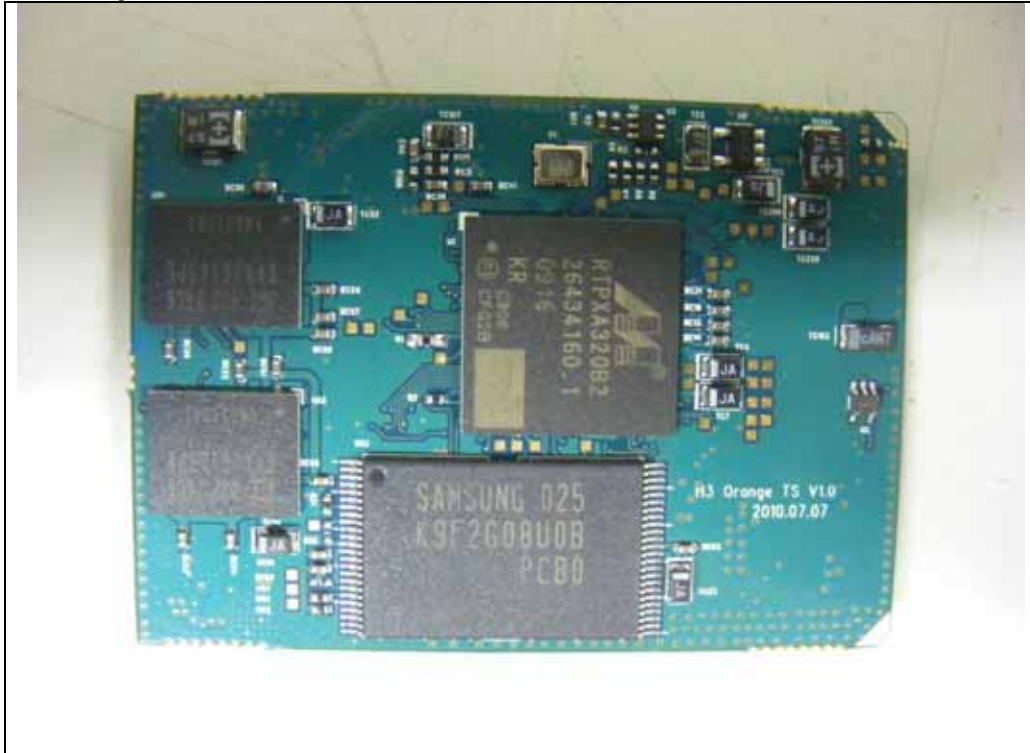


- Bottom View of Main Board

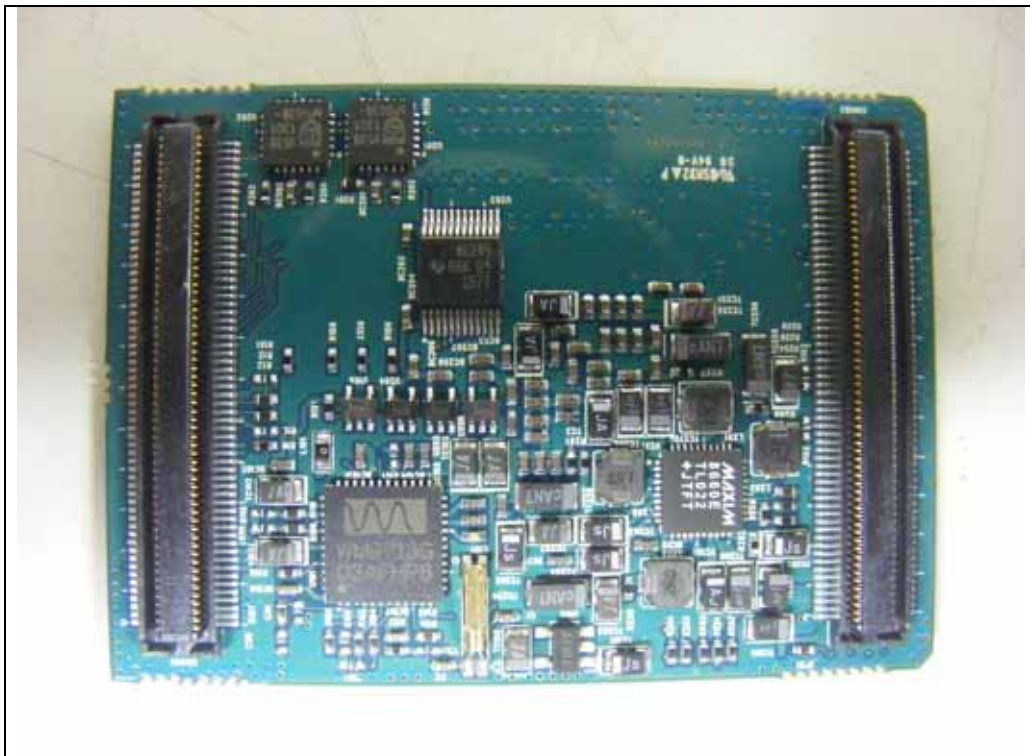




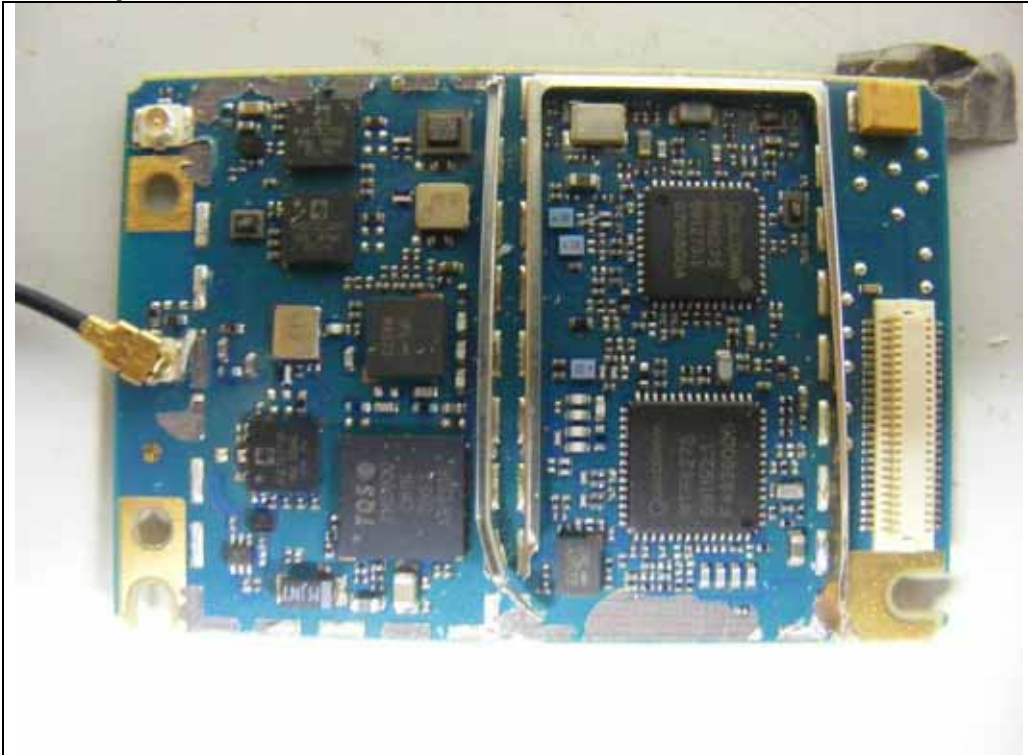
- Top View of CPU Module



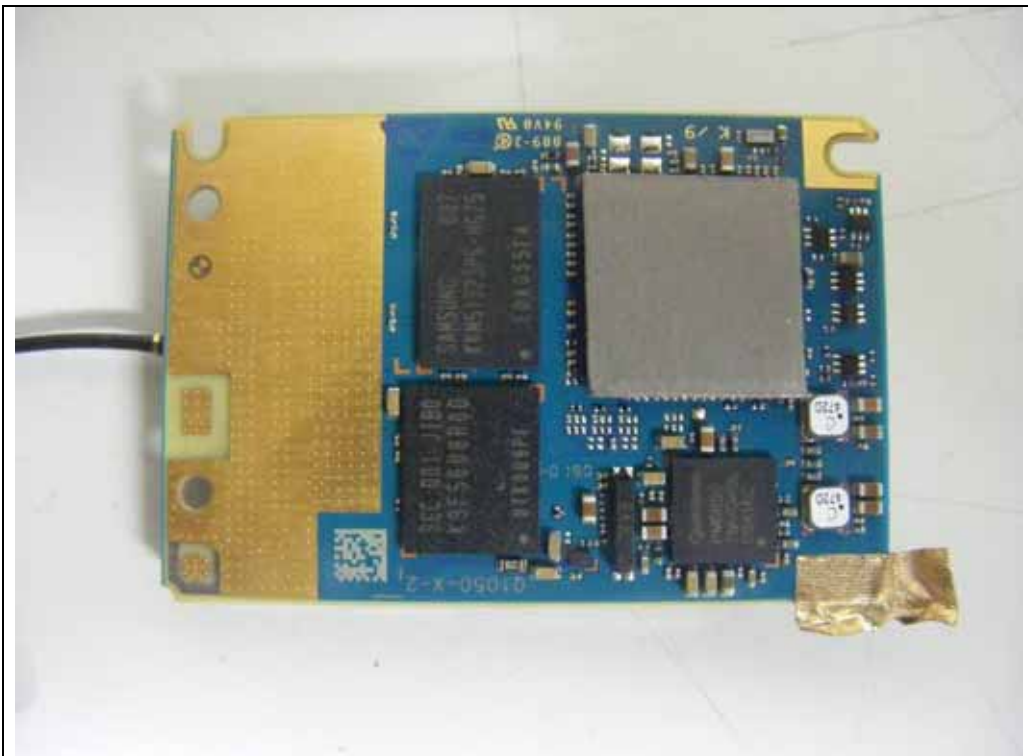
- Bottom View of CPU Module



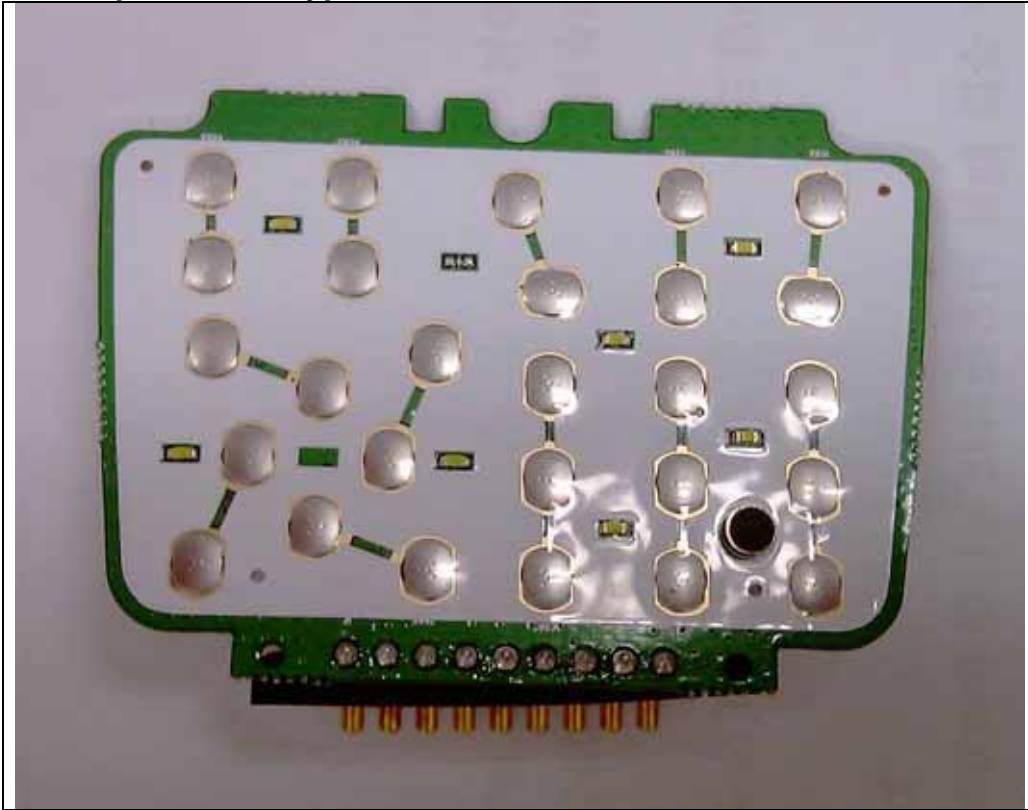
- Top View of GSM Module



- Bottom View of GSM Module



- Top View of Keypad Board



- Bottom View of Keypad Board





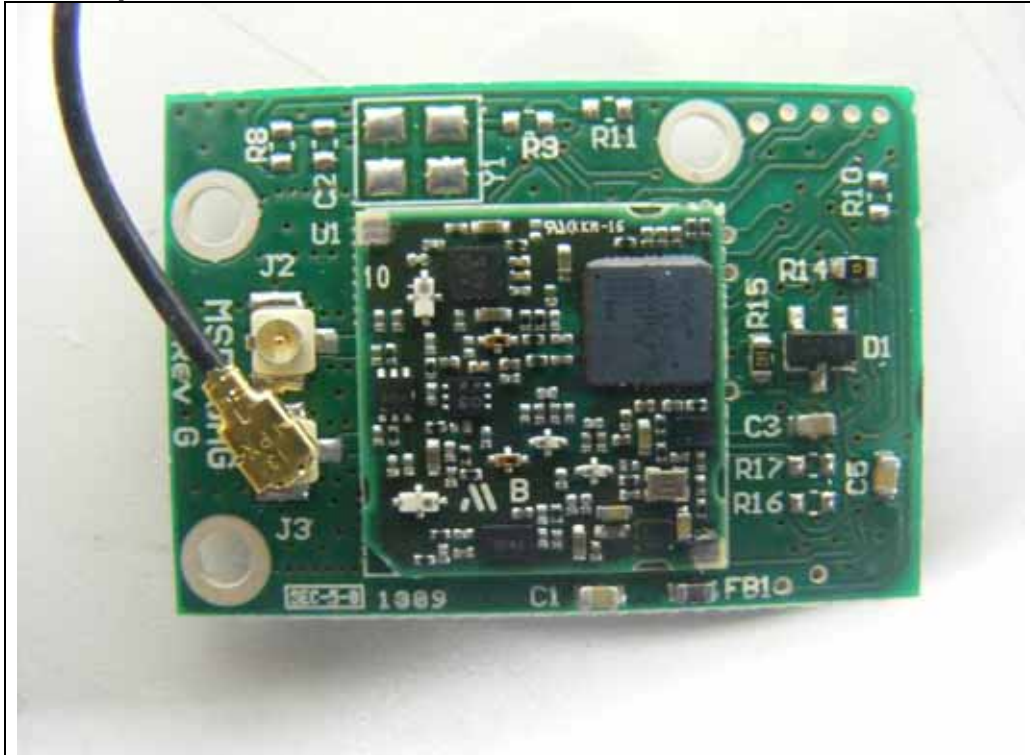
- Top View of LCD Panel



- Bottom View of LCD Panel



- Top View of WLAN Module



- Bottom View of WLAN Module





● Camera Board



● Battery



● Front View of Cradle



● Rear View of Cradle



- Top View of Cradle Board



- Bottom View of Cradle Board



## ● AC Adapter



## ● AC Adapter Label





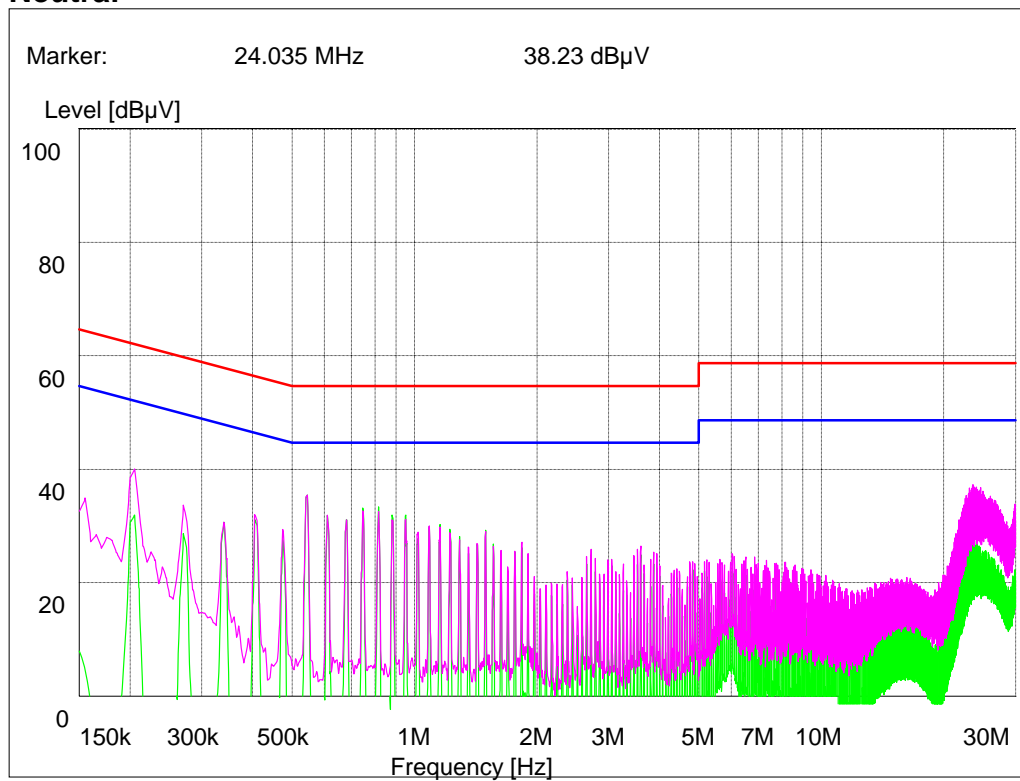
● Inside



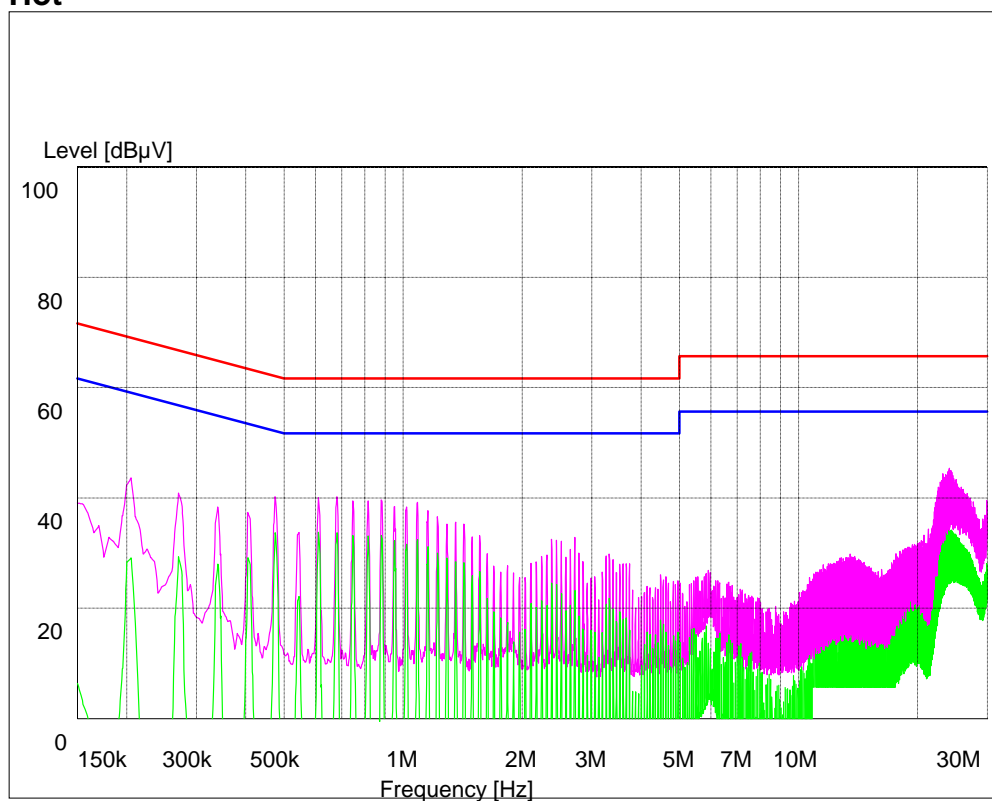
## Appendix A : Conducted Emission

### -Mode 1 USB

#### Neutral

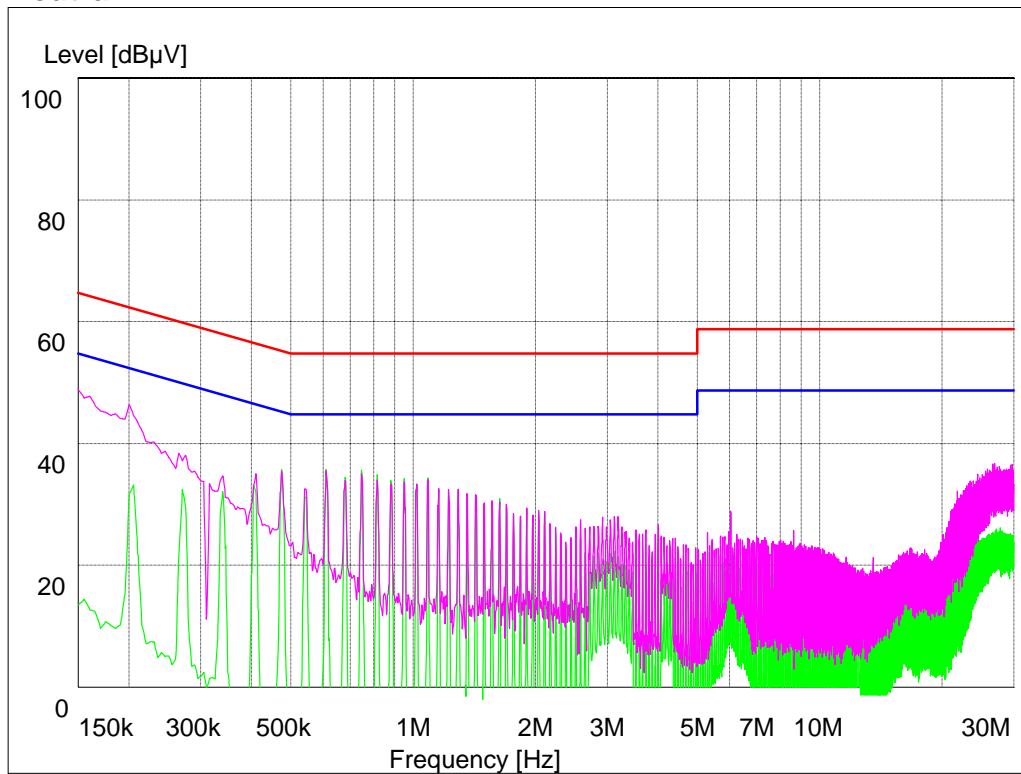


#### Hot

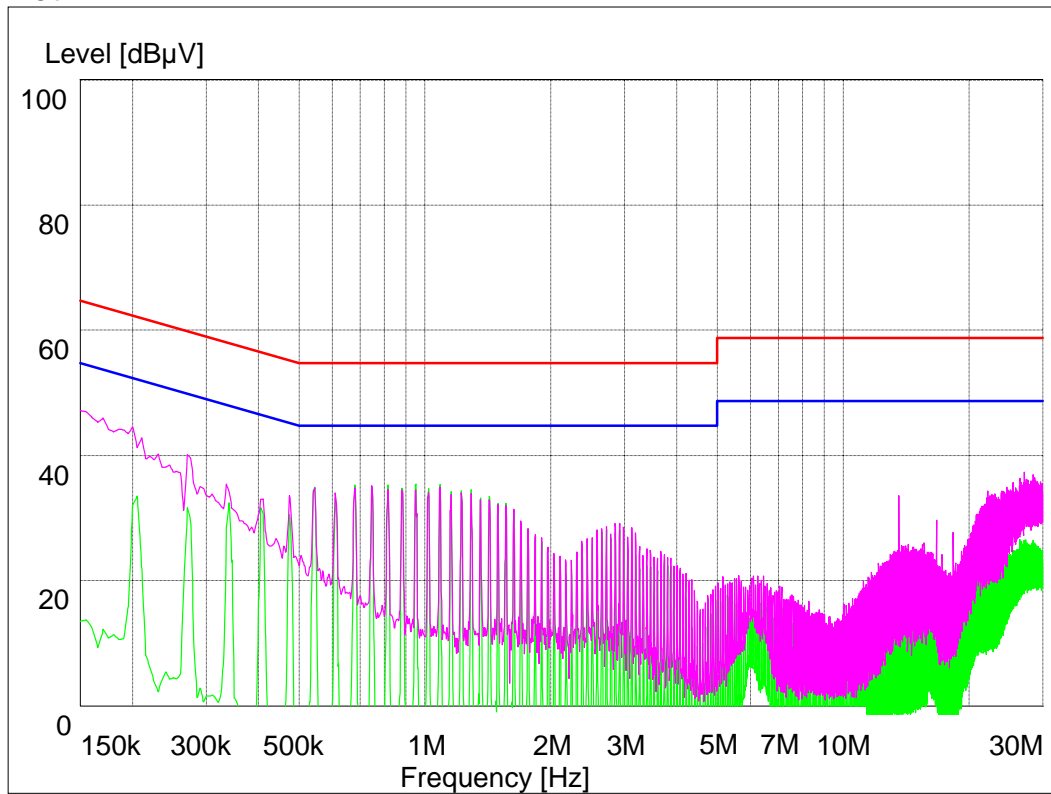


## -Mode 2 Camera

### Neutral

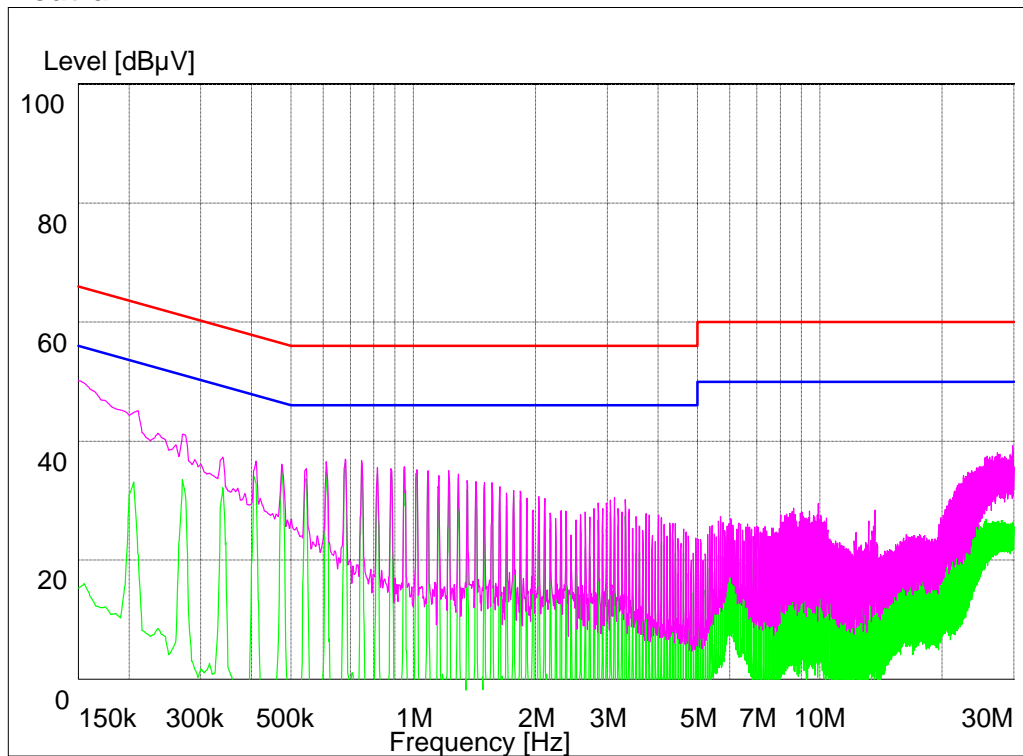


### Hot

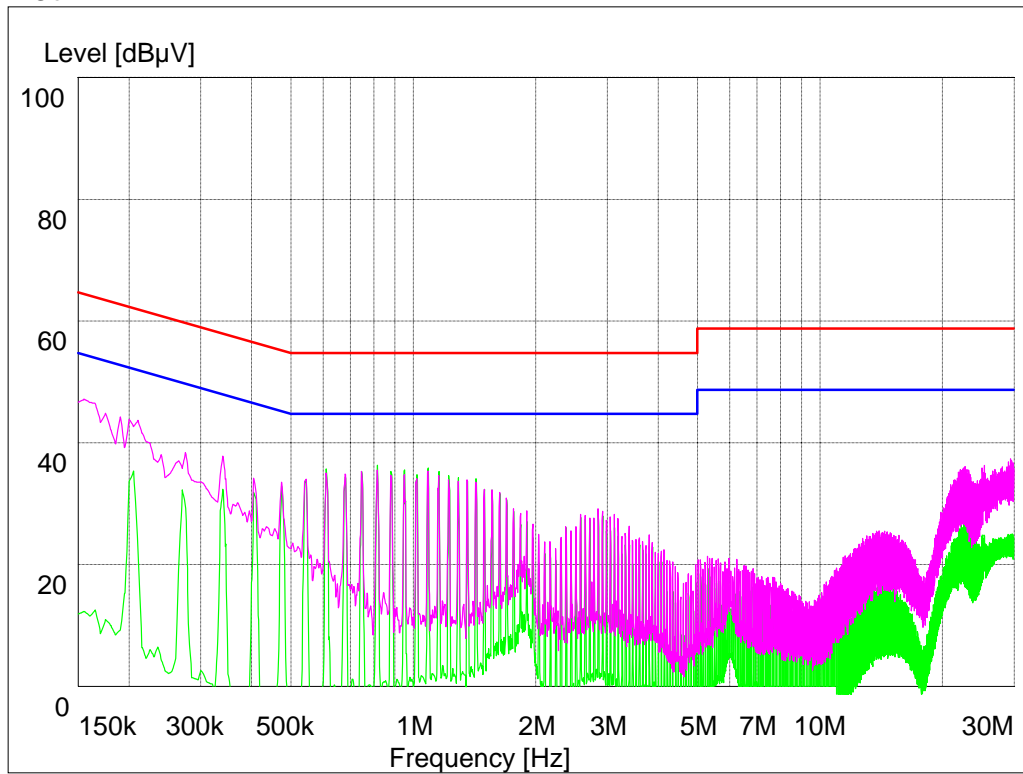


### -Mode 3 MP3

#### Neutral



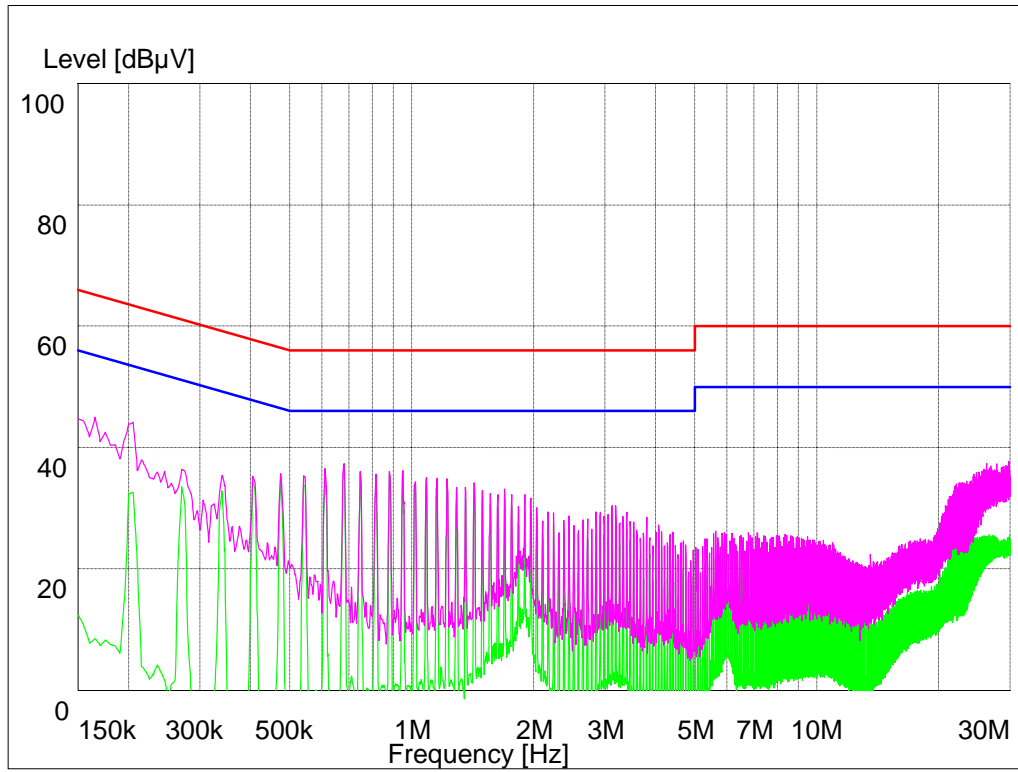
#### Hot



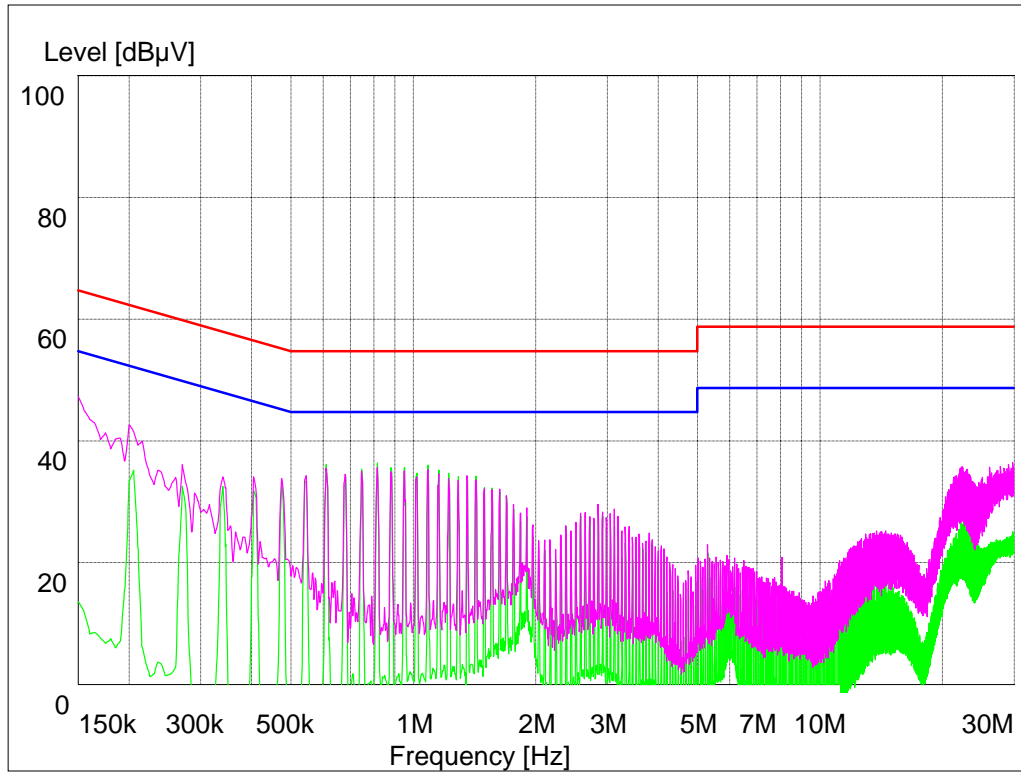


## -Mode 4 MP4

### Neutral

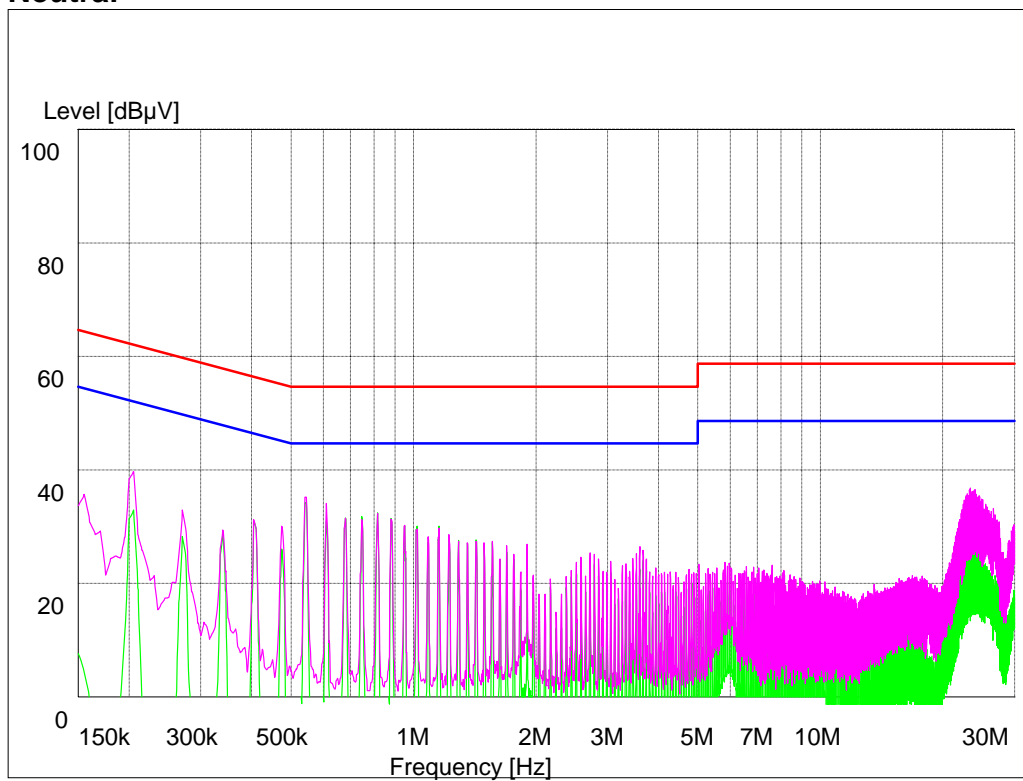


### Hot

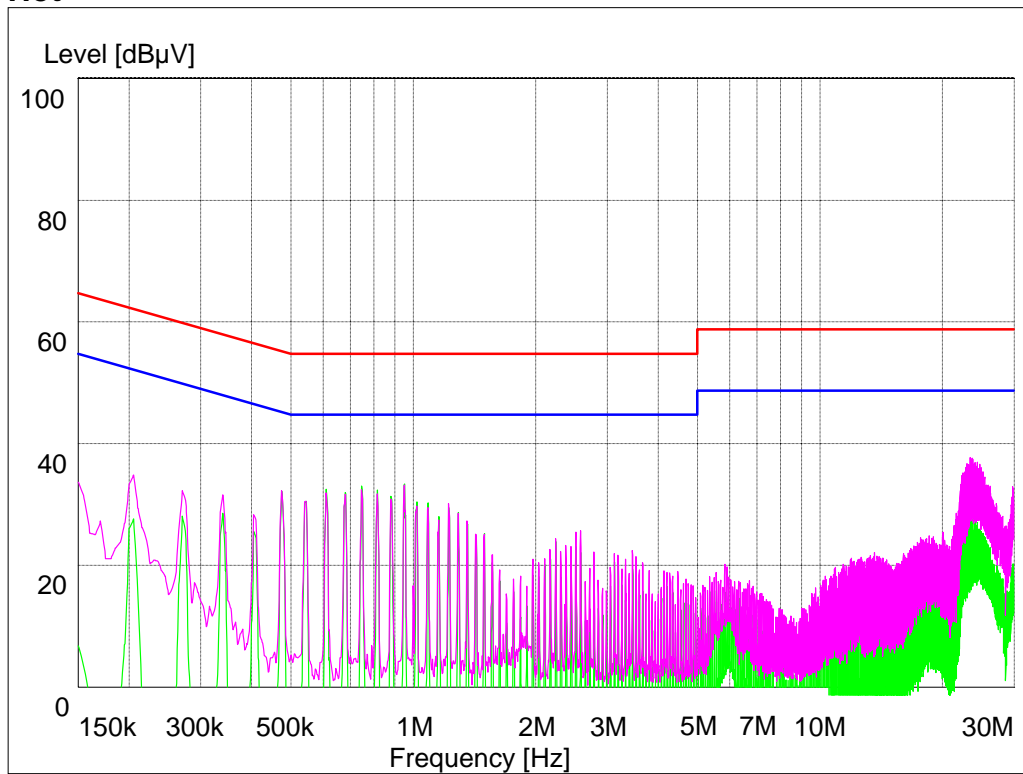


## -Mode 5 Barcode

### Neutral

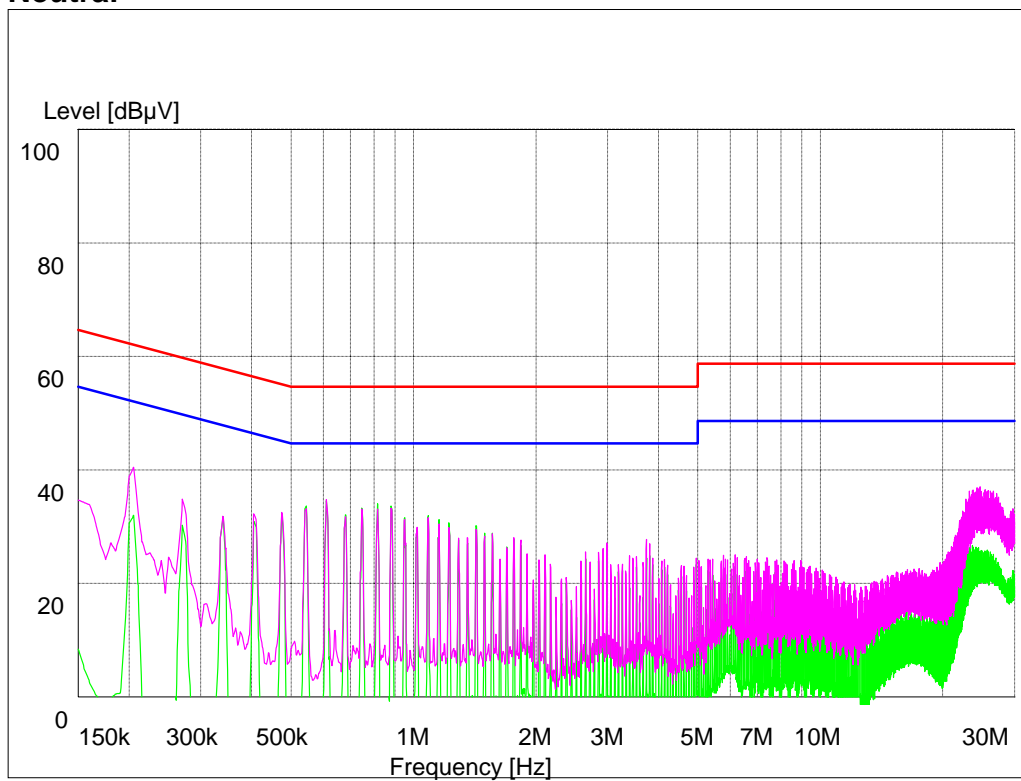


### Hot



## -Mode 6 GPS

### Neutral



### Hot

