

FCC Report

Applicant: Mitac International Corporation

Address of Applicant: Building B, No.209, Sec.1, Nan Gang Rd., Nan Gang Taipei,
11568 Taiwan

Equipment Under Test (EUT)

Product Name: GPS Portable Navigation Device

Model No.: N515

Trade Mark: Mitac, Magellan, Mio

FCC ID: P4Q-N515

Applicable standards: FCC CFR Title 47 Part 15 Subpart B:2015

Date of sample receipt: August 29, 2016

Date of Test: August 30-September 01, 2016

Date of report issue: September 02, 2016

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

A circular logo for GTS (Glo3al United Technology Services Co., Ltd.) is overlaid with a handwritten signature in black ink. The logo contains the text 'GTS' in the center, 'GLO3AL UNITED TECHNOLOGY SERVICES CO., LTD.' around the perimeter, and 'GLOBAL TESTING' at the bottom.

Robinson Lo

Laboratory Manager

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 and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Version

Version No.	Date	Description
00	September 02, 2016	Original

Prepared By:

Edward Pan

Date:

September 02, 2016

Project Engineer

Check By:

Andy Wu

Date:

September 02, 2016

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Conducted Emission	Part15.107	PASS
Radiated Emissions	Part15.109	PASS

PASS: The EUT complies with the essential requirements in the standard.

Remark : Test according to ANSI C63.4:2014.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 Client Information

Applicant:	Mitac International Corporation
Address of Applicant:	Building B, No.209, Sec.1, Nan Gang Rd., Nan Gang Taipei, 11568 Taiwan
Manufacturer:	MITAC COMPUTER (KUSHAN) CO. LTD
Address of Manufacturer:	No. 269, 2nd Rd, Export Processing Zone Changjiang South Road Kushan, Jiangsu China

5.2 General Description of EUT

Product Name:	GPS Portable Navigation Device
Model No.:	N515
CPT panel No.:	KD070D28-40NB-B22 C
Power Supply:	Adapter 1: Model:MIL050200I Input: AC 100-240V~50/60Hz, 0.6A Output: DC 5V ,2A Adapter 2: Model:CA-052-00U-09 Input: DC 12/24V, 1300mA Output: DC 5V ,2A Adapter 3: Model:TCV10100 Input: DC 12-24V Output: DC 5V ,2A Or DC 3.7V 4000mAh Li-ion Battery

Remark: All of adapters were tested. And found radiated emission of adapter 3 was the worst case. Conducted emission of adapter 1 was the worst. So only the worst case was recorded in the report.

5.3 Test mode

Test mode:	
PC mode	Keep the EUT in data exchange with PC mode.
REC mode	Keep the EUT in video recording mode.
USB playing mode	Keep the EUT in video playing via USB flash disk mode.
TF card playing mode	Keep the EUT in TF card playing mode.

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 600491**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 600491, June 22, 2016.

- **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016..

5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5.6 Description of Support Units

Manufacturer	Description	Model	Serial Number	FCC Approval
Apple	PC	A1278	C1MN99ERDTY3	FCC DoC
DELTA	ADAPTER	ADP-60ADT	N/A	FCC DoC
DELL	KEYBOARD	SK-8115	N/A	FCC DoC
DELL	MOUSE	N/A	N/A	FCC DoC
GS	Lead-Acid battery	S5D26R-MFZ	9442804454	FCC DoC

5.7 Deviation from Standards

Biconical, log.per. antenna and horn antenna were used instead of dipole antenna. Semi-anechoic Chamber was used as alternation of open air test sites, and all test suites were performed with radiated method in it.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	ESU EMI Test Receiver	R&S	ESU26	GTS203	June. 29 2016	June. 28 2017
4	Loop Antenna	Zhinan	ZN30900A	GTS534	June. 29 2016	June. 28 2017
5	BiConiLog Antenna	SCHWARZBECK	VULB9163	GTS214	June. 29 2016	June. 28 2017
6	Double-ridged horn antenna	SCHWARZBECK	9120D	GTS208	June. 29 2016	June. 28 2017
7	Horn Antenna	ETS-LINDGREN	3160-09	GTS218	June. 29 2016	June. 28 2017
8	RF Amplifier	HP	8347A	GTS204	June. 29 2016	June. 28 2017
9	RF Amplifier	HP	8349B	GTS206	June. 29 2016	June. 28 2017
10	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	June. 29 2016	June. 28 2017
11	PSA Series Spectrum Analyzer	Agilent	E4440A	GTS536	June. 29 2016	June. 28 2017
12	Universal Radio Communication tester	ROHDE&SCHWARZ	CMU 200	GTS538	June. 29 2016	June. 28 2017
13	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
14	Coaxial Cable	GTS	N/A	GTS210	June. 29 2016	June. 28 2017
15	Coaxial Cable	GTS	N/A	GTS211	June. 29 2016	June. 28 2017
16	Coaxial Cable	GTS	N/A	GTS210	June. 29 2016	June. 28 2017
17	Coaxial Cable	GTS	N/A	GTS212	June. 29 2016	June. 28 2017
18	Thermo meter	N/A	N/A	GTS256	June. 29 2016	June. 28 2017
19	D.C. Power Supply	Instek	PS-3030	GTS232	June. 29 2016	June. 28 2017

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 29 2016	June. 28 2017
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 29 2016	June. 28 2017
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 29 2016	June. 28 2017
5	High voltage probe	SCHWARZBECK	TK9420	GTS537	June. 29 2016	June. 28 2017
6	ISN	SCHWARZBECK	NTFM 8158	GTS565	June. 29 2016	June. 28 2017
7	Coaxial Cable	GTS	N/A	GTS227	June. 29 2016	June. 28 2017
8	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
9	Thermo meter	KTJ	TA328	GTS233	June. 29 2016	June. 28 2017
10	10dB Pulse Limiter	Rohde & Schwarz	N/A	GTS224	June. 29 2016	June. 28 2017

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Barometer	ChangChun	DYM3	GTS255	June. 29 2016	June. 28 2017

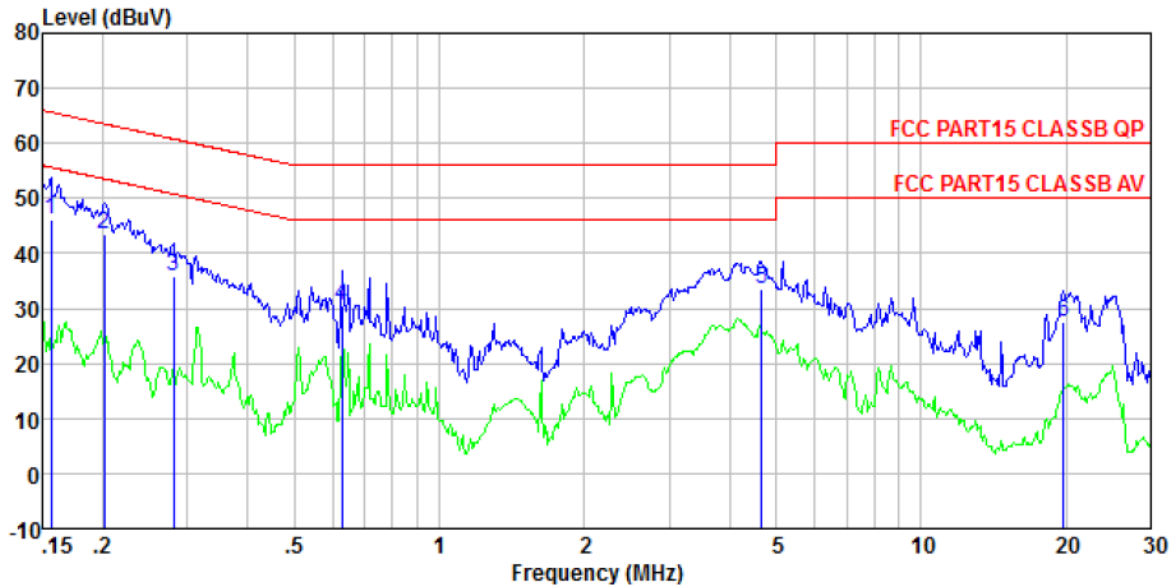
7 Test Results and Measurement Data

7.1 Conducted Emissions

Test Requirement:	FCC Part15 B Section 15.107														
Test Method:	ANSI C63.4:2014														
Test Frequency Range:	150KHz to 30MHz														
Class / Severity:	Class B														
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto														
Limit:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> <p>* Decreases with the logarithm of the frequency.</p>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test setup:	<p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test procedure:	<ol style="list-style-type: none"> 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement. 														
Test Instruments:	Refer to section 6 for details														
Test mode:	Refer to section 5.3 for details														
Test results:	Pass														

Measurement Data

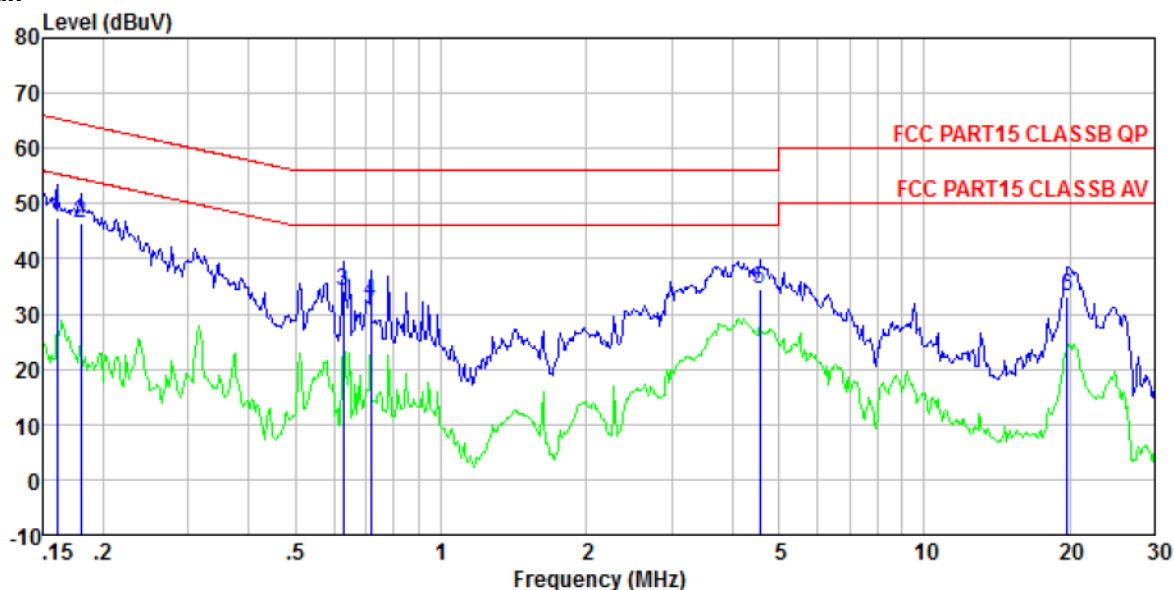
Line:



Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 LINE
 Job No. : 0356
 Test mode : PC mode
 Test Engineer: Sky

	Freq	Read Level	LISN Factor	Cable Loss	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dBuV	dBuV	dB	
1	0.156	45.88	0.15	0.12	46.15	65.65	-19.50	QP
2	0.202	43.22	0.14	0.13	43.49	63.54	-20.05	QP
3	0.280	35.69	0.11	0.10	35.90	60.81	-24.91	QP
4	0.627	30.24	0.13	0.12	30.49	56.00	-25.51	QP
5	4.672	33.21	0.21	0.15	33.57	56.00	-22.43	QP
6	19.740	26.78	0.59	0.22	27.59	60.00	-32.41	QP

Neutral:



Site : Shielded room
 Condition : FCC PART15 CLASSB QP LISN-2013 NEUTRAL
 Job No. : 0356
 Test mode : PC mode
 Test Engineer: Sky

	Read	LISN	Cable	Limit	Over	
Freq	Level	Factor	Loss	Line	Limit	Remark
MHz	dBuV	dB	dB	dBuV	dB	
1	0.161	47.23	0.07	0.12	47.42	65.43 -18.01 QP
2	0.180	46.12	0.07	0.13	46.32	64.50 -18.18 QP
3	0.627	33.99	0.07	0.12	34.18	56.00 -21.82 QP
4	0.716	31.98	0.07	0.13	32.18	56.00 -23.82 QP
5	4.574	34.12	0.15	0.15	34.42	56.00 -21.58 QP
6	19.740	32.32	0.51	0.22	33.05	60.00 -26.95 QP

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

7.2 Radiated Emission

Test Requirement:	FCC Part15 B Section 15.109																							
Test Method:	ANSI C63.4:2014																							
Test Frequency Range:	30MHz to 25GHz																							
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																							
Receiver setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120kHz</td> <td>300kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak Value</td> </tr> <tr> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average Value</td> </tr> </tbody> </table>				Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value	
Frequency	Detector	RBW	VBW	Remark																				
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value																				
Above 1GHz	Peak	1MHz	3MHz	Peak Value																				
	Peak	1MHz	10Hz	Average Value																				
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>30MHz-88MHz</td> <td>40.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>88MHz-216MHz</td> <td>43.50</td> <td>Quasi-peak Value</td> </tr> <tr> <td>216MHz-960MHz</td> <td>46.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td>960MHz-1GHz</td> <td>54.00</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td> <td>54.00</td> <td>Average Value</td> </tr> <tr> <td>74.00</td> <td>Peak Value</td> </tr> </tbody> </table>				Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.00	Quasi-peak Value	88MHz-216MHz	43.50	Quasi-peak Value	216MHz-960MHz	46.00	Quasi-peak Value	960MHz-1GHz	54.00	Quasi-peak Value	Above 1GHz	54.00	Average Value	74.00	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																						
30MHz-88MHz	40.00	Quasi-peak Value																						
88MHz-216MHz	43.50	Quasi-peak Value																						
216MHz-960MHz	46.00	Quasi-peak Value																						
960MHz-1GHz	54.00	Quasi-peak Value																						
Above 1GHz	54.00	Average Value																						
	74.00	Peak Value																						
Test Procedure:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 																							
Test setup:	Below 1GHz																							

	<p>Above 1GHz</p>					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Measurement Record:	Uncertainty: ± 4.5dB					
Test Instruments:	Refer to section 6 for details					
Test mode:	Refer to section 5.3 for details					
Test results:	Pass					

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

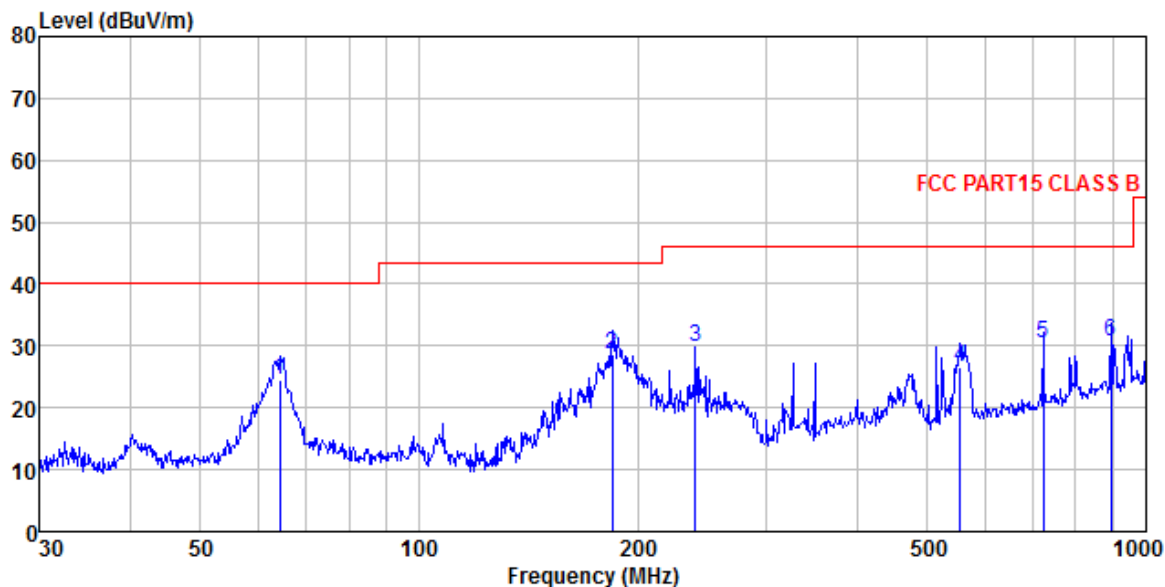
$$Final\ Test\ Level = Receiver\ Reading + Antenna\ Factor + Cable\ Factor - Preamplifier\ Factor$$

Measurement Data

PC mode:

Below 1GHz

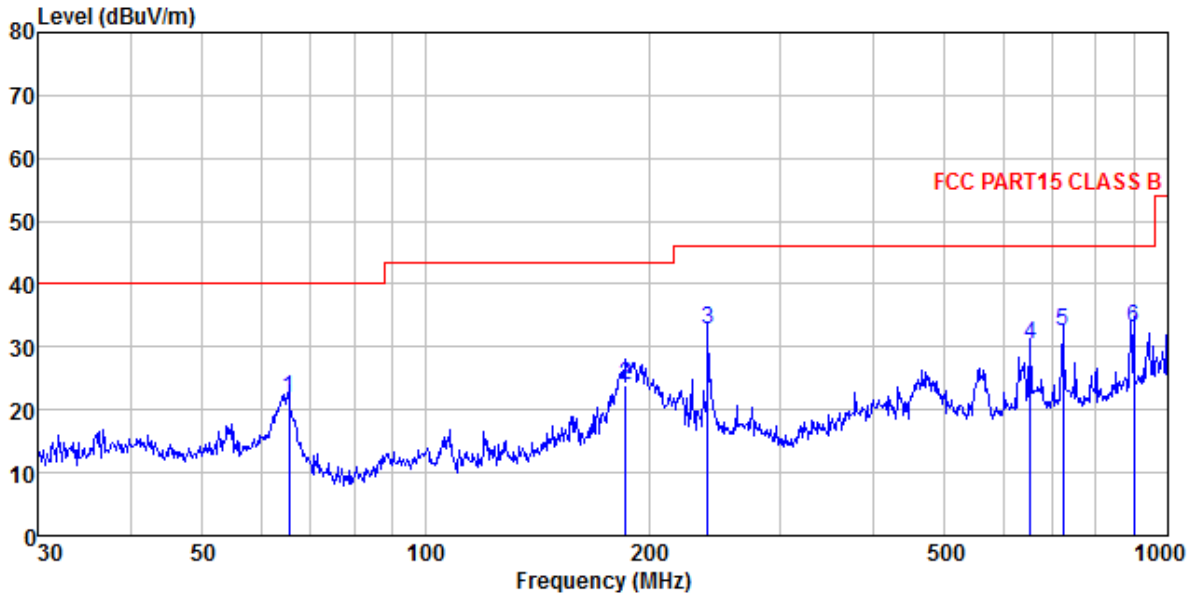
Horizontal:



Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m HORIZONTAL
 Job No. : 0356
 Test Mode : PC mode
 Test Engineer: Sky

	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	64.208	40.41	12.97	0.90	29.89	24.39	40.00 -15.61 QP
2	184.490	43.92	12.08	1.76	29.26	28.50	43.50 -15.00 QP
3	239.987	43.15	14.09	2.07	29.56	29.75	46.00 -16.25 QP
4	554.825	32.61	19.67	3.54	29.30	26.52	46.00 -19.48 QP
5	721.726	34.25	21.10	4.17	29.20	30.32	46.00 -15.68 QP
6	893.857	31.92	23.05	4.83	29.10	30.70	46.00 -15.30 QP

Vertical:



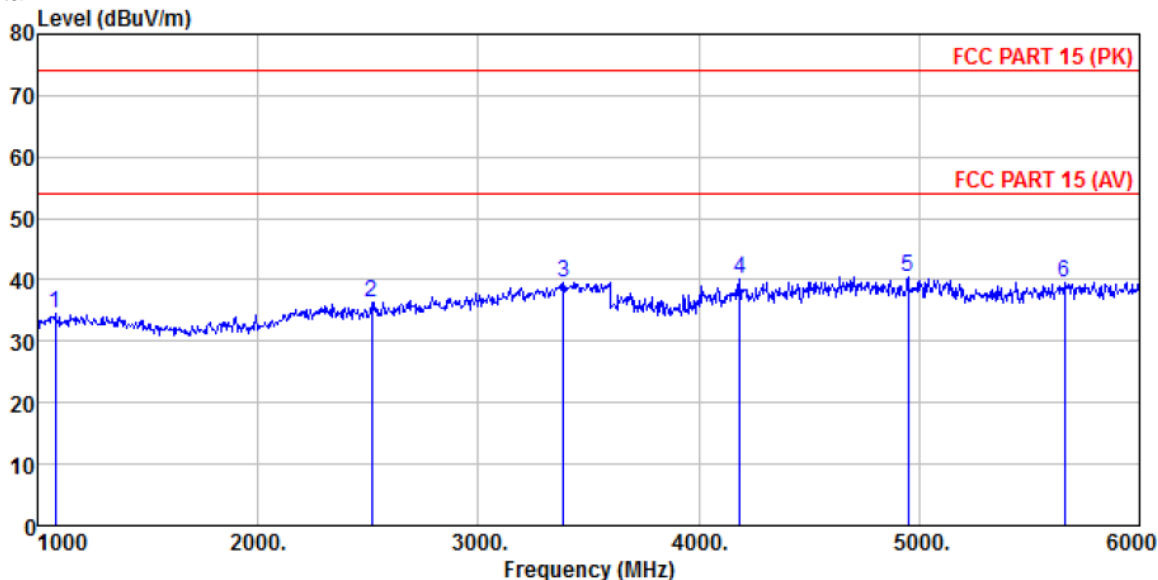
Site : 3m chamber
 Condition : FCC PART15 CLASS B 3m VERTICAL
 Job No. : 0356
 Test Mode : PC mode
 Test Engineer: Sky

	Read	Antenna	Cable	Preamp	Limit	Over	
Freq	Level	Factor	Loss	Factor	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	65.343	38.30	12.57	0.90	29.88	21.89	40.00 -18.11 QP
2	185.788	39.24	12.16	1.77	29.25	23.92	43.50 -19.58 QP
3	239.987	46.09	14.09	2.07	29.56	32.69	46.00 -13.31 QP
4	651.942	35.07	20.65	3.92	29.25	30.39	46.00 -15.61 QP
5	721.726	36.49	21.10	4.17	29.20	32.56	46.00 -13.44 QP
6	900.147	34.10	23.09	4.85	29.10	32.94	46.00 -13.06 QP

Above 1GHz

PC mode:

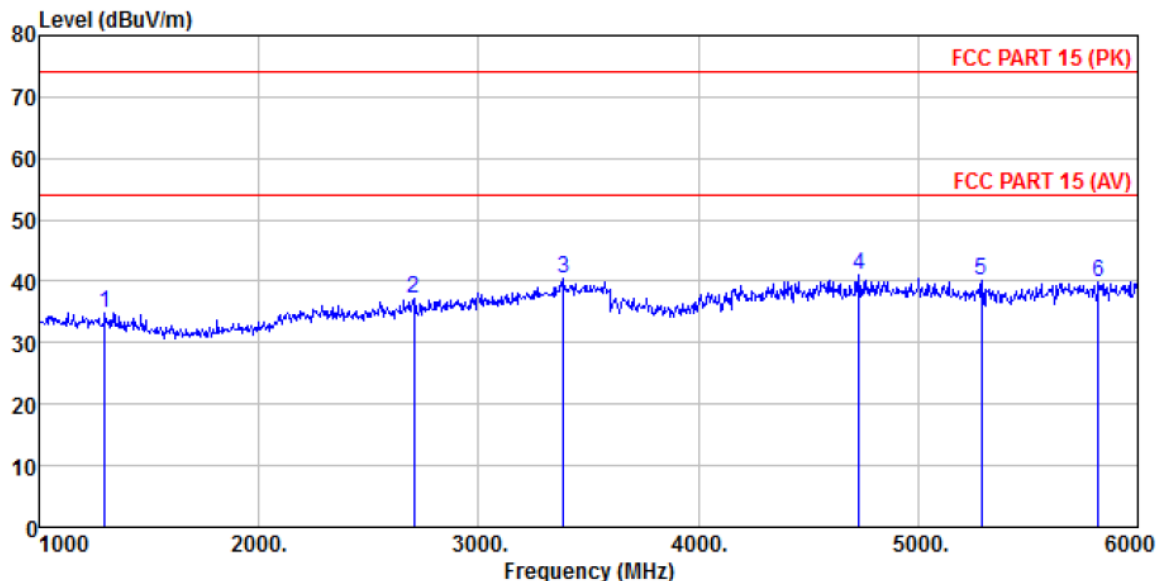
Horizontal:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m HORIZONTAL
 Job No. : 0356
 Test Mode : PC mode
 Test Engineer: Sky

	ReadAntenna	Cable	Preamp	Limit	Over				
Freq	Level	Loss	Factor	Line	Limit	Remark			
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m			
1	1080.000	38.30	24.70	4.37	32.89	34.48	74.00	-39.52	Peak
2	2515.000	37.20	27.57	5.50	33.88	36.39	74.00	-37.61	Peak
3	3385.000	37.22	28.57	6.74	32.89	39.64	74.00	-34.36	Peak
4	4185.000	33.96	30.18	8.04	31.98	40.20	74.00	-33.80	Peak
5	4950.000	32.08	31.91	8.71	32.16	40.54	74.00	-33.46	Peak
6	5660.000	29.81	32.40	9.74	32.34	39.61	74.00	-34.39	Peak

Vertical:



Site : 3m chamber
 Condition : FCC PART 15 (PK) 3m VERTICAL
 Job No. : 0356
 Test Mode : PC mode
 Test Engineer: Sky

	Read	Antenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	1300.000	38.00	25.63	4.54	33.27	34.90	74.00	-39.10 Peak
2	2705.000	37.05	28.17	5.67	33.66	37.23	74.00	-36.77 Peak
3	3385.000	38.05	28.57	6.74	32.89	40.47	74.00	-33.53 Peak
4	4730.000	32.96	31.70	8.54	32.05	41.15	74.00	-32.85 Peak
5	5290.000	31.59	31.72	9.19	32.32	40.18	74.00	-33.82 Peak
6	5820.000	29.45	32.68	9.95	32.23	39.85	74.00	-34.15 Peak

Remark: No emission found from 6GHz to 25GHz. So this band was not display on the report.

8 Test Setup Photo

Radiated Emission(PC mode)



Conducted Emission



9 EUT Constructional Details

Reference to the test report No. GTS201608000356E01

----- End-----