FCC Part 15B
Measurement and Test Report

For

mophie LLC

6224 Technology Ave. Kalamazoo, MI 49009 U.S.A.

FCC ID: 2ACWB-SP6P

Test Rule(s):	FCC Part 15 Subpart B
Product Description:	mophie space pack
Tested Model:	SP-IP6P-32GB-BLK
Report No.:	STR15048183I-2
Tested Date:	2015-05-24 to 2015-06-27
Issued Date:	2015-06-27
Tested By:	Jason Su / Engineer
Reviewed By:	Lahm Peng / EMC Manager
Approved & Authorized By:	Jandy so / PSQ Manager

Prepared By:

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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	mophie LLC
Address of applicant:	6224 Technology Ave. Kalamazoo, MI 49009 U.S.A.
Manufacturer:	mophie LLC
Address of manufacturer:	6224 Technology Ave. Kalamazoo, MI 49009 U.S.A.

General Description of EUT	
Product Name:	mophie space pack
Trade Name:	mophie
Model No.:	SP-IP6P-32GB-BLK
Adding Model(s):	SP-IP6P-64GB-BLK, SP-IP6P-64GB-GLD, SP-IP6P-128GB-BLK, SP-IP6P-128GB-GLD
Note: The test data is gathered from a production sample, provided by the manufacturer. The Storage capacity and color of others models listed in the report is different from main-test model SP-IP6P-32GB-BLK, but the circuit and the electronic construction do not change, declared by the manufacturer.	

Technical Characteristics of EUT	
Rated Voltage:	USB DC 5V ; Battery:DC3.8V
Rated Current:	Input 1.8A ; Outpot max 1.0A
Battery Capacity	2600mAh
Rated Power:	/
Power Adapter Model:	/
Lowest Internal Frequency:	12MHz
Highest Internal Frequency:	16MHz
Classification of ITE:	Class B

1.2 Test Standards

The following report is prepared on behalf of the mophie LLC in accordance with Part 2, Subpart J, and Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC Part 15, Subpart B, and section 15.205, 15.107, and 15.109 rules.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

1.4 Test Facility

FCC – Registration No.: 934118

Shenzhen SEM.Test Technology Co., Ltd. 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 our files and the Registration is 934118.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM.Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

CNAS Registration No.: L4062

Shenzhen SEM.Test Technology Co., Ltd. is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L4062. All measurement facilities used to collect the measurement data are located at 1/F, Building A, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C (518101).

1.5 EUT Setup and Operation Mode

The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted according to the operation manual for use, more detailed description as follows:

Test Mode List:

Test Mode	Description	Remark
TM1	Charging	/
TM2	Discharging	/
TM3	Downloading	/

EUT Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
USB Cable	0.8	Shielded	Without Ferrite

Auxiliary Equipment List and Details

Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E23	EB12648265
Adapter	Apple	A1357	/
iPhone 6 Plus	Apple	A1549	/

Special Cable List and Details

Cable Description	Length (M)	Shielded/Unshielded	With Core/Without Core
/	/	/	/

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 15.107 (a)	Conducted Emissions	Compliant
§ 15.109 (a)	Radiated Emissions	Compliant

N/A: not applicable

3. Conducted Emissions

3.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

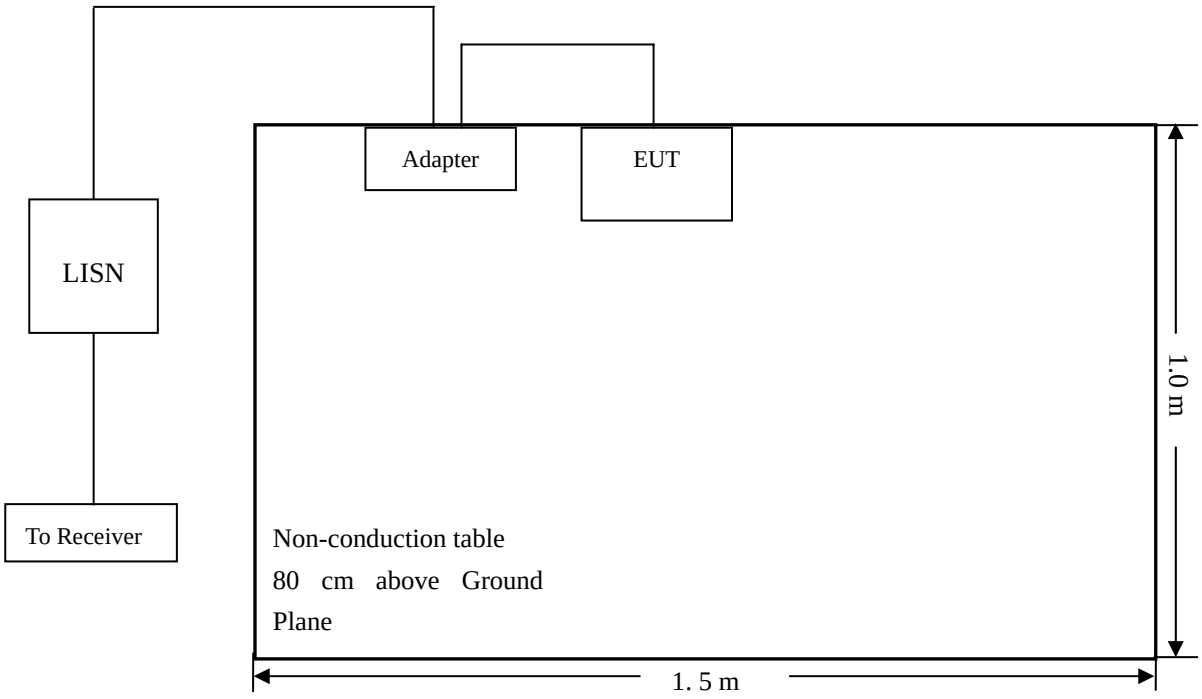
3.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2014-05-28	2015-05-27
L.I.S.N	Schwarz beck	NSLK8126	8126-224	2014-05-28	2015-05-27
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2014-05-28	2015-05-27

3.3 Test Procedure

Test is conducting under the description of ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

3.4 Basic Test Setup Block Diagram



3.5 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	52%
ATM Pressure:	1011 mbar

3.6 Summary of Test Results/Plots

According to the data in section 3.7, the EUT complied with the FCC Part 15.107(a) Conducted margin for a Class B device, with the *worst* margin reading of:

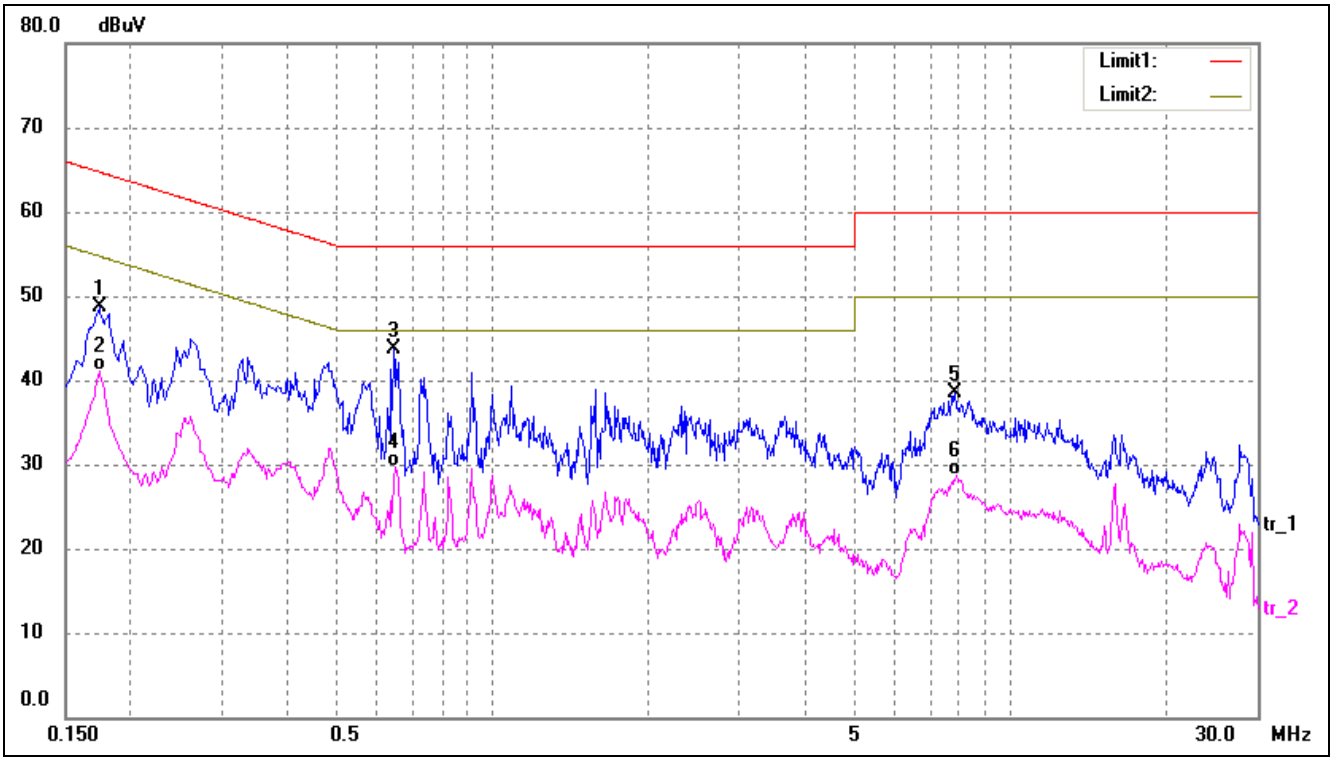
-10.71 dB at **0.2060 MHz** in the **Line**, **Peak** detector, 0.15-30MHz

3.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

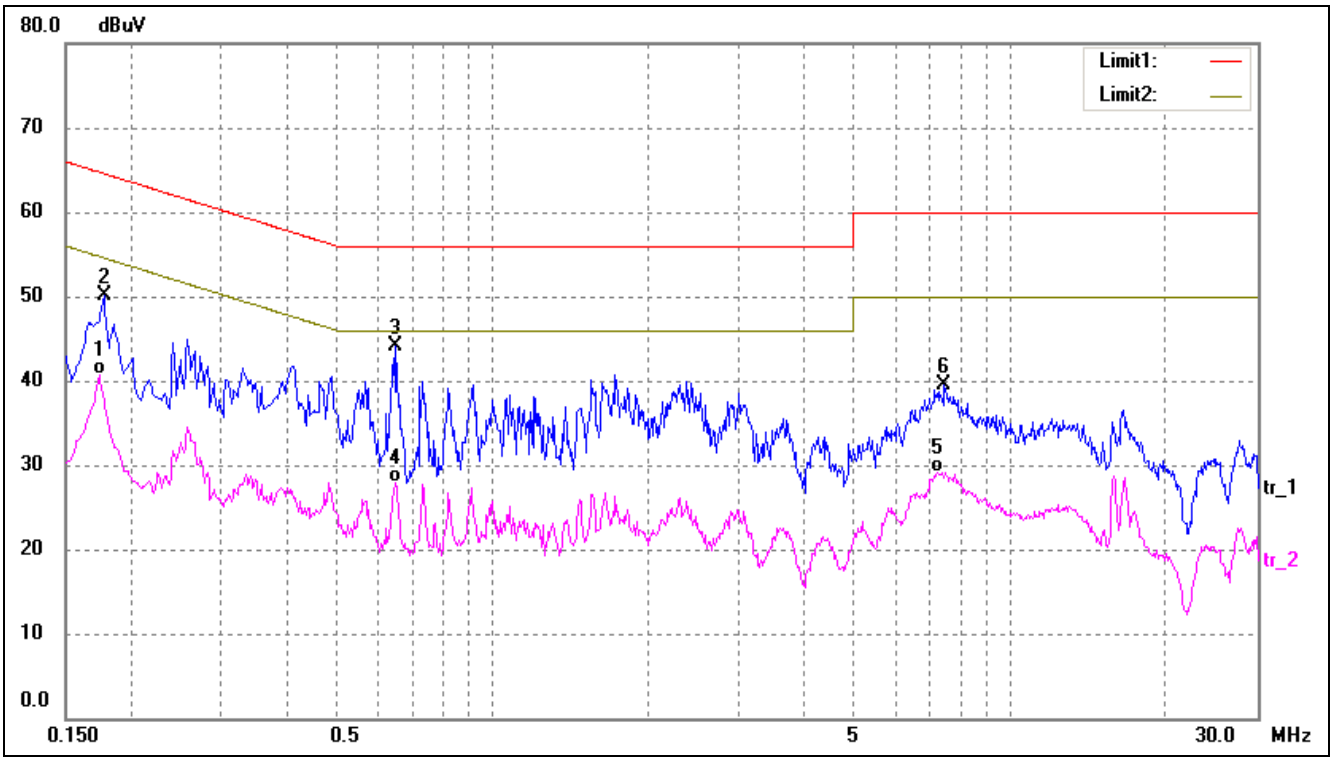
EUT: *mophie space pack*
Tested Model: *SP-IP6P-32GB-BLK*
Operating Condition: *TM1*
Comment: *AC 120V/60Hz; Adapter DC 5V*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1740	39.13	9.50	48.63	64.77	-16.14	QP
2	0.1740	31.65	9.50	41.15	54.77	-13.62	AVG
3	0.6460	33.99	9.65	43.64	56.00	-12.36	QP
4	0.6500	19.98	9.65	29.63	46.00	-16.37	AVG
5	7.8140	28.49	10.00	38.49	60.00	-21.51	QP
6	7.8740	18.64	10.00	28.64	50.00	-21.36	AVG

Test Specification: *Line*

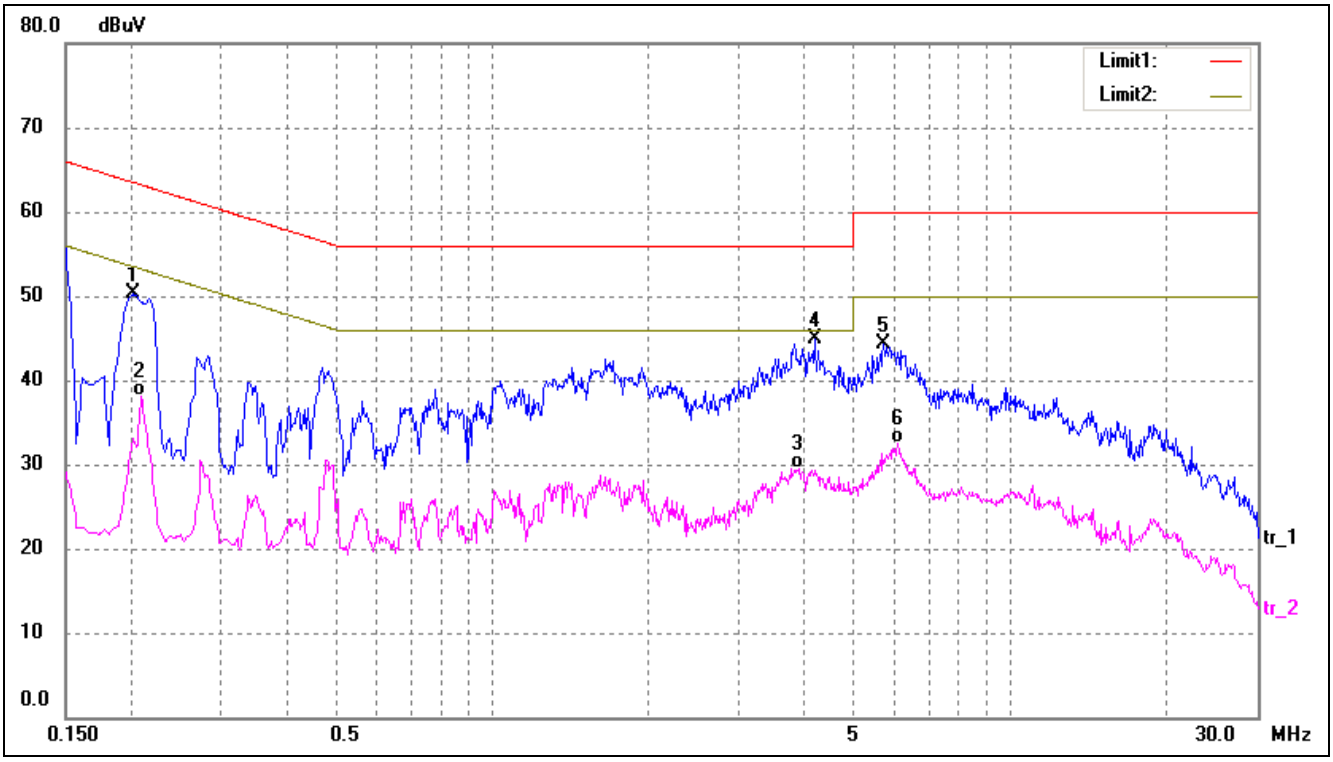


No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1740	31.28	9.50	40.78	54.77	-13.99	AVG
2	0.1780	40.53	9.50	50.03	64.58	-14.55	QP
3	0.6540	34.37	9.65	44.02	56.00	-11.98	QP
4	0.6540	18.25	9.65	27.90	46.00	-18.10	AVG
5	7.2300	19.16	10.00	29.16	50.00	-20.84	AVG
6	7.4860	29.58	10.00	39.58	60.00	-20.42	QP

Plot of Conducted Emissions Test Data

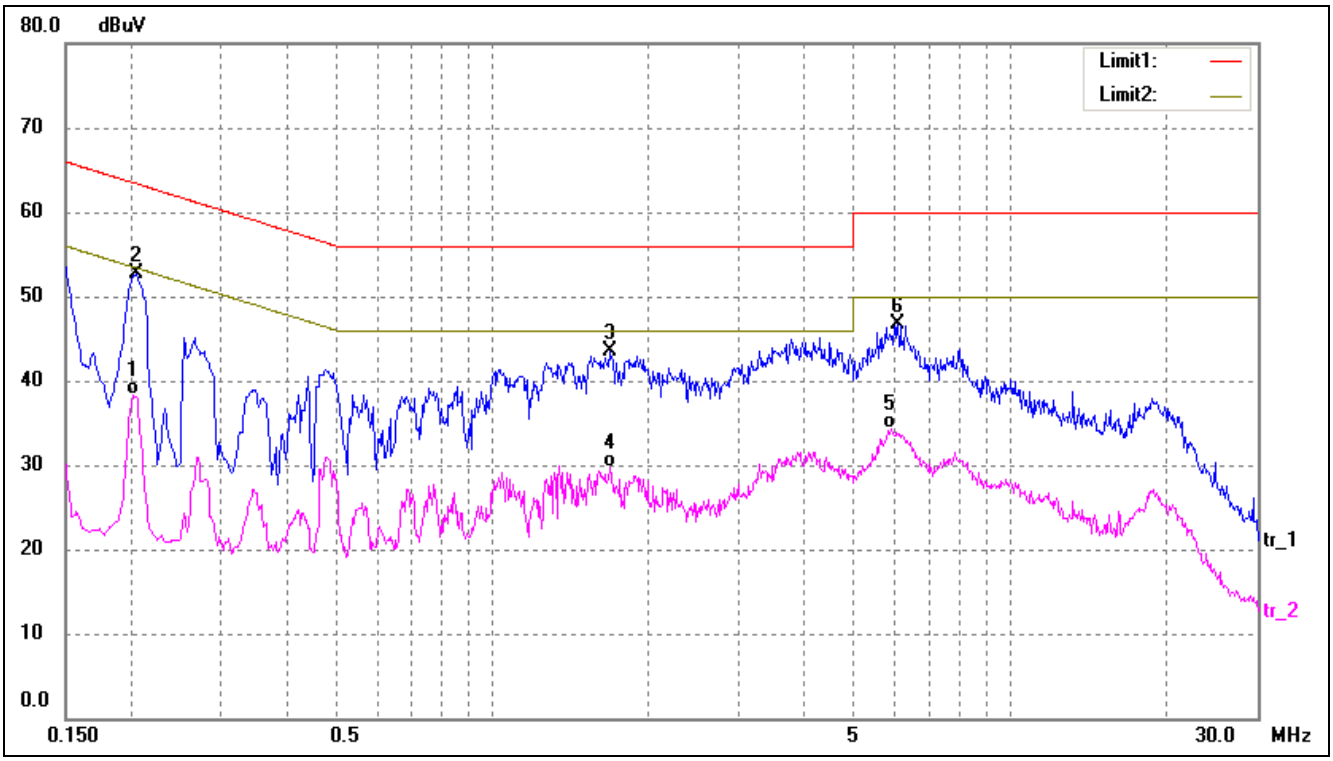
EUT: *Mophie space pack*
Tested Model: *SP-IP6P-32GB-BLK*
Operating Condition: *TM3*
Comment: *AC 120V/60Hz; USB DC 5V*

Test Specification: *Neutral*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.2020	40.78	9.50	50.28	63.53	-13.25	QP
2	0.2100	28.55	9.50	38.05	53.21	-15.16	AVG
3	3.9100	19.45	10.00	29.45	46.00	-16.55	AVG
4	4.1820	34.84	10.00	44.84	56.00	-11.16	QP
5	5.6860	34.36	10.00	44.36	60.00	-15.64	QP
6	6.0820	22.45	10.00	32.45	50.00	-17.55	AVG

Test Specification: *Line*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.2020	28.80	9.50	38.30	53.53	-15.23	AVG
2	0.2060	43.16	9.50	52.66	63.37	-10.71	QP
3	1.6820	33.55	10.00	43.55	56.00	-12.45	QP
4	1.6900	19.73	10.00	29.73	46.00	-16.27	AVG
5	5.8700	24.25	10.00	34.25	50.00	-15.75	AVG
6	6.0740	36.74	10.00	46.74	60.00	-13.26	QP

4. Radiated Emissions

4.1 Measurement Uncertainty

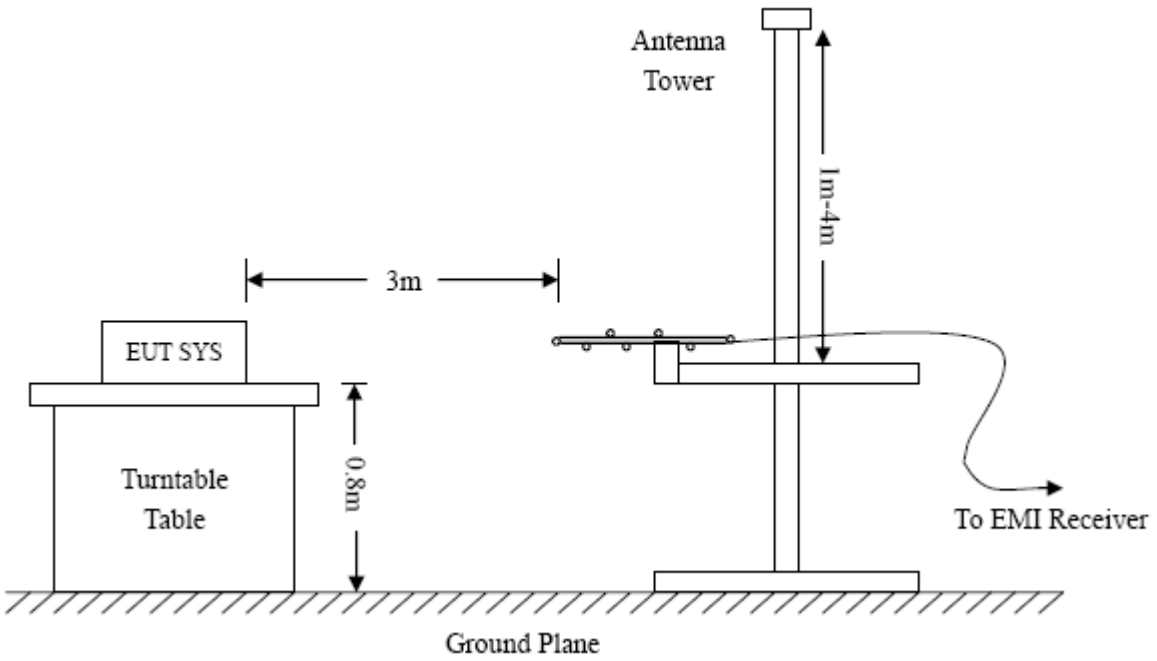
Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any radiation emissions measurement is ± 5.10 dB.

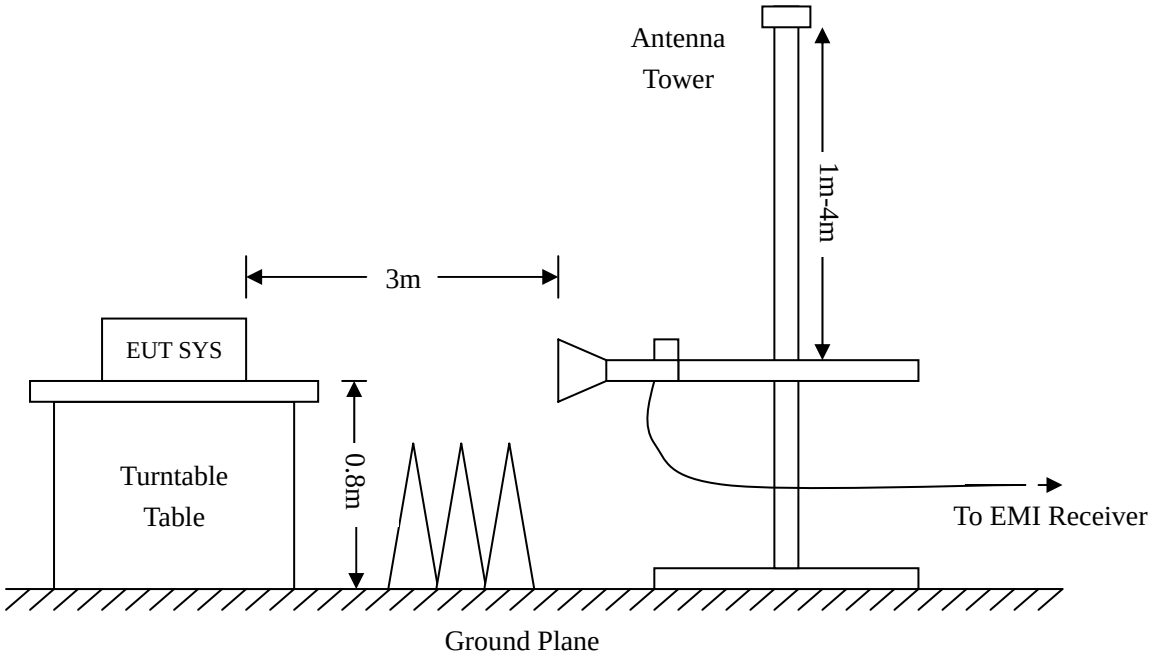
4.2 Test Equipment List and Details

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Spectrum Analyzer	R&S	FSP	836079/035	2014-05-28	2015-05-27
EMI Test Receiver	R&S	ESVB	825471/005	2014-05-28	2015-05-27
Pre-amplifier	Agilent	8447F	3113A06717	2014-05-28	2015-05-27
Pre-amplifier	Compliance Direction	PAP-0118	24002	2014-05-28	2015-05-27
Trilog Broadband Antenna	SCHWARZBECK	VULB9163	9163-333	2014-05-24	2015-05-23
Horn Antenna	ETS	3117	00086197	2014-05-24	2015-05-23
Loop Antenna	SCHWARZECK	HFRA 5165	9365	2014-05-24	2015-05-23

4.3 Test Procedure

The setup of EUT is according with per ANSI C63.4-2009 measurement procedure. The specification used was with the FCC Part 15.109 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.





4.4 Test Receiver Setup

Frequency :9kHz-30MHz	Frequency :30MHz-1GHz	Frequency :Above 1GHz
RBW=10KHz,	RBW=120KHz,	RBW=1MHz,
VBW =30KHz	VBW=300KHz	VBW=3MHz(Peak), 10Hz(AV)
Sweep time= Auto	Sweep time= Auto	Sweep time= Auto
Trace = max hold	Trace = max hold	Trace = max hold
Detector function = peak	Detector function = peak, QP	Detector function = peak, AV

4.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading – Corr. Factor

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for a Class B device. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15.109(a) Limit

4.6 Environmental Conditions

Temperature:	23 °C
Relative Humidity:	55 %
ATM Pressure:	1011 mbar

4.7 Summary of Test Results/Plots

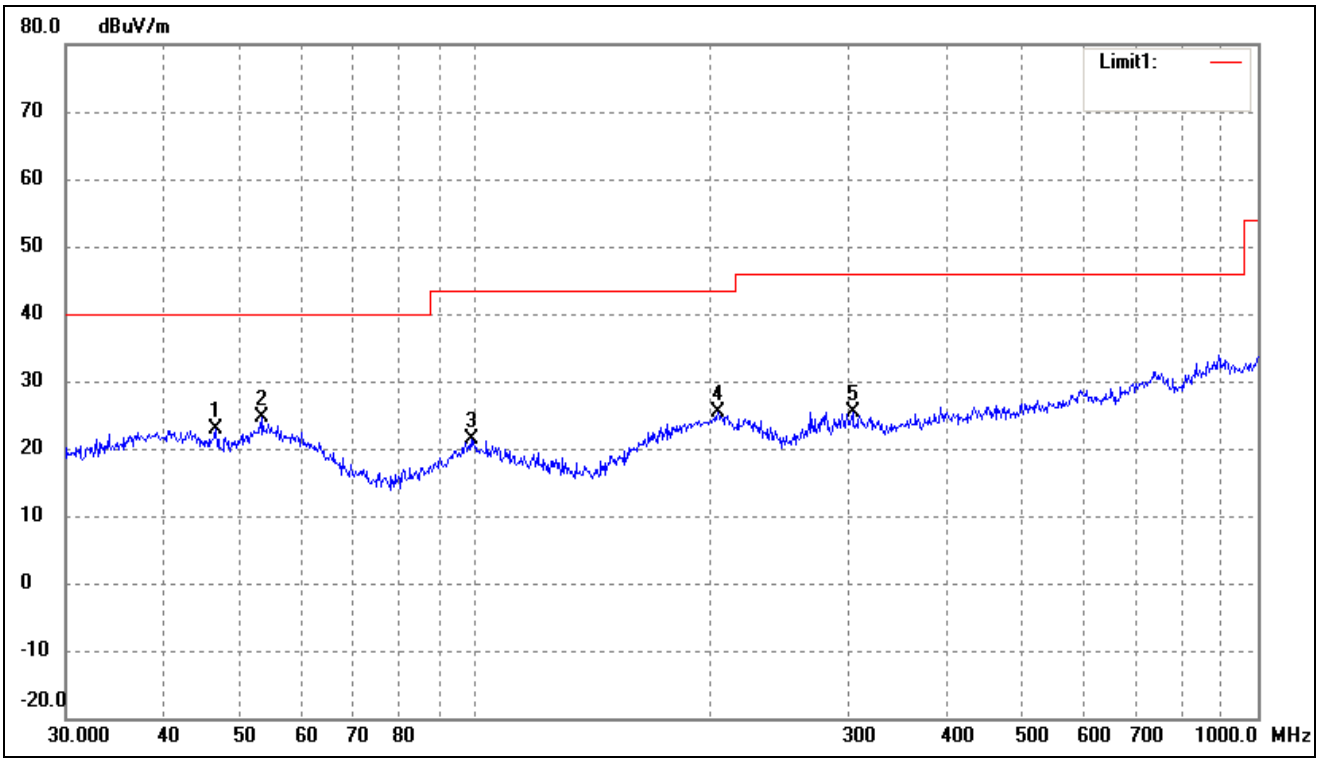
According to the data, the EUT complied with the FCC Part 15.109(a) rule, and had the worst margin of:

-1.43 dB at **721.7259 MHz** in the **Horizontal** polarization, **9 kHz** to **1 GHz**, **3Meters**

Plot of Radiated Emissions Test Data

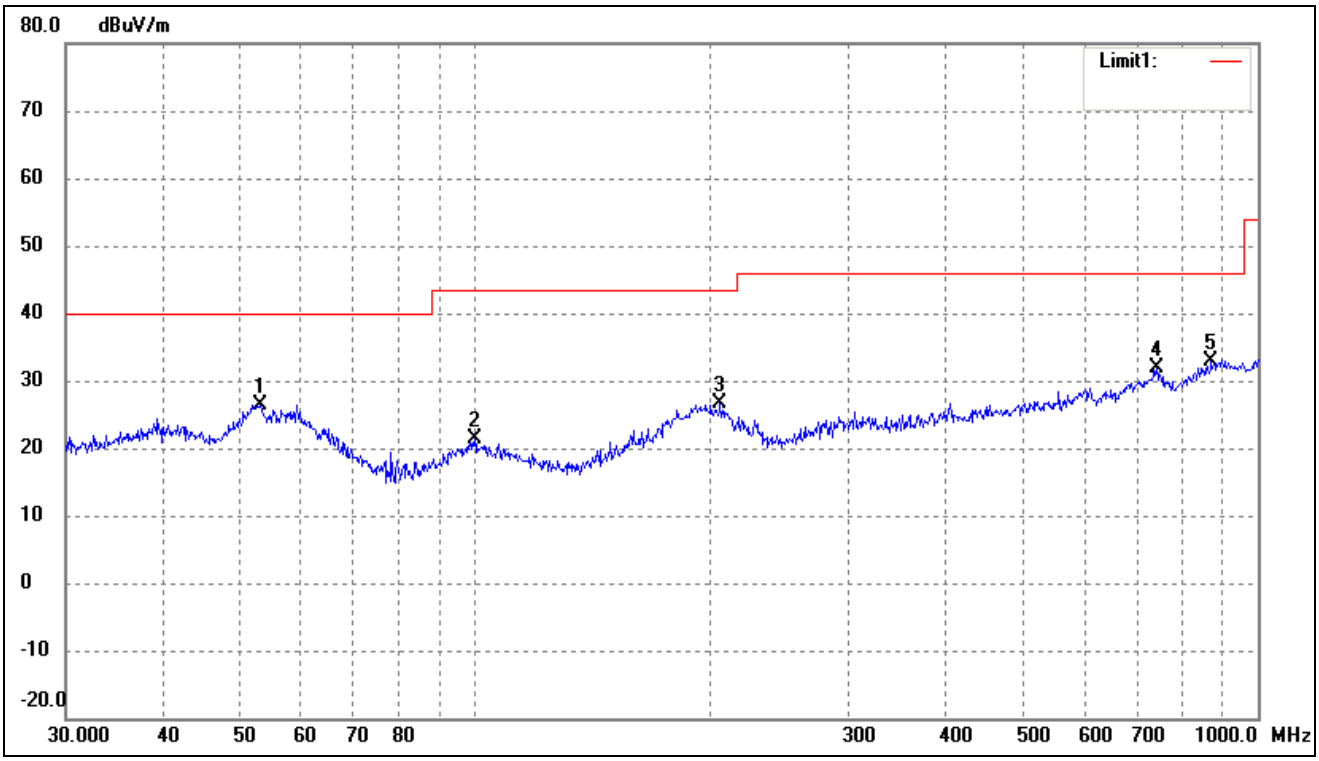
EUT: *mophie space pack*
Tested Model: *SP-IP6P-32GB-BLK*
Operating Condition: *TM1*
Comment: *AC 120V/60Hz; Adapter DC 5V*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	46.6664	15.24	7.59	22.83	40.00	-17.17	98	100	QP
2	53.5052	17.35	7.31	24.66	40.00	-15.34	126	100	QP
3	98.8326	15.64	5.84	21.48	43.50	-22.02	100	100	QP
4	204.2377	21.39	3.99	25.38	43.50	-18.12	329	100	QP
5	303.5437	16.26	9.19	25.45	46.00	-20.55	203	100	QP

Test Specification: *Vertical*

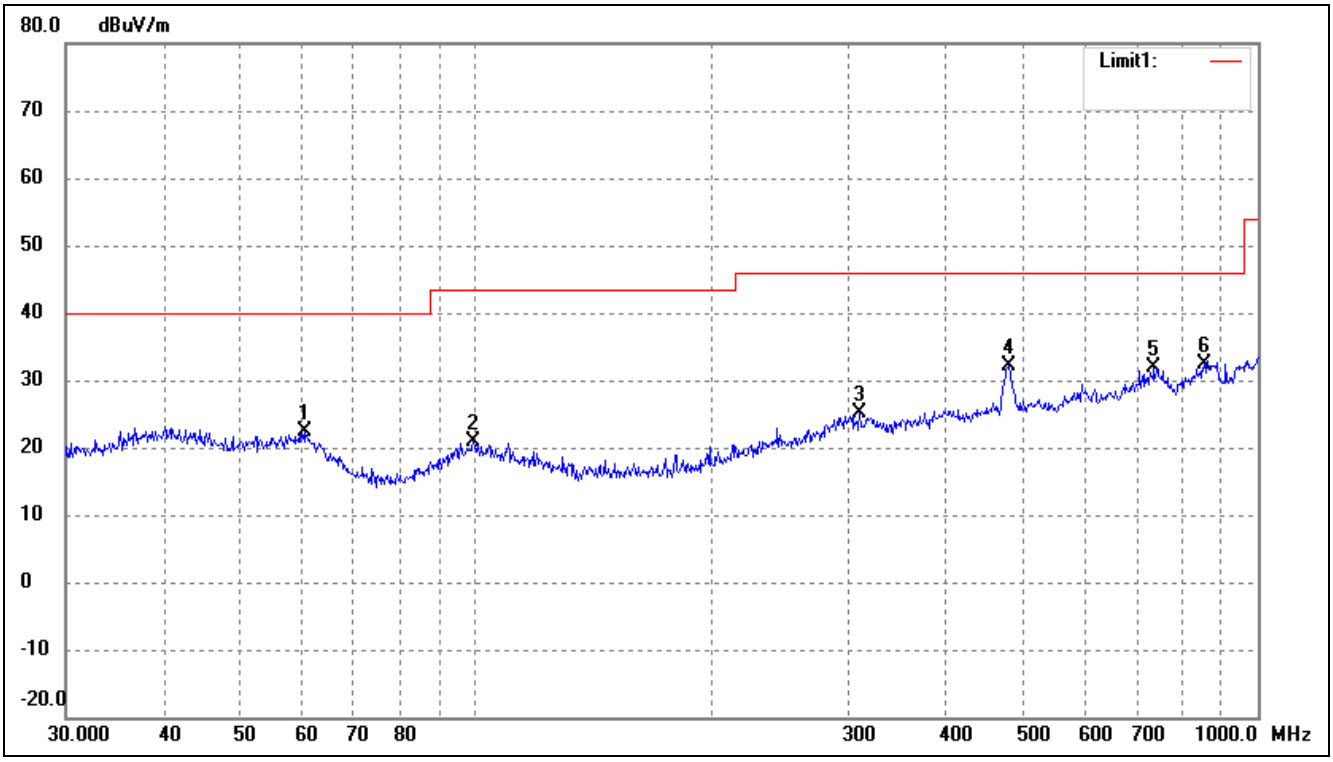


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	Factor(dB)	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	53.1313	19.87	6.61	26.48	40.00	-13.52	65	100	QP
2	99.8777	15.25	6.10	21.35	43.50	-22.15	125	100	QP
3	205.6751	22.44	4.08	26.52	43.50	-16.98	98	100	QP
4	742.2587	16.51	15.45	31.96	46.00	-14.04	236	100	QP
5	872.1832	16.23	16.61	32.84	46.00	-13.16	156	100	QP

Plot of Radiated Emissions Test Data

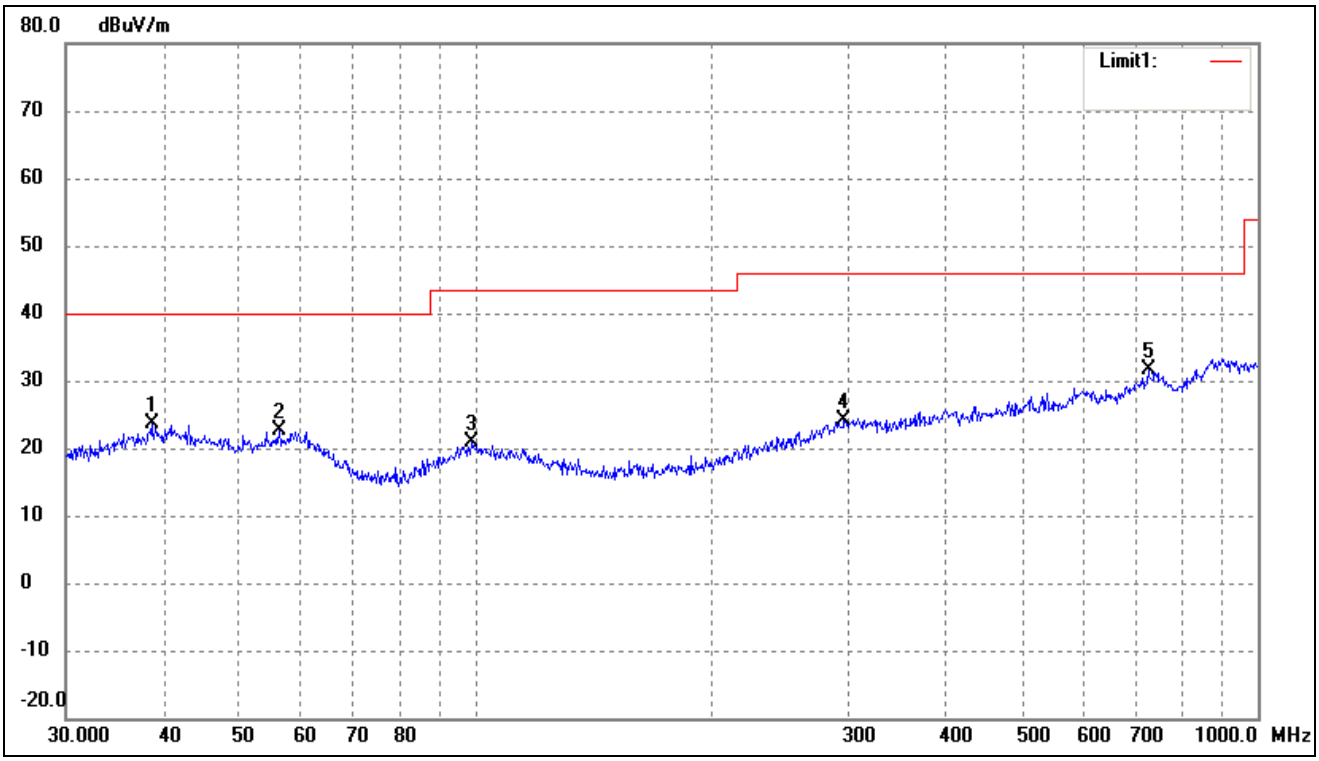
EUT: *mophie space pack*
Tested Model: *SP-IP6P-32GB-BLK*
Operating Condition: *TM2*
Comment: *DC 5V output*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	60.7044	15.42	7.01	22.43	40.00	-17.57	165	100	QP
2	99.5281	14.85	6.01	20.86	43.50	-22.64	231	100	QP
3	309.9977	16.02	9.23	25.25	46.00	-20.75	165	100	QP
4	480.5276	21.95	10.12	32.07	46.00	-13.93	120	100	QP
5	737.0714	18.39	13.37	31.76	46.00	-14.24	103	100	QP
6	854.0247	16.26	16.08	32.34	46.00	-13.66	98	100	QP

Test Specification: *Vertical*

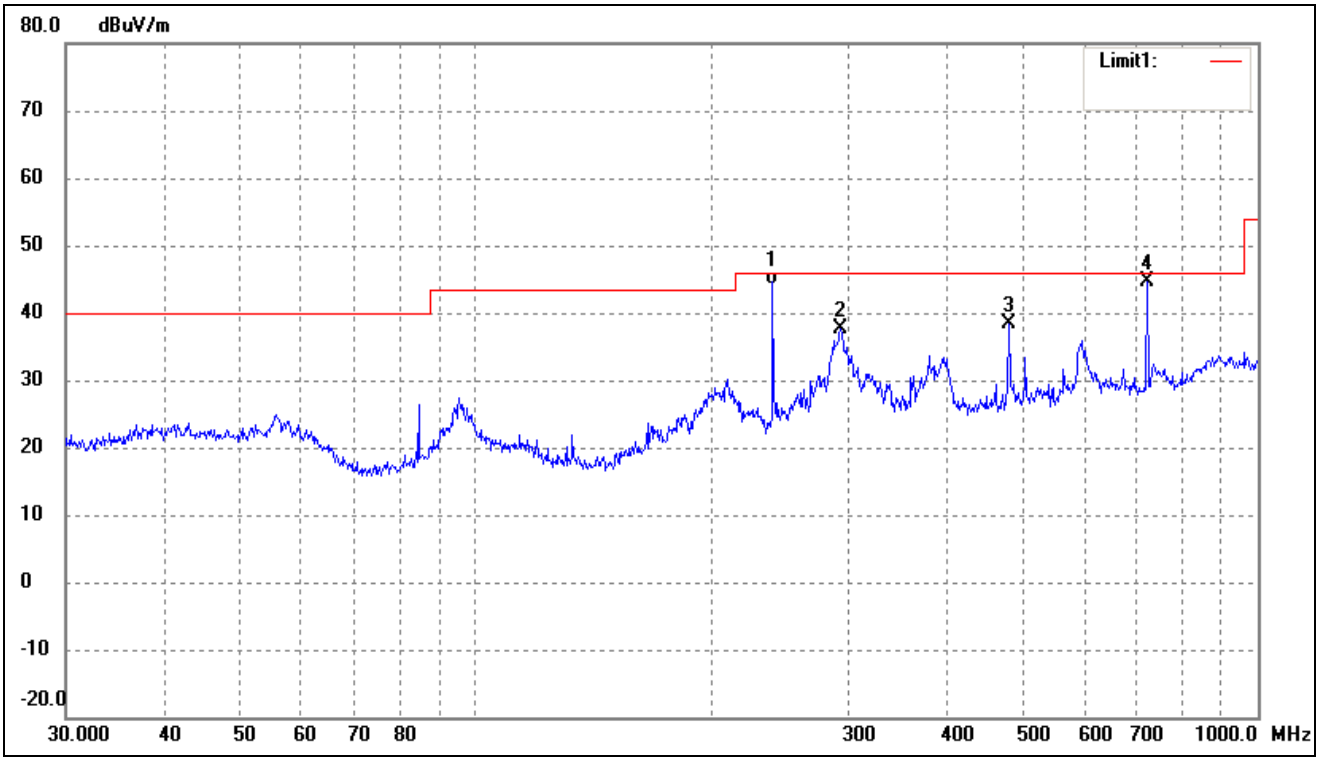


No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	38.6160	15.67	7.87	23.54	40.00	-16.46	165	100	QP
2	56.1974	15.78	6.95	22.73	40.00	-17.27	212	100	QP
3	98.8326	15.06	5.84	20.90	43.50	-22.60	68	100	QP
4	296.1836	15.14	9.03	24.17	46.00	-21.83	101	100	QP
5	724.2611	16.96	14.62	31.58	46.00	-14.42	98	100	QP

Plot of Radiated Emissions Test Data

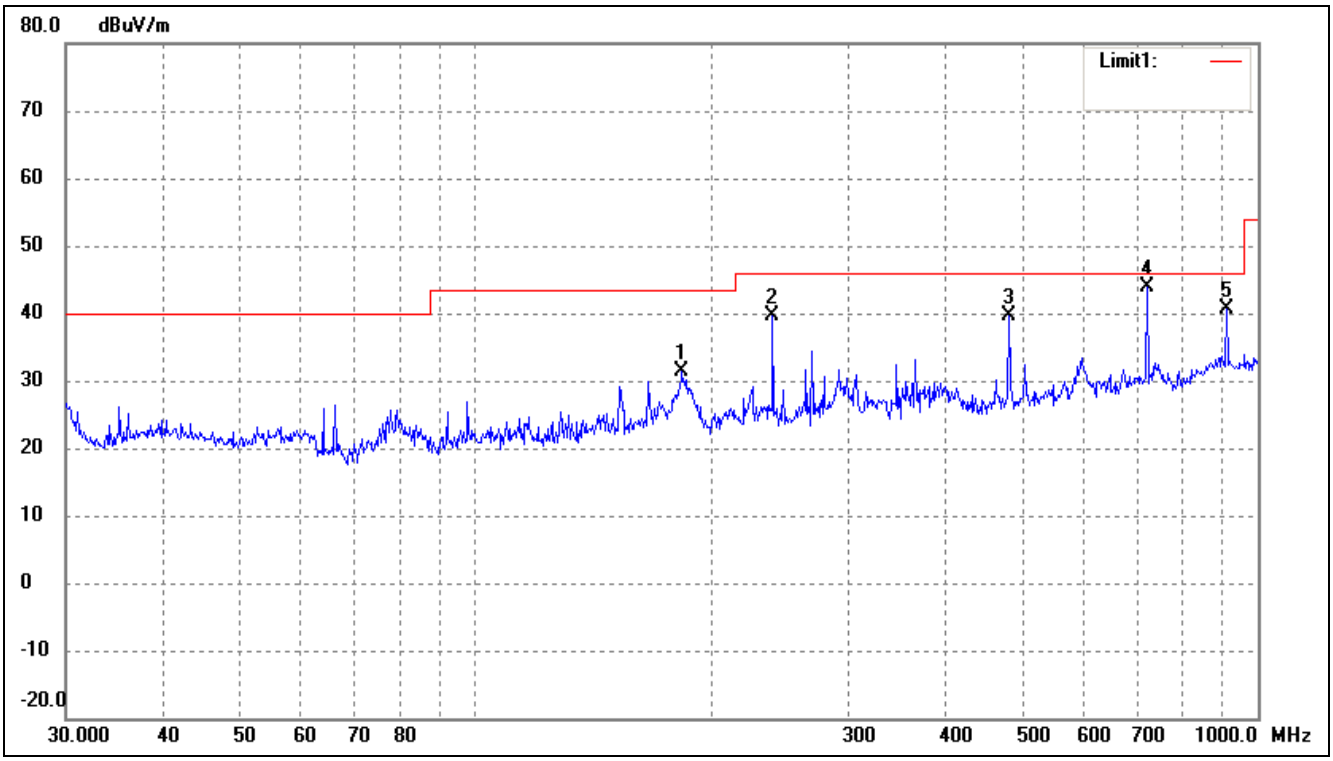
EUT: *mophie space pack*
Tested Model: *SP-IP6P-32GB-BLK*
Operating Condition: *TM3*
Comment: *USB DC5V*

Test Specification: *Horizontal*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	239.9874	37.73	6.33	44.06	46.00	-1.94	100	120	QP
2	293.0842	28.67	8.90	37.57	46.00	-8.43	98	164	QP
3	480.5276	28.31	10.12	38.43	46.00	-7.57	213	65	QP
4	721.7259	32.10	12.47	44.57	46.00	-1.43	213	101	QP

Test Specification: *Vertical*



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	(•)	(cm)	
1	183.8440	28.48	2.93	31.41	43.50	-12.09	132	100	QP
2	239.9874	33.30	6.33	39.63	46.00	-6.37	120	100	QP
3	480.5276	29.47	10.12	39.59	46.00	-6.41	156	100	QP
4	721.7259	29.49	14.47	43.96	46.00	-2.04	62	100	QP
5	912.8620	24.09	16.62	40.71	46.00	-5.29	231	100	QP

The measurements greater than 20dB below the limit from 9kHz to 30MHz and test data are not provided.

******* END OF REPORT *******