

FCC PART 15B
MEASUREMENT AND TEST REPORT

For

VIRTUAL TRUNK PTE LTD

12 Kallang Avenue The Annex #04-30, Aperia, Singapore 339511

FCC ID: 2AKDA-VT26W

Report Type: Original Report	Product Type: IP WALKIE TALKIE
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Report Number: RSHA171109004-00D	
Report Date: 2018-02-26	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	VIRTUAL TRUNK PTE LTD
Test Model	VT26W
Product	IP WALKIE TALKIE
Rate Voltage	DC 5.0V charging by adapter, battery voltage DC 3.7V
Highest Operation Frequency	2480MHz
Dimension	26.5 mm (L)* 60 mm (W)*131 mm(H)

Adapter Information:

Model: K2001U-1004UL

Input: AC100-240 V 50/60Hz 0.35A

Output: 5.0V, 2000mA

**All measurement and test data in this report was gathered from production sample serial number: 20171109004 (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2017-11-09.*

Objective

This report is prepared on behalf of VIRTUAL TRUNK PTE LTD in accordance with Part 2-Subpart J, and Part 15-Subparts A and B of the Federal Communication Commission's rules.

The objective of the manufacturer is to determine the compliance of EUT with FCC Part 15, Class B digital device.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS & DSS and Part 22H24E PCE submission with FCC ID: 2AKDA-VT26W.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2014, 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test mode 1: DC Port Charging & Playing music

Test mode 2: Desktop Charging & Playing music

Test mode 3: Data Transmission & Playing music

EUT Exercise Software

No software was used to test.

Special Accessories

No special accessory was used.

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

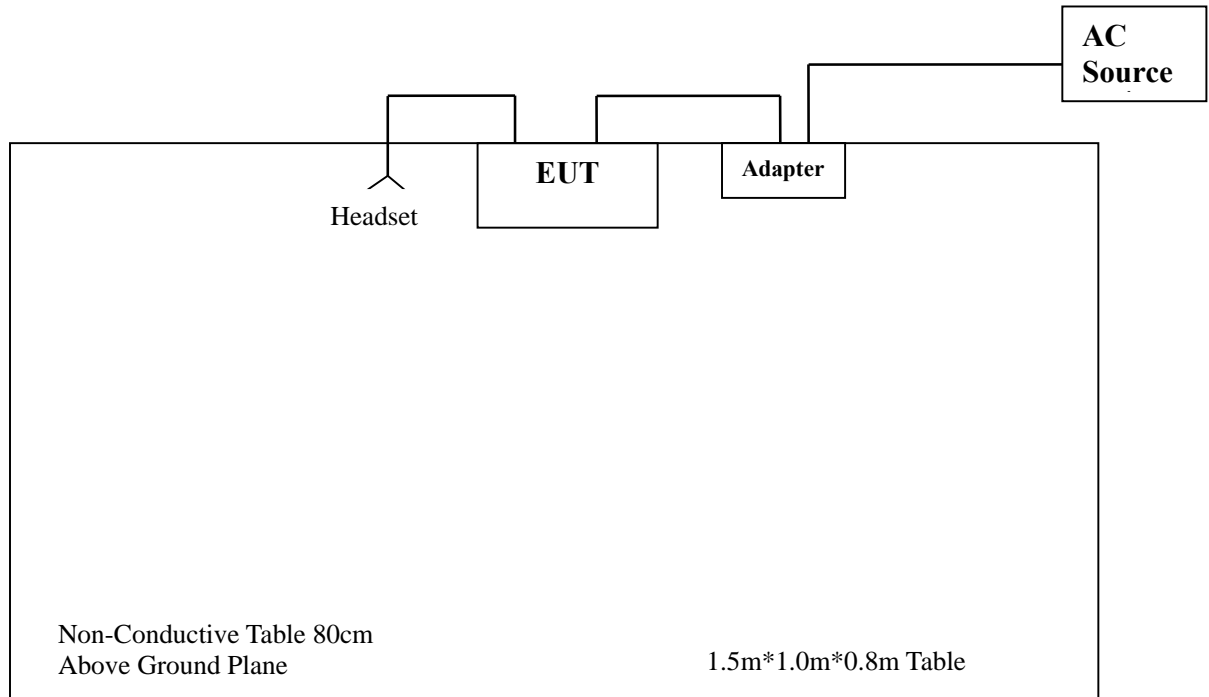
Manufacturer	Description	Model	Serial Number
BOLD	Headset	/	/
DELL	Notebook	E6410	3094742521
Logitech	Keyboard	Y-U0009	1648MG010PW8
Logitech	Mouse	M-U0026	HS529HB
DELL	Monitor	015K3N	00190-098-766-241
/	SIM Card	/	/
Sandisk	SD Card	16GB	/

External I/O Cable

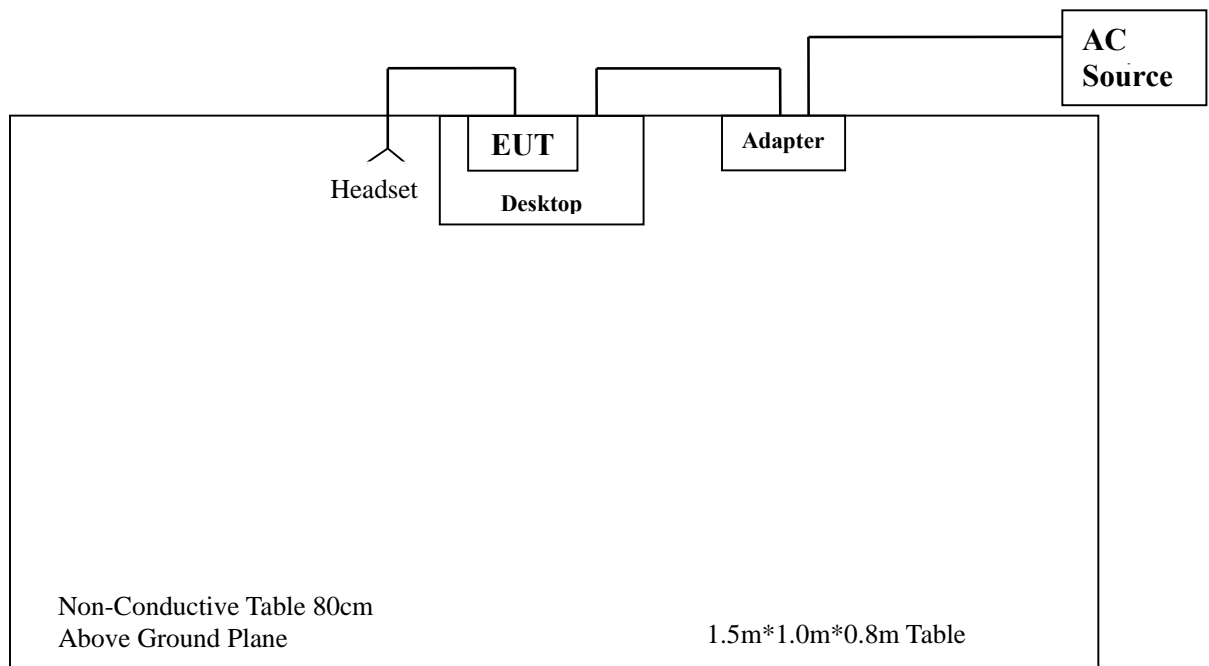
Cable Description	Length (m)	From/Port	To
Power Cable	1.0	Adapter	AC Source
USB Cable	1.0	EUT	Notebook
Keyboard USB Cable	1.0	Notebook	Keyboard
Mouse USB Cable	1.0	Notebook	Mouse
VGA Cable	1.2	Notebook	Monitor

Block Diagram of Radiated Test Setup

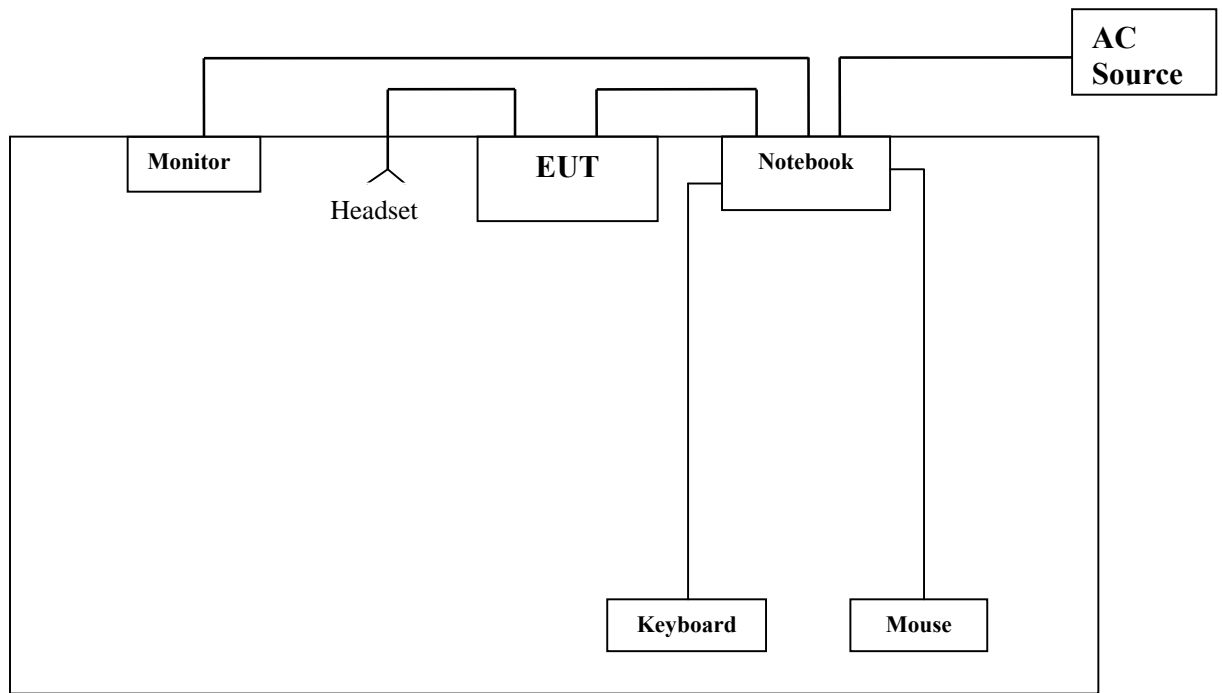
Test mode 1



Test mode 2



Test mode 3



Non-Conductive Table 80cm
Above Ground Plane

1.5m*1.0m*0.8m Table

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliance
§15.109	Radiated Emissions	Compliance

FCC §15.107 –CONDUCTED EMISSIONS

Applicable Standard

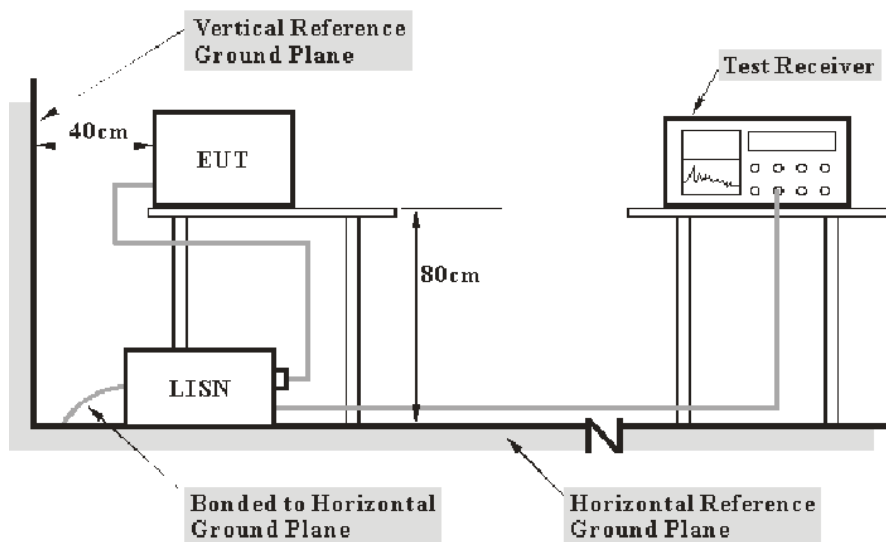
According to FCC§15.107

Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements may be receiver reading, attenuation of the connection between LISN and receiver, LISN voltage division factor, LISN VDF frequency interpolation and receiver related input quantities, etc.

Item		Measurement Uncertainty	U_{cispr}
AMN	150kHz~30MHz	3.19 dB	3.4~3.8 dB
AAN	150kHz~30MHz	4.69 dB	5.0 dB

EUT Setup



- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The measurement procedure of EUT setup is according with ANSI C63.4-2014. The related limit was specified in FCC Part 15.107 CLASS B.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	834115/007	2017-11-12	2018-11-11
ROHDE&SCHWARZ	LISN	ENV216	3560655016	2017-11-12	2018-11-11
BACL	Auto test Software	BACL-EMC	CE001	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2017-08-15	2018-08-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Factor & Margin Calculation

The Corrected factor is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation. The basic equation is as follows:

$$\text{Correction Amplitude} = \text{Meter Reading} + \text{VDF} + \text{Cable Loss} + \text{Transient Limiter Attenuation}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data**Environmental Conditions**

Temperature:	24°C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Annie Xuan on 2018-02-07.

Test Mode 1**Line:**

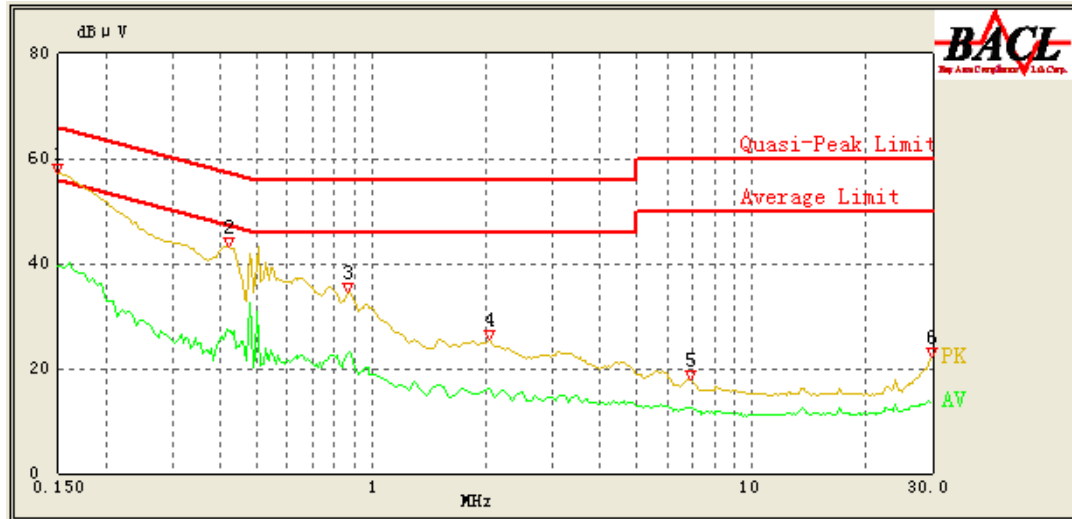
Frequency (MHz)	Reading (dBμV)	Correction (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.155	56.94	16.06	65.86	8.92	QP
0.155	39.86	16.06	55.86	16.00	AV
0.295	46.31	16.03	61.86	15.55	QP
0.295	29.07	16.03	51.86	22.79	AV
0.495	45.31	16.08	56.14	10.83	QP
0.495	28.65	16.08	46.14	17.49	AV
0.965	38.36	15.89	56.00	17.64	QP
0.965	22.69	15.89	46.00	23.31	AV
2.450	29.66	15.85	56.00	26.34	QP
2.450	17.25	15.85	46.00	28.75	AV
6.700	20.58	15.96	60.00	39.42	QP
6.700	13.66	15.96	50.00	36.34	AV

Neutral:

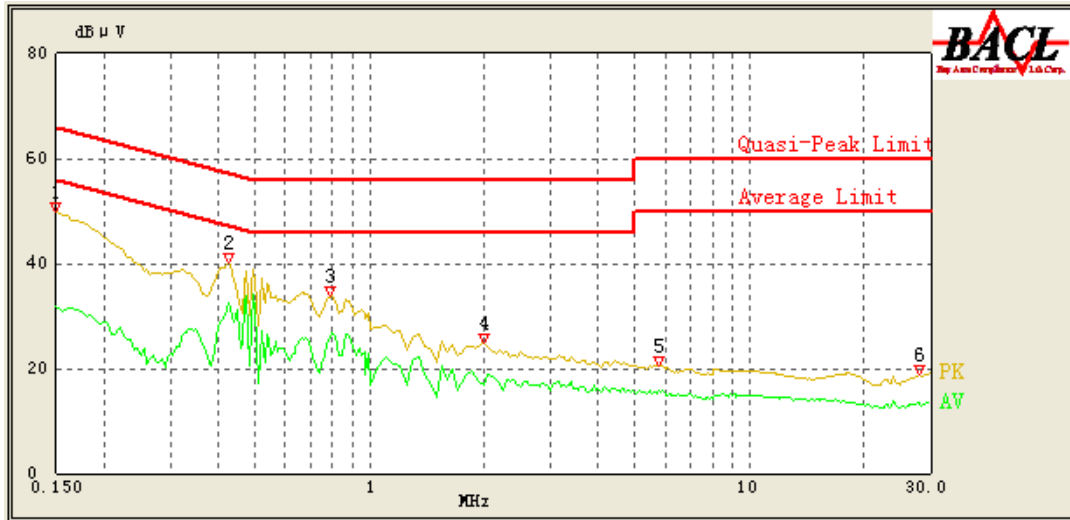
Frequency (MHz)	Reading (dBμV)	Correction (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.150	63.97	16.06	66.00	2.03	QP
0.150	47.42	16.06	56.00	8.58	AV
0.210	55.33	16.05	64.29	8.96	QP
0.210	39.32	16.05	54.29	14.97	AV
0.500	47.27	16.11	56.00	8.73	QP
0.505	32.93	16.11	46.00	13.07	AV
0.910	38.63	15.95	56.00	17.37	QP
0.910	28.84	15.95	46.00	17.16	AV
2.500	27.93	15.90	56.00	28.07	QP
2.500	20.35	15.90	46.00	25.65	AV
9.050	24.48	15.97	60.00	35.52	QP
9.050	18.63	15.97	50.00	31.37	AV

Test Mode 2

Line:



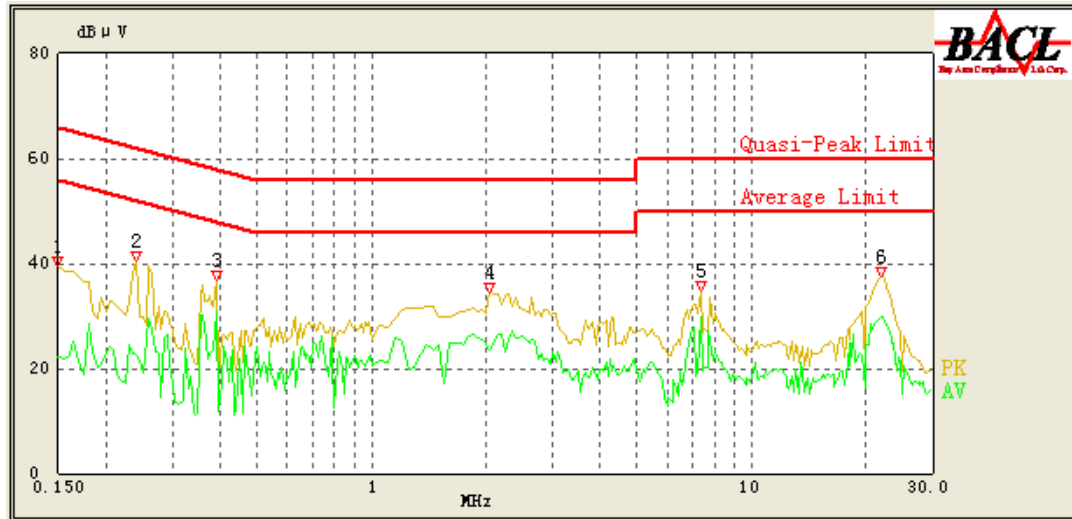
Frequency (MHz)	Reading (dBμV)	Correction (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.150	57.32	16.06	66.00	8.68	QP
0.150	39.36	16.06	56.00	16.64	AV
0.420	43.24	16.06	58.29	15.05	QP
0.420	27.26	16.06	48.29	21.03	AV
0.870	34.46	15.91	56.00	21.54	QP
0.870	22.96	15.91	46.00	23.04	AV
2.050	25.36	15.85	56.00	30.64	QP
2.050	16.04	15.85	46.00	29.96	AV
6.900	17.91	15.97	60.00	42.09	QP
6.900	12.63	15.97	50.00	37.37	AV
29.750	22.24	16.58	60.00	37.76	QP
29.900	13.99	16.59	50.00	36.01	AV

Neutral:

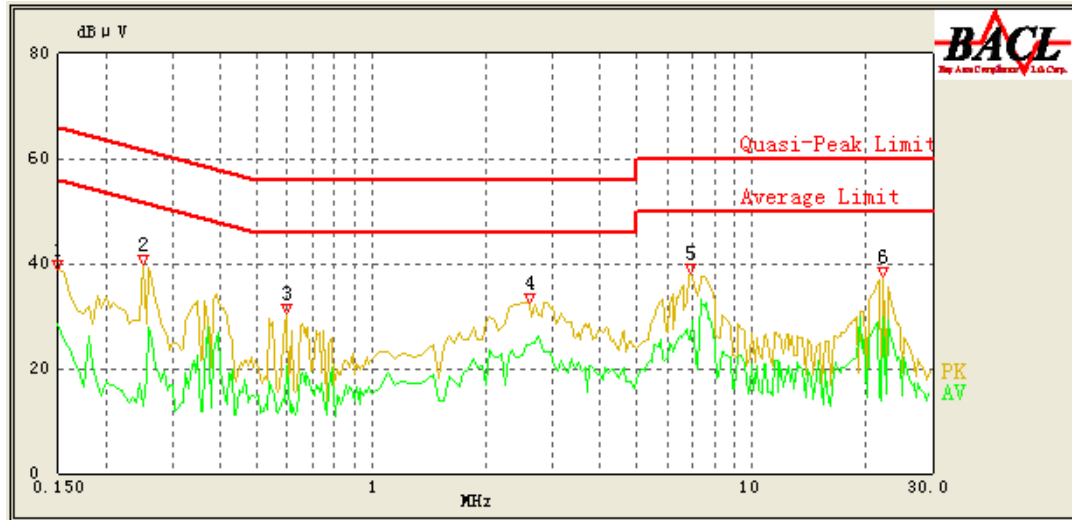
Frequency (MHz)	Reading (dBμV)	Correction (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.150	49.87	16.06	66.00	16.13	QP
0.150	31.96	16.06	56.00	24.04	AV
0.425	40.12	16.10	58.14	18.02	QP
0.425	32.48	16.10	48.14	15.66	AV
0.790	33.78	15.97	56.00	22.22	QP
0.795	26.58	15.97	46.00	19.42	AV
2.000	24.69	15.91	56.00	31.31	QP
2.000	16.94	15.91	46.00	29.06	AV
5.750	20.60	15.89	60.00	39.40	QP
5.750	15.73	15.89	50.00	34.27	AV
28.000	18.90	16.30	60.00	41.10	QP
28.000	13.44	16.30	50.00	36.56	AV

Test Mode 3

Line:



Frequency (MHz)	Reading (dBμV)	Correction (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.150	39.38	16.06	66.00	26.62	QP
0.150	22.07	16.06	56.00	33.93	AV
0.240	40.49	16.02	63.43	22.94	QP
0.240	22.36	16.02	53.43	31.07	AV
0.390	36.82	16.05	59.14	22.32	QP
0.390	30.68	16.05	49.14	18.46	AV
2.050	34.58	15.85	56.00	21.42	QP
2.050	23.49	15.85	46.00	22.51	AV
7.350	34.83	15.99	60.00	25.17	QP
7.350	29.90	15.99	50.00	20.10	AV
22.050	37.50	16.45	60.00	22.50	QP
22.050	30.00	16.45	50.00	20.00	AV

Neutral:

Frequency (MHz)	Reading (dBμV)	Correction (dB)	Limit (dBμV)	Margin (dB)	Detector (PK/AV/QP)
0.150	38.81	16.06	66.00	27.19	QP
0.150	28.42	16.06	56.00	27.58	AV
0.250	39.95	16.06	63.14	23.19	QP
0.250	12.72	16.06	53.14	40.42	AV
0.600	30.66	16.05	56.00	25.34	QP
0.600	20.43	16.05	46.00	25.57	AV
2.600	32.64	15.90	56.00	23.36	QP
2.600	24.42	15.90	46.00	21.58	AV
6.900	38.06	15.92	60.00	21.94	QP
6.900	25.55	15.92	50.00	24.45	AV
22.200	37.52	16.20	60.00	22.48	QP
22.250	29.78	16.20	50.00	20.22	AV

FCC §15.109 - RADIATED EMISSIONS

Applicable Standard

FCC §15.109

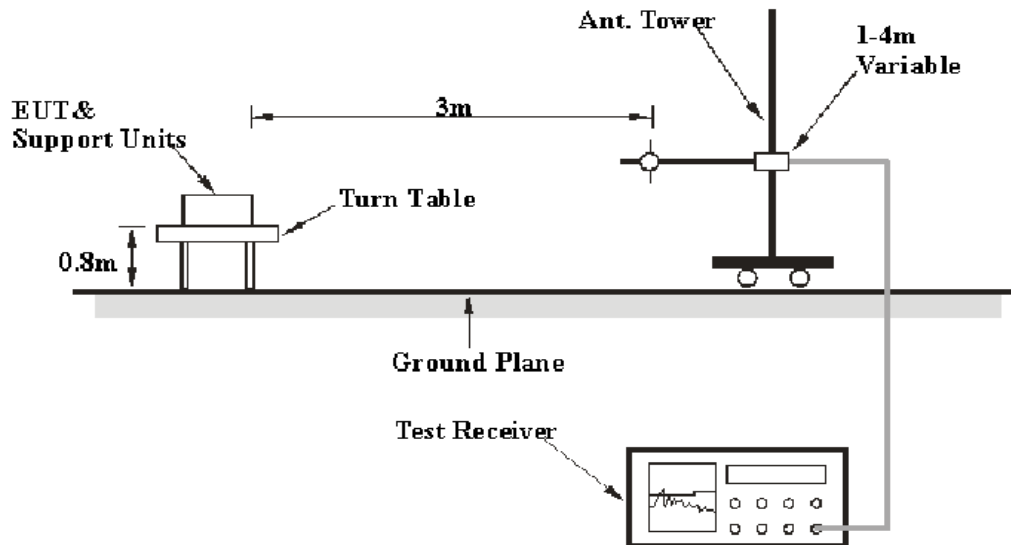
Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

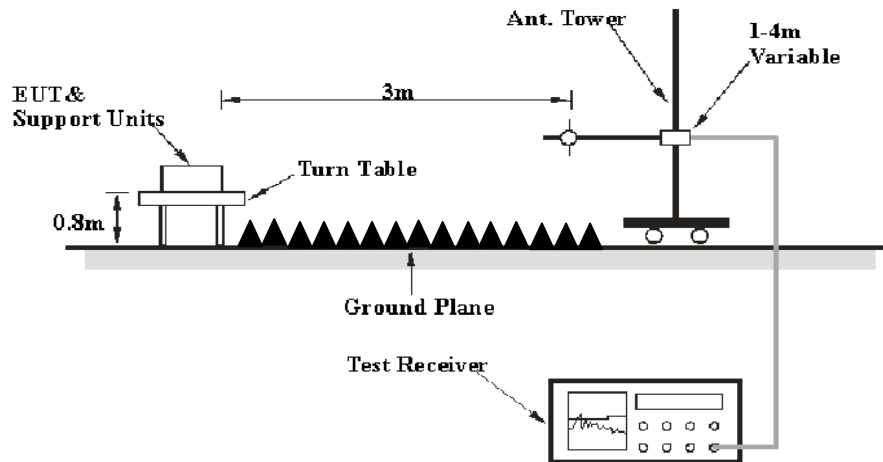
Item		Measurement Uncertainty	U_{cispr}
Radiated Emission	30MHz~1GHz	6.11dB	6.3 dB
	1GHz~6GHz	4.45dB	5.2 dB
	6 GHz ~18 GHz	5.23dB	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 Class B limits.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 18 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector Type
30MHz – 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	1 Hz	/	Peak

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz, Peak and average detection mode above 1 GHz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sonoma Instrument	Amplifier	310N	171205	2017-08-15	2018-08-14
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2017-11-12	2018-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Champrotek	Chamber	Chamber A	T-KSEMC049	-	-
R&S	Auto test Software	EMC32	100361	-	-
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
Rohde & Schwarz	EMI Receiver	ESU40	100207	2017-08-27	2018-08-26
Narda	Pre-amplifier	AFS42-00101800	2001270	2017-10-22	2018-10-21
MICRO-COAX	Coaxial Cable	Cable-8	001	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-9	002	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-10	003	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-4	004	2017-12-12	2018-12-11
MICRO-COAX	Coaxial Cable	Cable-5	005	2017-12-12	2018-12-11

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Corrected Amplitude & Margin Calculation

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

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

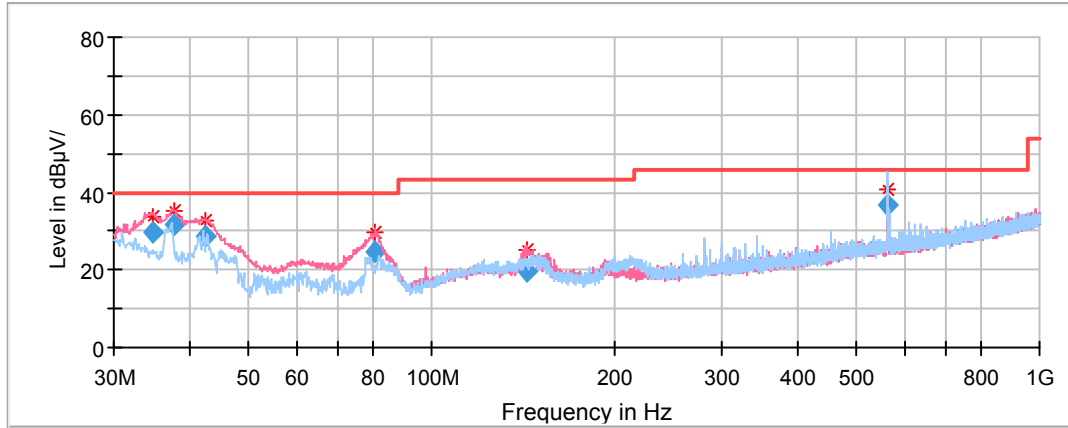
The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Data**Environmental Conditions**

Temperature:	20.2 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

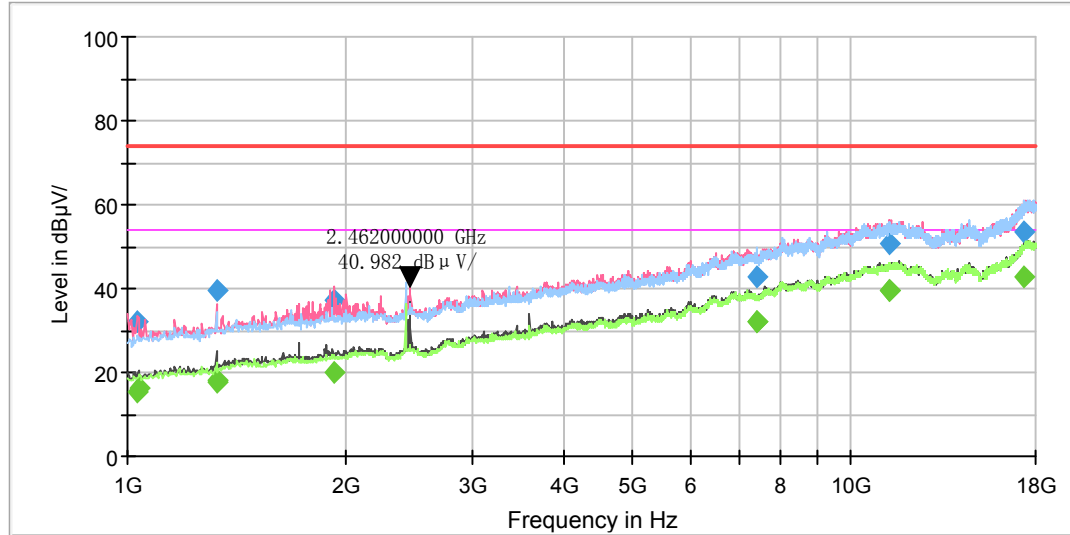
The testing was performed by Annie Xuan on 2018-02-09.

*Test Mode 1***1)30MHz ~ 1GHz**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.834680	29.70	40.00	10.30	101.0	V	283.0	-7.7
37.797340	31.53	40.00	8.47	101.0	V	154.0	-9.7
42.590910	28.44	40.00	11.56	101.0	V	178.0	-12.9
80.417320	24.50	40.00	15.50	101.0	V	151.0	-18.2
143.706440	19.82	43.50	23.68	101.0	V	83.0	-12.5
563.603300	36.51	46.00	9.49	199.0	H	276.0	-5.7

Above 1 GHz:

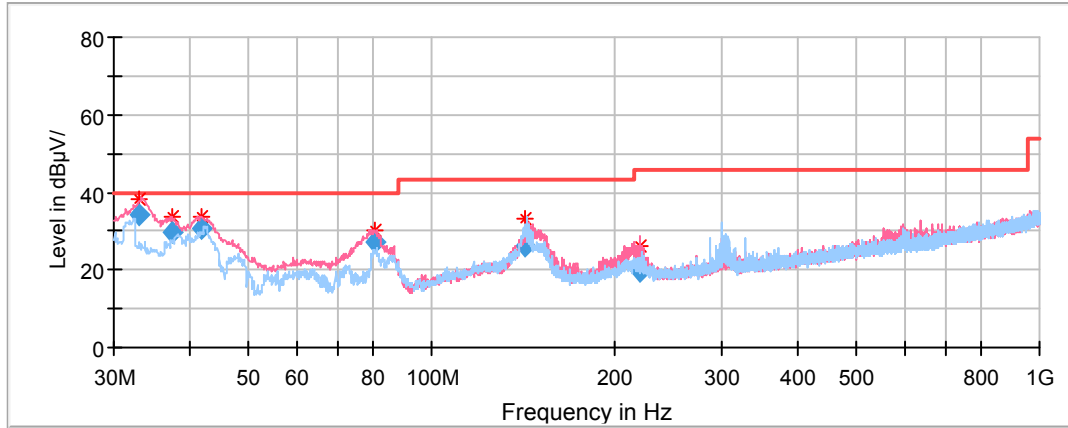
Full Spectrum



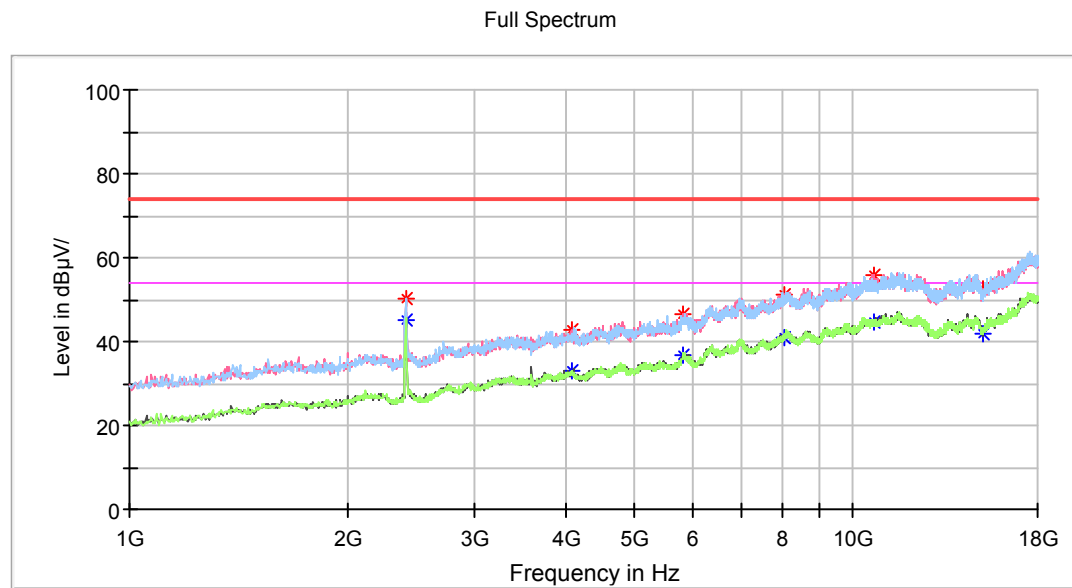
Frequency (MHz)	Max Peak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1072.200000	33.87	---	74.00	40.13	250.0	V	168.0	-11.5
1072.200000	---	16.38	54.00	37.62	250.0	V	168.0	-11.5
1597.400000	---	18.96	54.00	35.04	250.0	V	0.0	-7.6
1597.400000	30.19	---	74.00	43.81	250.0	V	0.0	-7.6
1889.200000	---	21.18	54.00	32.82	250.0	V	57.0	-6.4
1889.200000	42.69	---	74.00	31.31	250.0	V	57.0	-6.4
3729.400000	38.56	---	74.00	35.44	250.0	H	25.0	-0.1
3729.400000	---	27.17	54.00	26.83	250.0	H	25.0	-0.1
9301.400000	---	36.90	54.00	17.10	100.0	V	309.0	14.0
9301.400000	49.28	---	74.00	24.72	100.0	V	309.0	14.0
16988.600000	51.84	---	74.00	22.16	250.0	V	277.0	21.0
16988.600000	---	40.48	54.00	13.52	250.0	V	277.0	21.0

Test Mode 2

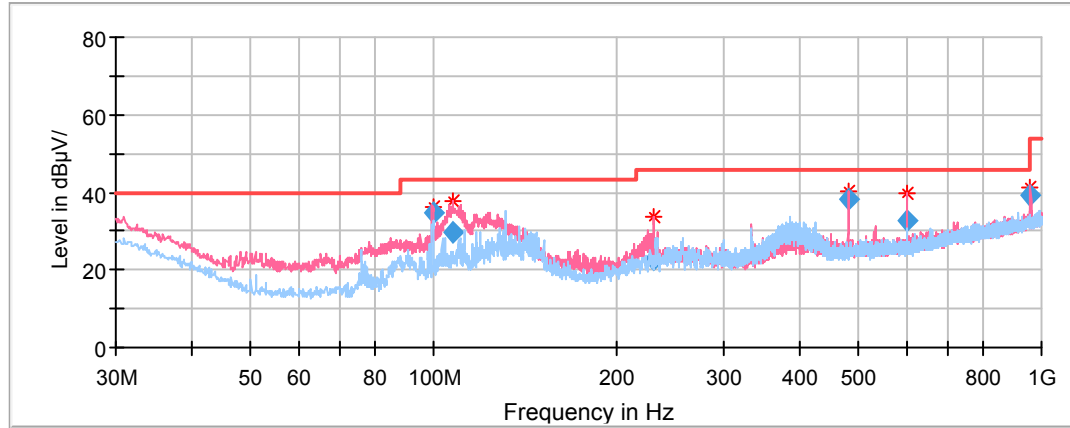
2)30MHz ~ 1GHz



Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
33.132840	34.41	40.00	5.59	101.0	V	137.0	-6.5
37.428590	29.72	40.00	10.28	101.0	V	159.0	-9.4
41.728770	30.66	40.00	9.34	101.0	V	178.0	-12.3
80.800880	27.09	40.00	12.91	101.0	V	138.0	-18.2
142.550210	26.21	43.50	17.29	199.0	H	234.0	-12.5
219.845440	19.62	46.00	26.38	101.0	V	230.0	-12.7

Above 1 GHz:

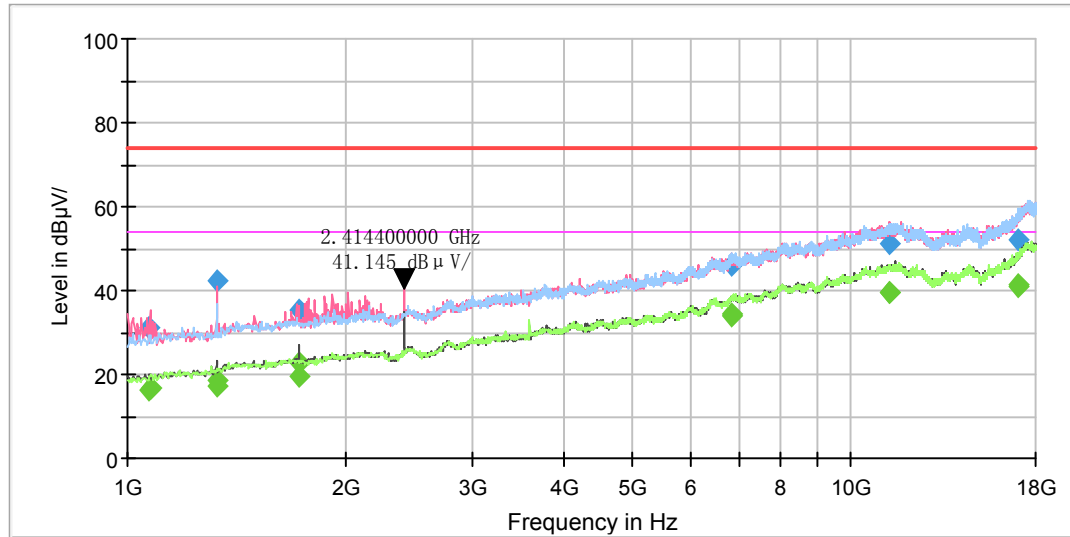
Frequency (MHz)	Max Peak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2411.000000	---	45.16	54.00	8.84	100.0	H	355.0	-4.9
2411.000000	50.46	---	74.00	23.54	100.0	H	355.0	-4.9
4077.000000	---	33.17	54.00	20.83	200.0	H	50.0	1.0
4077.000000	42.98	---	74.00	31.02	200.0	H	50.0	1.0
5821.200000	---	36.92	54.00	17.08	200.0	H	70.0	5.1
5821.200000	46.57	---	74.00	27.43	200.0	H	70.0	5.1
8038.000000	---	40.92	54.00	13.08	200.0	V	8.0	12.1
8038.000000	51.33	---	74.00	22.67	200.0	V	8.0	12.1
10703.600000	---	44.72	54.00	9.28	100.0	V	2.0	17.1
10703.600000	55.96	---	74.00	18.04	100.0	V	2.0	17.1
15120.200000	---	41.76	54.00	12.24	200.0	V	265.0	15.9
15120.200000	52.55	---	74.00	21.45	200.0	V	265.0	15.9

*Test Mode 3***3)30MHz ~ 1GHz**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
99.597500	34.95	43.50	8.55	101.0	V	311.0	-15.5
107.600000	29.64	43.50	13.86	101.0	V	317.0	-13.9
229.820000	22.77	46.00	23.23	101.0	V	200.0	-12.7
479.958750	38.05	46.00	7.95	101.0	V	333.0	-6.6
599.996250	32.85	46.00	13.15	101.0	V	31.0	-5.4
959.987500	39.13	46.00	6.87	101.0	V	318.0	1.4

Above 1 GHz:

Full Spectrum



Frequency (MHz)	Max Peak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1073.400000	---	16.43	54.00	37.57	200.0	V	127.0	-11.5
1073.400000	31.27	---	74.00	42.73	200.0	V	127.0	-11.5
1328.400000	42.19	---	74.00	31.81	150.0	V	52.0	-9.3
1328.400000	---	17.28	54.00	36.72	150.0	V	52.0	-9.3
1724.800000	35.58	---	74.00	38.42	200.0	V	19.0	-7.1
1724.800000	---	22.96	54.00	31.04	200.0	V	19.0	-7.1
6827.600000	46.20	---	74.00	27.80	250.0	V	233.0	9.1
6827.600000	---	34.08	54.00	19.92	250.0	V	233.0	9.1
11328.000000	51.03	---	74.00	22.97	250.0	V	74.0	17.9
11328.000000	---	39.69	54.00	14.31	250.0	V	74.0	17.9
16995.600000	52.26	---	74.00	21.74	200.0	H	193.0	21.0
16995.600000	---	40.85	54.00	13.15	200.0	H	193.0	21.0

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