



Part 15C

TEST REPORT

Product Name	Smartisan T1
Model Name	SM701
FCC ID	2AEUYSM701
Client	Smartisan Technology Co., Ltd
Manufacturer	Smartisan Technology Co., Ltd
Date of issue	July 22, 2015

TA Technology (Shanghai) Co., Ltd.

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GENERAL SUMMARY

Reference Standard(s)	FCC CFR47 Part 15C (2013) Radio Frequency Devices 15.205 Restricted bands of operation; 15.207 Conducted limits; 15.209 Radiated emission limits; general requirements; 15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850MHz. ANSI C63.4 Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40GHz. (2009) KDB 558074 D01 DTS Meas Guidance v03r03 Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 2 of this test report are below limits specified in the relevant standards. General Judgment: Pass
Comment	The test result only responds to the measured sample.

Approved by Kai Xu
Kai Xu
Director

Revised by Lingling Kang
Lingling Kang
RF Manager

Performed by Changxu Wan
Changxu Wan
RF Engineer

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1. General Information

1.1. Notes of the test report

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements. The site recognition number is 428261.

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement. The site recognition number is 8510A.

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. This report only refers to the item that has undergone the test.

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of **TA Technology (Shanghai) Co., Ltd.**

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1.2. Testing laboratory

Company: TA Technology (Shanghai) Co., Ltd.
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City: Shanghai
Post code: 201201
Country: P. R. China
Contact: Xu Kai
Telephone: +86-021-50791141/2/3
Fax: +86-021-50791141/2/3-8000
Website: <http://www.ta-shanghai.com>
E-mail: xukai@ta-shanghai.com

1.3. Applicant Information

Company: Smartisan Technology Co., Ltd
Address: 7th Floor, Motorola Building, 1 East Wangjing Road, Chaoyang District, Beijing,
100102, P.R. China

1.4. Manufacturer Information

Company: Smartisan Technology Co., Ltd
Address: 7th Floor, Motorola Building, 1 East Wangjing Road, Chaoyang District, Beijing,
100102, P.R. China

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1.5. Information of EUT

General information

Product IMEI:	864516020009106
Hardware Version:	MMR500003C
Software Version:	V1.5.0
Antenna Type:	Internal Antenna
Device Operating Configurations:	
Test Mode	Bluetooth(Low Energy)
Modulation Type:	GFSK
Packet Type:(Maximum Payload)	1Mbps
Max. Conducted Power	2.114dBm
Power Supply:	Battery or Charger (AC adaptor)
Operating Frequency Range(s)	2400 ~ 2483.5 MHz

1.6. Test Date

The test is performed from June 20, 2015 to June 29, 2015.

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2. Test Information

2.1. Test Mode

During the process of the testing, The EUT is max power transmission with proper modulation.

EUT is stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

Test Modes		
Band	Radiated Test Cases	Conducted Test Cases
Bluetooth(Low Energy)	Channel 19	Channel 0/19/39

Note: All modes of operation were investigated. The test results shown in the following sections represent the worst case emissions.

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2.2. Summary of test results

Number	Summary of measurements of results	Clause in FCC rules	Verdict
1	Peak Power Output -Conducted	15.247(b)(1)	PASS
2	Occupied Bandwidth (6dB)	15.247(a)(2)	PASS
3	Band Edge Compliance	15.247(d)	PASS
4	Power Spectral Density	15.247(e)	PASS
5	Spurious Radiated Emissions in the restricted band	15.247(d),15.205,15.209	PASS
6	Spurious RF Conducted Emissions	15.247(d)	PASS
7	Radiates Emission	15.247(d),15.205,15.209	PASS
8	AC Power Line Conducted Emission	15.207	PASS

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2.3. Peak Power Output –Conducted

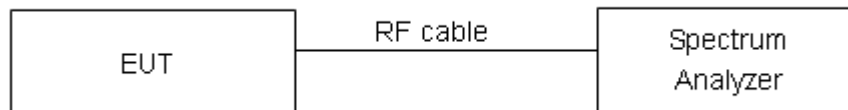
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the spectrum analyzer with a known loss. The EUT is max power transmission with proper modulation. The peak detector is used. RBW is set to 2 MHz; VBW is set to 6 MHz. These measurements have been tested at following channels: 0, 19 and 39 of Bluetooth (Low Energy).

Test Setup



Limits

Rule Part 15.247 (b) (1) specifies that " For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts."

Peak Output Power	$\leq 0.125\text{W}$ (21dBm)
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.44$ dB.

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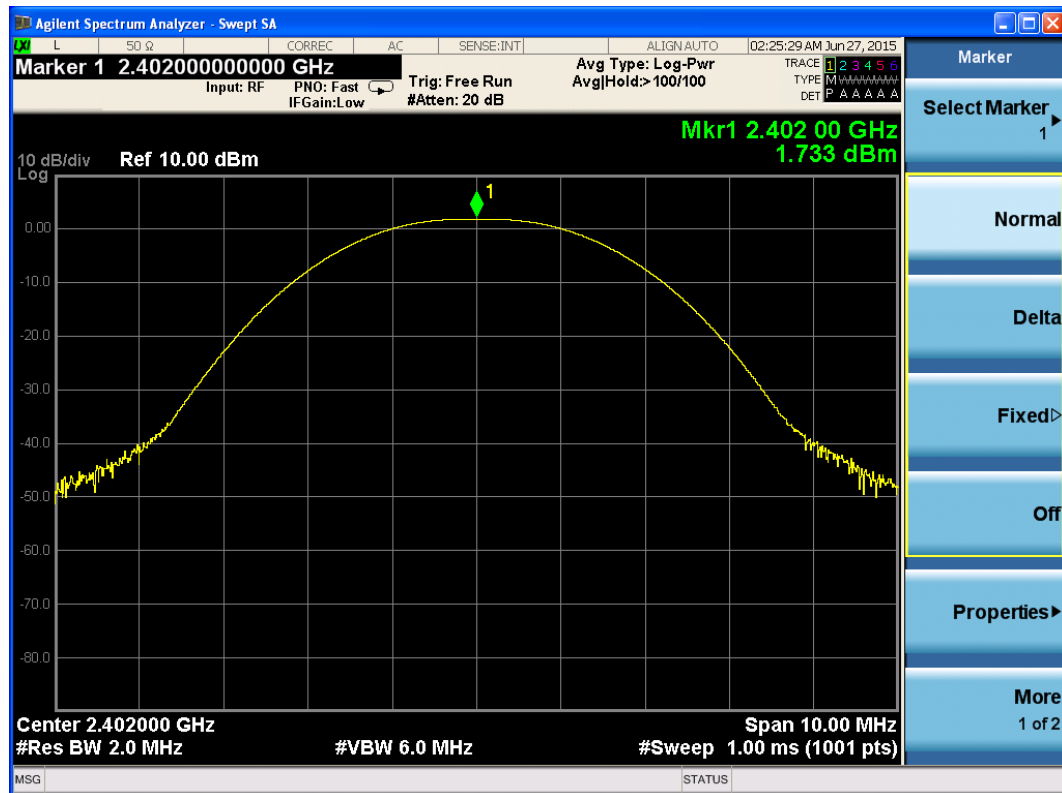
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Test Results

Bluetooth (Low Energy)

Channel	Frequency (MHz)	Peak Output Power (dBm)	Conclusion
		1Mbps	
0	2402	1.733	PASS
19	2440	2.114	PASS
39	2480	1.106	PASS



Carrier frequency (MHz): 2402

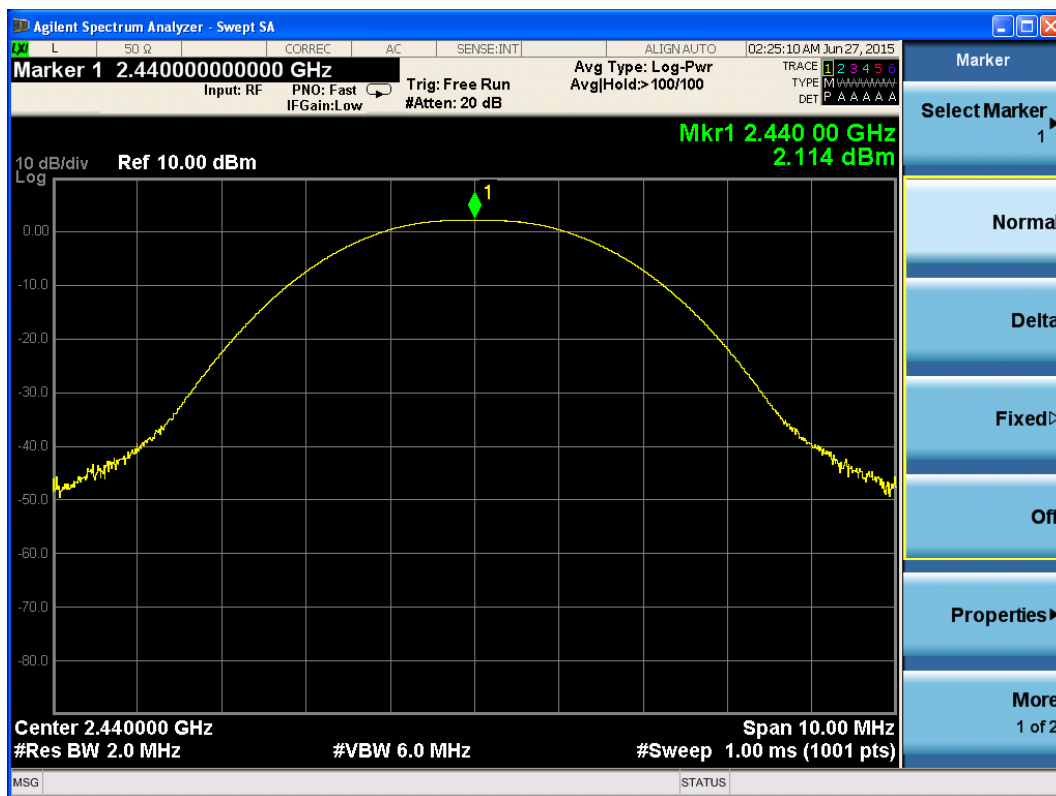
Channel No.:0

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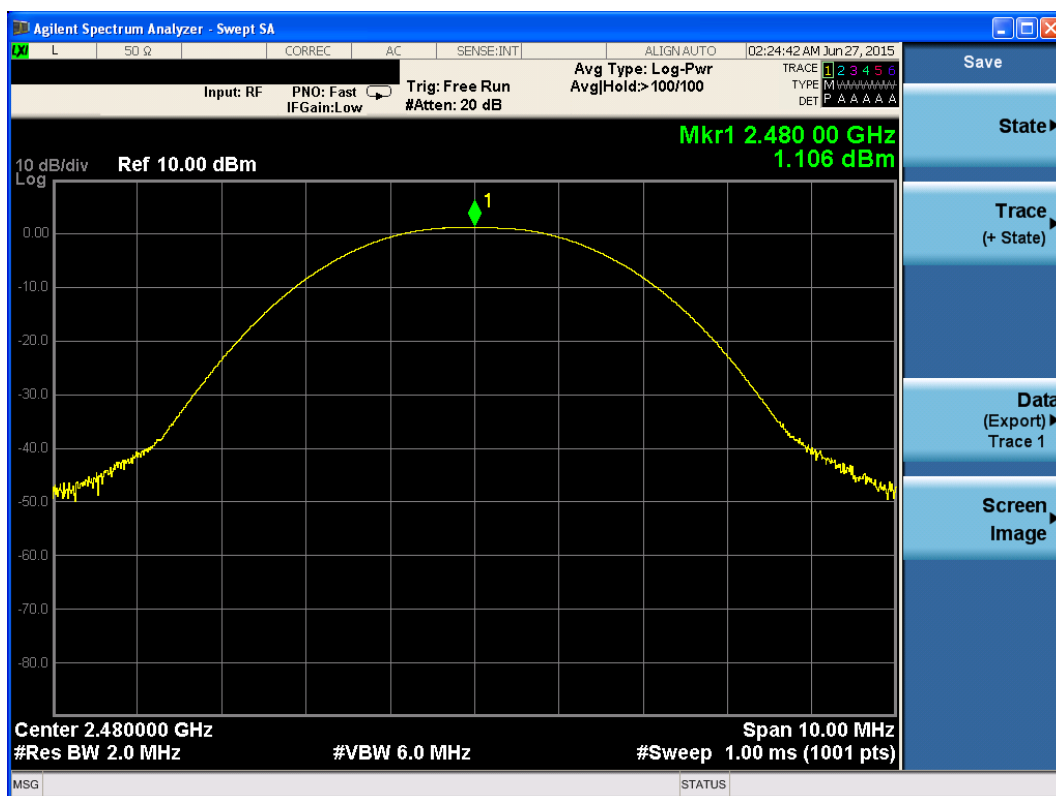
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Carrier frequency (MHz): 2440

Channel No.:19



Carrier frequency (MHz): 2480

Channel No.:39

2.4. 6dB Occupied Bandwidth

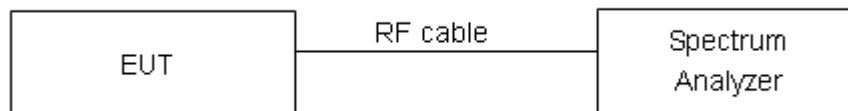
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer with a known loss. The occupied bandwidth is measured using spectrum analyzer. RBW is set to 100 kHz, VBW is set to 300 kHz on spectrum analyzer.

Test Setup



Limits

Rule Part 15.247 (a) (2) specifies that “Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.”

minimum 6 dB bandwidth	≥ 500 kHz
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 936$ Hz.

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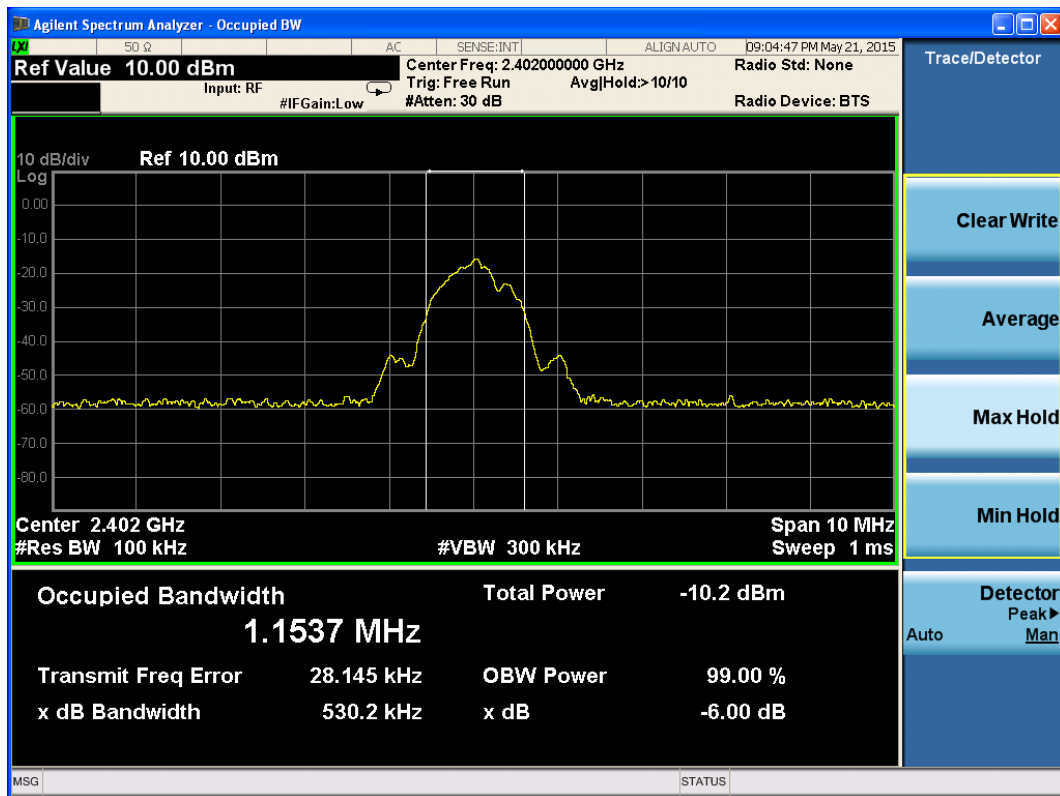
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Test Results:

Bluetooth (Low Energy)

Channel	Frequency (MHz)	6dB Bandwidth (kHz)
0	2402	530.2
19	2440	531.7
39	2480	532.4



Carrier frequency (MHz): 2402

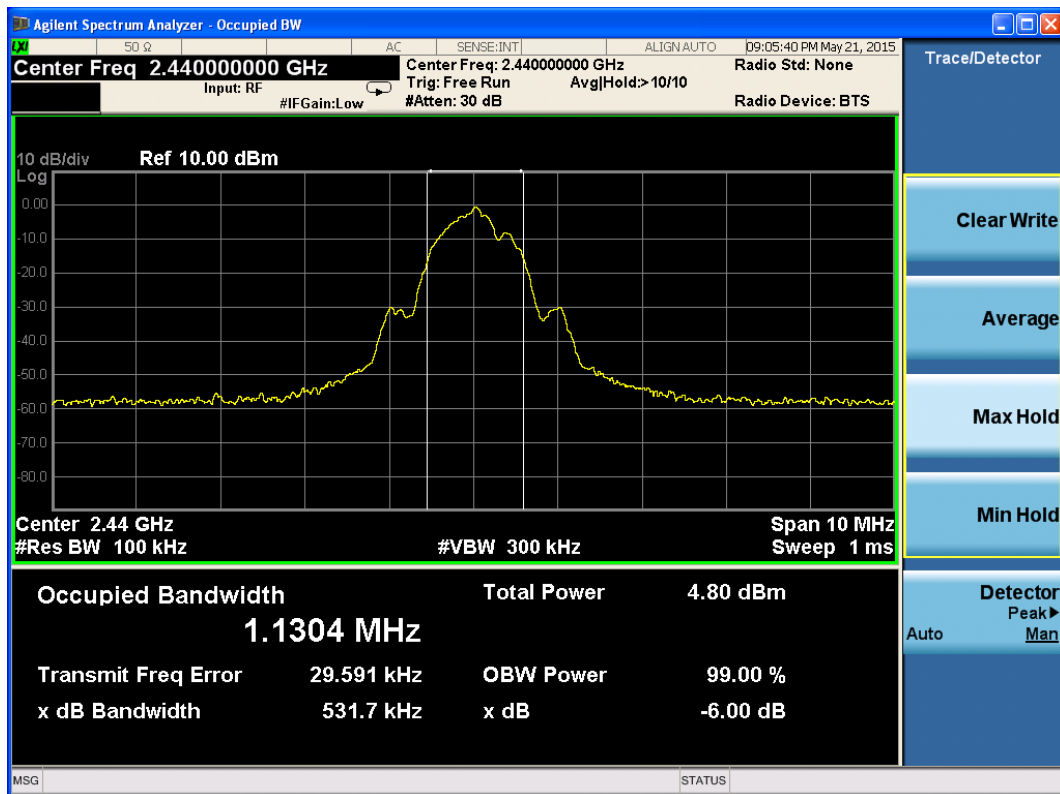
Channel No.:0

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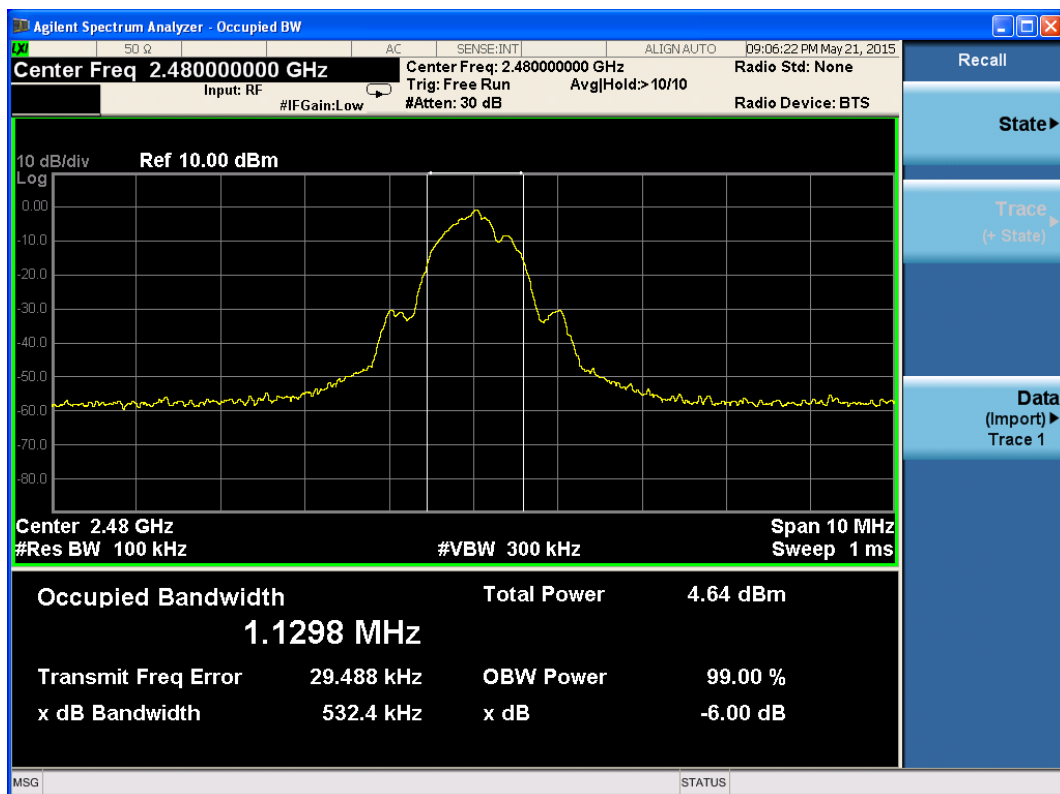
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Carrier frequency (MHz): 2440

Channel No.:19



Carrier frequency (MHz): 2480

Channel No.:39

2.5. Band Edge Compliance

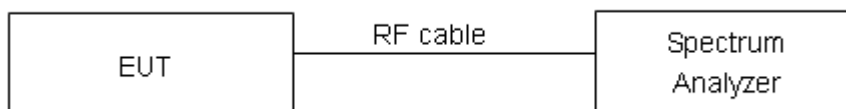
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer with a known loss. The lowest and highest channels were measured. The peak detector is used. RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer.

Test Setup



Limits

Rule Part 15.247(d) specifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.”

Measurement Uncertainty

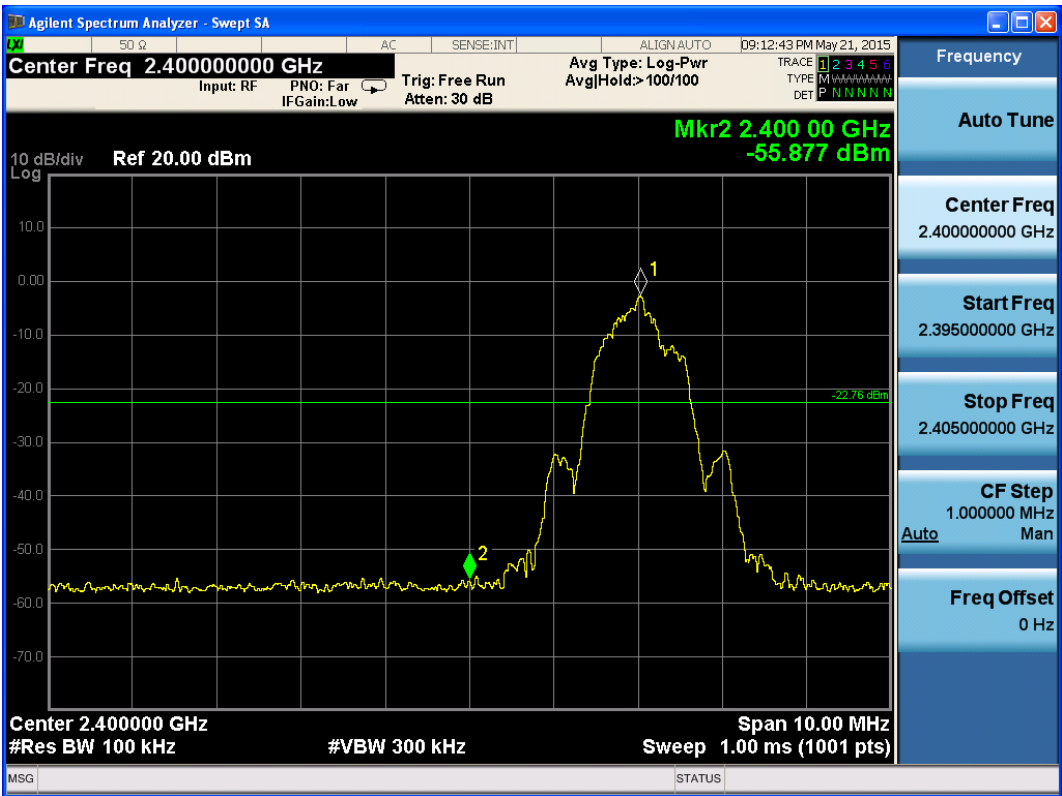
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

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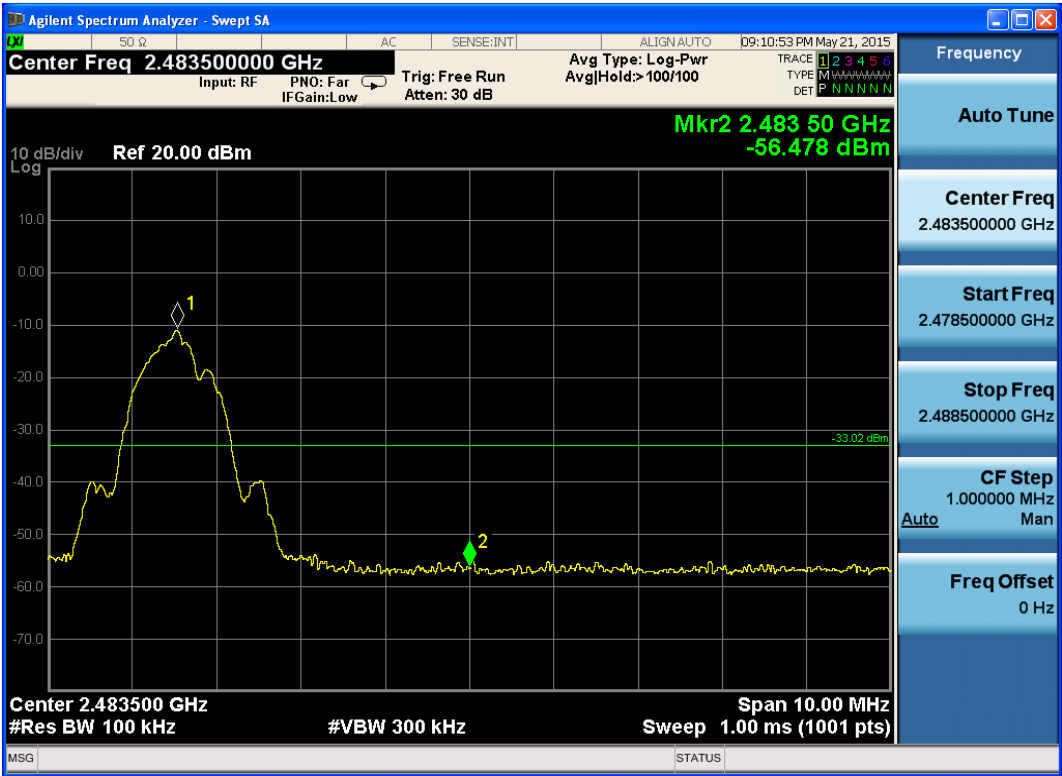
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Test Results: PASS
Low Energy



Carrier frequency (MHz): 2402
Channel No.:0



Carrier frequency (MHz): 2480
Channel No.:39

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2.6. Power Spectral Density

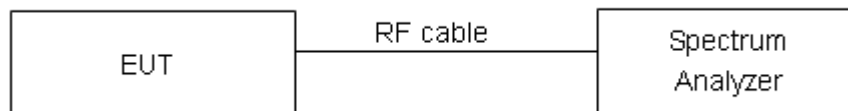
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer with a known loss. RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer. Set the span to at least 1.5 times the Low Energy channel bandwidth. The peak power spectral density is recorded. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log(3\text{ kHz}/100\text{kHz}) = -15.2\text{ dB}$.

Test setup



Limits

Rule Part 15.247(e) specifies that "For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission."

Limits	$\leq 8\text{ dBm} / 3\text{kHz}$
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.75\text{dB}$.

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Test Results:

Bluetooth (Low Energy)

Channel Number	Power Spectral Density dBm / 3kHz	Conclusion
0	-17.086	PASS
19	-16.141	PASS
39	-14.246	PASS



Low energy, Channel No.: 0

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Low energy, Channel No.: 19



Low energy, Channel No.: 39

2.7. Spurious Radiated Emissions in the Restricted Band

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

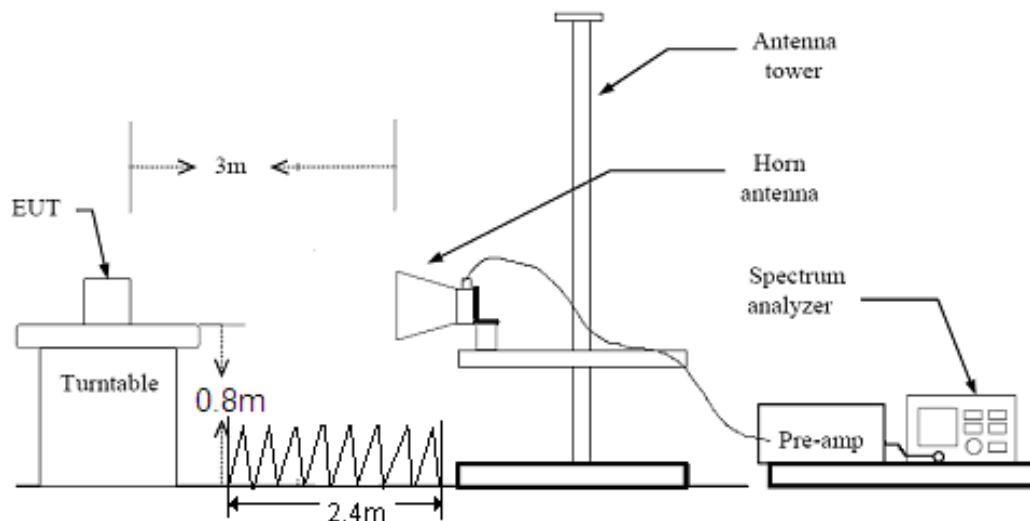
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) The dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit.

If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak- average correction factor, derived from the appropriate duty cycle calculation.

This setting method can refer to KDB 558074.

Test setup



Note: Area side: 2.4mX3.6m

Limits

Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

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MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Peak Limit=74 dBuV/m

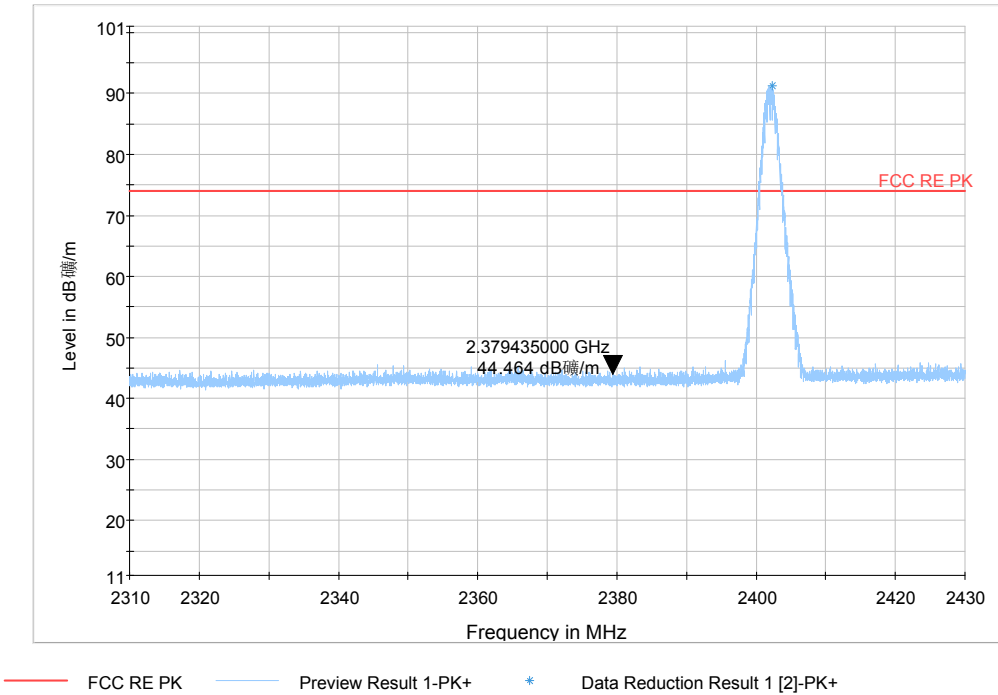
Average Limit=54 dBuV/m

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55$ dB.

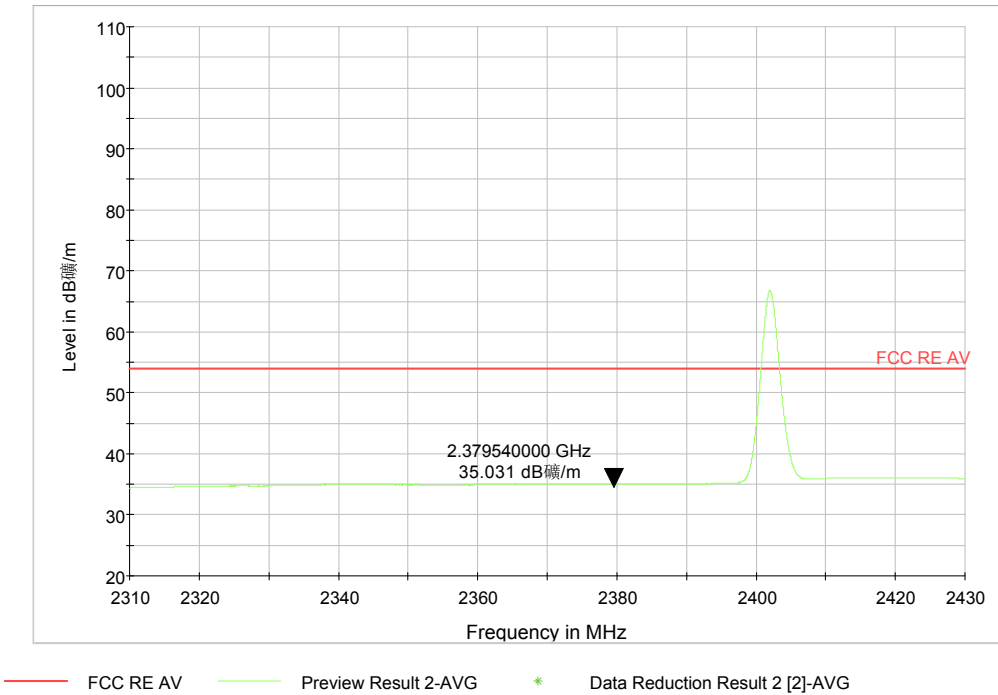
Channel 0

Peak



Note: This graph displays the maximum values of horizontal and vertical by software
Note: The signal beyond the limit is carrier, a font (Level in dB μ V/m) in the test plot =(level in dBuV/m)

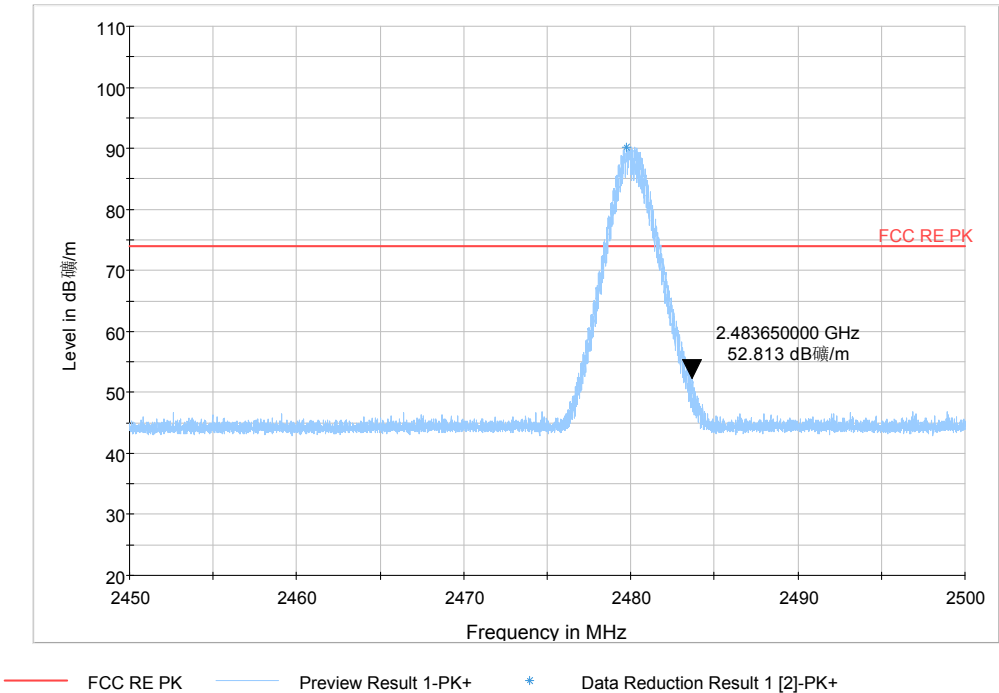
Average



Note: This graph displays the maximum values of horizontal and vertical by software
Note: The signal beyond the limit is carrier, a font (Level in dB μ V/m) in the test plot =(level in dBuV/m)

Channel 39

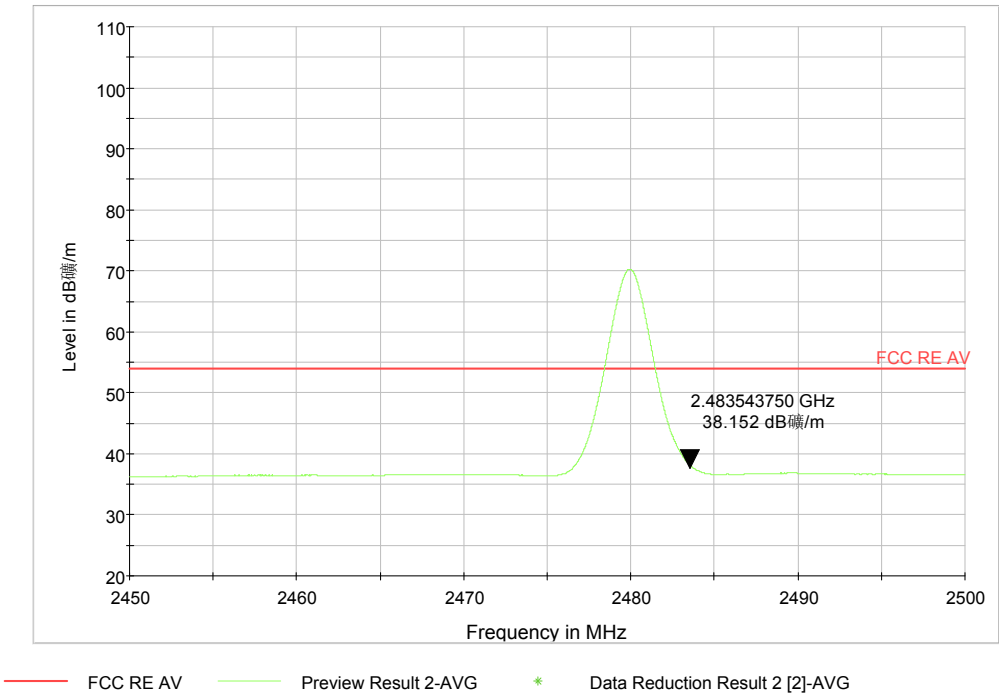
Peak



Note: This graph displays the maximum values of horizontal and vertical by software

Note: The signal beyond the limit is carrier, a font (Level in dB μ /m) in the test plot =(level in dBuV/m)

Average



Note: This graph displays the maximum values of horizontal and vertical by software

Note: The signal beyond the limit is carrier, a font (Level in dB μ /m) in the test plot =(level in dBuV/m)

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2.8. Spurious RF Conducted Emissions

Ambient condition

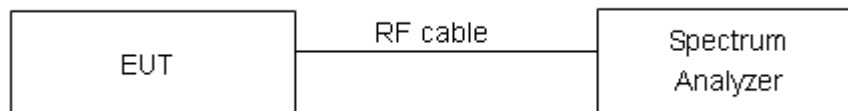
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. RBW and VBW are set to 100 kHz, Sweep is set to ATUO.

The test is in transmitting mode.

Test setup



Limits

Rule Part 15.247(d) pacifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.”

Mode	Carrier frequency (MHz)	Reference value (dBm)	Limit
Bluetooth(Low Energy)	2402	1.733	≤ -18.27
	2440	2.114	≤ -17.89
	2480	1.106	≤ -18.89

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

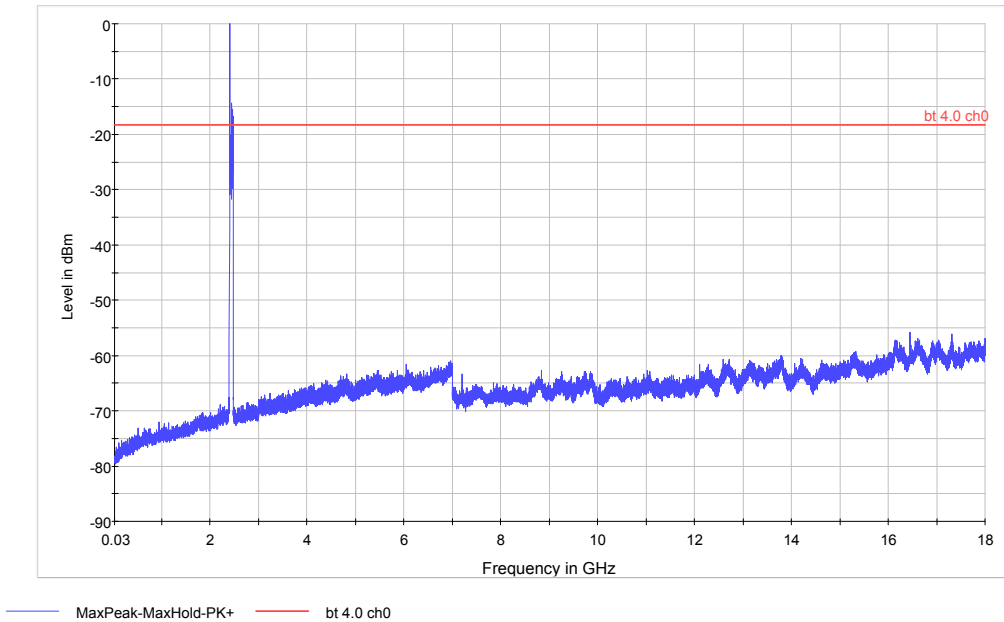
Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB

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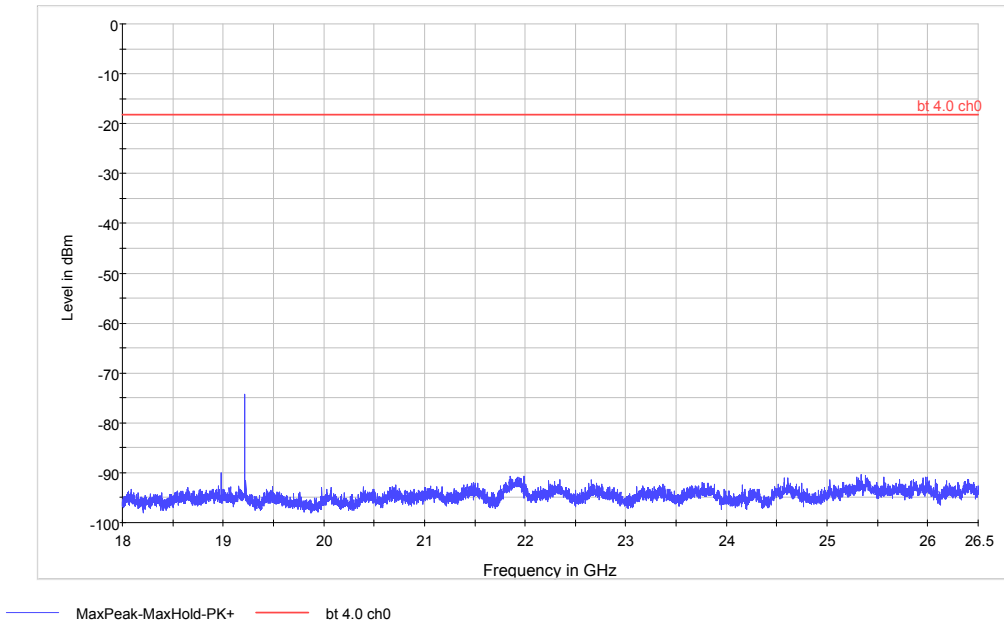
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Test Results:
Bluetooth (Low Energy)
CH0:



Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2402
Spurious RF conducted emissions from 30MHz to 18GHz



Spurious RF conducted emissions from 18GHz to 26.5GHz

Harmonic	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
8	19215.5	-74.22	-18.27	55.95

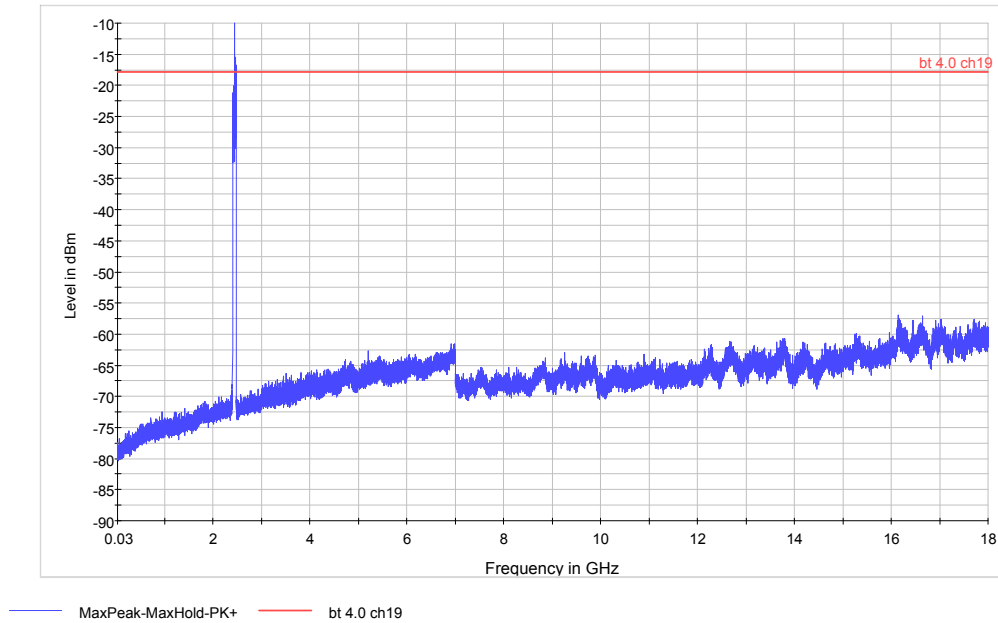
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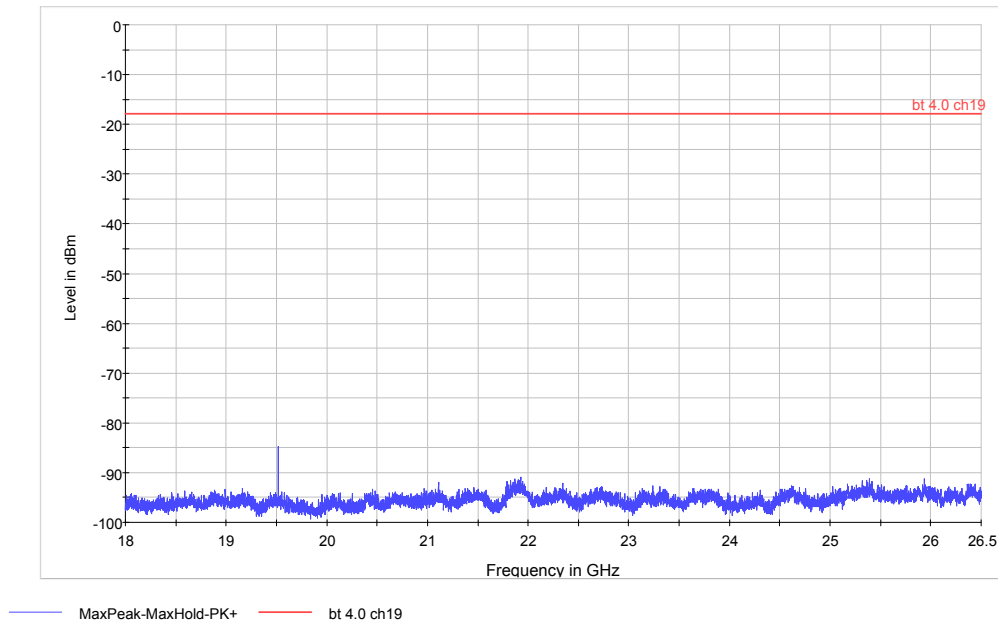
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CH19:



Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2440
Spurious RF conducted emissions from 30MHz to 18GHz



Spurious RF conducted emissions from 18GHz to 26.5GHz

Harmonic	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
8	19519.38	-84.74	-17.89	66.85

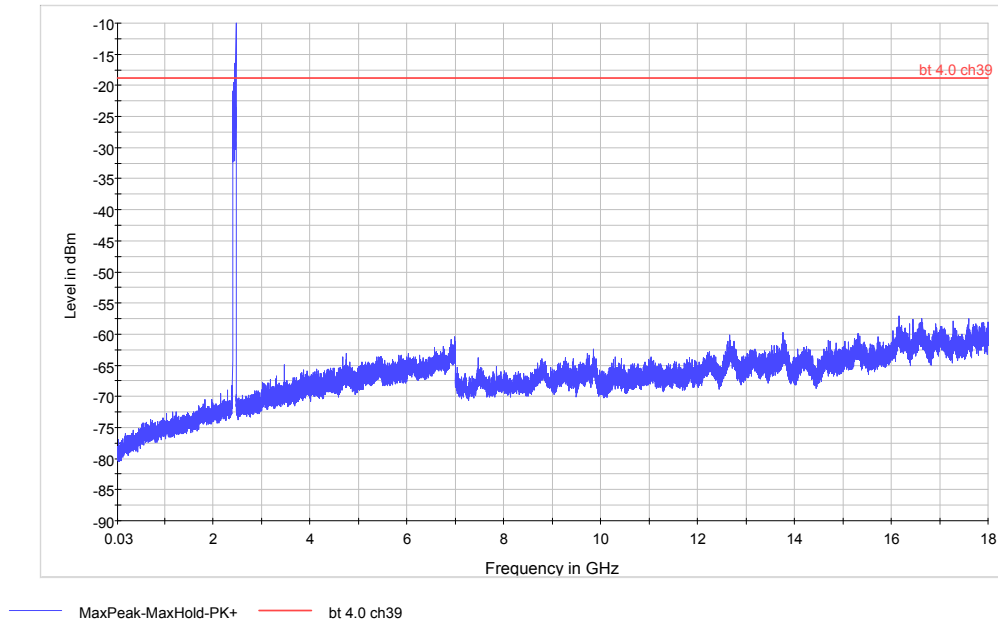
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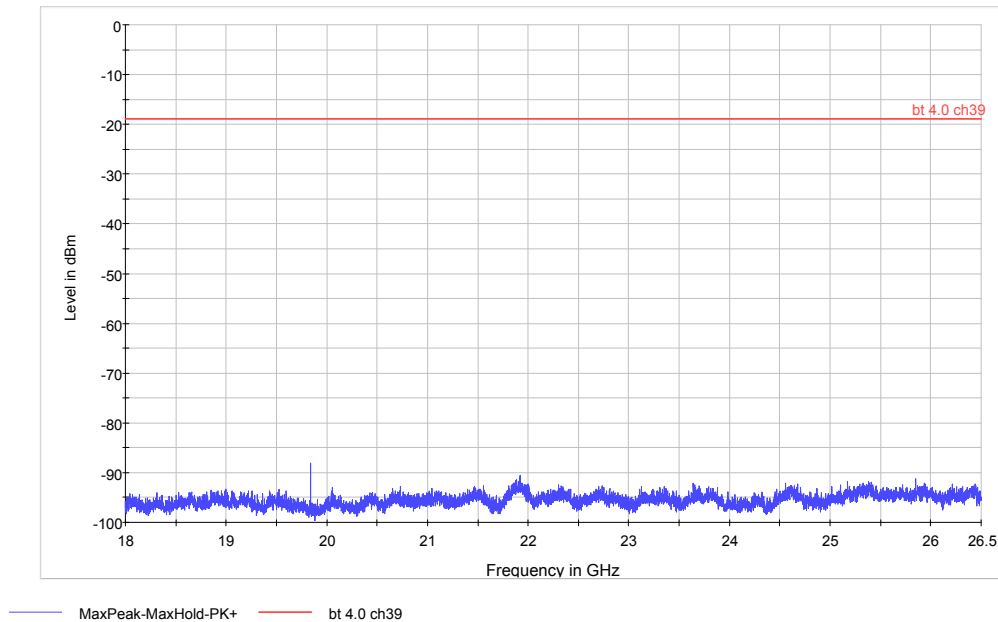
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CH39:



Note: The signal beyond the limit is carrier. Carrier frequency (MHz): 2480
Spurious RF conducted emissions from 30MHz to 18GHz



Spurious RF conducted emissions from 18GHz to 26.5GHz

Harmonic	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)
8	19840.25	-88.15	-18.89	69.26

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2.9. Radiates Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	102.5kPa

Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.4-2009. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.

Sweep the whole frequency band through the range from 9 kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, below 30MHz, the center of the loop shall be 1 meters; above 30MHz, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

Below 1GHz (detector: Peak and Quasi-Peak)

RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz (detector: Peak):

(a) PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO

(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

The test is in transmitting mode.

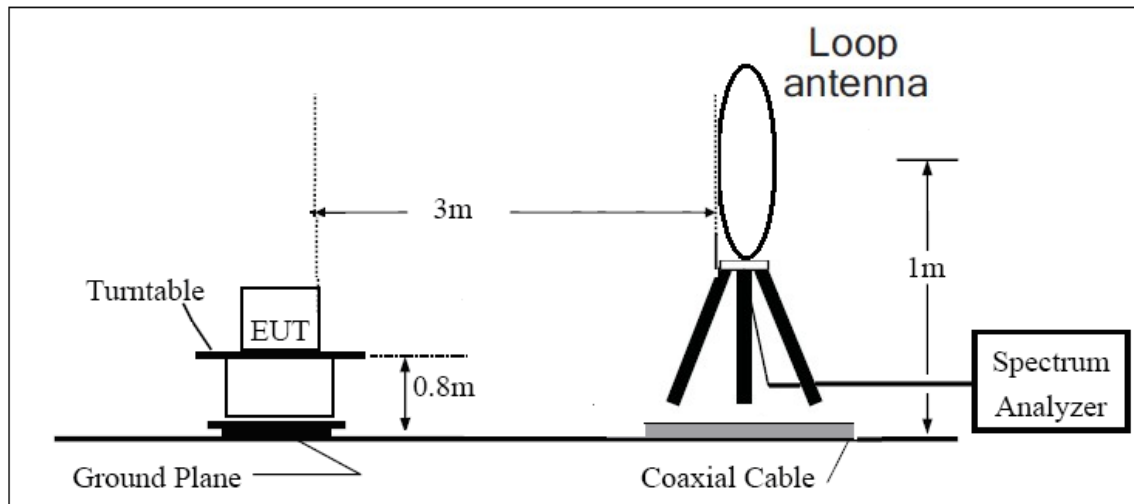
TA Technology (Shanghai) Co., Ltd.
Test Report

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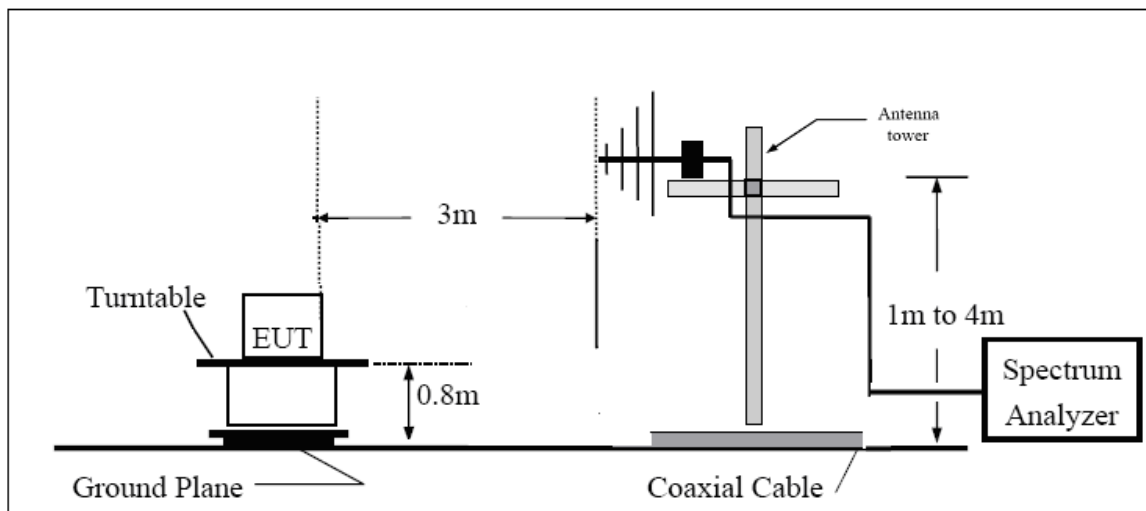
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Test setup

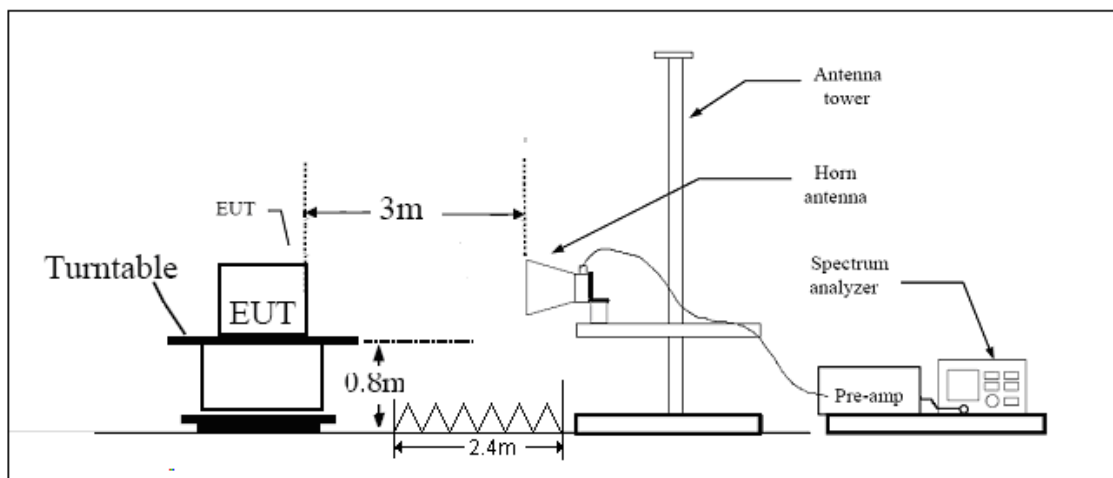
9KHz~~~ 30MHz



30MHz~~~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

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Limits

Rule Part 15.247(d) specifies that “In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).”

Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009–0.490	2400/F(kHz)	/
0.490–1.705	24000/F(kHz)	/
1.705–30.0	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$.

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.19 dB
200MHz-1GHz	3.63 dB
Above 1GHz	3.68 dB

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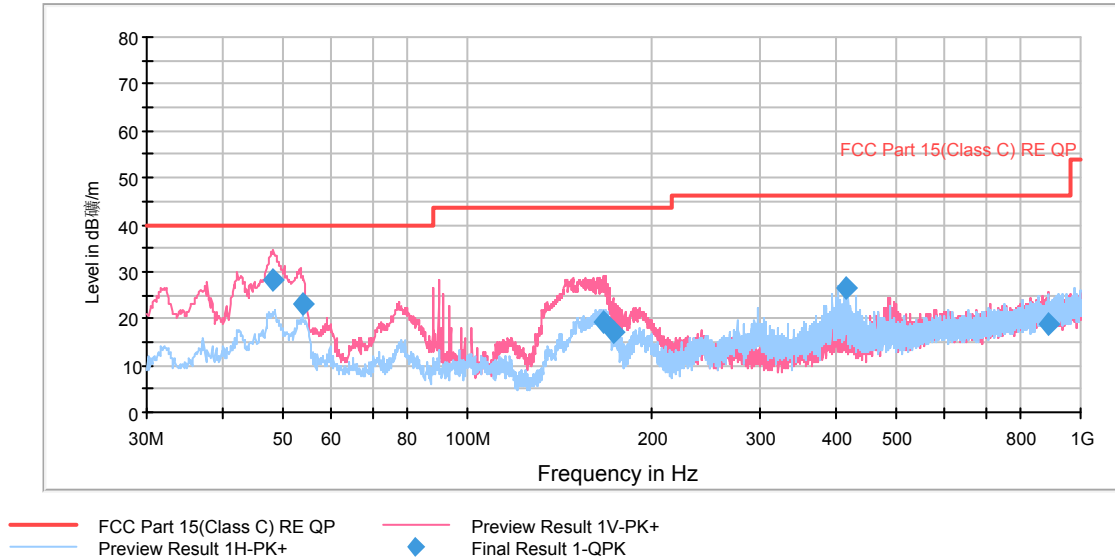
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Test result

CH0

RE 30M-1GHz QP



Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBμV/m) in the test plot =(level in dBuV/m)

Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
48.227978	28.3	103.0	V	195.0	6.7	-21.6	11.7	40.0
54.033428	22.9	102.0	V	248.0	0.6	-22.3	17.1	40.0
166.914022	19.1	101.0	V	322.0	-9.4	-28.5	24.4	43.5
173.484206	17.1	118.0	V	315.0	-11.0	-28.1	26.4	46.0
415.519750	26.6	100.0	H	43.0	5.9	-20.7	19.4	46.0
886.410750	18.8	101.0	V	329.0	5.8	-13.0	27.2	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

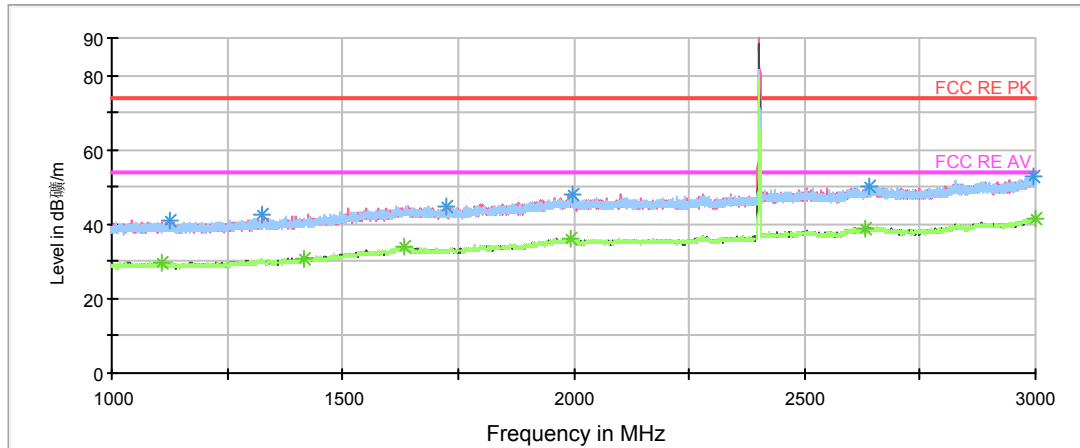
TA Technology (Shanghai) Co., Ltd.

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RE 1G-3GHz PK+AV



— FCC RE PK
 — Preview Result 1V-PK+
 — Preview Result 1H-PK+
 * Data Reduction Result 1 [2]-PK+
 — FCC RE AV
 — Preview Result 2V-AVG
 — Preview Result 2H-AVG
 * Data Reduction Result 2 [2]-AVG

Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBuV/m) in the test plot =(level in dBuV/m)

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1110.500000	38.8	101.0	V	0.0	29.0	-9.8	35.2	74
1418.000000	40.5	101.0	H	43.0	32.4	-8.1	33.5	74
1632.750000	42.5	101.0	H	0.0	37.4	-5.1	31.5	74
1993.000000	46.1	101.0	V	73.0	43.1	-3.0	27.9	74
2633.250000	47.7	101.0	H	129.0	47.2	-0.5	26.3	74
2999.250000	51.4	101.0	V	219.0	50.0	-1.4	22.6	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1110.500000	29.7	101.0	V	0.0	19.9	-9.8	24.3	54
1418.000000	30.8	101.0	H	43.0	22.7	-8.1	23.2	54
1632.750000	33.7	101.0	H	0.0	28.6	-5.1	20.3	54
1993.000000	36.2	101.0	V	73.0	33.2	-3.0	17.8	54
2633.250000	39.0	101.0	H	129.0	38.5	-0.5	15.0	54
2999.250000	41.7	101.0	V	219.0	40.3	-1.4	12.3	54

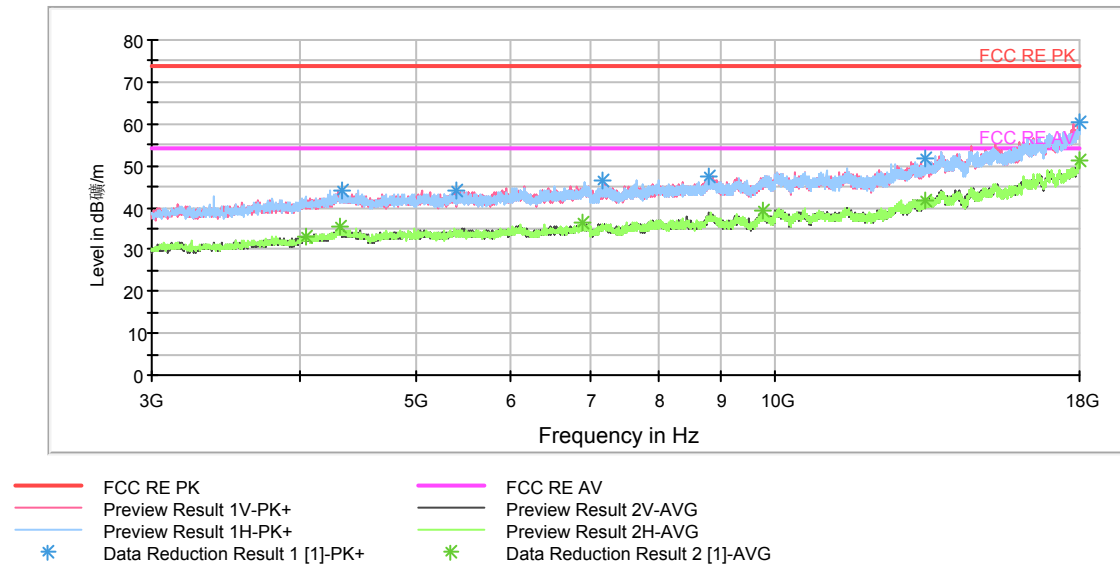
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RE 3-18GHz PK+AV



Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBμV/m) in the test plot =(level in dBuV/m)

Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4329.375000	43.9	101.0	V	307.0	41.0	-2.9	30.1	74
5401.875000	44.1	101.0	V	314.0	41.1	-3.0	29.9	74
7160.625000	46.4	101.0	V	0.0	38.9	-7.5	27.6	74
8812.500000	47.6	101.0	H	29.0	38.4	-9.2	26.4	74
13346.250000	51.9	101.0	H	112.0	37.4	-14.5	22.1	74
17994.375000	60.2	101.0	H	76.0	35.6	-24.6	13.8	74

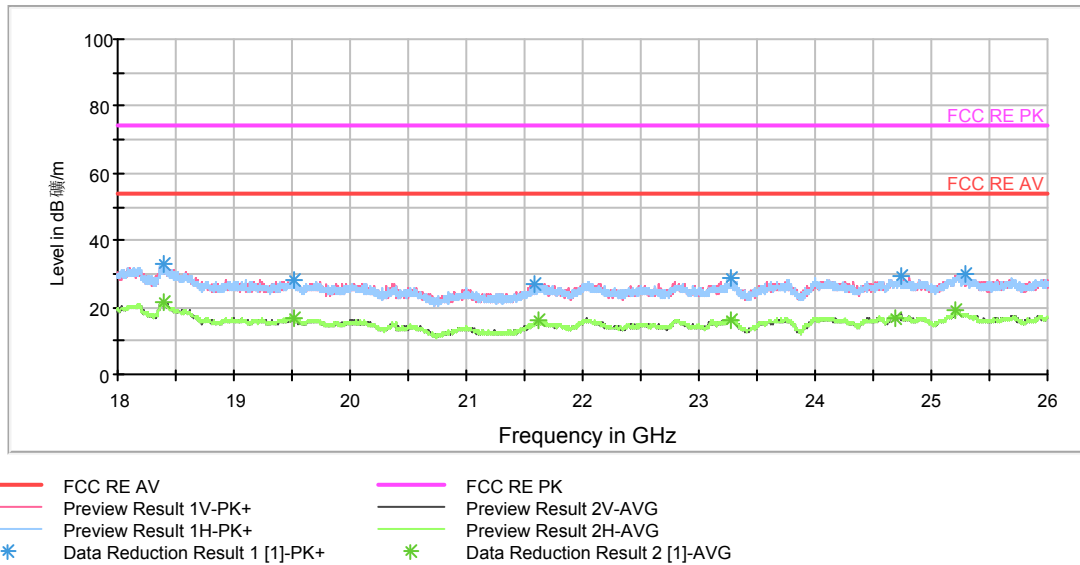
Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4329.375000	34.1	101.0	V	307.0	31.2	-2.9	19.9	54
5401.875000	33.9	101.0	V	314.0	30.9	-3.0	20.1	54
7160.625000	35.4	101.0	V	0.0	27.9	-7.5	18.6	54
8812.500000	37.3	101.0	H	29.0	28.1	-9.2	16.7	54
13346.250000	41.3	101.0	H	112.0	26.8	-14.5	12.7	54
17994.375000	50.6	101.0	H	76.0	26.0	-24.6	3.4	54

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Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dB μ V/m) in the test plot =(level in dBuV/m)

Note: The signal beyond the limit is carrier.

Radiates Emission from 18GHz to 26GHz

Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18403.750000	31.4	V	319.0	27.0	-4.4	42.6	74
19513.000000	27.7	V	278.0	21.2	-6.5	46.3	74
21617.812500	25.4	V	0.0	17.5	-7.9	48.6	74
23283.812500	26.9	V	153.0	20.6	-6.3	47.1	74
24688.437500	26.4	V	265.0	20.2	-6.2	47.6	74
25212.250000	27.8	V	238.0	22.2	-5.6	46.2	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18403.750000	21.7	V	319.0	17.3	-4.4	32.3	54
19513.000000	17.0	V	278.0	10.5	-6.5	37.0	54
21617.812500	16.3	V	0.0	8.4	-7.9	37.7	54
23283.812500	16.5	V	153.0	10.2	-6.3	37.5	54
24688.437500	16.9	V	265.0	10.7	-6.2	37.1	54
25212.250000	19.5	V	238.0	13.9	-5.6	34.5	54

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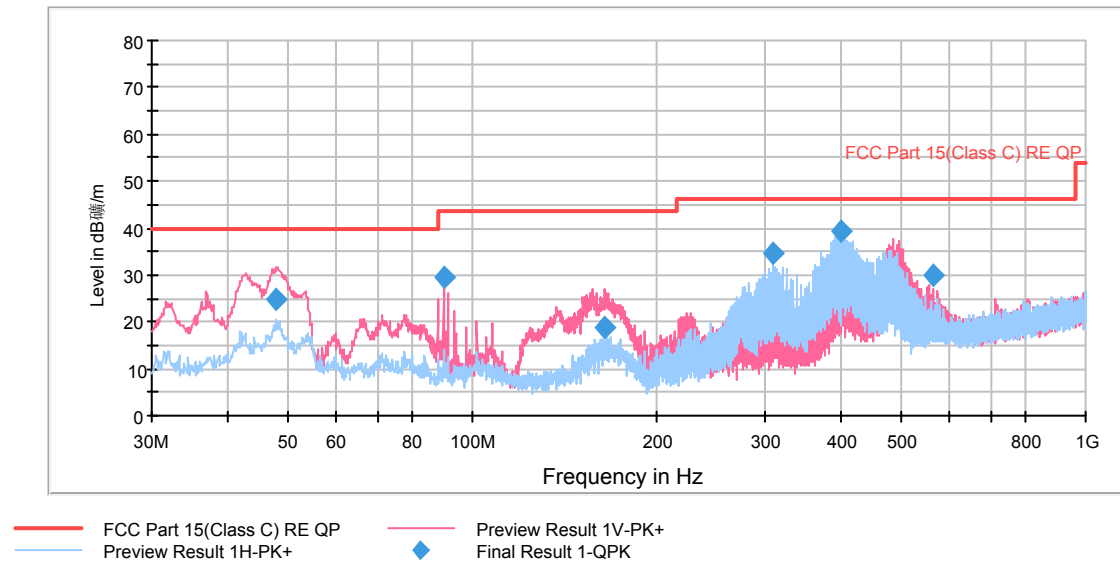
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CH19

RE 30M-1GHz QP



Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBuV/m) in the test plot =(level in dBuV/m)

Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
47.985138	25.0	100.0	V	202.0	3.4	-21.6	15.0	40.0
89.912756	29.5	101.0	V	337.0	4.0	-25.5	14.0	43.5
164.816031	18.9	100.0	V	253.0	-9.7	-28.6	24.6	43.5
308.781750	34.5	100.0	H	81.0	11.4	-23.1	11.5	46.0
398.401500	39.3	100.0	H	36.0	18.4	-20.9	6.7	46.0
563.209500	29.9	100.0	V	73.0	12.5	-17.4	16.1	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

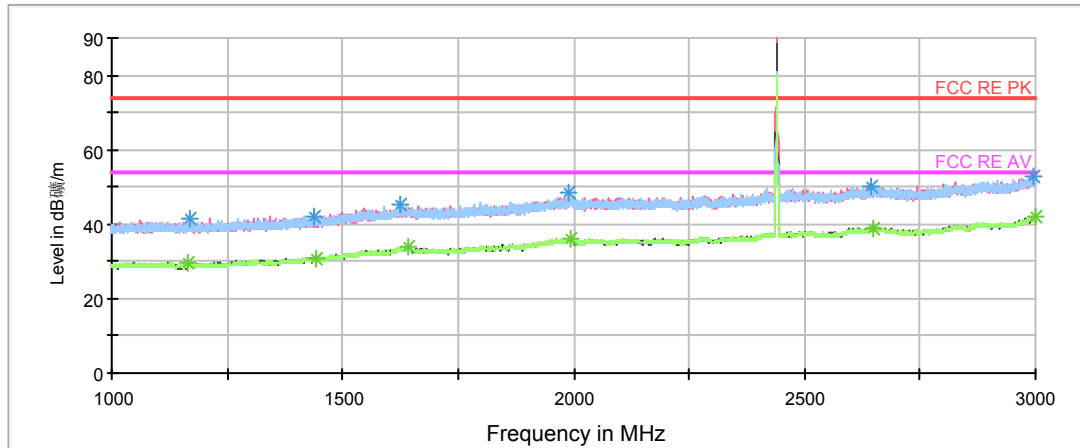
TA Technology (Shanghai) Co., Ltd.

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RE 1G-3GHz PK+AV



— FCC RE PK
 — Preview Result 1V-PK+
 — Preview Result 1H-PK+
 * Data Reduction Result 1 [2]-PK+
 — FCC RE AV
 — Preview Result 2V-AVG
 — Preview Result 2H-AVG
 * Data Reduction Result 2 [2]-AVG

Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBuV/m) in the test plot =(level in dBuV/m)

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1164.250000	39.3	103.0	H	109.0	29.7	-9.6	34.7	74
1441.750000	40.9	103.0	H	240.0	33.0	-7.9	33.1	74
1643.250000	44.3	103.0	V	114.0	39.1	-5.2	29.7	74
1994.250000	45.9	103.0	H	50.0	43.0	-2.9	28.1	74
2649.250000	48.7	103.0	V	0.0	48.6	-0.1	25.3	74
2999.250000	52.9	103.0	H	152.0	51.5	1.4	21.1	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1164.250000	29.8	103.0	H	109.0	20.2	-9.6	24.2	54
1441.750000	31.0	103.0	H	240.0	23.1	-7.9	23.0	54
1643.250000	33.7	103.0	V	114.0	28.5	-5.2	20.3	54
1994.250000	36.0	103.0	H	50.0	33.1	-2.9	18.0	54
2649.250000	38.9	103.0	V	0.0	38.8	-0.1	15.1	54
2999.250000	41.8	103.0	H	152.0	40.4	1.4	12.2	54

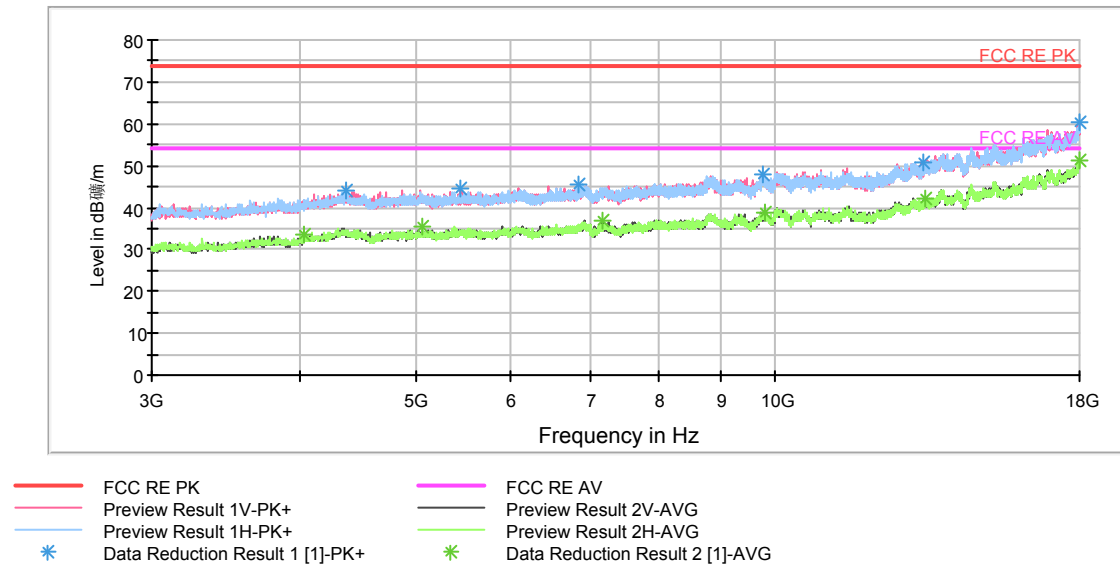
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RE 3-18GHz PK+AV



Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dB μ V/m) in the test plot =(level in dBuV/m)

Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4368.750000	44.1	101.0	H	37.0	41.4	2.7	29.9	74
5443.125000	44.5	101.0	V	122.0	41.3	3.2	29.5	74
6840.000000	45.6	101.0	H	0.0	40.2	5.4	28.4	74
9755.625000	47.7	101.0	H	44.0	37.0	10.7	26.3	74
13331.250000	50.8	101.0	V	289.0	36.5	14.3	23.2	74
17998.125000	60.2	101.0	V	275.0	35.5	24.7	13.8	74

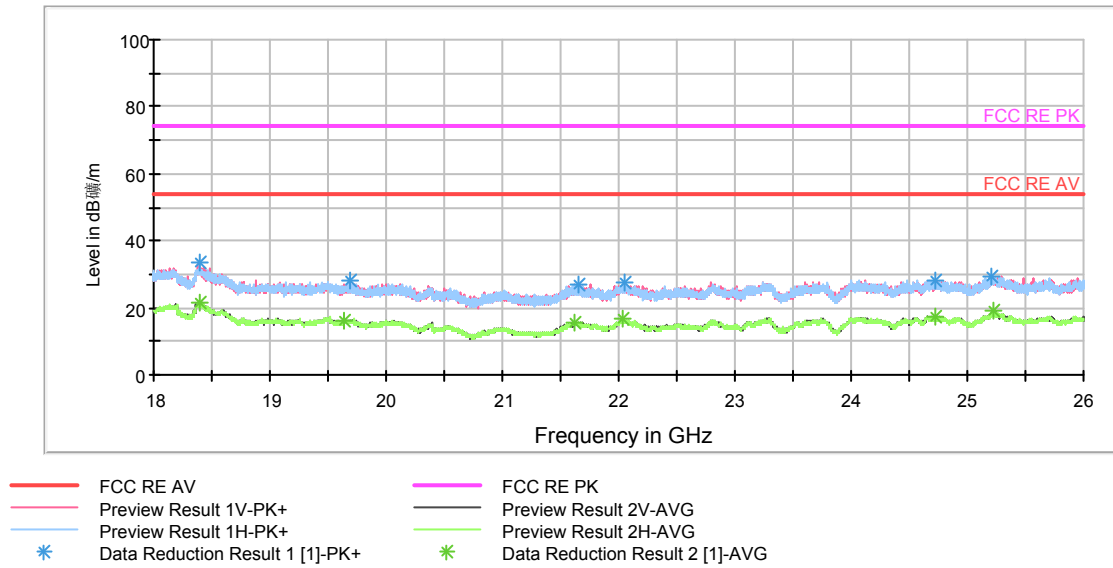
Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
4368.750000	33.9	101.0	H	37.0	31.2	2.7	20.1	54
5443.125000	33.8	101.0	V	122.0	30.6	3.2	20.2	54
6840.000000	35.4	101.0	H	0.0	30.0	5.4	18.6	54
9755.625000	38.3	101.0	H	44.0	27.6	10.7	15.7	54
13331.250000	41.5	101.0	V	289.0	27.2	14.3	12.5	54
17998.125000	50.5	101.0	V	275.0	25.8	24.7	3.5	54

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Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dB μ V/m) in the test plot =(level in dBuV/m)

Note: The signal beyond the limit is carrier.

Radiates Emission from 18GHz to 26GHz

Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18397.375000	31.6	V	180.0	27.3	-4.3	42.4	74
19644.750000	25.4	V	0.0	18.8	-6.6	48.6	74
21614.625000	24.9	V	167.0	17.0	-7.9	49.1	74
22042.812500	26.0	H	6.0	18.6	-7.4	48.0	74
24718.187500	26.2	V	63.0	20.5	-5.7	47.8	74
25227.125000	28.2	V	180.0	22.9	-5.3	45.8	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18397.375000	21.4	V	180.0	17.1	-4.3	32.6	54
19644.750000	16.3	V	0.0	9.7	-6.6	37.7	54
21614.625000	15.5	V	167.0	7.6	-7.9	38.5	54
22042.812500	16.5	H	6.0	9.1	-7.4	37.5	54
24718.187500	17.4	V	63.0	11.7	-5.7	36.6	54
25227.125000	18.9	V	180.0	13.6	-5.3	35.1	54

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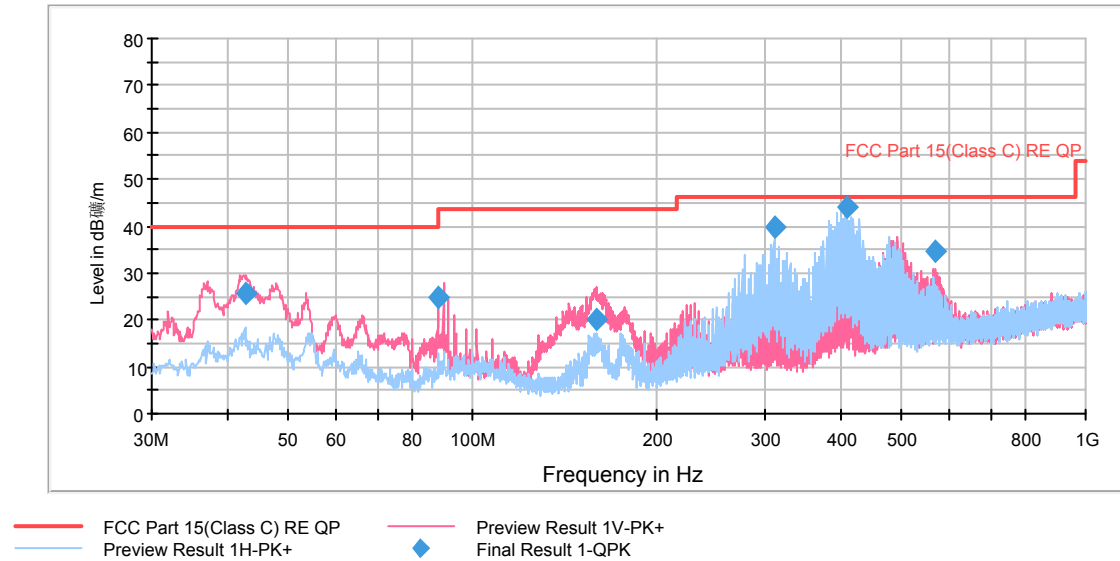
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CH39

RE 30M-1GHz QP



Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBuV/m) in the test plot =(level in dBuV/m)

Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
42.745369	25.6	100.0	V	27.0	4.5	-21.1	14.4	40.0
87.896660	25.0	100.0	V	105.0	-1.1	-26.1	15.0	40.0
159.215316	20.1	100.0	V	202.0	-8.8	-28.9	23.4	43.5
310.395250	40.0	100.0	H	89.0	17.0	-23.0	6.0	46.0
409.609750	44.1	100.0	H	225.0	23.3	-20.8	1.9	46.0
569.618500	34.6	100.0	V	67.0	17.3	-17.3	11.4	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

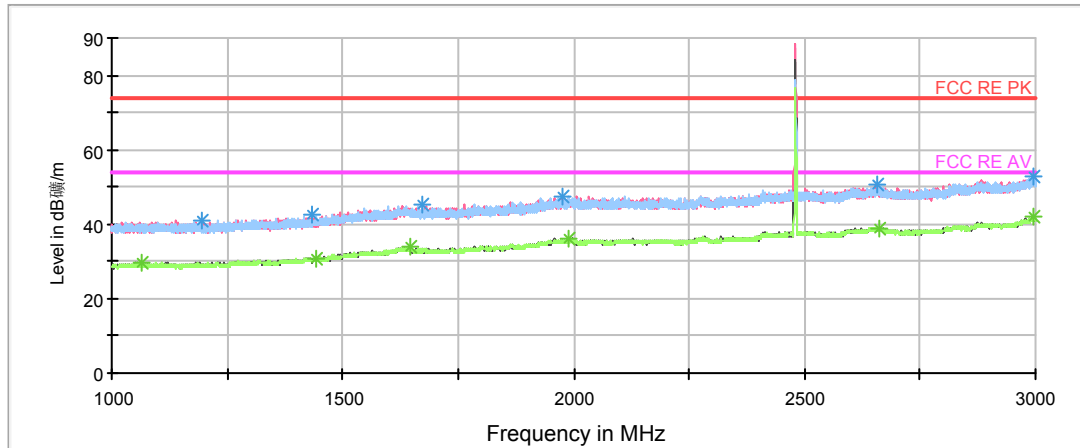
TA Technology (Shanghai) Co., Ltd.

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RE 1G-3GHz PK+AV



— FCC RE PK
 — Preview Result 1V-PK+
 — Preview Result 1H-PK+
 * Data Reduction Result 1 [2]-PK+
 — FCC RE AV
 — Preview Result 2V-AVG
 — Preview Result 2H-AVG
 * Data Reduction Result 2 [2]-AVG

Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBuV/m) in the test plot =(level in dBuV/m)

Note: The signal beyond the limit is carrier.

Radiates Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1066.000000	39.6	103.0	H	14.0	29.8	-9.8	34.4	74
1441.500000	40.8	103.0	V	217.0	32.9	-7.9	33.2	74
1645.750000	42.7	103.0	V	321.0	37.4	-5.3	31.3	74
1990.250000	45.9	103.0	H	25.0	42.8	-3.1	28.1	74
2661.750000	48.3	103.0	H	96.0	48.1	-0.2	25.7	74
2997.750000	51.2	103.0	H	204.0	49.8	1.4	22.8	74

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1066.000000	29.6	103.0	H	14.0	19.8	-9.8	24.4	54
1441.500000	30.9	103.0	V	217.0	23.0	-7.9	23.1	54
1645.750000	33.8	103.0	V	321.0	28.5	-5.3	20.2	54
1990.250000	36.0	103.0	H	25.0	32.9	-3.1	18.0	54
2661.750000	38.9	103.0	H	96.0	38.7	-0.2	15.1	54
2997.750000	41.9	103.0	H	204.0	40.5	1.4	12.1	54

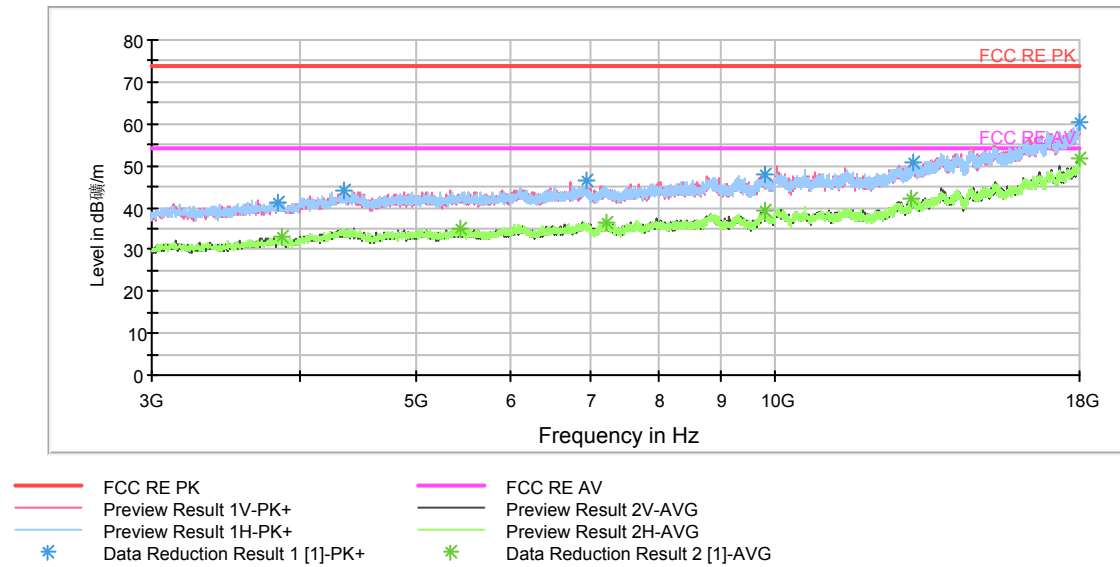
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RE 3-18GHz PK+AV



Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBμV/m) in the test plot =(level in dBuV/m)

Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3826.875000	41.3	101.0	V	93.0	41.0	0.3	32.7	74
4350.000000	43.9	101.0	H	92.0	41.1	2.8	30.1	74
6960.000000	46.7	101.0	H	57.0	41.2	5.5	27.3	74
9793.125000	48.0	101.0	H	99.0	36.7	11.3	26.0	74
13072.500000	50.9	101.0	V	232.0	36.5	14.4	23.1	74
17983.125000	60.3	101.0	H	125.0	35.9	24.4	13.7	74

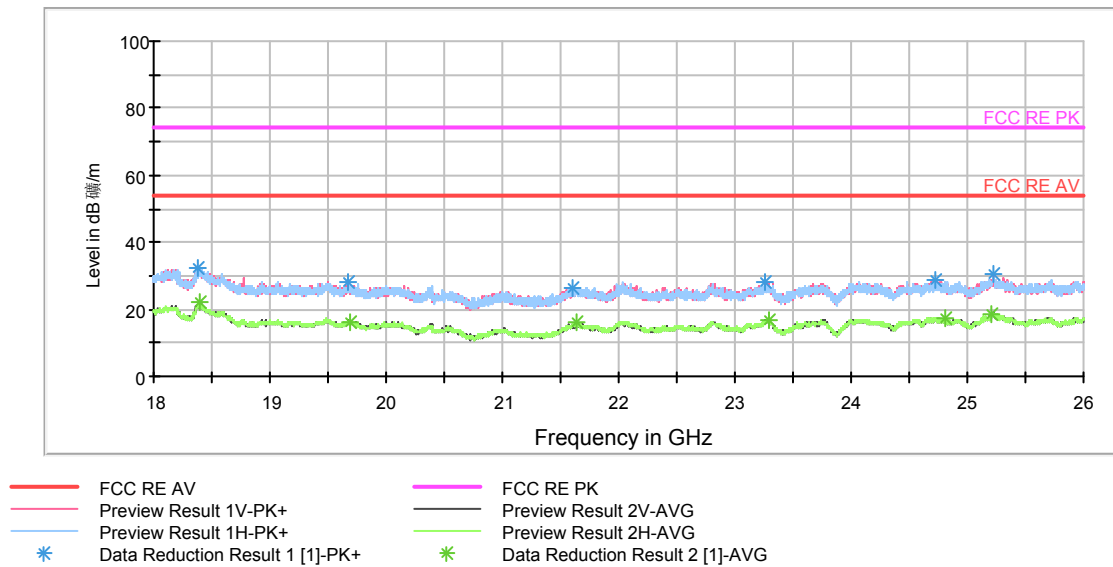
Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3826.875000	31.6	101.0	V	93.0	31.3	0.3	22.4	54
4350.000000	33.6	101.0	H	92.0	30.8	2.8	20.4	54
6960.000000	36.1	101.0	H	57.0	30.6	5.5	17.9	54
9793.125000	38.2	101.0	H	99.0	26.9	11.3	15.8	54
13072.500000	40.4	101.0	V	232.0	26.0	14.4	13.6	54
17983.125000	50.4	101.0	H	125.0	26.0	24.4	3.6	54

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Note: This graph displays the maximum values of horizontal and vertical by software

Note: a font (Level in dBμV/m) in the test plot =(level in dBuV/m)

Note: The signal beyond the limit is carrier.

Radiates Emission from 18GHz to 26GHz

Frequency (MHz)	Peak (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18389.937500	31.2	V	139.0	42.8	-4.3	42.8	74
19694.687500	25.7	V	132.0	48.3	-6.8	48.3	74
21633.750000	26.0	V	166.0	48.0	-8.1	48.0	74
23285.937500	25.9	H	67.0	48.1	-6.2	48.1	74
24803.187500	27.7	H	27.0	46.3	-6.0	46.3	74
25214.375000	27.8	H	1.0	46.2	-5.6	46.2	74

Frequency (MHz)	Average (dBuV/m)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
18389.937500	21.9	V	139.0	17.6	-4.3	32.1	54
19694.687500	16.4	V	132.0	9.6	-6.8	37.6	54
21633.750000	15.9	V	166.0	7.8	-8.1	38.1	54
23285.937500	17.0	H	67.0	10.8	-6.2	37.0	54
24803.187500	17.1	H	27.0	11.1	-6.0	36.9	54
25214.375000	18.8	H	1.0	13.2	-5.6	35.2	54

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2.10. Conducted Emission

Ambient condition

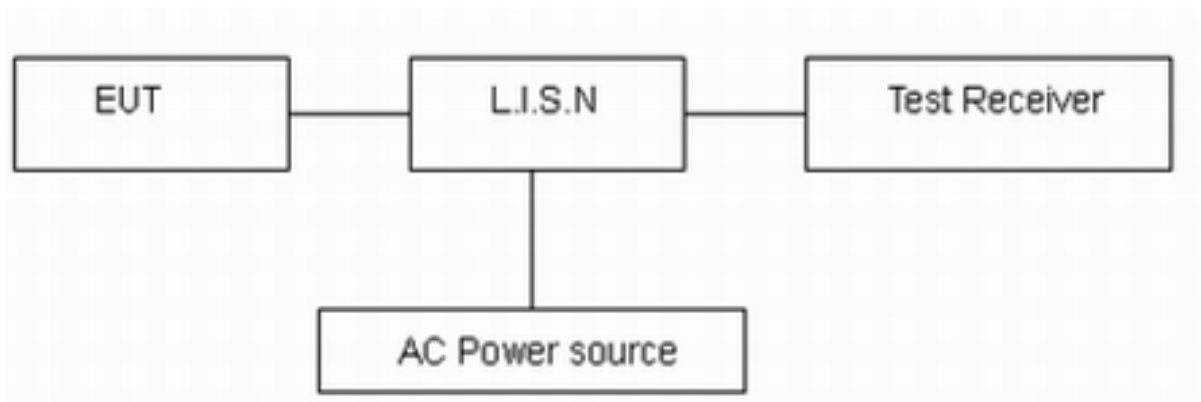
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2009. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

The test is in transmitting mode.

Test Setup



Note: AC Power source is used to change the voltage from 110V/60Hz.

Limits

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Frequency (MHz)	Conducted Limits(dBμV)	
	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.		

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 2.69$ dB.

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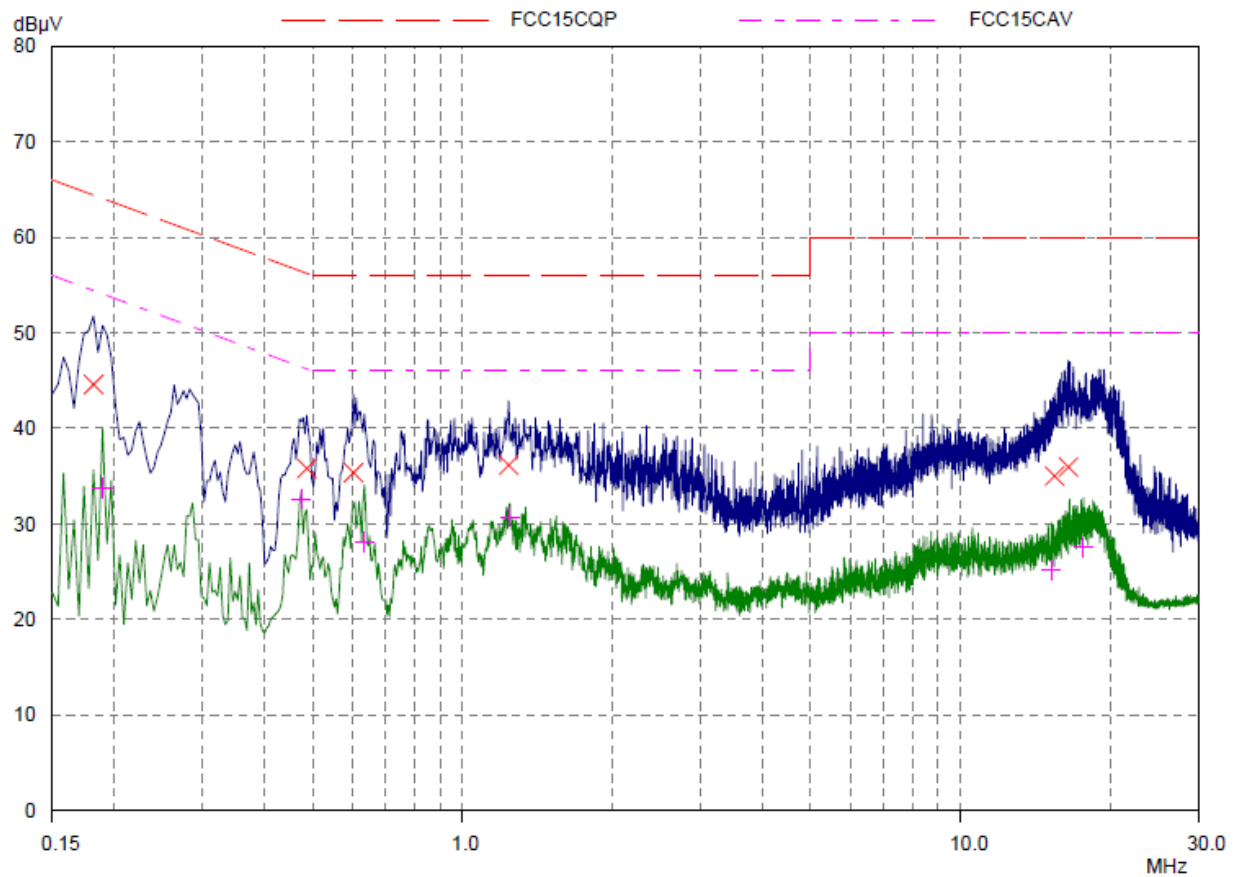
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Test Results:

CH0



Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -	PE -
0.18125	44.59	64.43	19.84	L1	gnd
0.48593	35.81	56.24	20.43	L1	gnd
0.60312	35.37	56.00	20.63	L1	gnd
1.23593	36.14	56.00	19.86	L1	gnd
15.45078	35.02	60.00	24.98	L1	gnd
16.45468	35.96	60.00	24.04	L1	gnd

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
0.18906	33.75	54.08	20.33	L1	gnd
0.47421	32.61	46.44	13.83	L1	gnd
0.63437	28.07	46.00	17.93	L1	gnd
1.24375	30.72	46.00	15.28	L1	gnd
15.19687	25.21	50.00	24.79	L1	gnd
17.65	27.51	50.00	22.49	L1	gnd

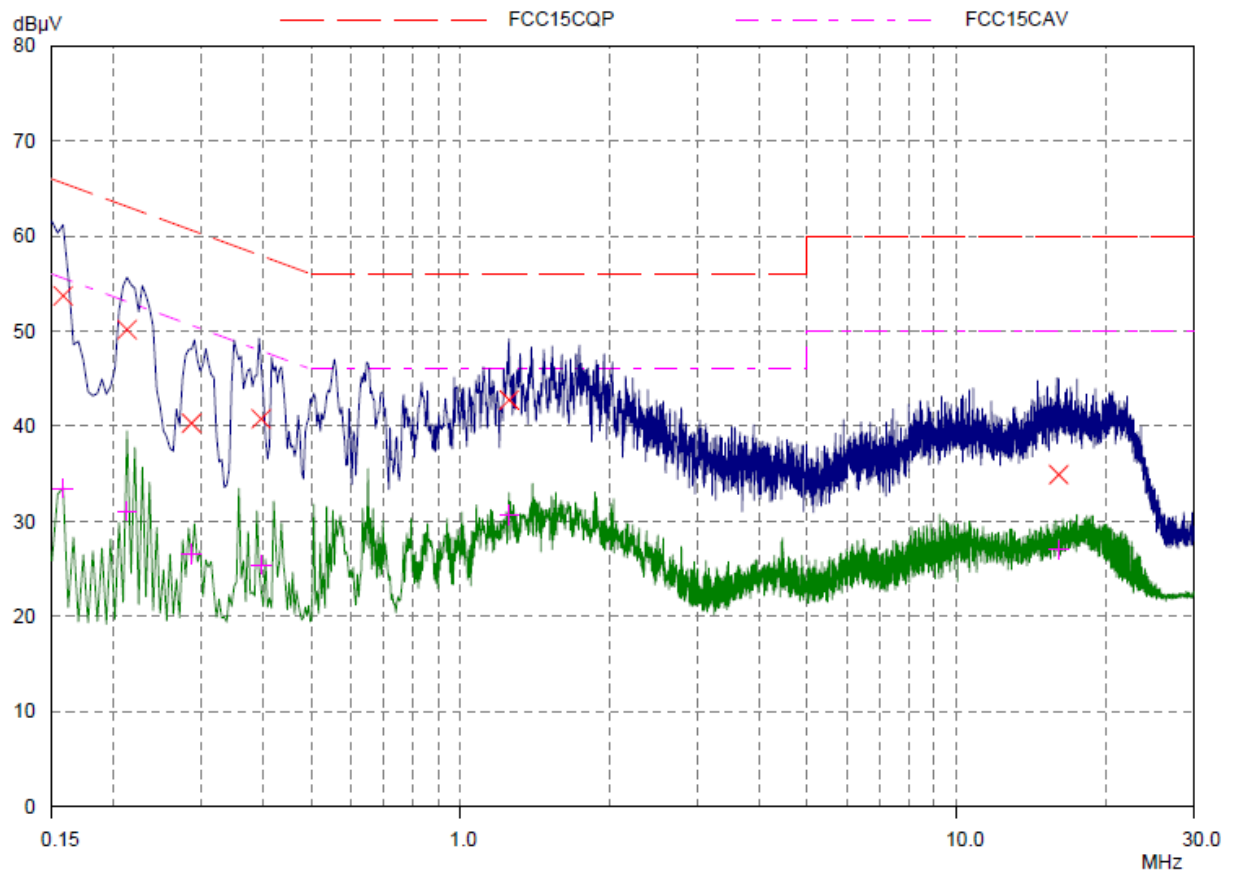
L Line

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Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -	PE -
0.15781	53.73	65.58	11.85	N	gnd
0.2125	50.16	63.11	12.95	N	gnd
0.28671	40.33	60.62	20.29	N	gnd
0.39609	40.78	57.93	17.15	N	gnd
1.25156	42.77	56.00	13.23	N	gnd
16.06015	34.92	60.00	25.08	N	gnd

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -	PE -
0.15781	33.48	55.58	22.10	N	gnd
0.2125	31.07	53.11	22.04	N	gnd
0.28671	26.60	50.62	24.02	N	gnd
0.39609	25.43	47.93	22.50	N	gnd
1.25156	30.69	46.00	15.31	N	gnd
16.06015	27.03	50.00	22.97	N	gnd

N Line

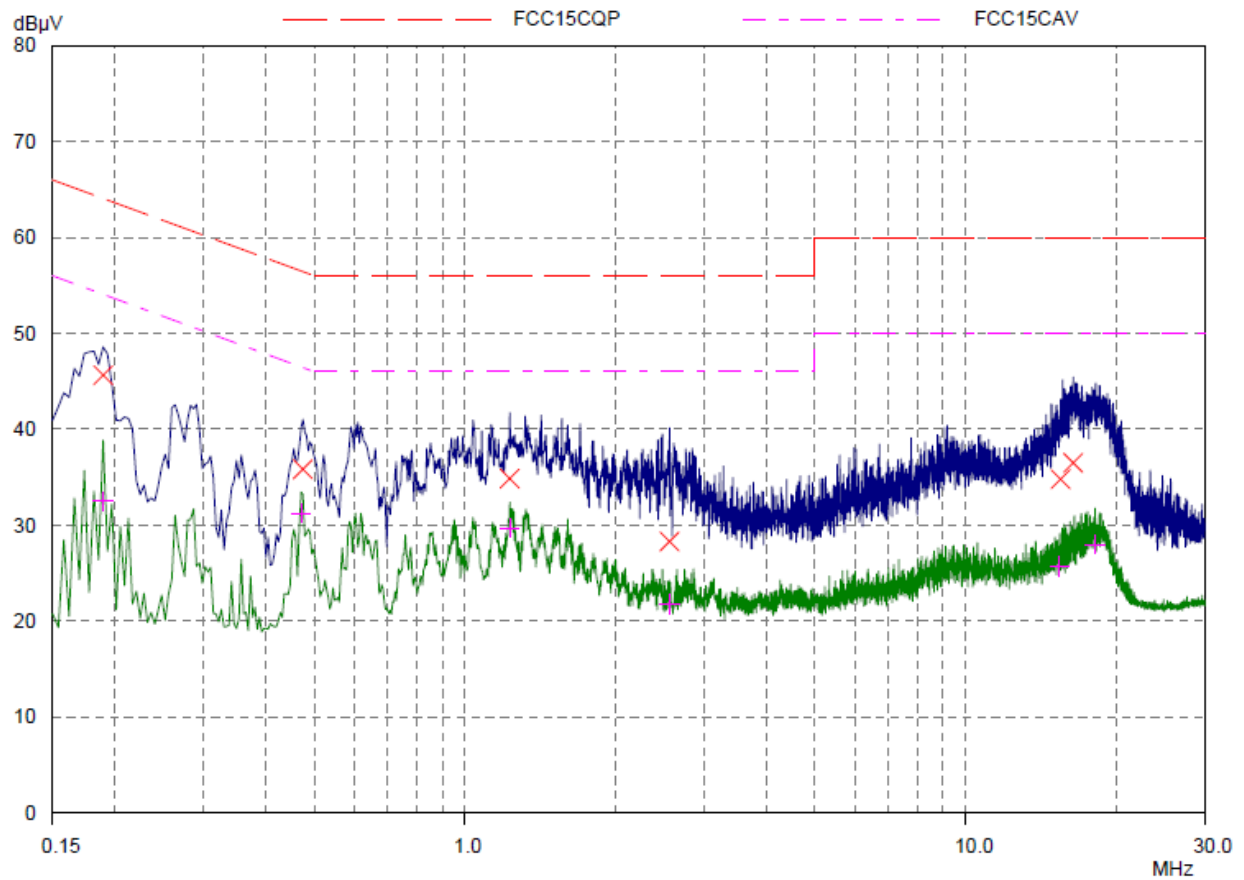
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Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -	PE -
0.18906	45.64	64.08	18.44	L1	gnd
0.47421	35.84	56.44	20.60	L1	gnd
1.22812	34.86	56.00	21.14	L1	gnd
2.56015	28.30	56.00	27.70	L1	gnd
15.4625	34.80	60.00	25.20	L1	gnd
16.38828	36.50	60.00	23.50	L1	gnd

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -	PE -
0.18906	32.48	54.08	21.60	L1	gnd
0.47031	31.25	46.51	15.26	L1	gnd
1.22812	29.73	46.00	16.27	L1	gnd
2.56015	21.81	46.00	24.19	L1	gnd
15.4039	25.68	50.00	24.32	L1	gnd
18.12656	28.00	50.00	22.00	L1	gnd

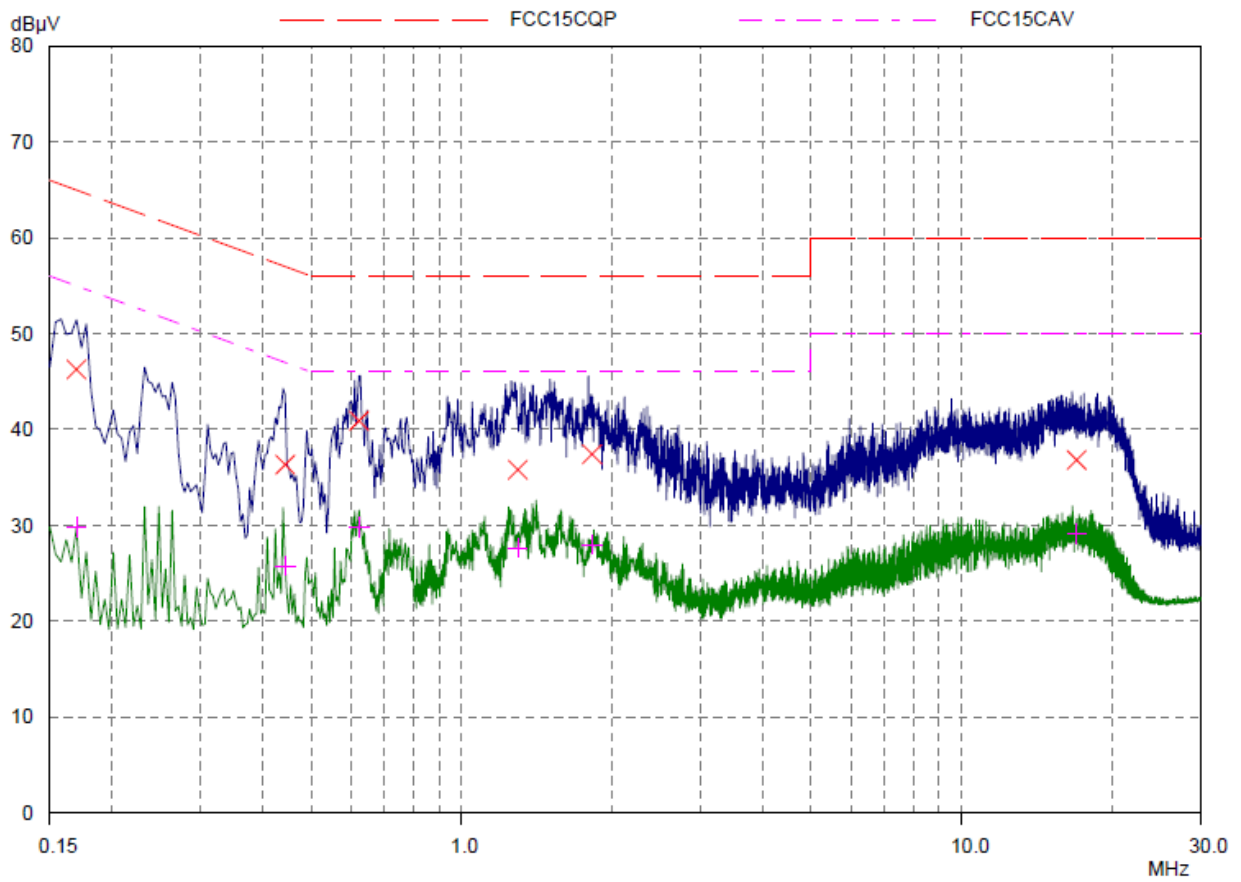
L Line

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Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -	PE -
0.16953	46.26	64.98	18.72	N	gnd
0.44296	36.33	57.01	20.68	N	gnd
0.62265	40.90	56.00	15.10	N	gnd
1.29453	35.81	56.00	20.19	N	gnd
1.82187	37.43	56.00	18.57	N	gnd
16.97421	36.82	60.00	23.18	N	gnd

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -	PE -
0.16953	29.83	54.98	25.15	N	gnd
0.44296	25.77	47.01	21.24	N	gnd
0.62265	29.79	46.00	16.21	N	gnd
1.29453	27.66	46.00	18.34	N	gnd
1.82187	28.01	46.00	17.99	N	gnd
16.97421	29.18	50.00	20.82	N	gnd

N Line

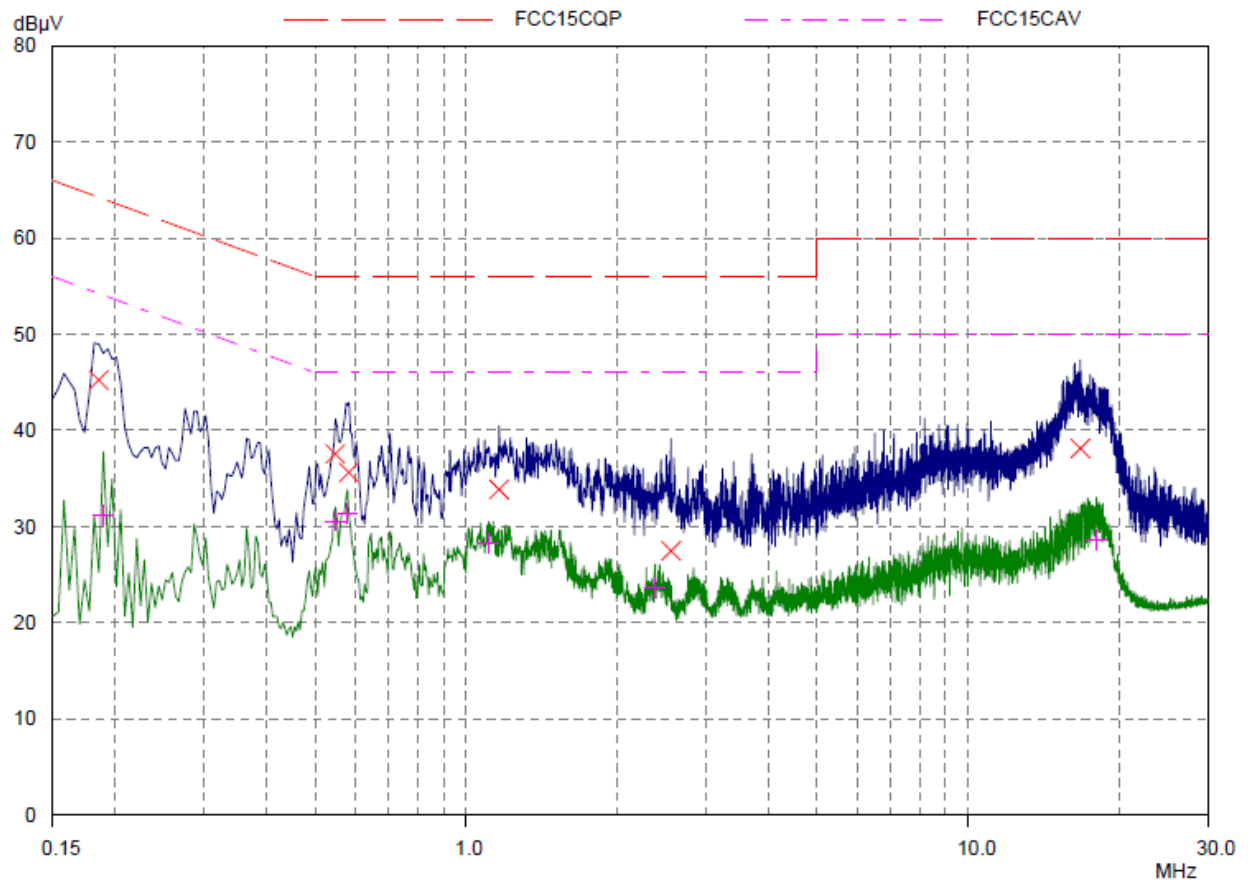
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Final Measurement Results

Frequency MHz	QP Level dBμV	QP Limit dBμV	QP Delta dB	Phase -	PE -
0.18515	45.25	64.25	19.00	L1	gnd
0.54843	37.57	56.00	18.43	L1	gnd
0.58359	35.64	56.00	20.36	L1	gnd
1.16171	33.87	56.00	22.13	L1	gnd
2.55625	27.48	56.00	28.52	L1	gnd
16.72421	38.13	60.00	21.87	L1	gnd

Frequency MHz	AV Level dBμV	AV Limit dBμV	AV Delta dB	Phase -	PE -
0.18906	31.23	54.08	22.85	L1	gnd
0.54843	30.55	46.00	15.45	L1	gnd
0.57968	31.37	46.00	14.63	L1	gnd
1.10703	28.31	46.00	17.69	L1	gnd
2.37656	23.67	46.00	22.33	L1	gnd
17.99765	28.66	50.00	21.34	L1	gnd

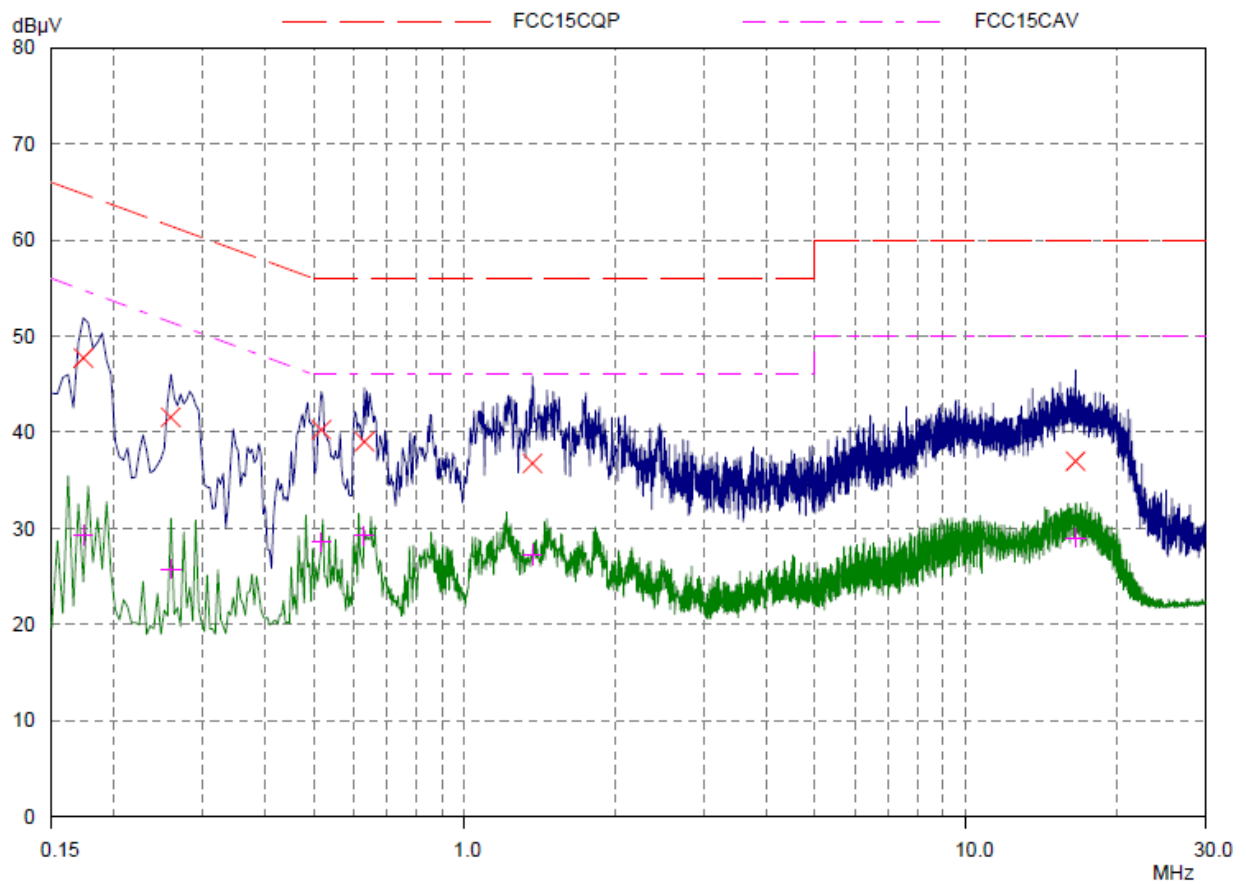
L Line

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Final Measurement Results

Frequency MHz	QP Level dBµV	QP Limit dBµV	QP Delta dB	Phase -	PE -
0.17343	47.72	64.79	17.07	N	gnd
0.25937	41.55	61.45	19.90	N	gnd
0.51718	40.26	56.00	15.74	N	gnd
0.63046	39.02	56.00	16.98	N	gnd
1.36484	36.77	56.00	19.23	N	gnd
16.55234	37.00	60.00	23.00	N	gnd

Frequency MHz	AV Level dBµV	AV Limit dBµV	AV Delta dB	Phase -	PE -
0.17343	29.28	54.79	25.51	N	gnd
0.25937	25.76	51.45	25.69	N	gnd
0.51718	28.55	46.00	17.45	N	gnd
0.63046	29.23	46.00	16.77	N	gnd
1.36484	27.30	46.00	18.70	N	gnd
16.55234	29.02	50.00	20.98	N	gnd

N Line

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3. Main Test Instruments

No.	Name	Type	Manufacturer	Serial Number	Calibration Date	Expiration Time	Valid Period
01	EMI Test Receiver	ESCS30	R&S	100138	2014-12-17	2015-12-16	1 year
02	Loop Antenna	FMZB1516	SCHWARZBECK	237	2014-06-29	2016-06-28	2 years
03	LISN	ENV216	R&S	101171	2014-12-17	2015-12-16	1 year
04	EMI Test Receiver	ESCI	R&S	100948	2015-05-25	2016-05-24	1 year
05	TRILOG Broadband Antenna	VULB 9163	Schwarzbeck	9163-201	2013-11-25	2016-11-24	3 years
06	Double Ridged Waveguide Horn Antenna	HF907	R&S	100126	2012-07-02	2015-07-01	3 years
07	PSG Analog Signal Generator	E8257D	Agilent	MY49281101	2015-05-25	2016-05-24	1 year
08	ESG Vector Signal Generator	E4438C	Agilent	MY49070900	2015-05-25	2016-05-24	1 year
09	Spectrum Analyzer	E4445A	Agilent	MY46181146	2015-05-25	2016-05-24	1 year
10	Power Splitter	SHX-GF2-2-13	Hua Xiang	10120101	NA	NA	NA
11	MOB COMMS DC SUPPLY	66319D	Agilent	MY43004105	2015-05-25	2016-05-24	1 year
12	Power Sensor	E9304A	Agilent	MY50220022	2015-05-25	2016-05-24	1 year
13	Power Meter	E4418B	Agilent	MY50000623	2015-05-25	2016-05-24	1 year
14	Vibration table	ESS-050-120	dongling	D1007126	2013-08-21	2016-08-20	3 years
15	Spectrum Analyzer	FSV30	R&S	100815	2014-12-18	2015-12-17	1 year
16	Standard Gain Horn	3160-09	ETS-Lindgren	00102644	2015-05-19	2018-05-18	3 years
17	RF Cable	SMA 15cm	Agilent	0001	2015-06-06	2015-08-05	2 Months

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

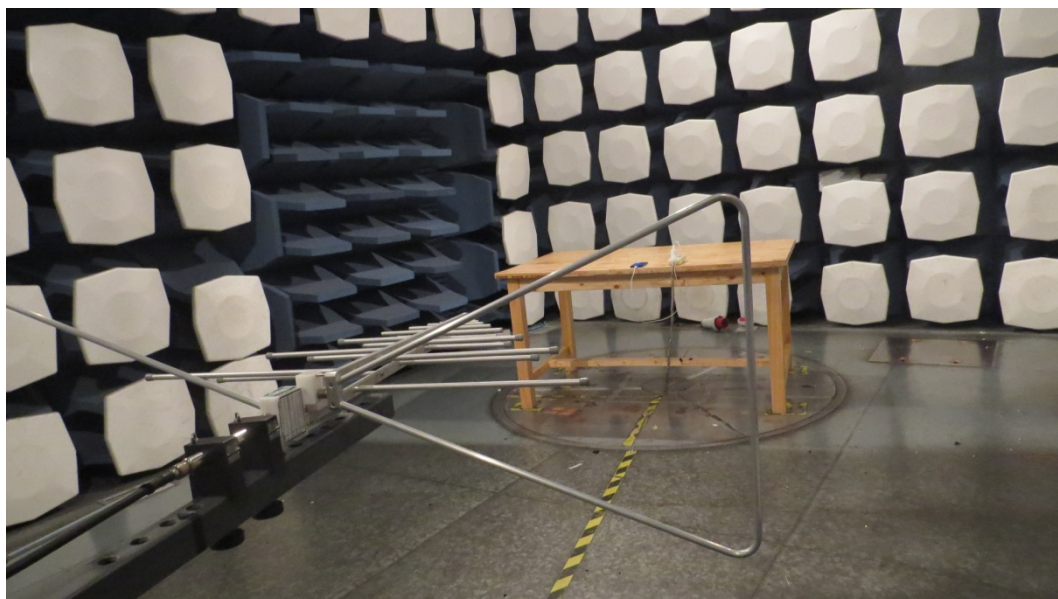
ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance

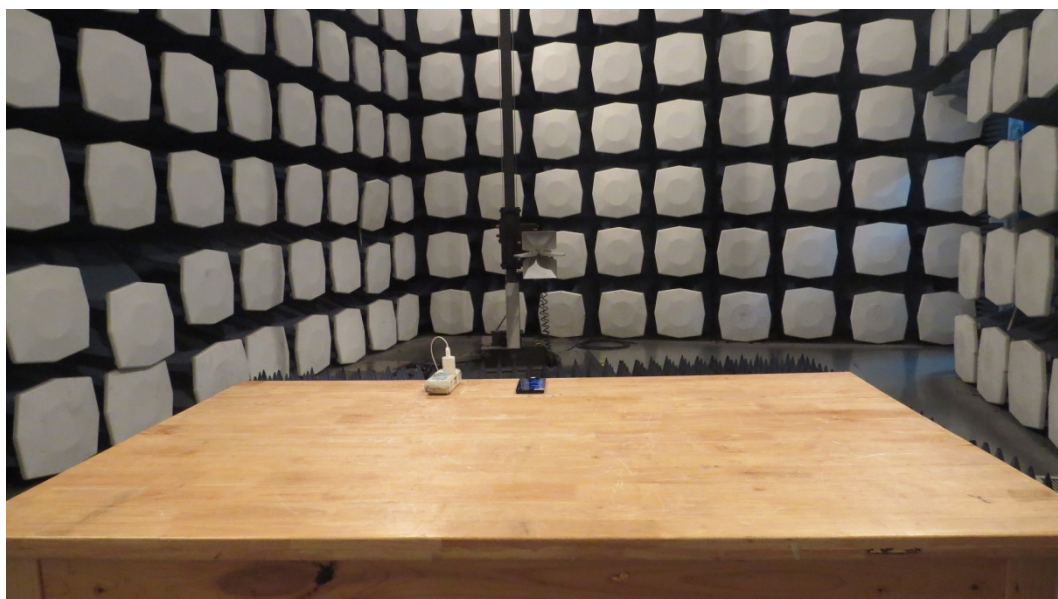


Picture 1 EUT

A.2 Test Setup



30M Hz-1GHz



Above 1GHz

Picture 2 Radiated Emission Test Setup

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Picture 3 Conducted Emission Test Setup