



RADIO TEST REPORT

Report No.:STS2201205W14

Issued for

Asteria Technology Pte. Ltd.

160 ROBINSON ROAD, #19-05 SBF CENTER, SINGAPORE
068914

Product Name:	Gravio Hub 2
Brand Name:	Gravio
Model Name:	GHUB002
Series Model:	N/A
FCC ID:	2AT7Z-GHUB002
Test Standard:	FCC Part 15.247

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TEST RESULT CERTIFICATION

Applicant's Name..... : Asteria Technology Pte. Ltd.

Address : 160 ROBINSON ROAD, #19-05 SBF CENTER, SINGAPORE 068914

Manufacturer's Name : Asteria Technology Pte. Ltd.

Address : 160 ROBINSON ROAD, #19-05 SBF CENTER, SINGAPORE
068914

Product Description

Product Name : Gravio Hub 2

Brand Name : Gravio

Model Name : GHUB002

Series Model : N/A

Test Standards..... : FCC Part15.247

Test Procedure : ANSI C63.10-2013

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test..... :

Date of receipt of test item : 20 Apr. 2022

Date (s) of performance of tests..... : 20 Apr. 2022 ~ 10 Aug. 2022

Date of Issue..... : 10 Aug. 2022

Test Result..... : **Pass**

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sean she)

Authorized Signatory :

(Bovey Yang)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	10 Aug. 2022	STS2201205W14	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02.

FCC Part 15.247,Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	--
15.209	Radiated Spurious Emission	PASS	--
15.205	Restricted bands of operation	PASS	--
15.203	Antenna Requirement	PASS	--

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report.
- (2) All tests are according to ANSI C63.10-2013.

The module has been certified, The module FCC IDENTIFIER is 2AR25ZM32P2SE.
In this report, this certified module is same as the original filling. We have tested the new Conducted Emission, Radiated Spurious Emission and Restricted bands of operation.



1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95** %.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.87\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.895\text{dB}$
3	All emissions, radiated 9K-30MHz	$\pm 3.80\text{dB}$
4	All emissions, radiated 30M-1GHz	$\pm 4.09\text{dB}$
5	All emissions, radiated 1G-6GHz	$\pm 4.92\text{dB}$
6	All emissions, radiated >6G	$\pm 5.49\text{dB}$
7	Conducted Emission (9KHz-30MHz)	$\pm 2.73\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Gravio Hub 2	
Trade Name	Gravio	
Model Name	GHUB002	
Series Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a Gravio Hub 2	
	Operation Frequency:	2405~2480 MHz
	Modulation Type:	OQPSK
	Number Of Channel:	Please refer to the Note 2.
	Antenna Designation:	Please refer to the Note 3.
	Antenna Gain (dBi)	2 dBi
Channel List	Please refer to the Note 2.	
Rating	Input: DC 12V	
Hardware version number	V4.4	
Software version number	V2.0	
Connecting I/O Port(s)	Please refer to the Note 1.	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User Manual.



2.

Channel List			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2405	09	2445
02	2410	10	2450
03	2415	11	2455
04	2420	12	2460
05	2425	13	2465
06	2430	14	2470
07	2435	15	2475
08	2440	16	2480

3.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	Gravio	AN3216	Chip antenna	N/A	2 dBi	ANT

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.



2.2 DESCRIPTION OF THE TEST MODES

For conducted test items and radiated spurious emissions

Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively.

Worst Mode	Description	Data/Modulation
Mode 1	TX CH01	OQPSK
Mode 2	TX CH08	OQPSK
Mode 3	TX CH16	OQPSK

Note:

(1) We tested for all available U.S. voltage and frequencies (For 120V, 50/60Hz and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/ 60Hz is shown in the report.

(2) The battery is fully-charged during the radiated and RF conducted test.

For AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 4 : Keeping BT TX

2.3 TEST SOFTWARE AND POWER LEVEL

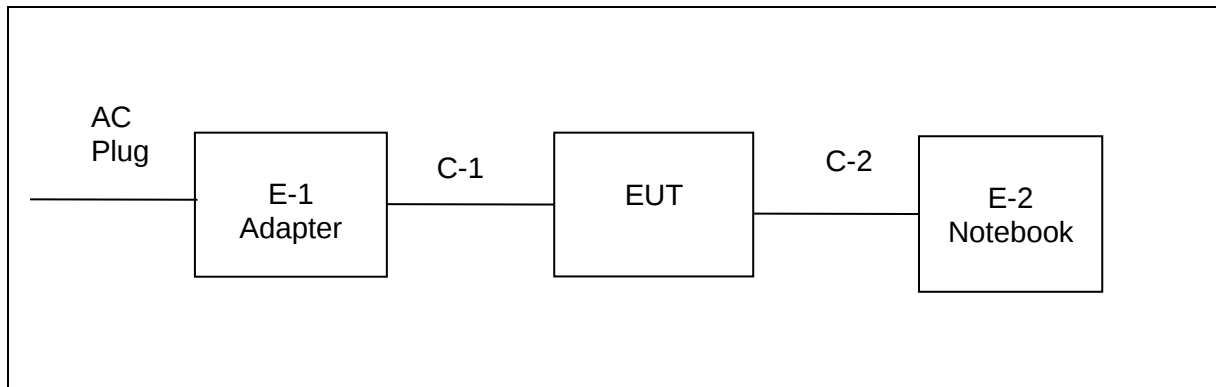
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

RF Function	Type	Mode Or Modulation type	ANT Gain(dBi)	Power Class	Software For Testing
Zigbee	2.4G	OQPSK	2	default	CMD

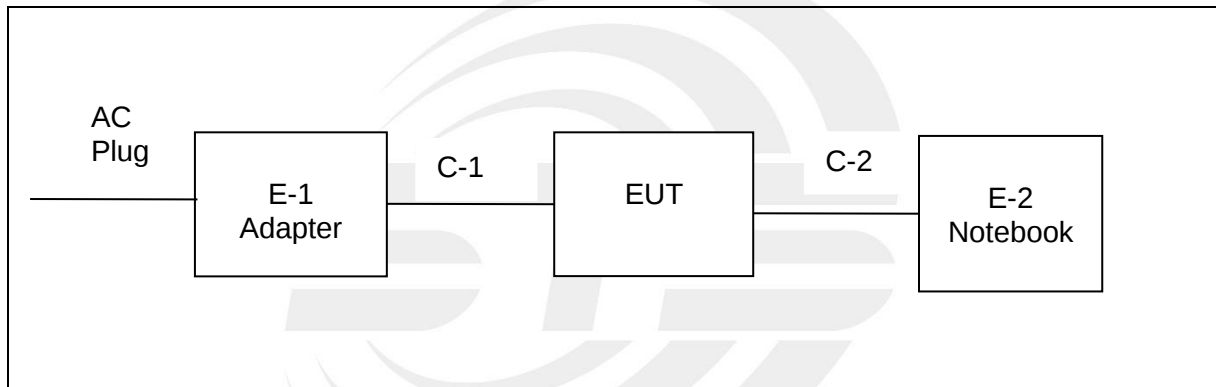


2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test





2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
E-2	DELL	Inspiron 14-3467	N/A	N/A	DELL
E-1	Adapter	HUAWEI	HW-050450C00	N/A	N/A
C-1	USB Cable	N/A	N/A	110cm	NO
C-2	LAN Cable	N/A	N/A	150cm	NO

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (2) “YES” is means “with core”; “NO” is means “without core”.



2.6 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
Signal Analyzer	R&S	FSV 40-N	101823	2021.09.30	2022.09.29
Active loop Antenna	ZHINAN	ZN30900C	16035	2021.04.11	2023.04.10
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2021.10.11	2023.10.10
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11
Pre-Amplifier(0.1M-3 GHz)	EM	EM330	060665	2021.10.08	2022.10.07
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2021.09.30	2022.09.29
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2021.09.28	2022.09.27
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2021.09.30	2022.09.29
LISN	R&S	ENV216	101242	2021.09.30	2022.09.29
LISN	EMCO	3810/2NM	23625	2021.09.30	2022.09.29
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 CE)			



RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Power Sensor	Keysight	U2021XA	MY55520005	2021.09.30	2022.09.29
			MY55520006	2021.09.30	2022.09.29
			MY56120038	2021.09.30	2022.09.29
			MY56280002	2021.09.30	2022.09.29
Signal Analyzer	Agilent	N9020A	MY51110105	2022.03.01	2023.02.28
Temperature & Humidity	HH660	Mieo	N/A	2021.10.09	2022.10.08
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			





3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

FREQUENCY (MHz)	Conducted Emission limit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of “ * ” marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

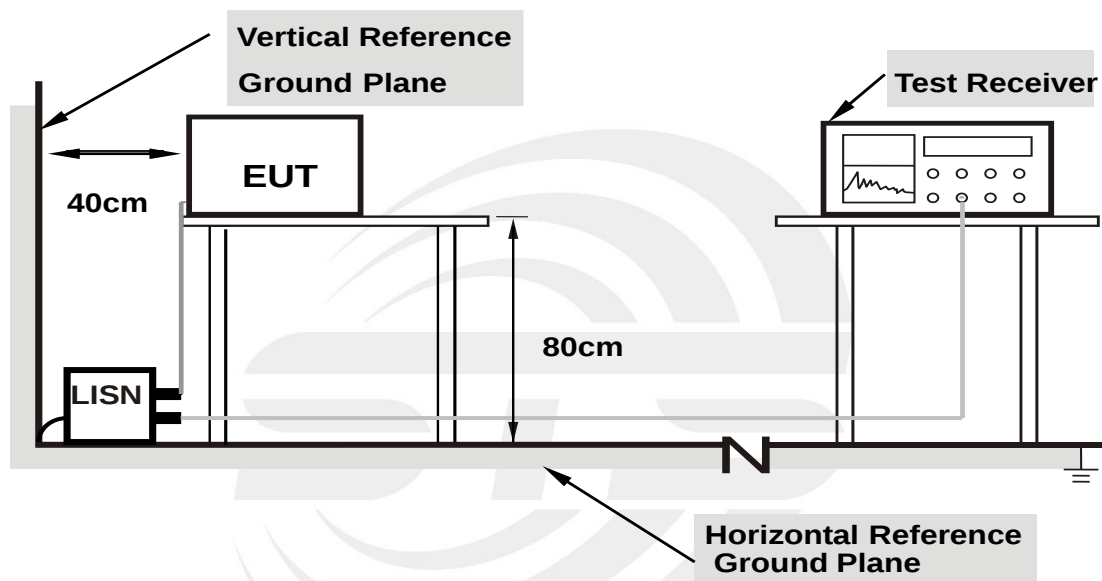
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.2 TEST PROCEDURE

- The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN is at least 80 cm from the nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3 TEST SETUP



Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support units.

3.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.5 TEST RESULTS

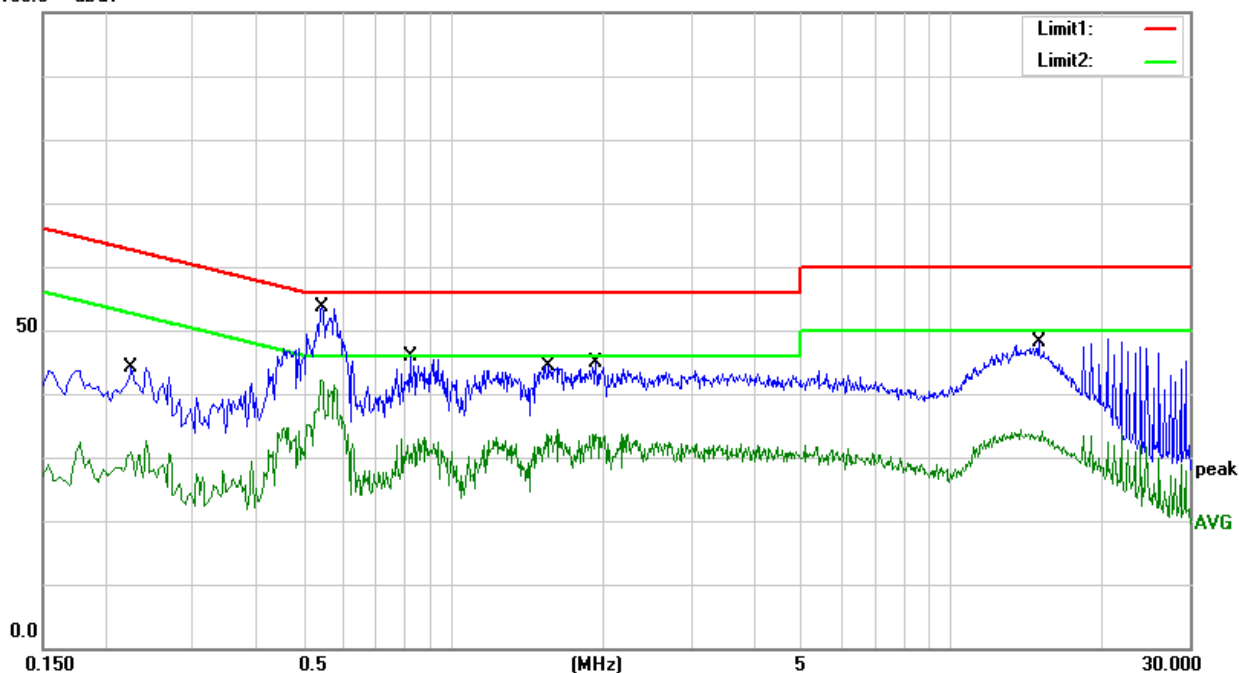
Temperature:	25.4(C)	Relative Humidity:	51%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 4		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(d B)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2260	23.81	20.43	44.24	62.60	-18.36	QP
2	0.2260	12.24	20.43	32.67	52.60	-19.93	AVG
3	0.5460	30.02	20.50	50.52	56.00	-5.48	QP
4	0.5460	21.74	20.50	42.24	46.00	-3.76	AVG
5	0.8180	25.60	20.33	45.93	56.00	-10.07	QP
6	0.8180	12.91	20.33	33.24	46.00	-12.76	AVG
7	1.5580	24.06	20.30	44.36	56.00	-11.64	QP
8	1.5580	13.32	20.30	33.62	46.00	-12.38	AVG
9	1.9340	24.50	20.30	44.80	56.00	-11.20	QP
10	1.9340	13.36	20.30	33.66	46.00	-12.34	AVG
11	14.9140	26.47	21.72	48.19	60.00	-11.81	QP
12	14.9140	12.62	21.72	34.34	50.00	-15.66	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result = Reading + Factor) – Limit
3. Factor = LISN factor + Cable loss + Limiter (10dB)

100.0 dBuV





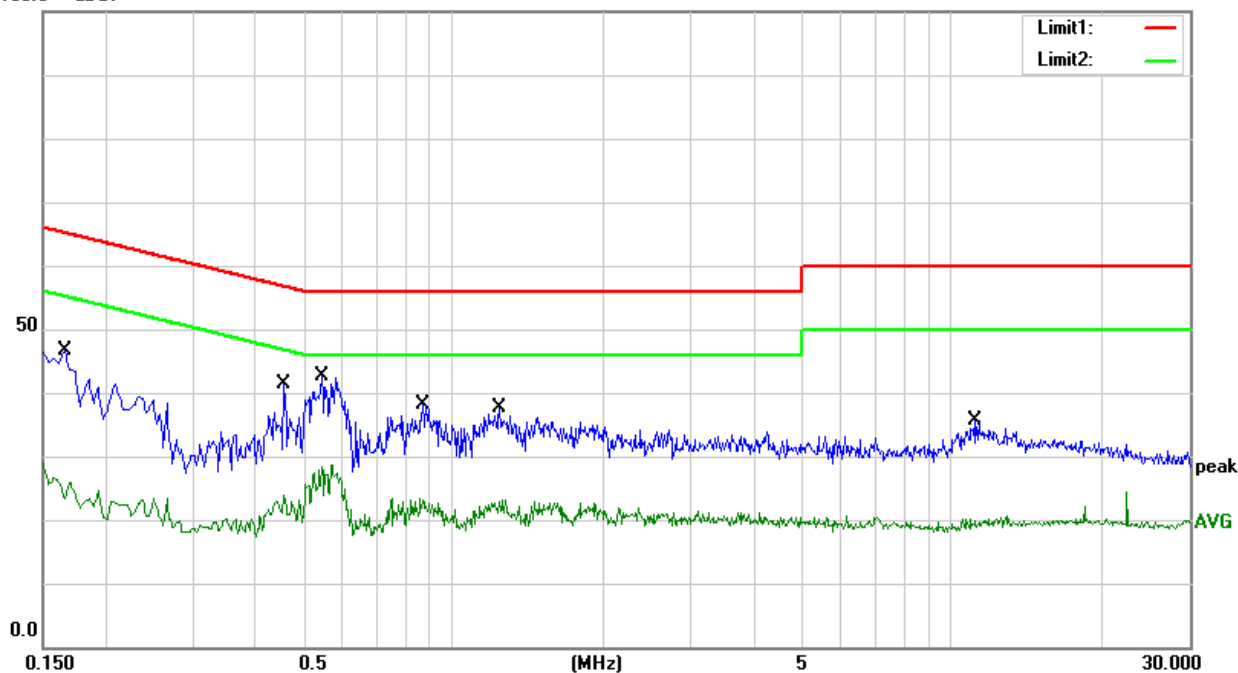
Temperature:	25.4(C)	Relative Humidity:	51%RH
Test Voltage:	AC 120V/60Hz	Phase:	N
Test Mode:	Mode 4		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1660	26.34	20.33	46.67	65.16	-18.49	QP
2	0.1660	8.66	20.33	28.99	55.16	-26.17	AVG
3	0.4580	20.76	20.52	41.28	56.73	-15.45	QP
4	0.4580	3.36	20.52	23.88	46.73	-22.85	AVG
5	0.5460	22.11	20.46	42.57	56.00	-13.43	QP
6	0.5460	8.10	20.46	28.56	46.00	-17.44	AVG
7	0.8700	17.86	20.33	38.19	56.00	-17.81	QP
8	0.8700	3.16	20.33	23.49	46.00	-22.51	AVG
9	1.2420	17.19	20.32	37.51	56.00	-18.49	QP
10	1.2420	2.82	20.32	23.14	46.00	-22.86	AVG
11	11.1740	14.47	21.08	35.55	60.00	-24.45	QP
12	11.1740	-0.35	21.08	20.73	50.00	-29.27	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result = Reading + Factor) – Limit
3. Factor = LISN factor + Cable loss + Limiter (10dB)

100.0 dBuV





4. RADIATED EMISSION MEASUREMENT

4.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (Frequency Range 9kHz-1000MHz)

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
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	Above 38.6
13.36-13.41			



For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP/AV
Start Frequency	9 KHz/150KHz(Peak/QP/AV)
Stop Frequency	150KHz/30MHz(Peak/QP/AV)
RB / VB (emission in restricted band)	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz); 200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/QP
Start Frequency	30 MHz(Peak/QP)
Stop Frequency	1000 MHz (Peak/QP)
RB / VB (emission in restricted band)	120 KHz / 300 KHz

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)

For Restricted band

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 2310 to 2410 MHz Upper Band Edge: 2475 to 2500 MHz
RB / VB	1 MHz / 3 MHz(Peak) 1 MHz/1/T MHz(AVG)



Receiver Parameter	Setting
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.2 TEST PROCEDURE

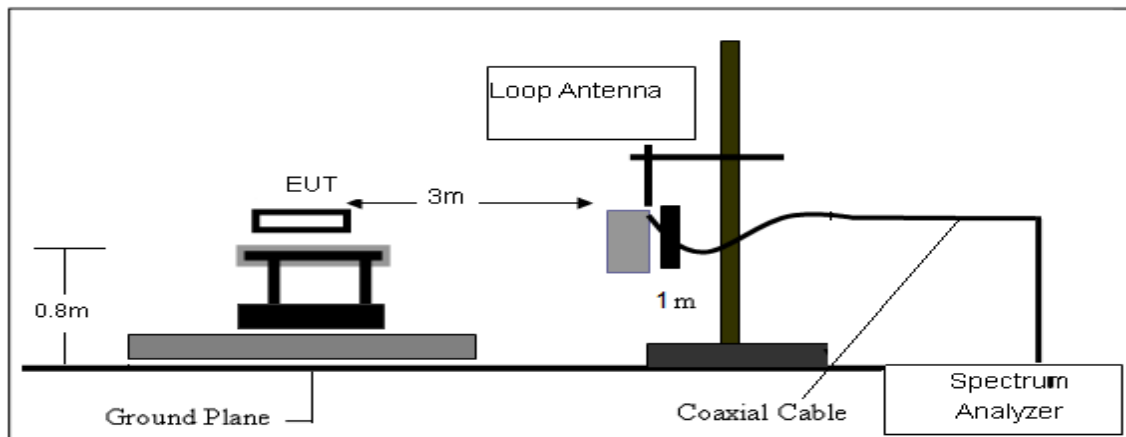
- The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
- The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and QuasiPeak detector mode will be re-measured.
- If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

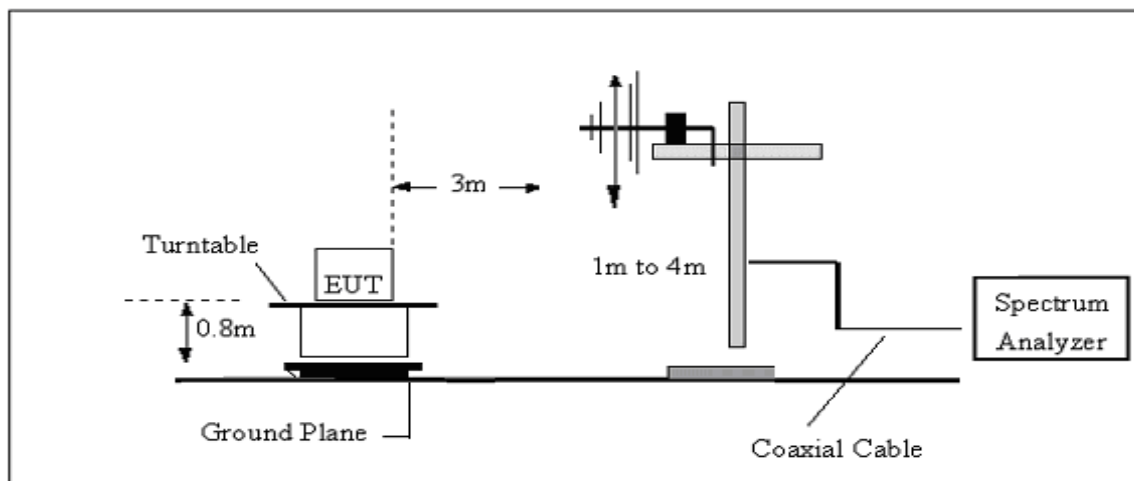
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

4.3 TEST SETUP

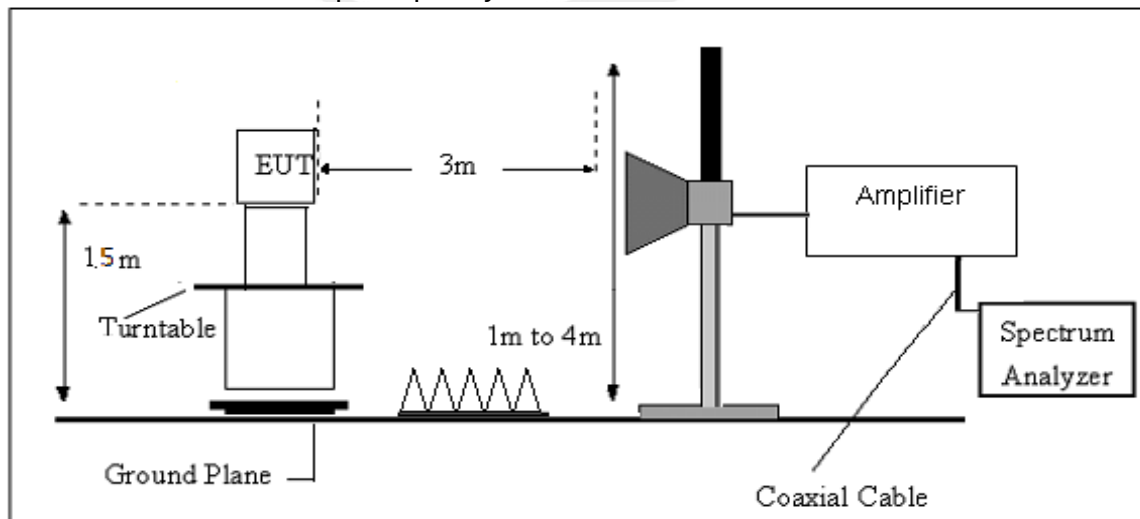
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.4 EUT OPERATING CONDITIONS

Please refer to section 3.4 of this report.



4.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dB μ V/m)	(dB μ V/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$





4.6 TEST RESULTS

(Between 9KHz – 30 MHz)

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Polarization:	--
Test Mode:	TX Mode		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})(\text{dB})$;

Limit line = specific limits(dBuv) + distance extrapolation factor.



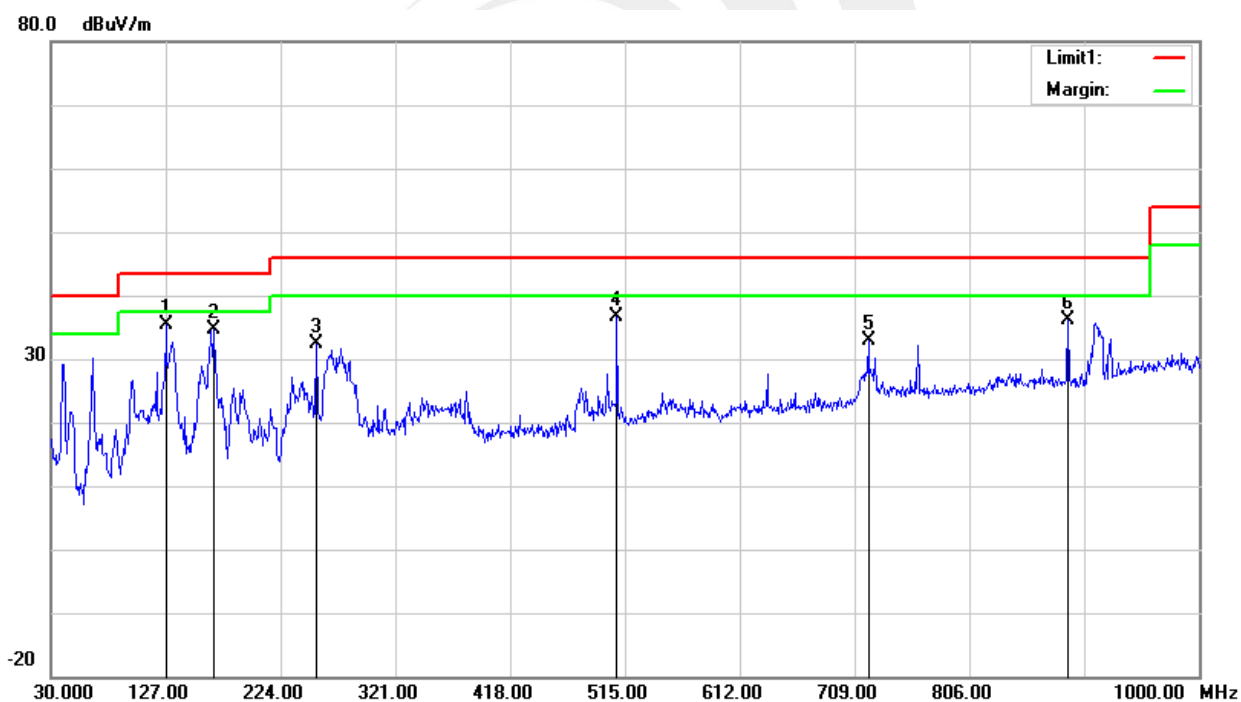
(30MHz -1000MHz)

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Horizontal
Test Mode:	Mode 1/2/3 (Mode 3 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	127.0000	53.61	-18.23	35.38	43.50	-8.12	QP
2	167.7400	54.15	-19.58	34.57	43.50	-8.93	QP
3	254.0700	47.90	-15.50	32.40	46.00	-13.60	QP
4	508.2100	44.63	-7.95	36.68	46.00	-9.32	QP
5	720.6400	35.97	-3.20	32.77	46.00	-13.23	QP
6	889.4200	36.82	-0.68	36.14	46.00	-9.86	QP

Remark:

1. Margin = Result (Result =Reading + Factor)-Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



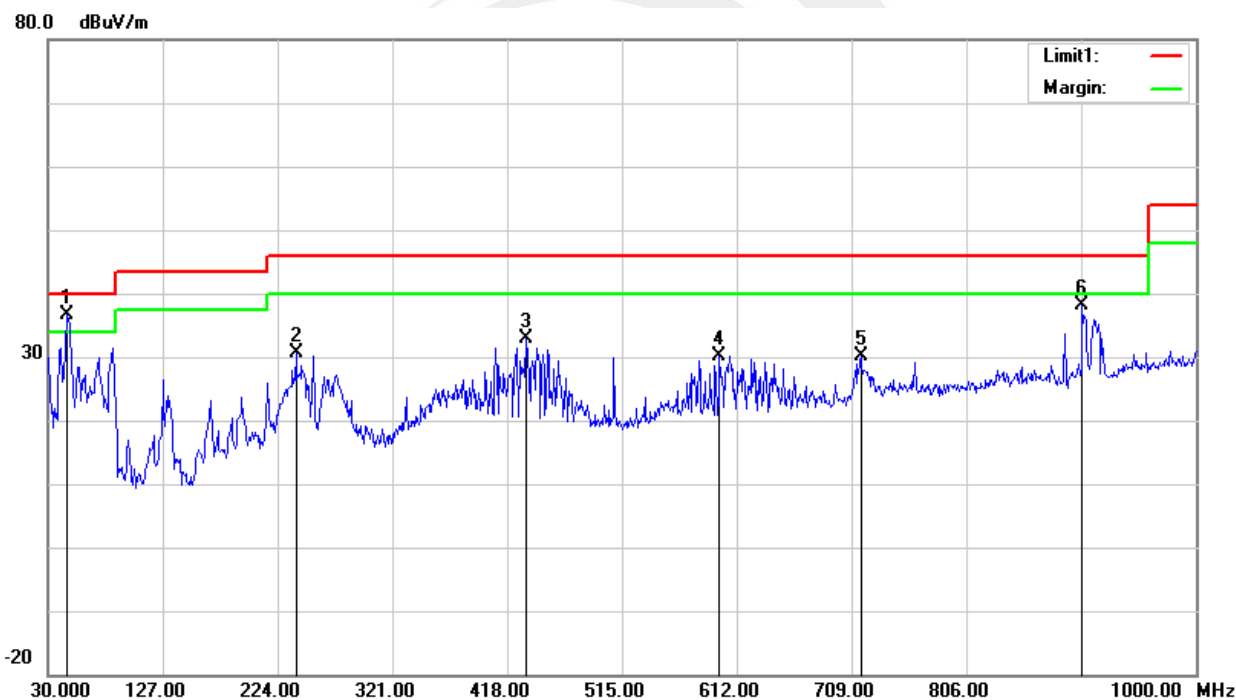


Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 12V	Phase:	Vertical
Test Mode:	Mode 1/2/3 (Mode 3 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	45.5200	57.48	-20.91	36.57	40.00	-3.43	QP
2	239.5200	48.68	-18.10	30.58	46.00	-15.42	QP
3	433.5200	42.89	-10.13	32.76	46.00	-13.24	QP
4	597.4500	36.04	-5.85	30.19	46.00	-15.81	QP
5	716.7600	33.69	-3.44	30.25	46.00	-15.75	QP
6	903.9700	38.55	-0.34	38.21	46.00	-7.79	QP

Remark:

1. $\text{Margin} = \text{Result} (\text{Result} = \text{Reading} + \text{Factor}) - \text{Limit}$
2. $\text{Factor} = \text{Antenna factor} + \text{Cable attenuation factor (cable loss)} - \text{Amplifier gain}$





(Above 1GHz) Spurious emission Requirements

OQPSK

Frequency	Meter Reading	Amplifier	Loss	Antenna Factor	Corrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBμV)	(dB)	(dB)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	Type	
Low Channel (OQPSK/2405 MHz)										
3264.80	61.77	44.70	6.70	28.20	-9.80	51.97	74.00	-22.03	PK	Vertical
3264.80	51.72	44.70	6.70	28.20	-9.80	41.92	54.00	-12.08	AV	Vertical
3264.69	61.13	44.70	6.70	28.20	-9.80	51.33	74.00	-22.67	PK	Horizontal
3264.69	49.91	44.70	6.70	28.20	-9.80	40.11	54.00	-13.89	AV	Horizontal
4804.44	59.02	44.20	9.04	31.60	-3.56	55.46	74.00	-18.54	PK	Vertical
4804.44	49.68	44.20	9.04	31.60	-3.56	46.12	54.00	-7.88	AV	Vertical
4804.38	58.55	44.20	9.04	31.60	-3.56	54.99	74.00	-19.01	PK	Horizontal
4804.38	49.10	44.20	9.04	31.60	-3.56	45.54	54.00	-8.46	AV	Horizontal
5359.69	48.69	44.20	9.86	32.00	-2.34	46.34	74.00	-27.66	PK	Vertical
5359.69	39.84	44.20	9.86	32.00	-2.34	37.49	54.00	-16.51	AV	Vertical
5359.84	47.57	44.20	9.86	32.00	-2.34	45.23	74.00	-28.77	PK	Horizontal
5359.84	38.80	44.20	9.86	32.00	-2.34	36.45	54.00	-17.55	AV	Horizontal
7205.78	53.87	43.50	11.40	35.50	3.40	57.27	74.00	-16.73	PK	Vertical
7205.78	44.27	43.50	11.40	35.50	3.40	47.67	54.00	-6.33	AV	Vertical
7205.94	53.85	43.50	11.40	35.50	3.40	57.25	74.00	-16.75	PK	Horizontal
7205.94	44.09	43.50	11.40	35.50	3.40	47.49	54.00	-6.51	AV	Horizontal
Middle Channel (OQPSK/2440 MHz)										
3262.97	62.17	44.70	6.70	28.20	-9.80	52.37	74.00	-21.63	PK	Vertical
3262.97	50.53	44.70	6.70	28.20	-9.80	40.73	54.00	-13.27	AV	Vertical
3263.02	61.40	44.70	6.70	28.20	-9.80	51.60	74.00	-22.40	PK	Horizontal
3263.02	50.07	44.70	6.70	28.20	-9.80	40.27	54.00	-13.73	AV	Horizontal
4880.12	58.52	44.20	9.04	31.60	-3.56	54.96	74.00	-19.04	PK	Vertical
4880.12	49.55	44.20	9.04	31.60	-3.56	45.99	54.00	-8.01	AV	Vertical
4880.08	58.66	44.20	9.04	31.60	-3.56	55.10	74.00	-18.90	PK	Horizontal
4880.08	50.42	44.20	9.04	31.60	-3.56	46.86	54.00	-7.14	AV	Horizontal
5357.24	49.17	44.20	9.86	32.00	-2.34	46.83	74.00	-27.17	PK	Vertical
5357.24	39.85	44.20	9.86	32.00	-2.34	37.50	54.00	-16.50	AV	Vertical
5357.39	47.29	44.20	9.86	32.00	-2.34	44.94	74.00	-29.06	PK	Horizontal
5357.04	39.12	44.20	9.86	32.00	-2.34	36.78	54.00	-17.22	AV	Horizontal
7320.85	54.81	43.50	11.40	35.50	3.40	58.21	74.00	-15.79	PK	Vertical
7320.85	43.83	43.50	11.40	35.50	3.40	47.23	54.00	-6.77	AV	Vertical
7320.31	53.58	43.50	11.40	35.50	3.40	56.98	74.00	-17.02	PK	Horizontal
7320.31	44.46	43.50	11.40	35.50	3.40	47.86	54.00	-6.14	AV	Horizontal



High Channel (QPSK/2480 MHz)										
3264.80	60.98	44.70	6.70	28.20	-9.80	51.18	74.00	-22.82	PK	Vertical
3264.80	51.66	44.70	6.70	28.20	-9.80	41.86	54.00	-12.14	AV	Vertical
3264.77	61.46	44.70	6.70	28.20	-9.80	51.66	74.00	-22.34	PK	Horizontal
3264.77	49.91	44.70	6.70	28.20	-9.80	40.11	54.00	-13.89	AV	Horizontal
4960.53	59.41	44.20	9.04	31.60	-3.56	55.85	74.00	-18.15	PK	Vertical
4960.53	49.68	44.20	9.04	31.60	-3.56	46.12	54.00	-7.88	AV	Vertical
4960.40	58.27	44.20	9.04	31.60	-3.56	54.71	74.00	-19.29	PK	Horizontal
4960.40	49.71	44.20	9.04	31.60	-3.56	46.15	54.00	-7.85	AV	Horizontal
5359.89	48.41	44.20	9.86	32.00	-2.34	46.07	74.00	-27.93	PK	Vertical
5359.89	39.96	44.20	9.86	32.00	-2.34	37.61	54.00	-16.39	AV	Vertical
5359.76	47.72	44.20	9.86	32.00	-2.34	45.38	74.00	-28.62	PK	Horizontal
5359.76	38.10	44.20	9.86	32.00	-2.34	35.75	54.00	-18.25	AV	Horizontal
7439.80	53.66	43.50	11.40	35.50	3.40	57.06	74.00	-16.94	PK	Vertical
7439.80	44.75	43.50	11.40	35.50	3.40	48.15	54.00	-5.85	AV	Vertical
7439.89	54.31	43.50	11.40	35.50	3.40	57.71	74.00	-16.29	PK	Horizontal
7439.89	43.56	43.50	11.40	35.50	3.40	46.96	54.00	-7.04	AV	Horizontal

Note:

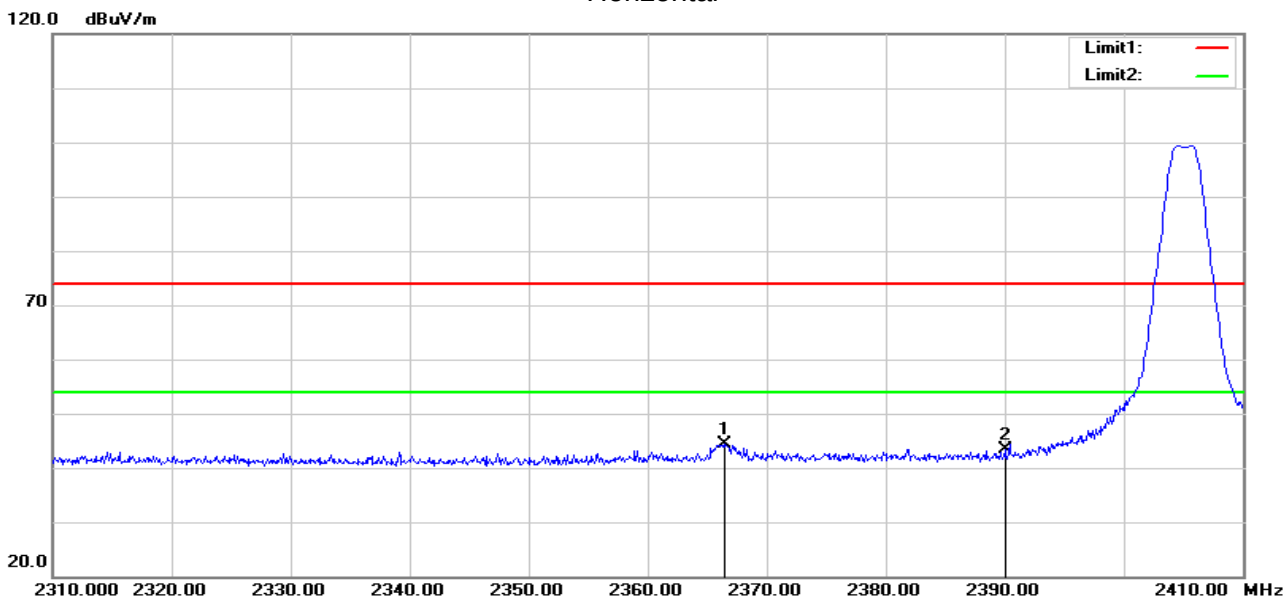
1) Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Reading + Factor

2) The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

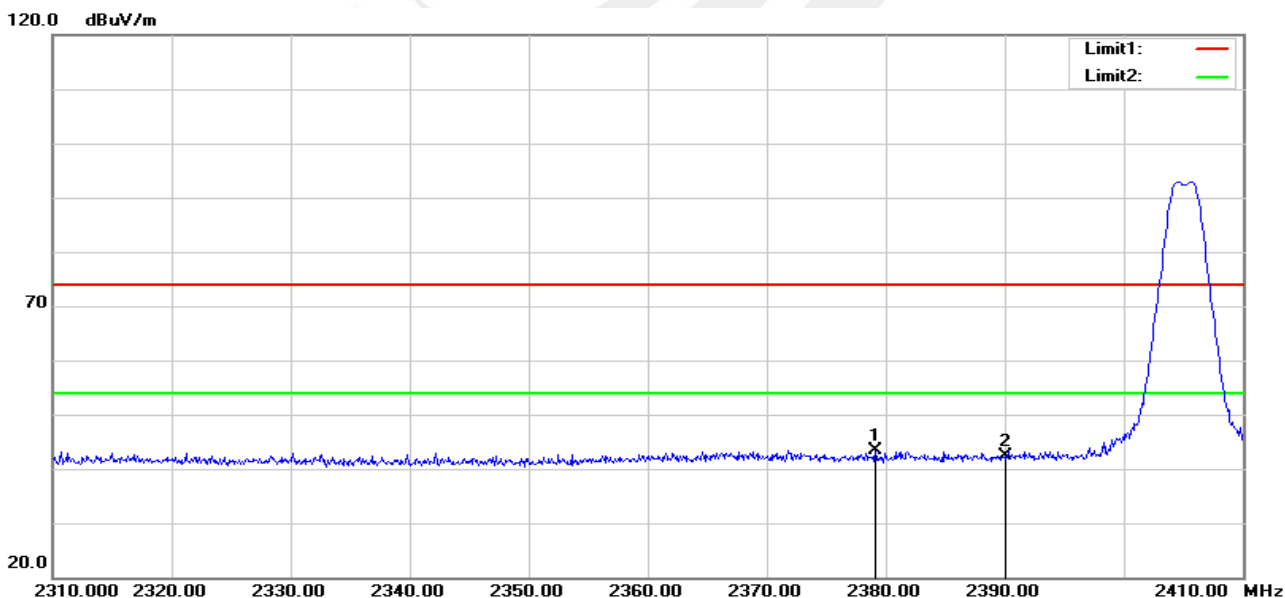


4.6 TEST RESULTS (Restricted Bands Requirements)

Low
Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2366.400	40.40	3.99	44.39	74.00	-29.61	peak
2	2390.000	38.99	4.34	43.33	74.00	-30.67	peak

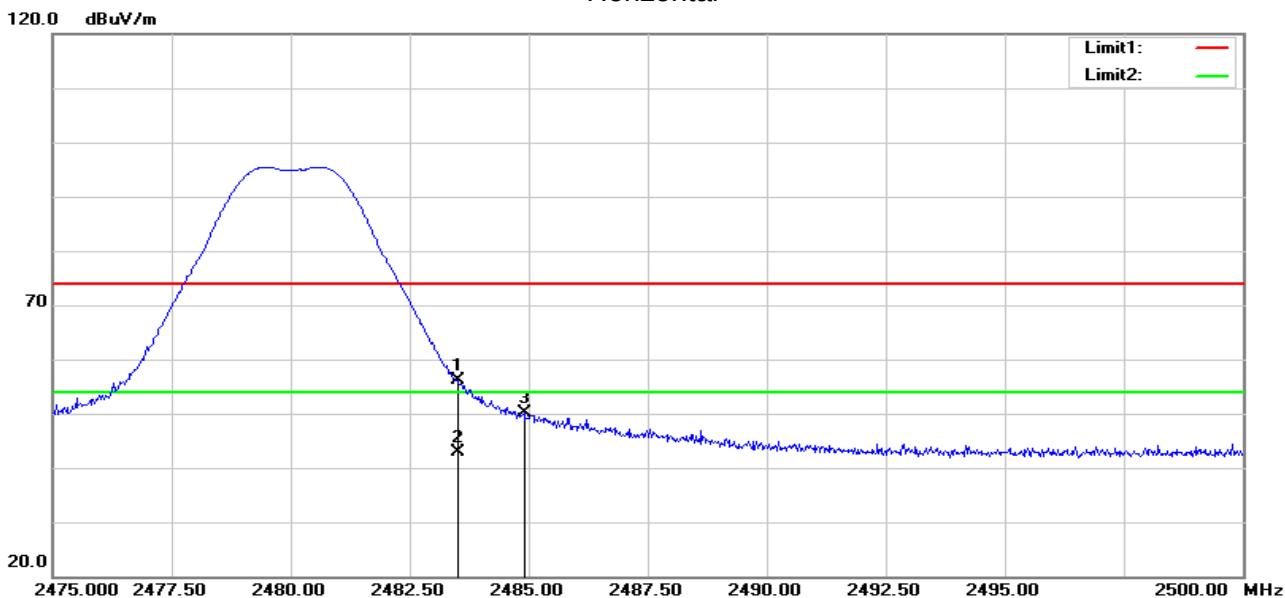
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2379.100	39.18	4.18	43.36	74.00	-30.64	peak
2	2390.000	38.09	4.34	42.43	74.00	-31.57	peak

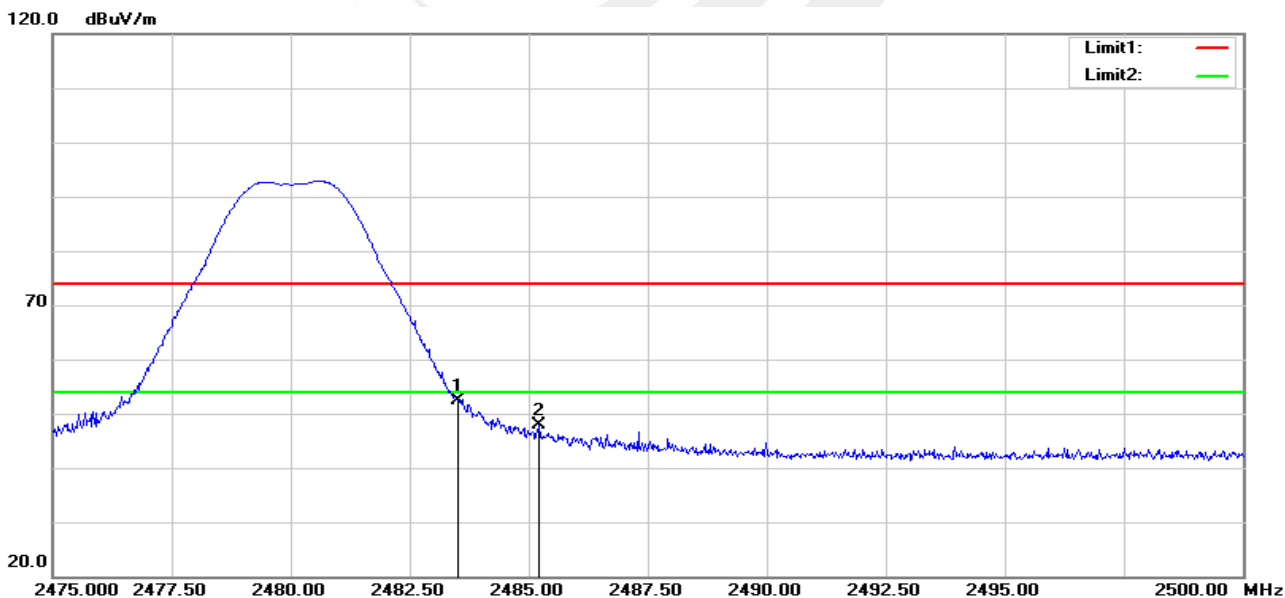


High Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	51.42	4.60	56.02	74.00	-17.98	peak
2	2483.500	38.39	4.60	42.99	54.00	-11.01	AVG
3	2484.900	45.56	4.61	50.17	74.00	-23.83	peak

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	47.90	4.60	52.50	74.00	-21.50	peak
2	2485.225	43.20	4.61	47.81	74.00	-26.19	peak



5. ANTENNA REQUIREMENT

5.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

9.2 EUT ANTENNA

The EUT antenna is Chip antenna Antenna. It comply with the standard requirement.





6. EUT TEST PHOTO

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

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

