RF Test Report

Report No.: CTA231102001W01

Issued for

Buddi Limited

Talbot House 17 Church Street Rickmansworth, WD3 1DE
United Kingdom

Product Name:	SureTag
Brand Name:	Buddi Ltd
Model Name:	S12-BUD-1-915-US-0
Series Model(s):	1000002
FCC ID	ZDLRF4
Test Standards:	FCC Part 15.249

TEST REPORT

Applicant's Name .....:	Buddi Limited
Address.....:	Talbot House 17 Church Street Rickmansworth, WD3 1DE United Kingdom
Manufacturer's Name.....:	Buddi Limited
Address.....:	Talbot House 17 Church Street Rickmansworth, WD3 1DE United Kingdom

Product Description

Product Name .....:	SureTag
Brand Name .....:	Buddi Ltd
Model Name.....:	S12-BUD-1-915-US-0
Series Model(s) .....:	1000002
Test Standards.....:	FCC Part15.249
Test Procedure.....:	ANSI C63.10-2013

This device described above has been tested by CTA, 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.
This report shall not be reproduced except in full, without the written approval of CTA, this document only be altered or revised by CTA, personal only, and shall be noted in the revision of the document.

Date of Test.....:	
Date of receipt of test item.....:	18 Sept. 2023
Date of performance of tests ..:	18 Sept. 2023 ~ 27 Sept. 2023
Date of Issue.....:	27 Sept. 2023
Test Result .....:	**Pass**

Testing Engineer :

(Zoey Cao)

Technical Manager :

(Amy Wen)

Authorized Signatory :

(Eric Wang)

Table of Contents **Page**

1. SUMMARY OF TEST RESULTS **5**
1.1 TEST FACTORY 6
1.2 MEASUREMENT UNCERTAINTY 6
2. GENERAL INFORMATION **7**
2.1 GENERAL DESCRIPTION OF THE EUT 7
2.2 DESCRIPTION OF THE TEST MODES 8
2.3 TEST SOFTWARE AND POWER LEVEL 8
2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED 9
2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS 10
2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS 11
3. EMC EMISSION TEST **13**
3.1 CONDUCTED EMISSION MEASUREMENT 13
3.2 RADIATED EMISSION MEASUREMENT 17
4. BANDWIDTH TEST **33**
4.1 TEST PROCEDURE 33
4.2 TEST SETUP 33
4.3 EUT OPERATION CONDITIONS 33
4.4 TEST RESULTS 34
5. ANTENNA REQUIREMENT **37**
5.1 STANDARD REQUIREMENT 37
5.2 EUT ANTENNA 37
APPENDIX- PHOTOS OF TEST SETUP **38**

Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	27 Sept. 2023	CTA231102001W01	ALL	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 15.249 , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	Pass	
15.203	Antenna Requirement	Pass	
15.249	Radiated Spurious Emission	Pass	
15.249	Radiated Band Edge Emission	Pass	
15.249	Field Strength of fundamental	Pass	
15.215(c)	20dB Bandwidth	Pass	

NOTE:

(1) 'N/A' denotes test is not applicable in this Test Report.

(2) All tests are according to ANSI C63.10-2013.

1.1 TEST FACTORY

Shenzhen CTA Testing Technology Co., Ltd.
Room 106, Building 1, Yibaolai Industrial Park, Qiaotou Community,Fuhai Street, Bao'an District, Shenzhen, China
FCC test Firm Registration Number: 517856
IC test Firm Registration Number: 27890
A2LA Certificate No.: 6534.01
IC CAB ID: CN0127

1.2 MEASUREMENT UNCERTAINTY

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

Test	Range	Measurement Uncertainty
Radiated Emission	30~1000MHz	4.06 dB
Radiated Emission	1~18GHz	5.14 dB
Radiated Emission	18-40GHz	5.38 dB
Conducted Disturbance	0.15~30MHz	2.14 dB
Output Peak power	30MHz~18GHz	0.55 dB
Power spectral density	/	0.57 dB
Spectrum bandwidth	/	1.1%
Radiated spurious emission (30MHz-1GHz)	30~1000MHz	4.10 dB
Radiated spurious emission (1GHz-18GHz)	1~18GHz	4.32 dB
Radiated spurious emission (18GHz-40GHz)	18-40GHz	5.54 dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	SureTag
Trade Name	Buddi Ltd
Model Name	S12-BUD-1-915-US-0
Series Model	1000002
Model Difference	The difference only in the model name.
Product Description	The EUT is a SureTag. Operation Frequency: 914.5-921.0MHz Modulation Type: ASK Antenna Designation: Flex Antenna Antenna Gain(Peak): -3.4dBi Based on the application, features, or specification exhibited in User Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User Manual.
Adapter	Charging back clip Model: 1000003 Input: DC 5V, 1000mA Output: DC 5V, 1000mA Charging head: Model: ICP06-050-1200B Input: 100-240V~, 50/60Hz, 0.3A Output: DC 12V 1.2A
Battery	Rated Voltage: 3.7V Charge Limit Voltage: 4.2V Capacity: 370mAh
Hardware version number	V1.0
Software version number	V0.0.3
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)	Channel	Frequency (MHz)
1	914.50	2	917.50	3	921.00

Test channel List		
Test Channel	EUT Channel	Test Frequency (MHz)
lowest	CH01	914.50
middle	CH02	917.50
highest	CH03	921.00

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.

Pretest Mode	Description	Data/Modulation
Mode 1	TX/CH01	ASK
Mode 2	TX/CH02	ASK
Mode 3	TX/CH03	ASK

Note:

(1) All above mode have been measurement, only worst data was reported.

(2) We have be tested for all avaiable 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,50/60Hz is shown in the report.

For AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 4 : Keeping 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.

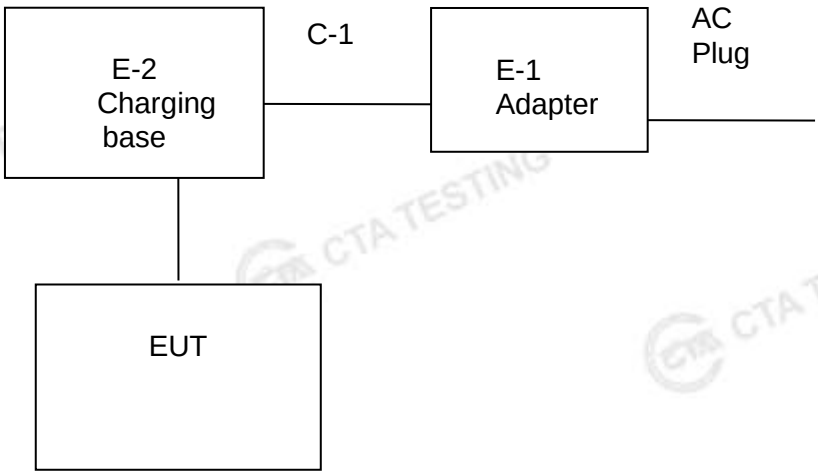
RF Function	Type	Mode Or Modulation type	ANT Gain(dBi)	Power Class	Software For Testing
Other SRD	914.5-921.0MHz	ASK	-3.4	Default	The EUT has signal transmission when it is powered on

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters.

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
E-1	Adapter	N/A	ICP06C-050-1200B	N/A	N/A
C-2	Charging base	Buddi	N/A	N/A	N/A
C-1	DC Cable	N/A	N/A	200cm	NO

Support units

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

Note:

(1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Test Equipment	Manufacturer	Model No.	Equipment No.	Calibration Date	Calibration Due Date
LISN	R&S	ENV216	CTA-308	2023/08/02	2024/08/01
LISN	R&S	ENV216	CTA-314	2023/08/02	2024/08/01
EMI Test Receiver	R&S	ESPI	CTA-307	2023/08/02	2024/08/01
EMI Test Receiver	R&S	ESCI	CTA-306	2023/08/02	2024/08/01
Spectrum Analyzer	Agilent	N9020A	CTA-301	2023/08/02	2024/08/01
Spectrum Analyzer	R&S	FSP	CTA-337	2023/08/02	2024/08/01
Vector Signal generator	Agilent	N5182A	CTA-305	2023/08/02	2024/08/01
Analog Signal Generator	R&S	SML03	CTA-304	2023/08/02	2024/08/01
WIDEBAND RADIO COMMUNICATIO N TESTER	CMW500	R&S	CTA-302	2023/08/02	2024/08/01
Temperature and humidity meter	Chigo	ZG-7020	CTA-326	2023/08/02	2024/08/01
Ultra-Broadband Antenna	Schwarzbeck	VULB9163	CTA-310	2023/10/17	2024/10/16
Horn Antenna	Schwarzbeck	BBHA 9120D	CTA-309	2023/10/13	2024/10/12
Loop Antenna	Zhinan	ZN30900C	CTA-311	2023/10/17	2024/10/16
Horn Antenna	Beijing Hangwei Dayang	OBH100400	CTA-336	2021/08/07	2024/08/06
Amplifier	Schwarzbeck	BBV 9745	CTA-312	2023/08/02	2024/08/01
Amplifier	Taiwan chengyi	EMC051845B	CTA-313	2023/08/02	2024/08/01
Directional coupler	NARDA	4226-10	CTA-303	2023/08/02	2024/08/01
High-Pass Filter	XingBo	XBLBQ-GTA18	CTA-402	2023/08/02	2024/08/01
High-Pass Filter	XingBo	XBLBQ-GTA27	CTA-403	2023/08/02	2024/08/01
Automated filter bank	Tonscend	JS0806-F	CTA-404	2023/08/02	2024/08/01
Power Sensor	Agilent	U2021XA	CTA-405	2023/08/02	2024/08/01
Amplifier	Schwarzbeck	BBV9719	CTA-406	2023/08/02	2024/08/01

Test Equipment	Manufacturer	Model No.	Version number	Calibration Date	Calibration Due Date
EMI Test Software	Tonscend	TS®JS32-RE	5.0.0.2	N/A	N/A
EMI Test Software	Tonscend	TS®JS32-CE	5.0.0.1	N/A	N/A
RF Test Software	Tonscend	TS®JS1120-3	3.1.65	N/A	N/A
RF Test Software	Tonscend	TS®JS1120	3.1.46	N/A	N/A

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)	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.

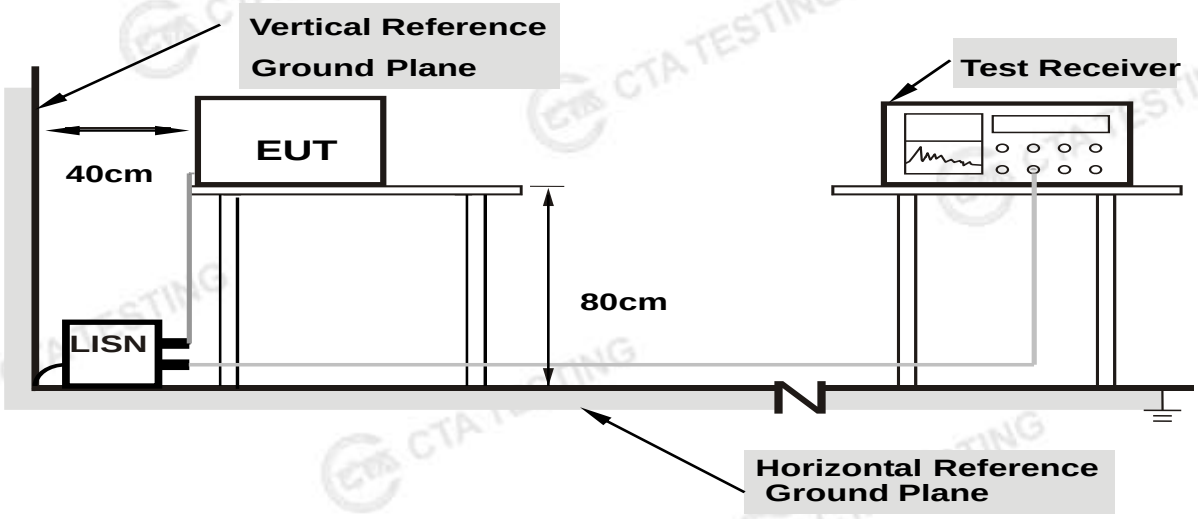
The following table is the setting of the receiver

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

3.1.2 TEST PROCEDURE

a. 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.
b. 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.
c. 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.
d. LISN is at least 80 cm from the nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



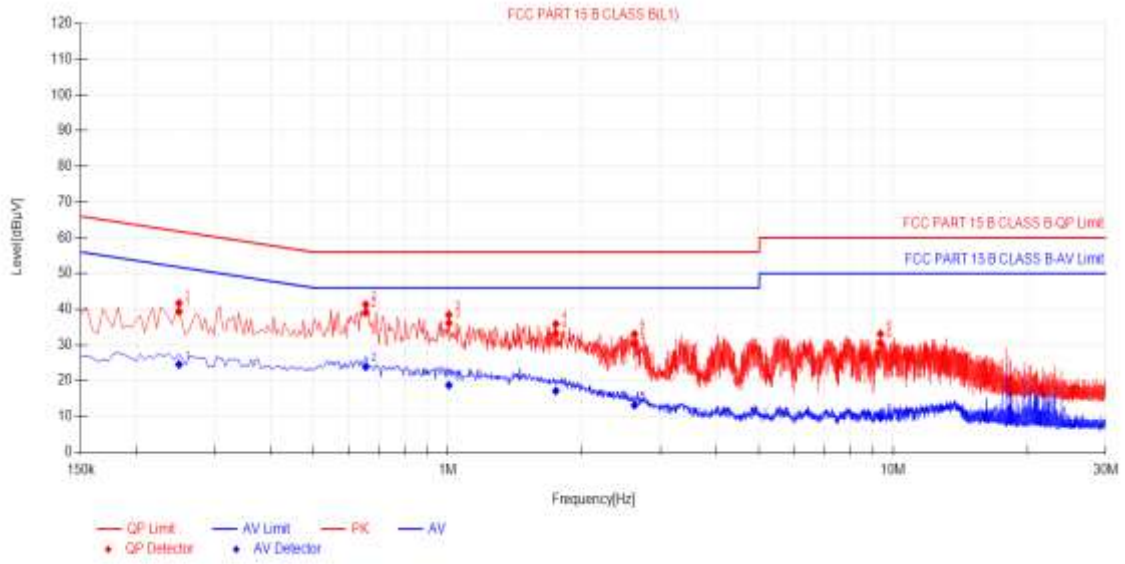
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes support.

3.1.4 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.

3.4.2 Spurious Radiated Emission 30 MHz -1000MHz

Temperature:	26.2(C)	Relative Humidity:	54%RH
Test Voltage:	AC 120V / 60Hz	Phase:	L



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.249	10.50	28.87	39.37	61.79	22.42	14.06	24.56	51.79	27.23	PASS
2	0.654	10.50	28.50	39.00	56.00	17.00	13.37	23.87	46.00	22.13	PASS
3	1.005	10.50	25.65	36.15	56.00	19.85	8.22	18.72	46.00	27.28	PASS
4	1.7475	10.50	22.76	33.26	56.00	22.74	6.63	17.13	46.00	28.87	PASS
5	2.625	10.50	19.84	30.34	56.00	25.66	2.62	13.12	46.00	32.88	PASS
6	9.3615	10.50	20.06	30.56	60.00	29.44	-0.90	9.60	50.00	40.40	PASS

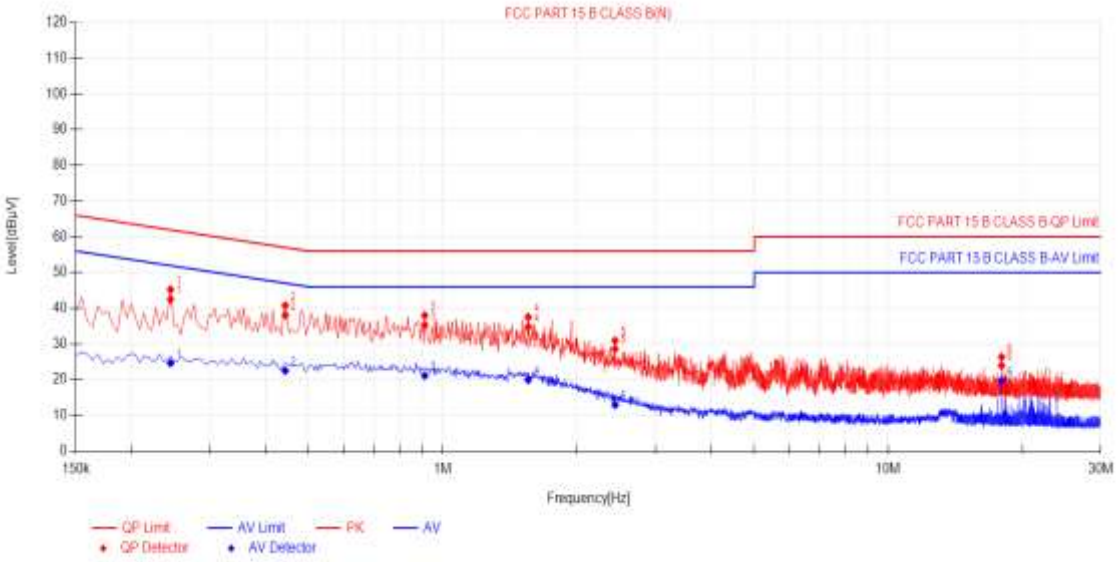
Note:1).QP Value (dBµV)= QP Reading (dBµV)+ Factor (dB)

2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)

3). QPMargin(dB) = QP Limit (dBµV) - QP Value (dBµV)

4). AVMargin(dB) = AV Limit (dBµV) - AV Value (dBµV)

Temperature:	26.2(C)	Relative Humidity:	54%RH
Test Voltage:	AC 120V/60Hz	Phase:	N



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Reading[dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.2445	10.50	32.01	42.51	61.94	19.43	14.15	24.65	51.94	27.29	PASS
2	0.4425	10.50	27.54	38.04	57.01	18.97	12.01	22.51	47.01	24.50	PASS
3	0.9105	10.50	24.79	35.29	56.00	20.71	10.64	21.14	46.00	24.86	PASS
4	1.554	10.50	24.30	34.80	56.00	21.20	9.44	19.94	46.00	26.06	PASS
5	2.436	10.50	18.12	28.62	56.00	27.38	2.43	12.93	46.00	33.07	PASS
6	17.97	10.50	13.43	23.93	60.00	36.07	9.17	19.67	50.00	30.33	PASS

Note:1).QP Value (dBµV)= QP Reading (dBµV)+ Factor (dB)

2). Factor (dB)=insertion loss of LISN (dB) + Cable loss (dB)

3). QPMargin(dB) = QP Limit (dBµV) - QP Value (dBµV)

4). AVMargin(dB) = AV Limit (dBµV) - AV Value (dBµV)

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15.249 and the Part 15.209(a) limit in the table below has to be followed.

Standard FCC 15.209

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
960~1000	500	3
Above 1000	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	3

Standard FCC 15.249

Frequency of Emission (MHz)	**Field Strength of fundamental (millivolts /meter)**	**Field Strength of Harmonics (microvolts/meter)**
900~928	50	500
2400~2483.5	50	500
5725~5875	50	500
24000~242500	250	2500

Notes:

(1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

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			

Spectrum Parameter	Setting
Detector	Peak/AV
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB (emission in restricted band)	>20BW
VB (emission in restricted band)	=3xRB

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

3.2.2 TEST PROCEDURE

a. The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of arotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)

b. The measuring distance of 3m shall used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)

c. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.

d. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

e. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform (Below 1GHz)

f. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak & AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)

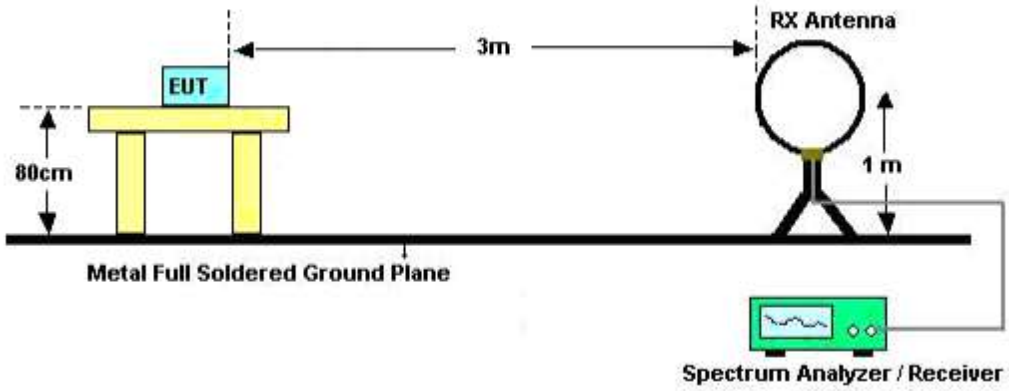
g. For the actual test configuration, please refer to the related Item –EUT Test Photos. Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

3.2.3 DEVIATION FROM TEST STANDARD

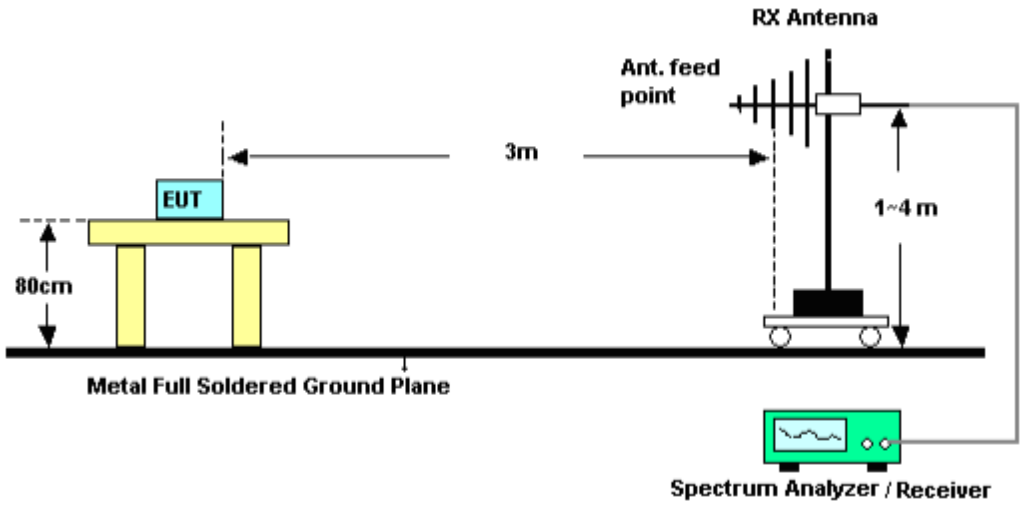
No deviation

3.2.4 TEST SETUP

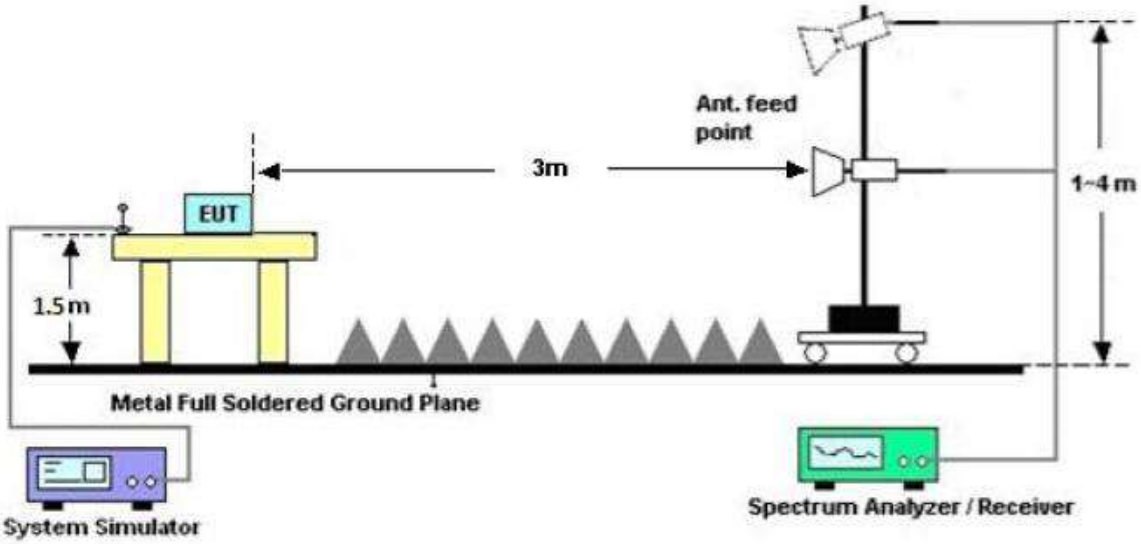
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.2.5 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:
Margin=PL-PK L or AL- AV L; Margin only shown the worst case.
Where
PR = Peak Reading
AR = Average Reading
PL = Peak Level
AL = Average Level
AF = Antenna Factor
PK L = Peak Limit
AV L = AV Limit
For example

Frequency	PR	AR	AF	PL	AL	PK L	AV L	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
2178	40.23	30.31	9.83	50.06	40.14	74.00	54.00	-13.86

3.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

Below 30 MHz

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	AC 120V/60Hz	Polarization:	---
Test Mode:	TX Mode		

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

NOTE:

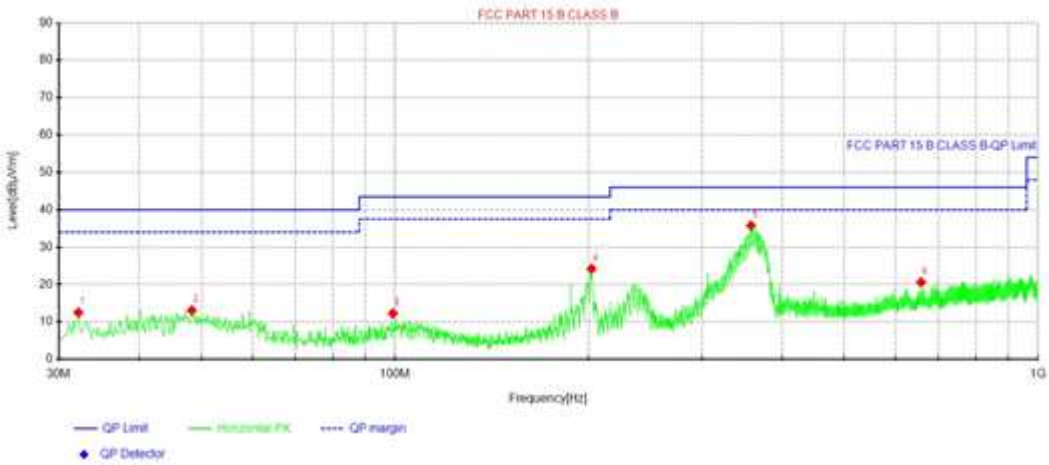
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

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

Between 30MHz – 1000 MHz Radiation Spurious

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 1 (Worst case)		



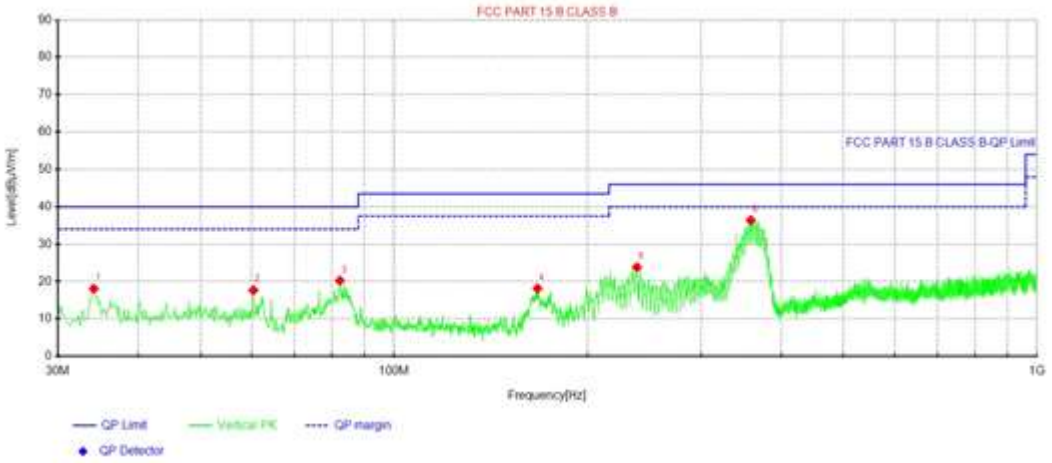
Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	32.1825	30.90	12.53	-18.37	40.00	27.47	100	90	Horizontal
2	48.3088	29.31	13.12	-16.19	40.00	26.88	100	80	Horizontal
3	99.2338	30.76	12.28	-18.48	43.50	31.22	100	360	Horizontal
4	202.175	43.47	24.22	-19.25	43.50	19.28	100	40	Horizontal
5	357.738	51.75	35.79	-15.96	46.00	10.21	100	130	Horizontal
6	657.832	32.61	20.63	-11.98	46.00	25.37	100	60	Horizontal

Note:1).Level (dBµV/m)= Reading (dBµV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBµV/m) - Level (dBµV/m)

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 1 (Worst case)		



Suspected Data List									
NO.	Freq. [MHz]	Reading [dBµV]	Level [dBµV/m]	Factor [dB/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	34.1225	36.08	18.07	-18.01	40.00	21.93	100	260	Vertical
2	60.4338	36.00	17.67	-18.33	40.00	22.33	100	190	Vertical
3	82.38	41.25	20.25	-21.00	40.00	19.75	100	140	Vertical
4	167.133	39.35	18.14	-21.21	43.50	25.36	100	350	Vertical
5	238.55	42.13	23.83	-18.30	46.00	22.17	100	280	Vertical
6	358.83	52.30	36.35	-15.95	46.00	9.65	100	320	Vertical

Note:1).Level (dBµV/m)= Reading (dBµV)+ Factor (dB/m)

2). Factor(dB/m)=Antenna Factor (dB/m) + Cable loss (dB) - Pre Amplifier gain (dB)

3). Margin(dB) = Limit (dBµV/m) - Level (dBµV/m)

Above 1G Radiation Spurious

914.5MHz

Frequency	Meter Reading	Detector	Amplifier	Loss	Antenna Factor	Orrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna Polar
(MHz)	(dBμV/m)	(PK/QP/AV)	（dB）	（dB）	（dB/m）	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
1829.00	61.12	PK	50.33	8.84	31.22	-10.27	50.85	74	-21.79	H
1829.00	60.63	PK	50.33	8.84	31.22	-10.27	50.36	74	-22.63	V
2743.37	58.36	PK	55.48	9.31	34.05	-12.12	46.24	74	-26.64	H
2743.37	56.59	PK	55.48	9.31	34.05	-12.12	44.47	74	-28.24	V
3658.09	61.60	PK	59.13	9.89	36.99	-12.25	49.35	74	-23.61	H
3658.09	60.41	PK	59.13	9.89	36.99	-12.25	48.16	74	-24.70	V

917.5MHz

Frequency	Meter Reading	Detector	Amplifier	Loss	Antenna Factor	Orrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna Polar
(MHz)	(dBμV/m)	(PK/QP/AV)	（dB）	（dB）	（dB/m）	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
1835.21	59.88	PK	50.33	8.84	31.22	-10.27	49.61	74	-21.79	H
1835.21	59.15	PK	50.33	8.84	31.22	-10.27	48.88	74	-22.63	V
2752.75	57.28	PK	55.48	9.31	34.05	-12.12	45.16	74	-26.64	H
2752.75	55.35	PK	55.48	9.31	34.05	-12.12	43.23	74	-28.24	V
3670.18	60.57	PK	59.13	9.89	36.99	-12.25	48.32	74	-23.61	H
3670.18	58.91	PK	59.13	9.89	36.99	-12.25	46.66	74	-24.70	V

921.0MHz

Frequency	Meter Reading	Detector	Amplifier	Loss	Antenna Factor	Orrected Factor	Corrected Amplitude	Limit	Margin	RX Antenna Polar
(MHz)	(dBμV/m)	(PK/QP/AV)	（dB）	（dB）	（dB/m）	（dB）	(dBμV/m)	(dBμV/m)	(dB)	(H/V)
1841.98	58.53	PK	50.33	8.84	31.22	-10.27	48.26	74	-21.79	H
1841.98	57.87	PK	50.33	8.84	31.22	-10.27	47.60	74	-22.63	V
2763.05	56.05	PK	55.48	9.31	34.05	-12.12	43.93	74	-26.64	H
2763.05	54.05	PK	55.48	9.31	34.05	-12.12	41.93	74	-28.24	V
3684.21	59.17	PK	59.13	9.89	36.99	-12.25	46.92	74	-23.61	H
3684.21	57.80	PK	59.13	9.89	36.99	-12.25	45.55	74	-24.70	V

Remark:

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

Note: Duty Factor=20*LOG10(1/(Ton/Tp))

Ton(ms)	Tp (ms)	Duty Factor
100	100	0.00

(Radiation Band edge**)**

Horizontal

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 1		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	894.5300	28.61	-0.58	28.03	46.00	-17.97	peak
2	902.0000	27.12	-0.40	26.72	46.00	-19.28	peak

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
3	914.500	93.08	-0.11	-	92.97	114.00	-21.03	peak
4	914.500	93.08	-0.11	0	92.97	94.00	-1.03	AVG

Vertical

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 1		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	898.1000	29.79	-0.50	29.29	46.00	-16.71	peak
2	902.0000	26.52	-0.40	26.12	46.00	-19.88	peak

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
3	914.500	87.76	-0.11	-	87.65	114.00	-26.35	peak
4	914.500	87.76	-0.11	0	87.65	94.00	-6.35	AVG

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 2		

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	917.500	91.71	-0.06	-	91.65	114.00	-22.35	peak
2	917.500	91.71	-0.06	0	91.65	94.00	-2.35	AVG

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 2		

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	917.500	86.90	-0.06	-	86.84	114.00	-27.16	peak
2	917.500	86.90	-0.06	0	86.84	94.00	-7.16	AVG

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	Mode 3		

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
2	928.0000	27.62	0.43	28.05	46.00	-17.95	peak
3	936.3000	28.51	1.07	29.58	46.00	-16.42	peak

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	921.00	90.92	0.04	-	90.96	114.00	-23.04	peak
4	921.00	90.92	0.04	0	90.96	94.00	-3.04	AVG

Temperature:	23.1(C)	Relative Humidity:	60%RH
Test Voltage:	DC 3.7V	Phase:	Vertical
Test Mode:	Mode 3		

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
2	928.0000	27.66	0.43	28.09	46.00	-17.91	peak
3	935.2800	29.10	0.98	30.08	46.00	-15.92	peak

Fundamental Frequency

No.	Frequency	Reading	Correct	Duty cycle	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	921.00	86.62	0.04	-	86.66	114.00	-27.34	peak
4	921.00	86.62	0.04	0	86.66	94.00	-7.34	AVG

4. BANDWIDTH TEST

4.1 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b. Spectrum Setting : RBW= 30KHz, VBW≧RBW, Sweep time = Auto.

4.2 TEST SETUP

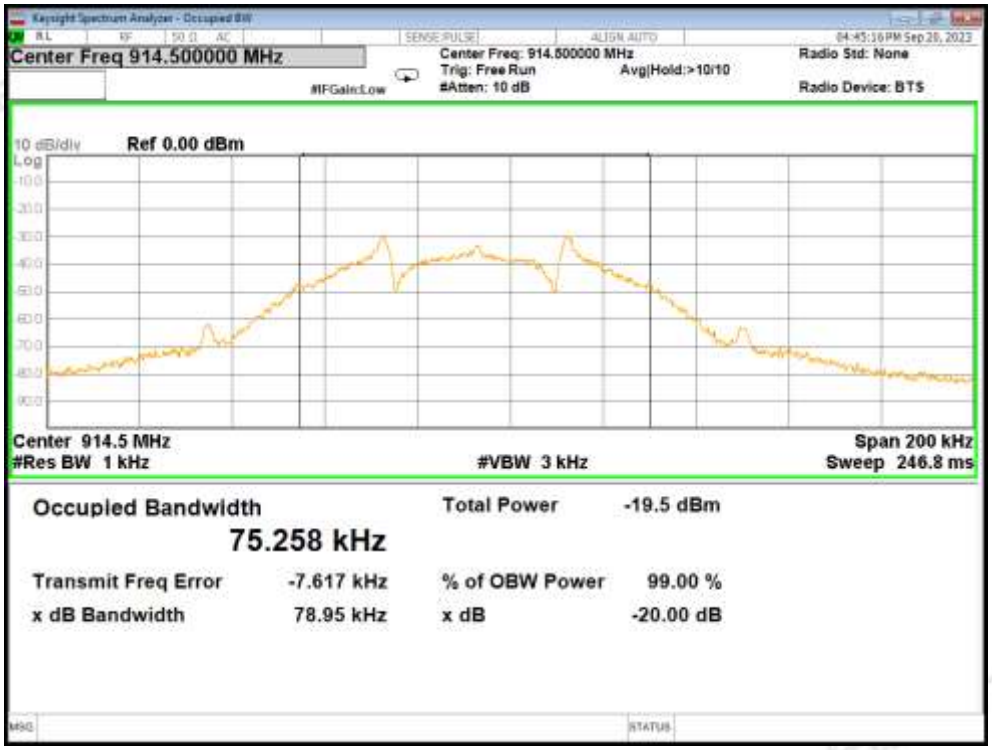
4.3 EUT OPERATION CONDITIONS

TX mode.

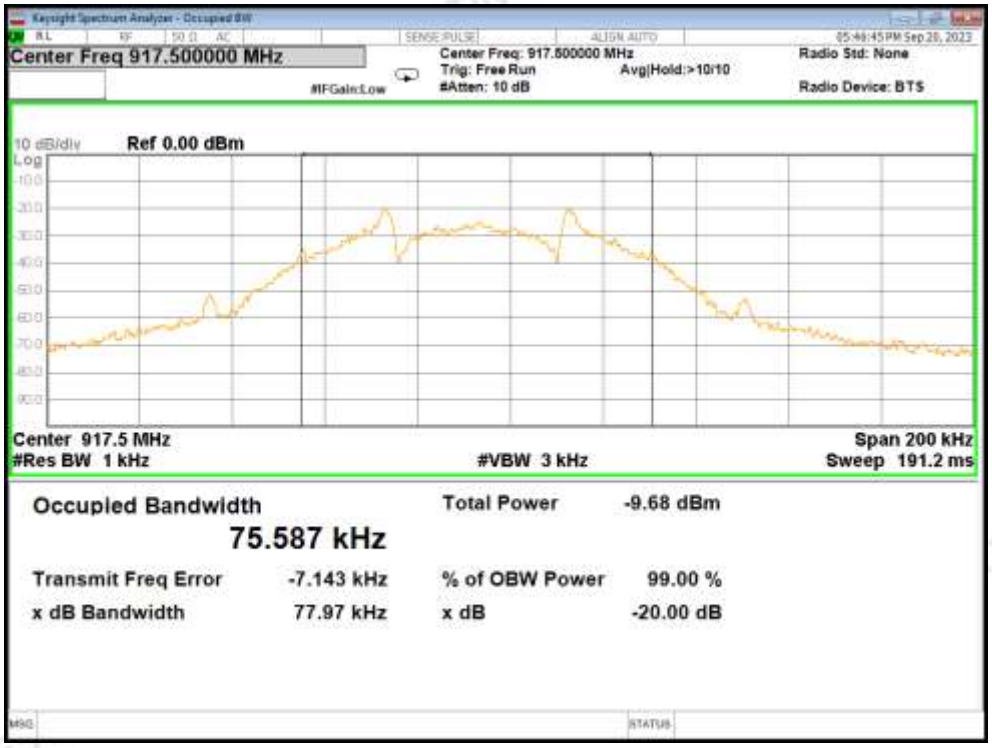
4.4 TEST RESULTS

Test Channel	Frequency(MHz)	20dB Bandwidth(KHz)	99% Bandwidth(KHz)
CH01	914.5	78.95	75.258
CH02	917.5	77.97	75.587
CH03	921	71.58	71.037

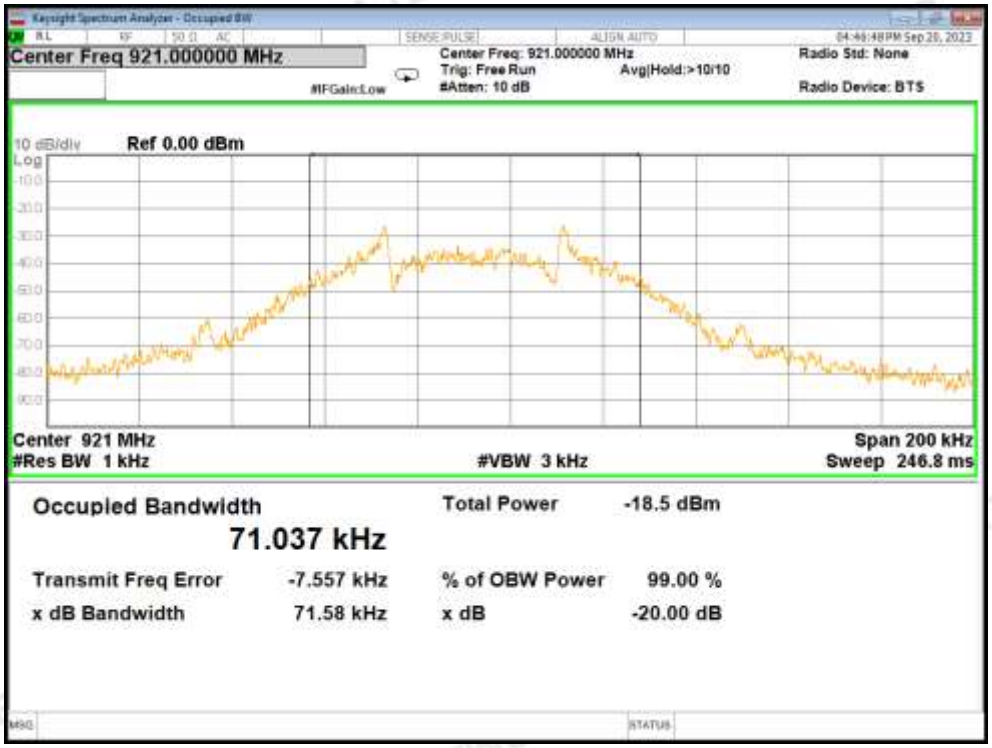
CH01



CH02


Keysight Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:PULSE
ALIGN AUTO
05:48:45 PM Sep 28, 2023
Center Freq 917.500000 MHz
Center Freq: 917.500000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
10 dB/div
Log
Ref 0.00 dBm
Center 917.5 MHz
#Res BW 1 kHz
#VBW 3 kHz
Span 200 kHz
Sweep 191.2 ms
Occupied Bandwidth
75.587 kHz
Total Power -9.68 dBm
Transmit Freq Error -7.143 kHz
% of OBW Power 99.00 %
x dB Bandwidth 77.97 kHz
x dB -20.00 dB
MSG
STATUS

CH03


Keysight Spectrum Analyzer - Occupied BW
Center Freq 921.000000 MHz
Center Freq: 921.000000 MHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
10 dB/div
Log
Ref 0.00 dBm
Center 921 MHz
#Res BW 1 kHz
#VBW 3 kHz
Span 200 kHz
Sweep 246.8 ms
Occupied Bandwidth
71.037 kHz
Total Power -18.5 dBm
Transmit Freq Error -7.557 kHz
% of OBW Power 99.00 %
x dB Bandwidth 71.58 kHz
x dB -20.00 dB

5. ANTENNA REQUIREMENT

5.1 STANDARD REQUIREMENT

According to the FCC Part 15 Paragraph 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.

5.2 EUT ANTENNA

The EUT antenna is Flex Antenna.It conforms to the standard requirements.

APPENDIX- PHOTOS OF TEST SETUP

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

※※※※※END OF THE REPORT※※※※※