FCC Test Report

Report No.: AGC01906140601FE02

FCC ID	:	A379502P
PRODUCT DESIGNATION	:	UHF Reader
BRAND NAME	:	HQS
TEST MODEL	:	9502, 9502E, 9511, 9511E, 9512, 9512E, 9514, 9514E, 9518, 9518E, 8201, 8201E, 8203, 8203E, 8502, 8502E, 8503, 8503E
CLIENT	:	Shenzhen HQS Intel. &Tech CO., LTD.
DATE OF ISSUE	:	Jun.27, 2014
STANDARD(S)	:	FCC Part 15 Rules

Attestation of Global Compliance (Shenzhen) Co., Ltd

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Jun.27, 2014	Valid	Original Report

VERIFICATION OF COMPLIANCE

Applicant	Shenzhen HQS Intel. &Tech CO., LTD.
	4th floor, C building, Sanjing industrial park, Hangkong road, Baoan avenue, Baoan District, Shenzhen, Guangdong, China
Manufacturer	Shenzhen HQS Intel. &Tech CO., LTD.
	4th floor, C building, Sanjing industrial park, Hangkong road, Baoan avenue, Baoan District, Shenzhen, Guangdong, China
Product Designation	UHF Reader
Brand Name	HQS
Test Model	9502
Series Name	9502E, 9511, 9511E, 9512, 9512E, 9514, 9514E, 9518, 9518E, 8201, 8201E, 8203, 8203E, 8502, 8502E, 8503, 8503E
Difference description:	All the same except for the model name.
Date of Test	Jun.25,2014 to Jun.27,2014

WE HEREBY CERTIFY THAT:

The above equipment was tested by Attestation of Global Compliance Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 15.247.

Prepared By

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1 .GENERAL INFORMATION

1.1 PRODUCT DESCRIPTION

The EUT is a **UHF Reader** designed as a “Communication Device”. It is designed by way of utilizing the FHSS technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	902.5 MHz ~ 927 MHz
Rated Output Power	27.91 dBm(max)
Modulation	AFSK
Number of channels	50
Antenna Designation	Detachable Antenna
Antenna Gain	7dBi
antenna connector	SMA
Hardware Version	N/A
Software Version	N/A
Power Supply	DC9V

1.2 TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
902-928MHZ	1	902.5MHZ
	2	903MHZ
	:	:
	25	914MHZ
	26	914.5MHZ
	27	915 MHZ
	:	:
	49	926.5 MHZ
	50	927 MHZ

Note:1.The channel separation of EUT is 0.5MHz.
2.All channels of the EUT hop totally randomly when start to work.

1.3 RECEIVER INPUT BANDWIDTH

The input bandwidth of the receiver is 100 KHz, The RF ID reader determines both TX and RX hopping sequence and working bandwidth. All channels were equal used within less than 0.4s

1.4 EXAMPLE OF A HOPPING SEQUENCY IN DATA MODE

Example of a 50 hopping sequence in data mode:
46,14,10,39,37,12,24,48,40,36,23,15,7,20,41,38,6,11,3,
4,21,47,13,22,18,16,9,25,42,2,29,1,19,27,31,49,17,30,5,
26,32,33,43,45,8,44,35,28,34,50

1.5 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: A379502P** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

1.6 TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

1.7 TEST FACILITY

All measurement facilities used to collect the measurement data are located at
Attestation of Global Compliance Co., Ltd.
1F., No.2 Building, Huafeng No.1 Technical Industrial Park, Sanwei, Xixiang, Baoan District, Shenzhen
The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC register No.: 259865

1.8 SPECIAL ACCESSORIES

Refer to section 2.2.

1.9 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

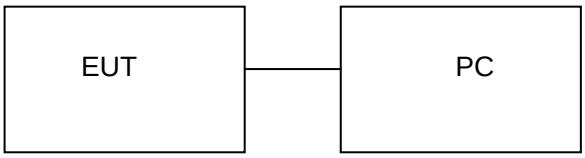
1.10 MEASUREMENT UNCERTAINTY

Uncertainty of Radio Frequency, Uc=±1 x 10^{-7}
Uncertainty of total RF power, conducted, Uc = ±0.8dB
Uncertainty of RF power density, conducted, Uc = ±2.6dB
Uncertainty of spurious emissions, conducted, Uc = ±2.7dB
Uncertainty of spurious emissions, radiated, Uc = ±5.4dB
Uncertainty of Temperature: ±0.5° C
Uncertainty of Humidity: ±1 %
Uncertainty of DC and low frequency voltages: ±2%

SYSTEM TEST CONFIGURATIONS

2.1 CONFIGURATION OF TESTED SYSTEM

Configure:



Note: All the accessories have been used during the test.

2.2 EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Mfr/Brand	Model/Type No.	Remark
1	UHF Reader	N/A	9502	EUT
2	PC	Dell	SL410K	A.E
3	adapter	Anthin	API324-0926	A.E.

Note: the power supply by our laboratory.

2.3 I/O Port Information

I/O Port of EUT		
I/O Port Type	**Cable Description**	**Tested With**
DC port	1.5m, unshielded	1
SMA Port	0.5m, unshielded	1

2.4 Cable information

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Radiation Cable 1	Sat	RE1	R003	06/04/2014	06/03/2015
Conduction Cable	Sat	CE1	C001	06/04/2014	06/03/2015

3 SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Peak Output Power	Compliant
§15.247	20 dB Bandwidth	Compliant
§15.247	Conducted Spurious Emission	Compliant
§15.207	Conduction Emission	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§15.247	Number of Hopping Frequency	Compliant
§15.247	Time of Occupancy	Compliant
§15.247	Frequency Separation	Compliant

4. DESCRIPTION OF TEST MODES

The following operating modes were applied for the related test items.

No.	TEST MODES
1	Low Channel(TX)
2	Middle Channel(TX)
3	High Channel(TX)
4	Normal Hopping

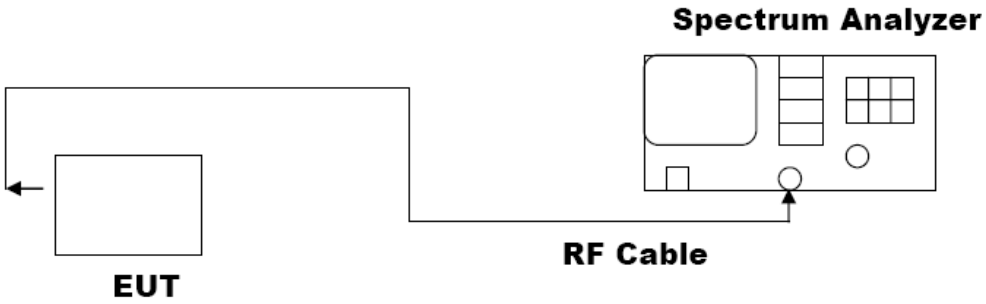
Note: only the result of the worst case was recorded in the report.

5 PEAK OUTPUT POWER

5.1 MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer.
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 5 times the 20 dB bandwidth, centered on a hoping channel
   RBW > the 20 dB bandwidth of the emission being measured
   VBW ≥ RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

5.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



5.3 MEASUREMENT EQUIPMENT USED

Description	Manufacturer	Model	SERIAL NUMBER	Cal. Date	Cal. Due
Spectrum Analyzer	Agilent	E4440A	N/A	06/25/2014	06/24/2015

5.4 LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT			
Frequency (MHz)	Result (dBm)	Applicable Limits (dBm)	Pass or Fail
902.5	27.91	29	Pass
915	27.84	29	Pass
927	27.83	29	Pass

Note:the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna gain = 7dBi, the exceeding gain = 1dBi, so limit= (30-1)dBm=29dBm.

6 20 DB BANDWIDTH

6.1 MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel
   RBW ≥ 1% of the 20 dB bandwidth, VBW ≥ RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

6.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in Section 5.2

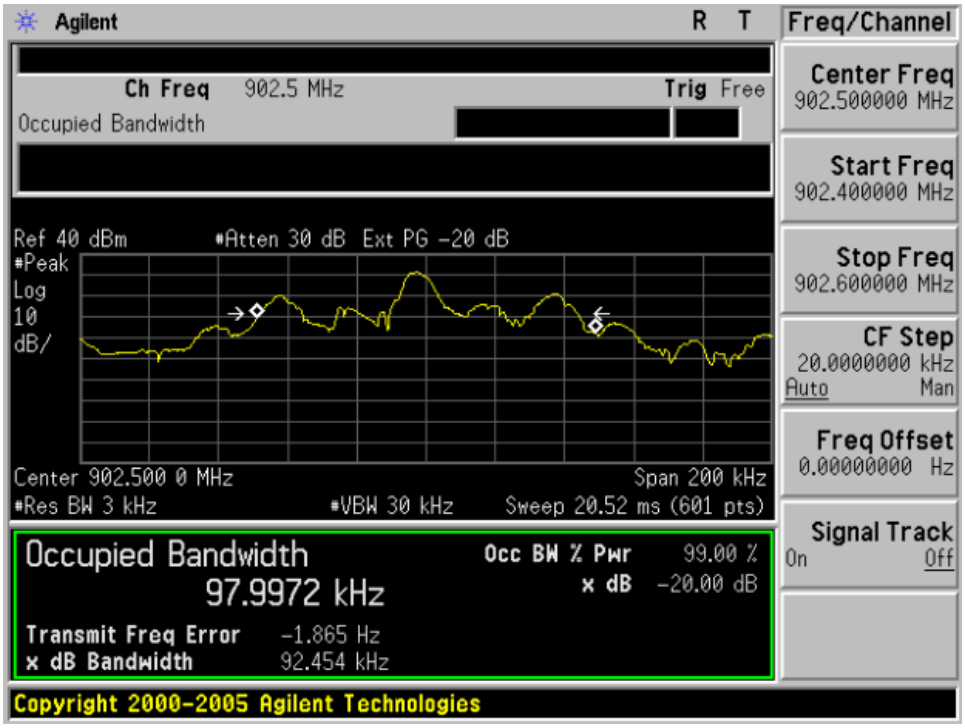
6.3 MEASUREMENT EQUIPMENT USED

The same as described in Section 5.3

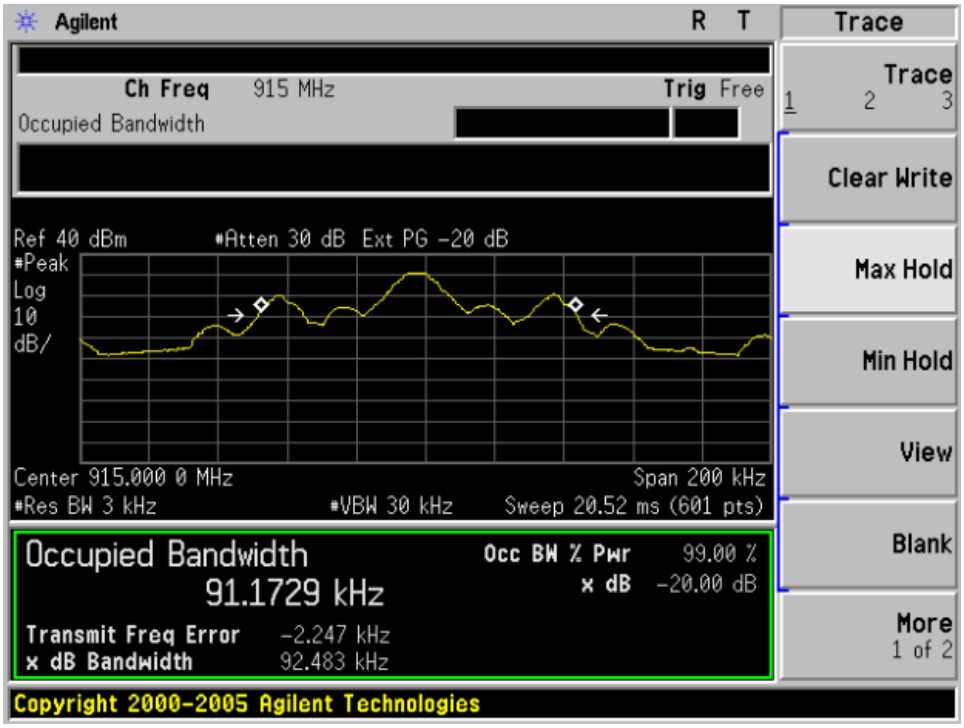
6.4 LIMITS AND MEASUREMENT RESULTS

THE MEASUREMENT RESULT WITH THE WORST CASE			
Applicable Limits	Measurement Result		
	Test Data (KHz)		Criteria
≦500KHz	Low Channel	92.454	PASS
	Middle Channel	92.483	PASS
	High Channel	91.223	PASS

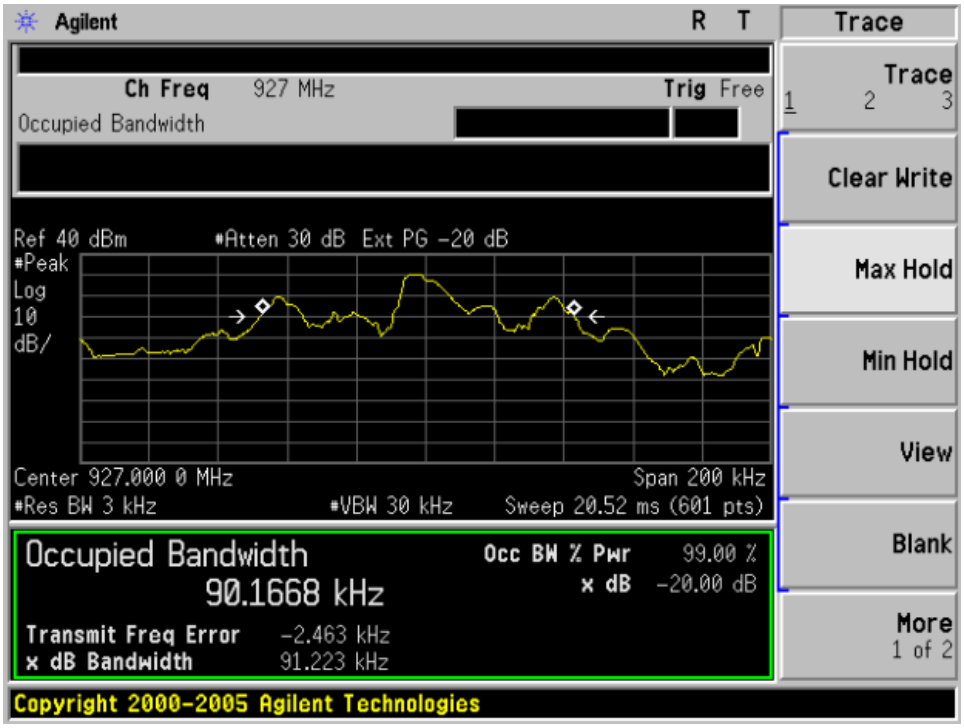
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



7. CONDUCTED SPURIOUS EMISSION

7.1 MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic. RBW = 100 kHz; VBW ≥ RBW; Sweep = auto; Detector function = peak.
4. Set SPA Trace 1 Max hold, then View.

7.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 5.2

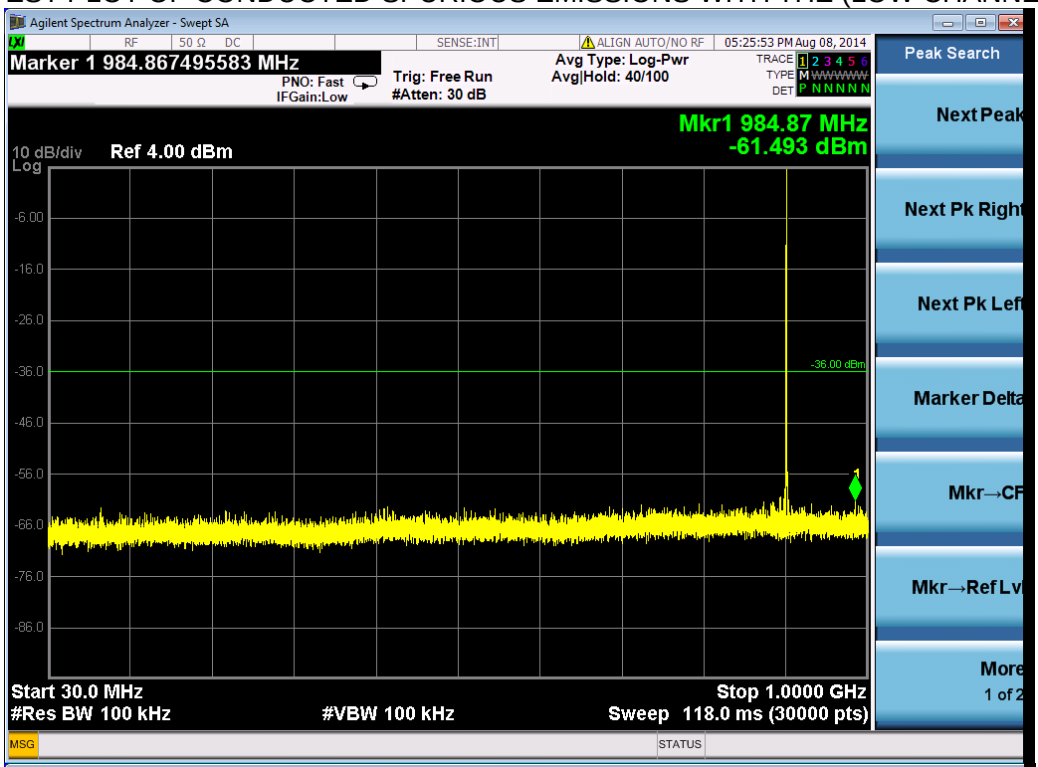
7.3 MEASUREMENT EQUIPMENT USED

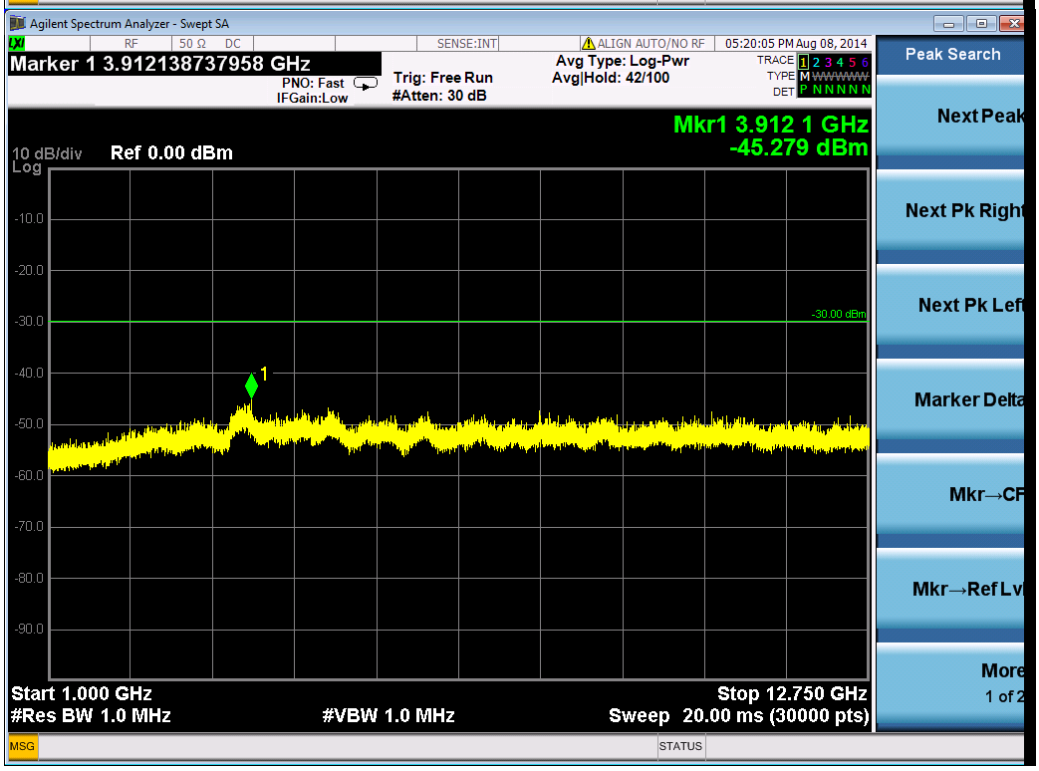
Description	Manufacturer	Model	SERIAL NUMBER	Cal. Date	Cal. Due
Spectrum Analyzer	Agilent	E4440A	N/A	06/25/2014	06/24/2015
EXA Signal Analyzer	Agilent	N9010A	MY53470504	Mar. 28, 2014	Mar. 28, 2015

7.4 LIMITS AND MEASUREMENT RESULT

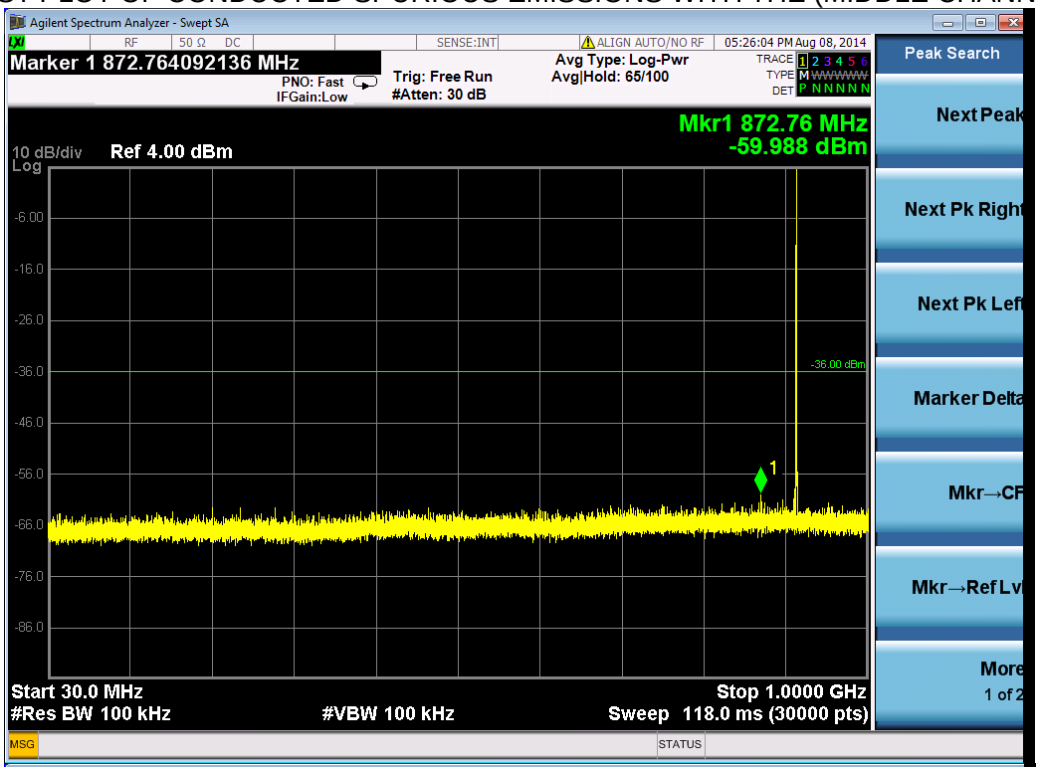
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -20dBc than the limit Specified on the BOTTOM Channel	PASS
In addition, radiation 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))	At least -20dBc than the limit Specified on the TOP Channel	PASS

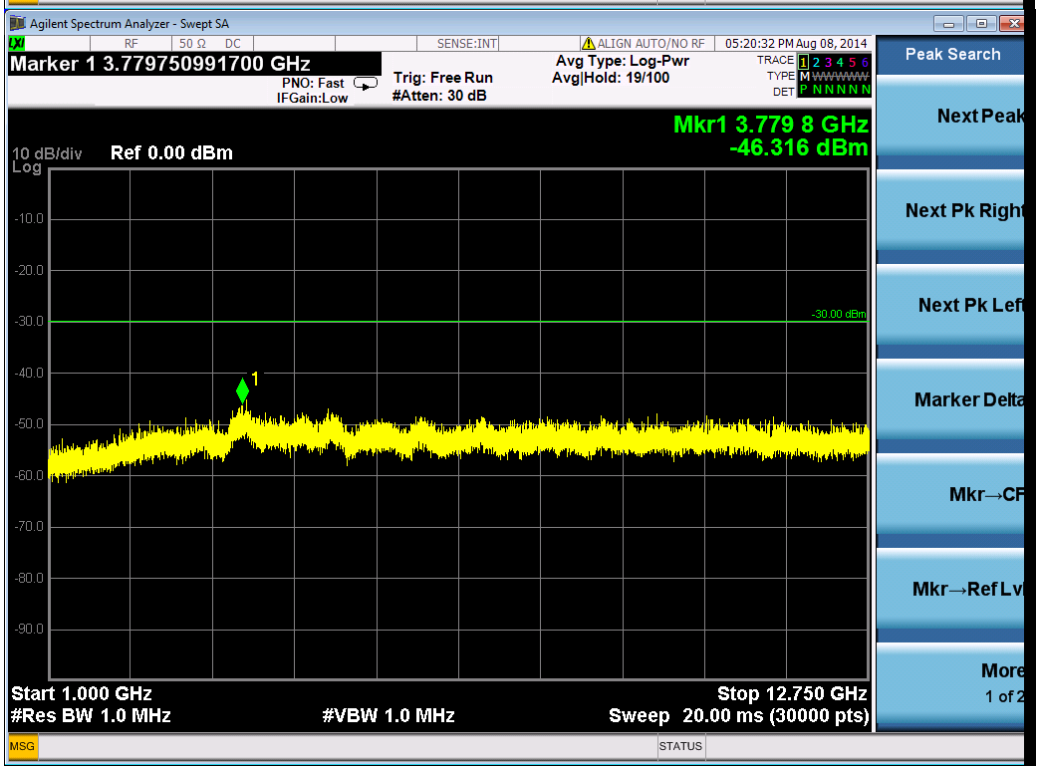
TEST PLOT OF CONDUCTED SPURIOUS EMISSIONS WITH THE (LOW CHANNEL)



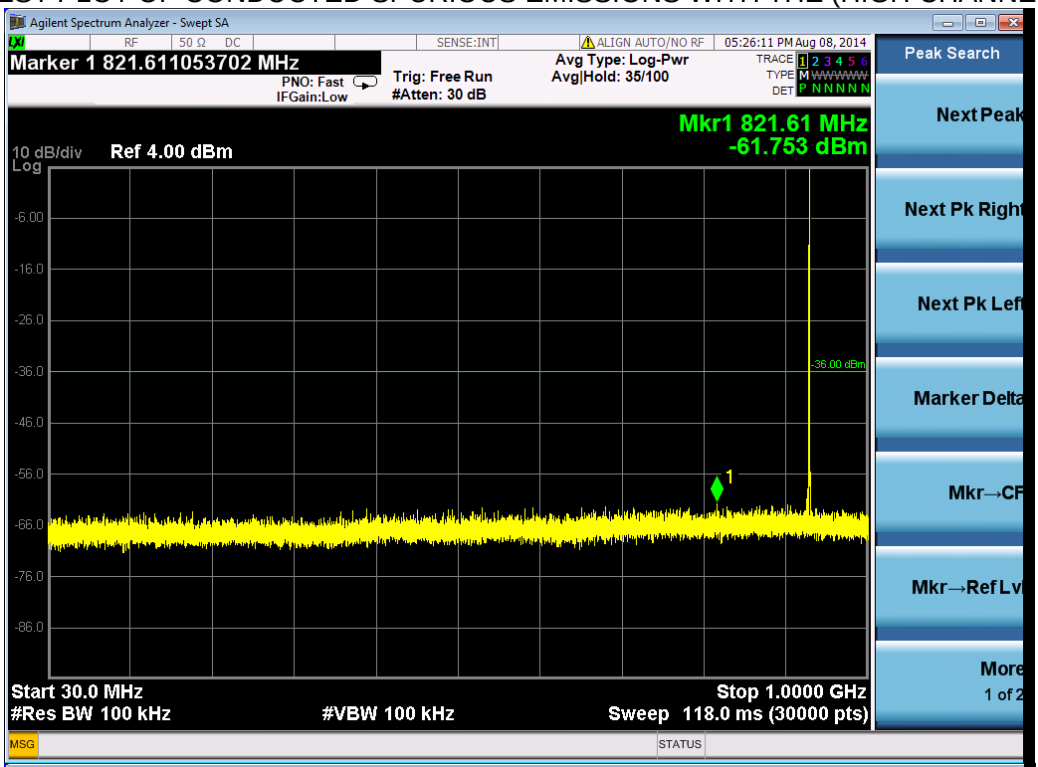


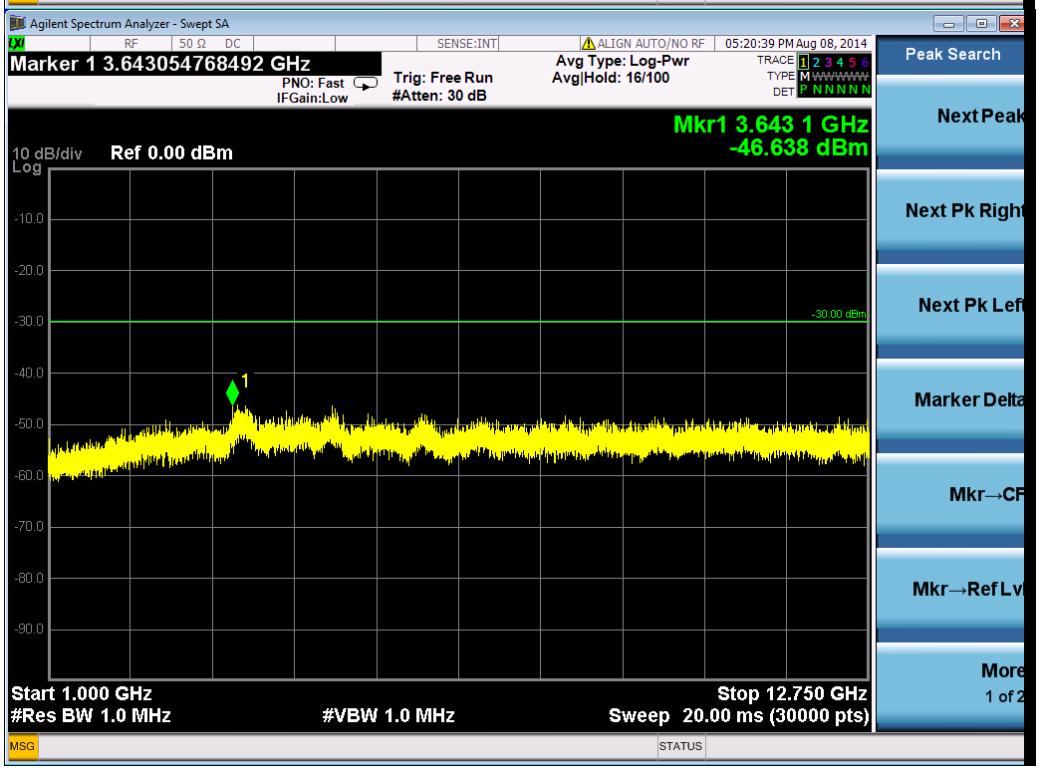
TEST PLOT OF CONDUCTED SPURIOUS EMISSIONS WITH THE (MIDDLE CHANNEL)





TEST PLOT OF CONDUCTED SPURIOUS EMISSIONS WITH THE (HIGH CHANNEL)





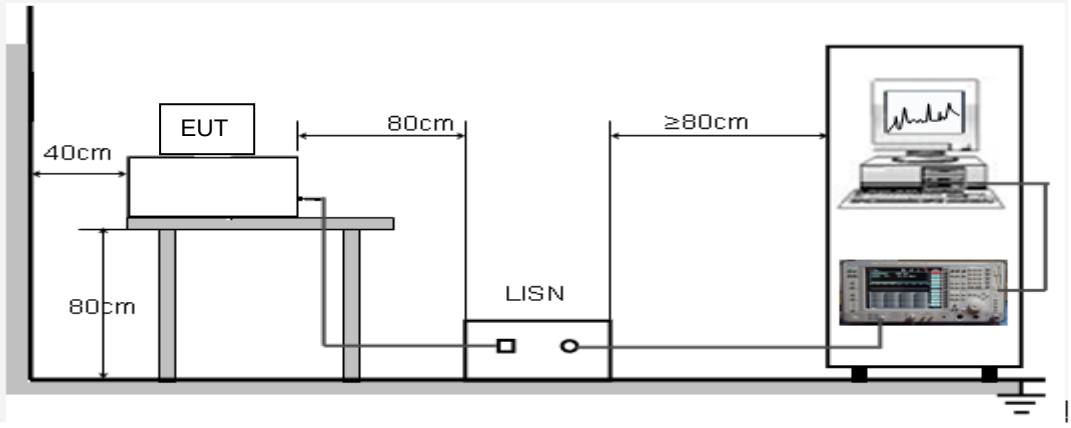
8 CONDUCTED EMISSION

8.1 .LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	79	66
500kHz~30MHz	73	60

***Note: 1. The lower limit shall apply at the transition frequency.*

8.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



8.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) The EUT received by adapter which received 120V/60Hz power from socket under the turntable through a LISN.
5) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
6) Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
7) During the above scans, the emissions were maximized by cable manipulation.
8) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions.
9) Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.

The test data of the worst case condition(s) was reported on the Summary Data page.

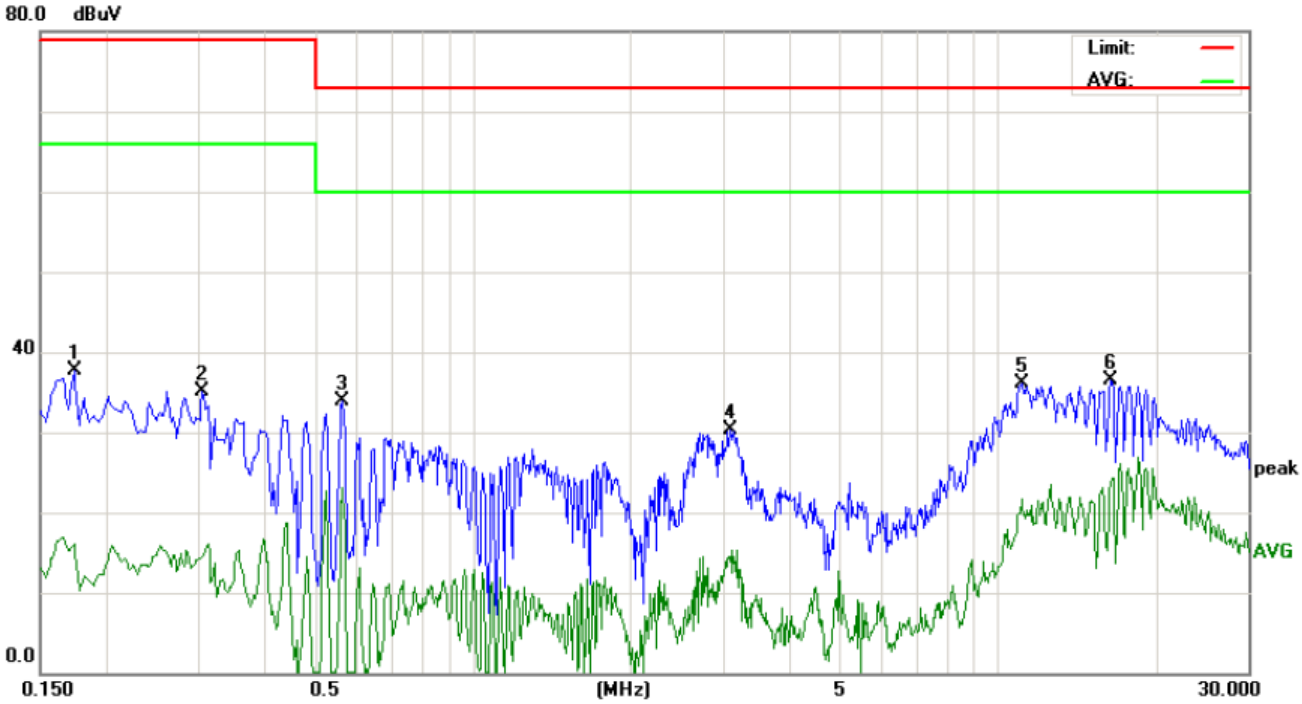
8.4 MEASUREMENT EQUIPMENT USED

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	100694	07/17/2014	07/16/2015
LISN	R&S	ESH3-Z5	8389791009	07/17/2014	07/16/2015
PULSE LIMITER	R&S	ESH3-Z2	100624	07/16/2014	07/15/2015

Remark: *Each piece of equipment is scheduled for calibration once a year.*

8.5 TEST RESULT OF LINE CONDUCTED EMISSION TEST

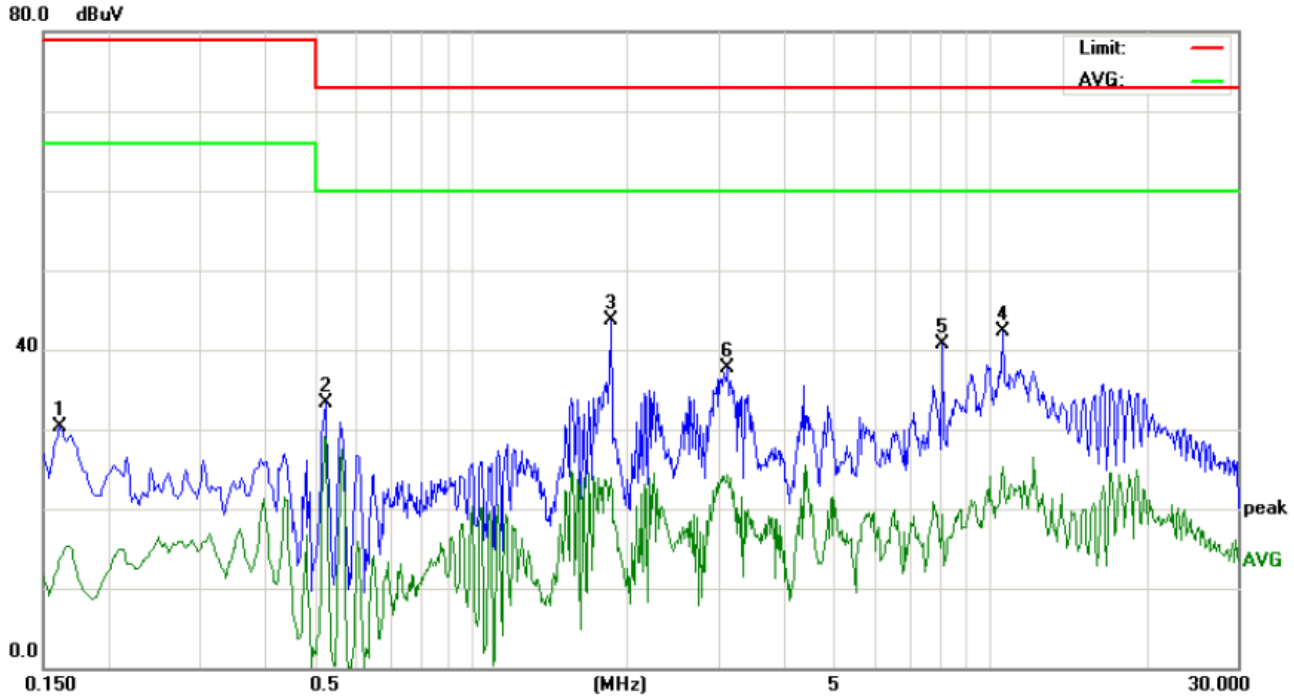
LINE CONDUCTED EMISSION – L



Site: Conduction | Phase: *L1* | Temperature: 26
Limit: FCC Class A Conduction | Power: | Humidity: 60 %
EUT: UHF Reader
M/N: 9502
Mode: Normal
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1740	37.70		16.19	0.00	37.70		16.19	79.00	66.00	-41.30	-49.81	P	
2	0.3060	35.16		14.53	0.00	35.16		14.53	79.00	66.00	-43.84	-51.47	P	
3	0.5660	33.80		23.01	0.00	33.80		23.01	73.00	60.00	-39.20	-36.99	P	
4	3.1020	30.31		13.93	0.00	30.31		13.93	73.00	60.00	-42.69	-46.07	P	
5	11.1419	36.10		20.42	0.00	36.10		20.42	73.00	60.00	-36.90	-39.58	P	
6	16.4459	36.53		23.70	0.00	36.53		23.70	73.00	60.00	-36.47	-36.30	P	

LINE CONDUCTED EMISSION – N



Site: Conduction | Phase: *N* | Temperature: 26
Limit: FCC Class A Conduction | Power: | Humidity: 60 %
EUT: UHF Reader
M/N: 9502
Mode: Normal
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1620	30.33		13.90	0.00	30.33		13.90	79.00	66.00	-48.67	-52.10	P	
2	0.5260	33.25		28.60	0.00	33.25		28.60	73.00	60.00	-39.75	-31.40	P	
3	1.8620	43.77		23.81	0.00	43.77		23.81	73.00	60.00	-29.23	-36.19	P	
4	10.5860	42.27		25.31	0.00	42.27		25.31	73.00	60.00	-30.73	-34.69	P	
5	8.1059	40.62		19.25	0.00	40.62		19.25	73.00	60.00	-32.38	-40.75	P	
6	3.1260	37.65		24.23	0.00	37.65		24.23	73.00	60.00	-35.35	-35.77	P	

9 RADIATED EMISSION

9.1 MEASUREMENT PROCEDURE

1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

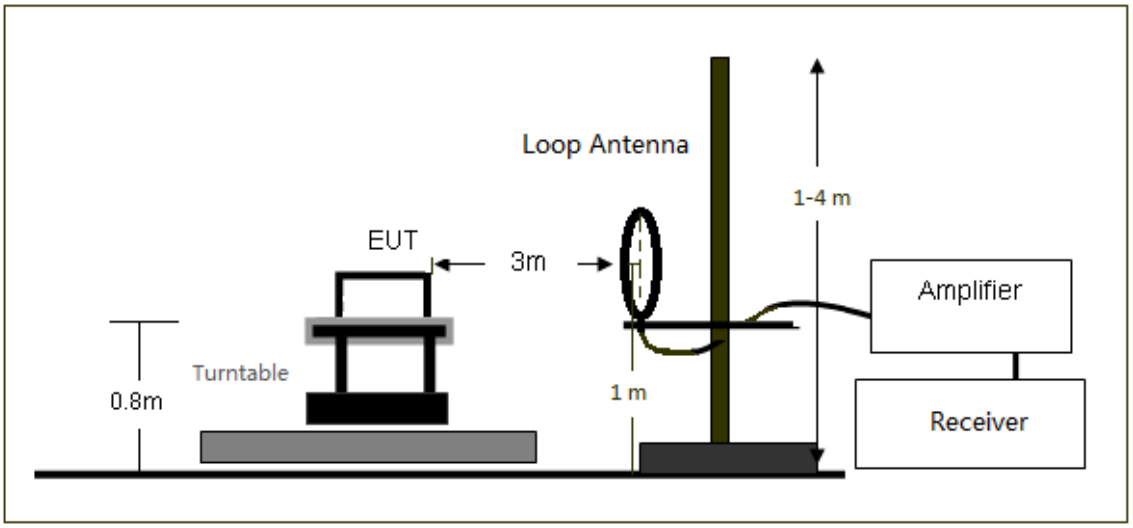
The following table is the setting of spectrum analyzer and receiver.'

Spectrum Parameter	Setting
Start Frequency	1GHz
Stop Frequency	10GHz
RB/VB(Emission in restricted band)	1MHz/1MHz for Peak, 1MHz/10Hz for Average
RB/VB(Emission in non-restricted band)	1MHz/1MHz for Peak

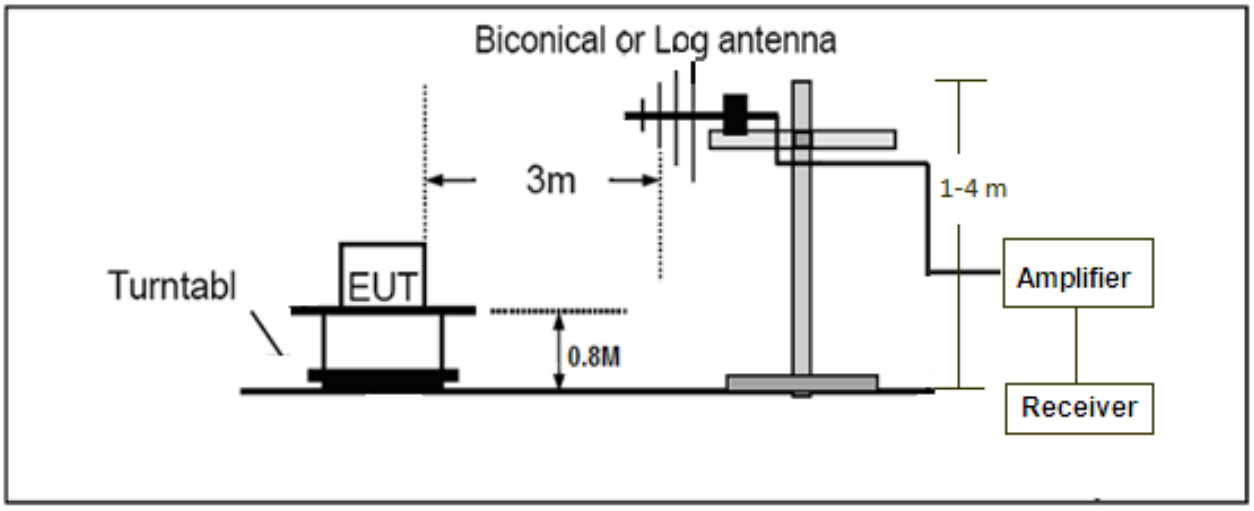
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

9.2 TEST SETUP

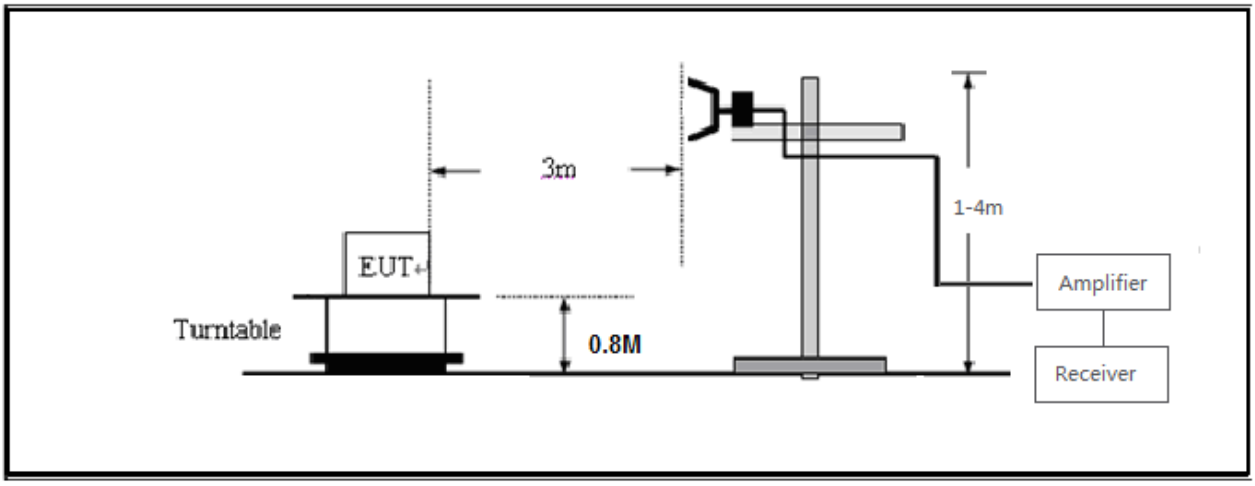
RADIATED EMISSION TEST SETUP BELOW 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



9.3 TEST EQUIMENT LIST

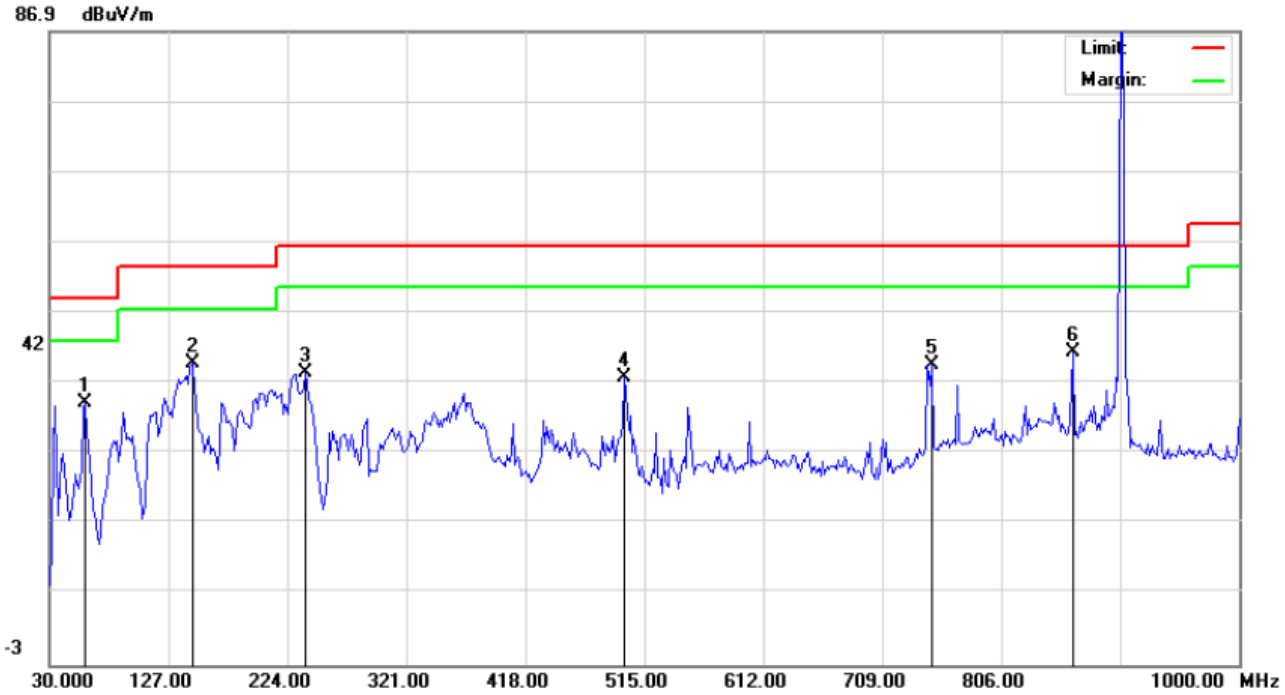
Description	Manufacturer	Model	SERIAL NUMBER	Cal. Date	Cal. Due
Spectrum Analyzer	Agilent	E4440A	N/A	07/25/2014	07/24/2015
Amplifier	EM	EM30180	0607030	02/27/2014	02/26/2015
Horn Antenna	EM	EM-AH-10180	N/A	04/19/2014	04/18/2015
EMI Test Receiver	Rohde & Schwarz	ESCI	N/A	07/25/2014	07/24/2015
Amplifier	EM	EM30180	N/A	06/25/2014	06/24/2015
Biological Antenna	A.H. Systems Inc.	SAS-521-4	N/A	06/06/2014	06/05/2015
Loop Antenna	Daze	ZN30900N	SEL0097	06/06/2014	06/05/2015
Isolation Transformer	LETEAC	LTBK	N/A	07/25/2014	07/24/2015

9.4 TEST RESULT

RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ-Low

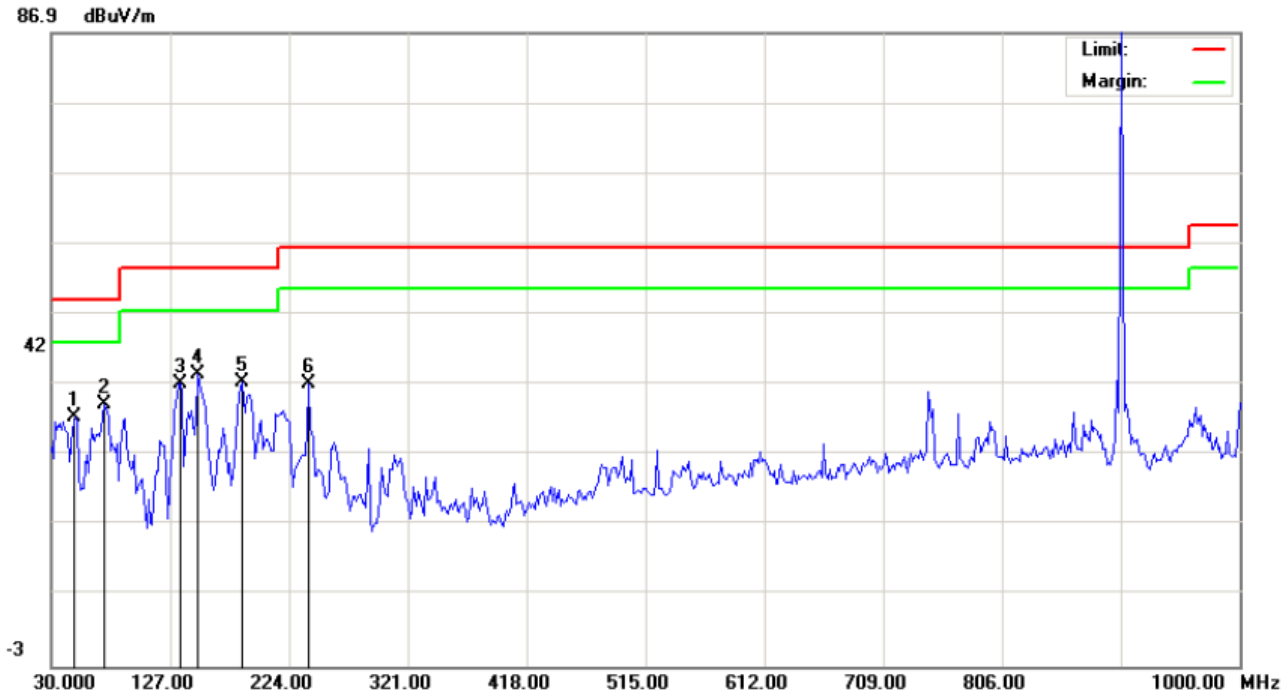


Site: site #1
Limit: FCC Class A 3M Radiation
EUT: UHF Reader
M/N: 9502
Mode: channel 1 TX
Note:

Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		59.1000	30.58	3.63	34.21	49.00	-14.79	peak			
2	*	146.4000	26.69	13.03	39.72	53.50	-13.78	peak			
3		238.5500	26.20	12.27	38.47	56.50	-18.03	peak			
4		498.8333	14.83	22.88	37.71	56.50	-18.79	peak			
5		749.4167	13.03	26.45	39.48	56.50	-17.02	peak			
6		864.2000	12.13	29.14	41.27	56.50	-15.23	peak			



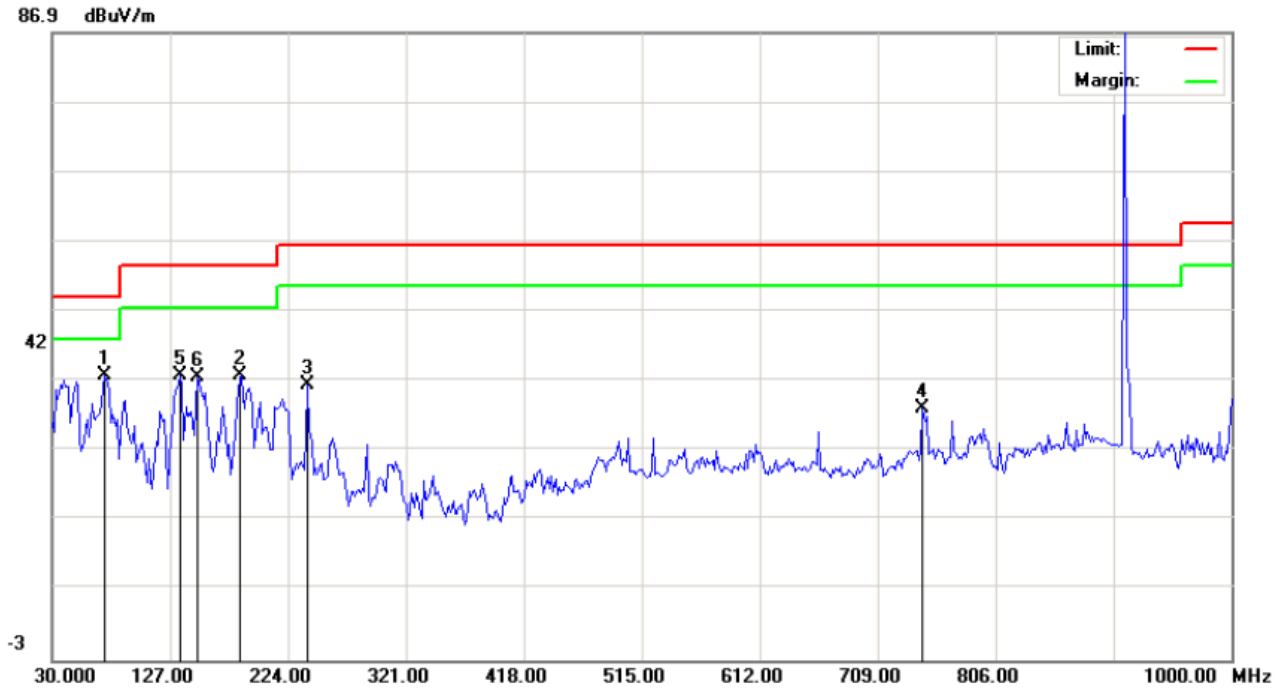
Site: site #1
Limit: FCC Class A 3M Radiation
EUT: UHF Reader
M/N: 9502
Mode: channel 1 TX
Note:

Polarization: ***Vertical***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		49.3998	27.60	4.71	32.31	49.00	-16.69	peak			
2	*	73.6500	28.85	5.35	34.20	49.00	-14.80	peak			
3		135.0833	27.08	10.06	37.14	53.50	-16.36	peak			
4		149.6333	19.57	18.90	38.47	53.50	-15.03	peak			
5		185.2000	28.55	8.64	37.19	53.50	-16.31	peak			
6		240.1667	22.76	14.23	36.99	56.50	-19.51	peak			

RADIATED EMISSION BELOW 1GHZ-Middle

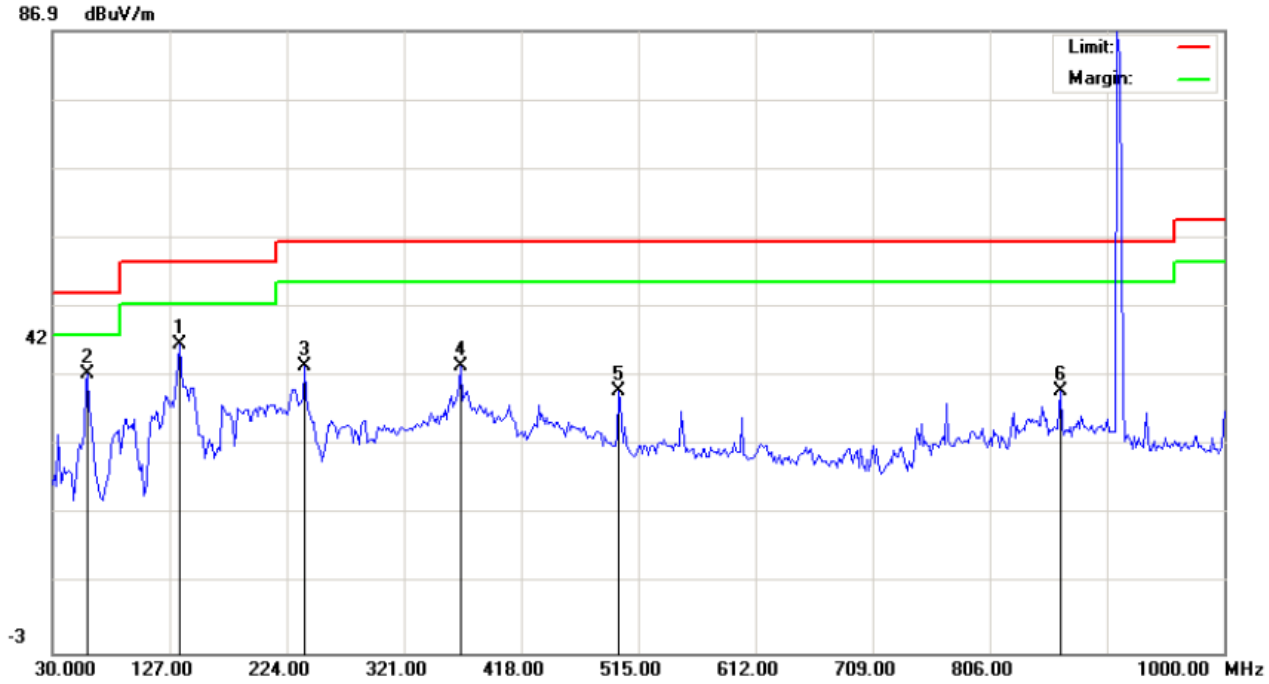


Site: site #1
Limit: FCC Class A 3M Radiation
EUT: UHF Reader
M/N: 9502
Mode: channel 25 TX
Note:

Polarization: ***Vertical***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

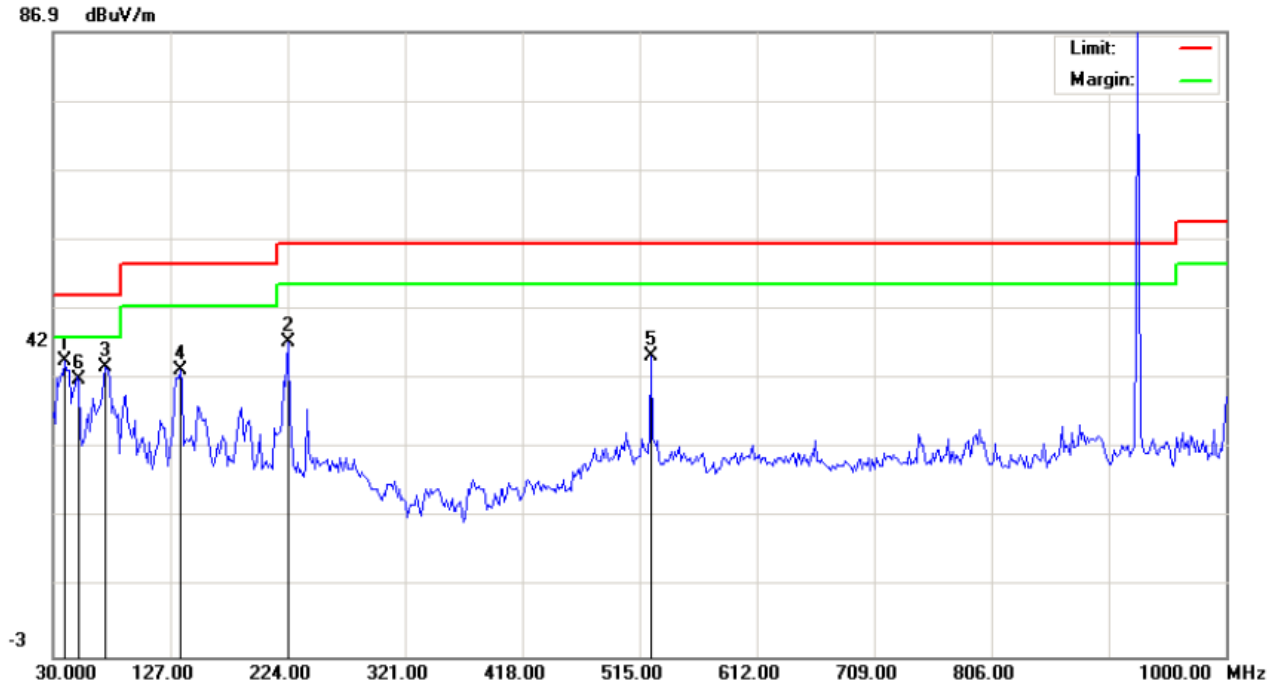
No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	73.6500	32.35	5.35	37.70	49.00	-11.30	peak			
2		185.1999	29.05	8.64	37.69	53.50	-15.81	peak			
3		240.1665	22.26	14.23	36.49	56.50	-20.01	peak			
4		746.1833	5.54	27.49	33.03	56.50	-23.47	peak			
5		135.0833	27.58	10.06	37.64	53.50	-15.86	peak			
6		149.6331	18.58	18.89	37.47	53.50	-16.03	peak			



Site: site #1 | Polarization: ***Horizontal*** | Temperature: 26
Limit: FCC Class A 3M Radiation | Power: | Humidity: 60 %
EUT: UHF Reader | Distance: 3m
M/N: 9502
Mode: channel 25 TX
Note:

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		135.0833	28.18	13.43	41.61	53.50	-11.89	peak			
2	*	59.1000	33.58	3.63	37.21	49.00	-11.79	peak			
3		238.5500	26.20	12.27	38.47	56.50	-18.03	peak			
4		367.8833	19.28	19.16	38.44	56.50	-18.06	peak			
5		498.8333	11.83	22.88	34.71	56.50	-21.79	peak			
6		864.2000	5.63	29.14	34.77	56.50	-21.73	peak			

RADIATED EMISSION BELOW 1GHZ-High

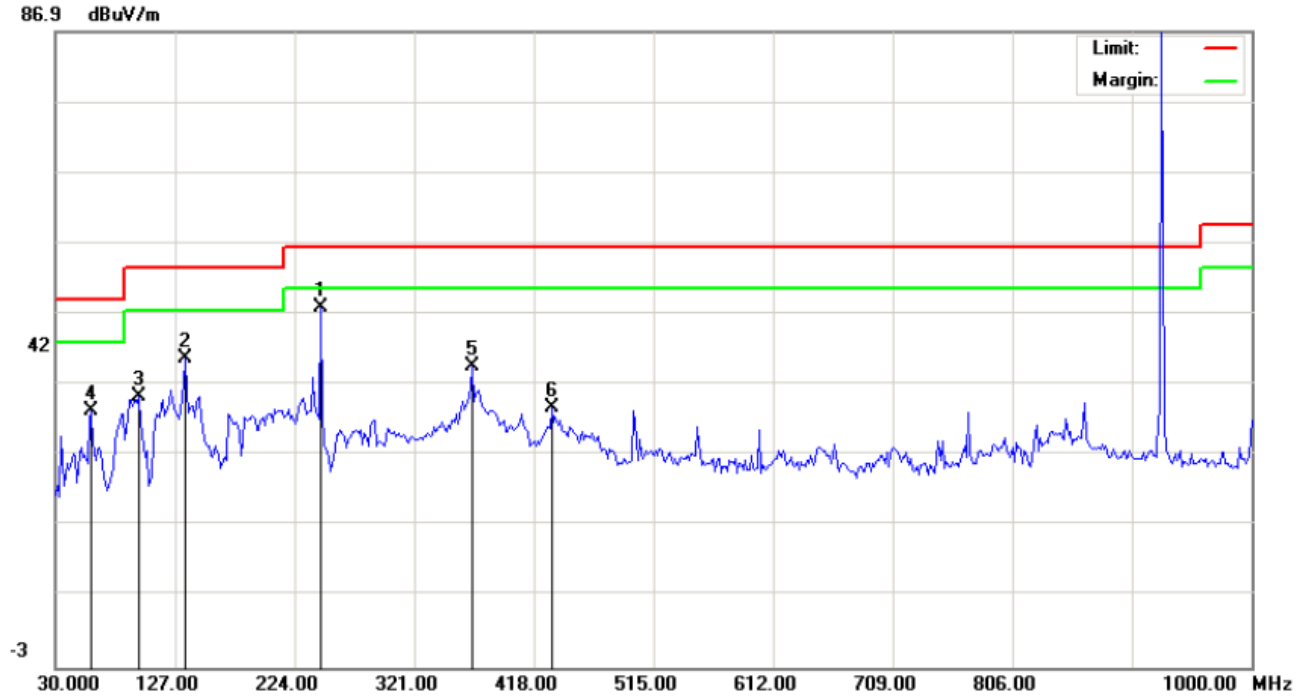


Site: site #1
Limit: FCC Class A 3M Radiation
EUT: UHF Reader
M/N: 9502
Mode: channel 50 TX
Note:

Polarization: ***Vertical***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	39.7000	33.70	5.88	39.58	49.00	-9.42	peak			
2		224.0000	34.20	7.93	42.13	56.50	-14.37	peak			
3		73.6500	33.35	5.35	38.70	49.00	-10.30	peak			
4		135.0833	28.08	10.06	38.14	53.50	-15.36	peak			
5		524.7000	16.81	23.32	40.13	56.50	-16.37	peak			
6		51.0167	32.40	4.49	36.89	49.00	-12.11	peak			



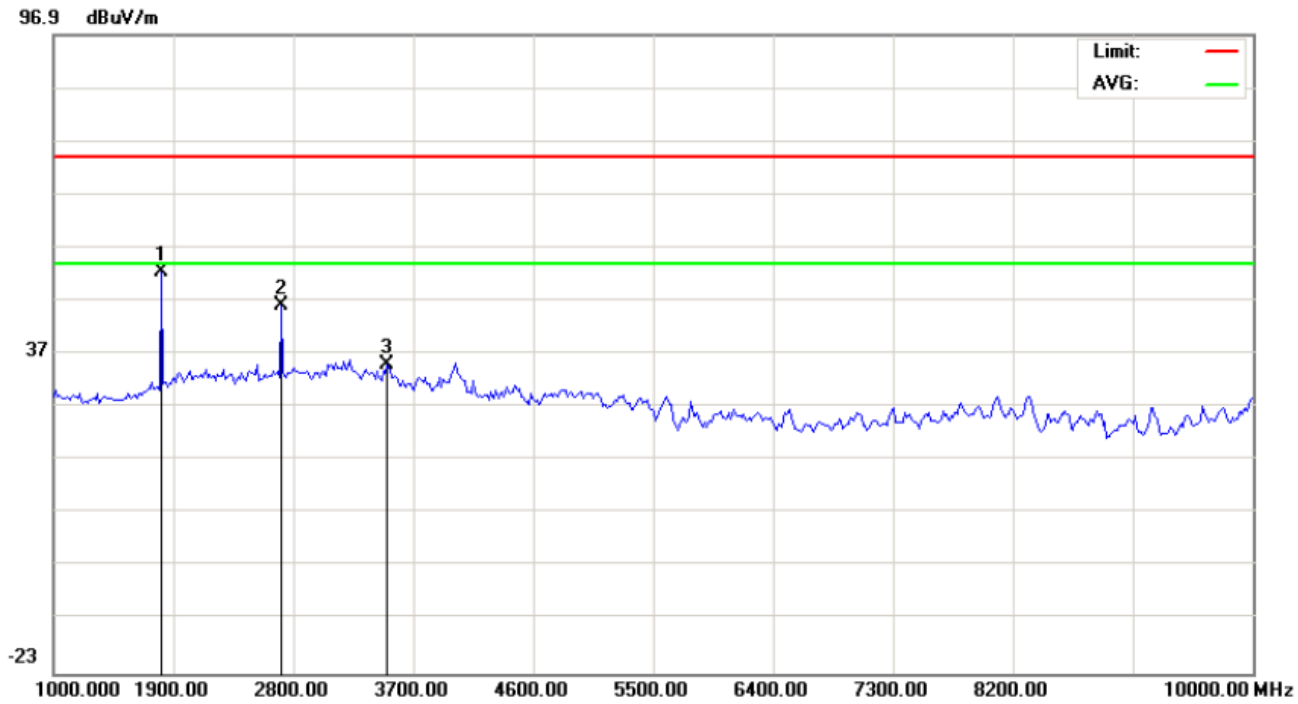
Site: site #1
Limit: FCC Class A 3M Radiation
EUT: UHF Reader
M/N: 9502
Mode: channel 50 TX
Note:

Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	245.0166	37.22	10.65	47.87	56.50	-8.63	peak			
2		135.0833	27.18	13.43	40.61	53.50	-12.89	peak			
3		97.9000	22.11	13.24	35.35	53.50	-18.15	peak			
4		59.1000	29.58	3.63	33.21	49.00	-15.79	peak			
5		367.8833	20.28	19.16	39.44	56.50	-17.06	peak			
6		432.5500	12.67	21.09	33.76	56.50	-22.74	peak			

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-Low

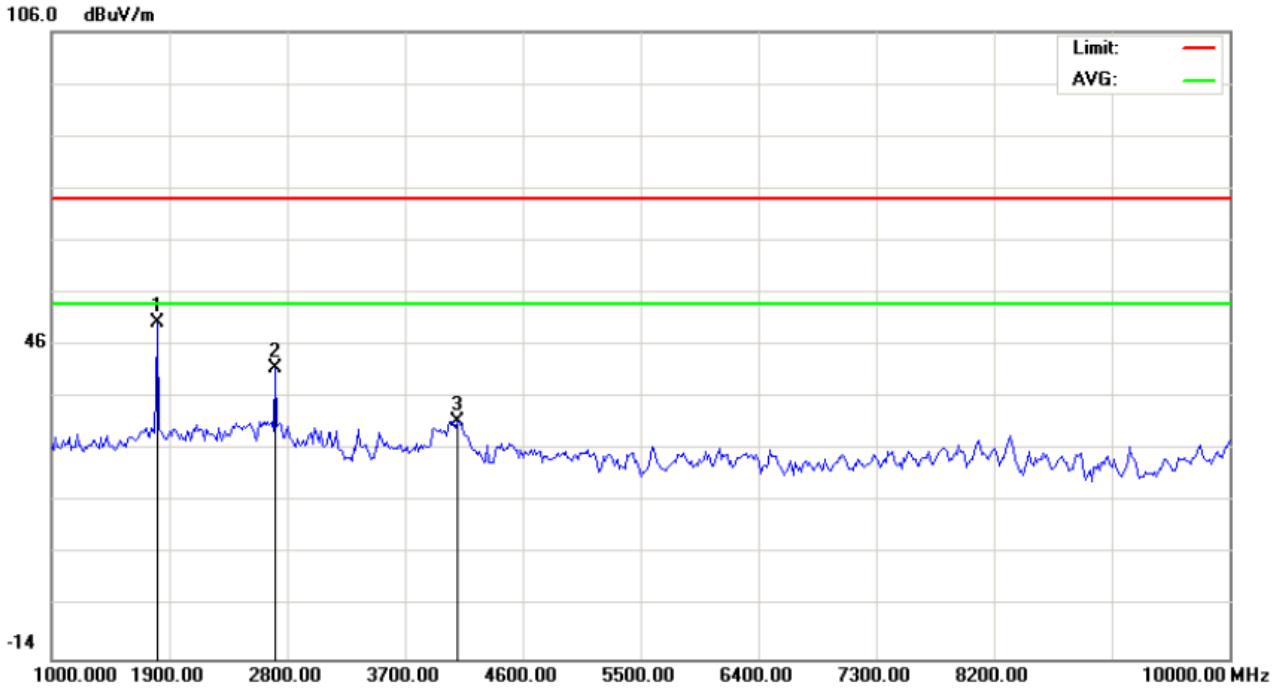


Site: site #1
Limit: FCC 3M Radiation above 1GHZ(PK)
EUT: UHF Reader
M/N: 9502
Mode: channel 1 TX
Note:

Polarization: ***Vertical***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	1810.000	44.41	7.88	52.29	74.00	-21.71	peak			
2		2710.000	35.24	10.94	46.18	74.00	-27.82	peak			
3		3505.000	22.83	12.14	34.97	74.00	-39.03	peak			



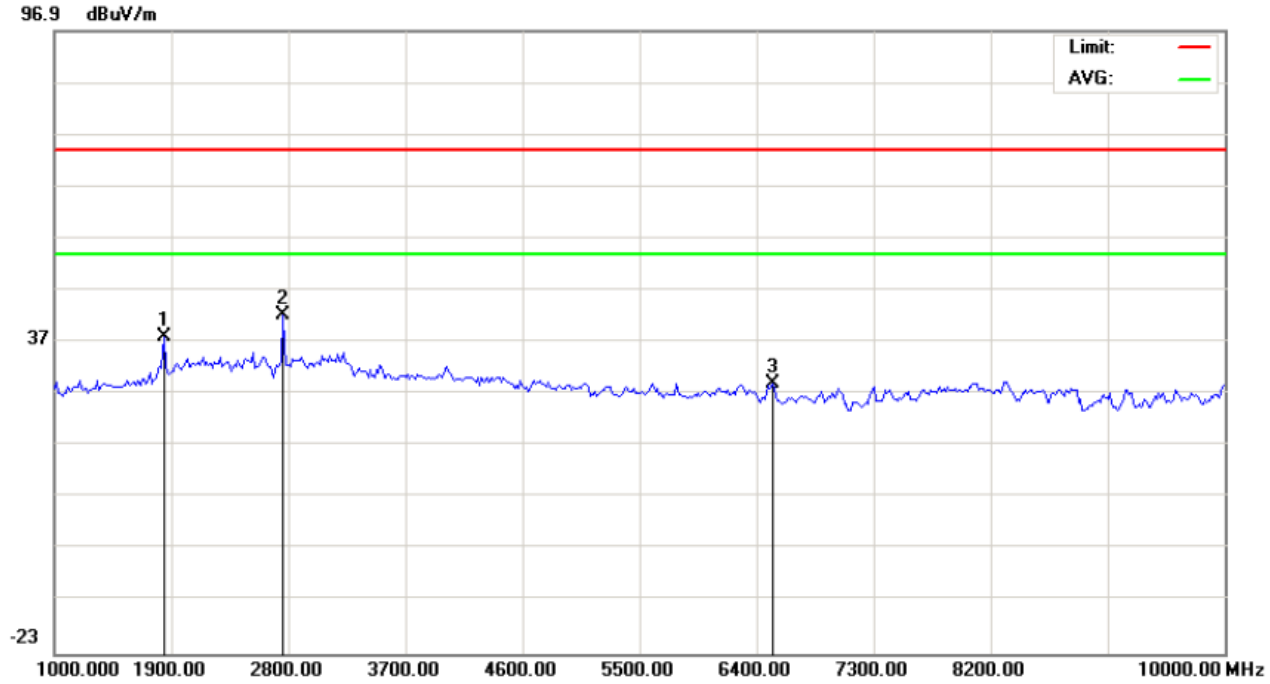
Site: site #1
Limit: FCC 3M Radiation above 1GHZ(PK)
EUT: UHF Reader
M/N: 9502
Mode: channel 1 TX
Note:

Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	1810.000	42.46	7.88	50.34	74.00	-23.66	peak			
2		2710.000	30.74	10.94	41.68	74.00	-32.32	peak			
3		4105.000	20.24	11.35	31.59	74.00	-42.41	peak			

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-Middle

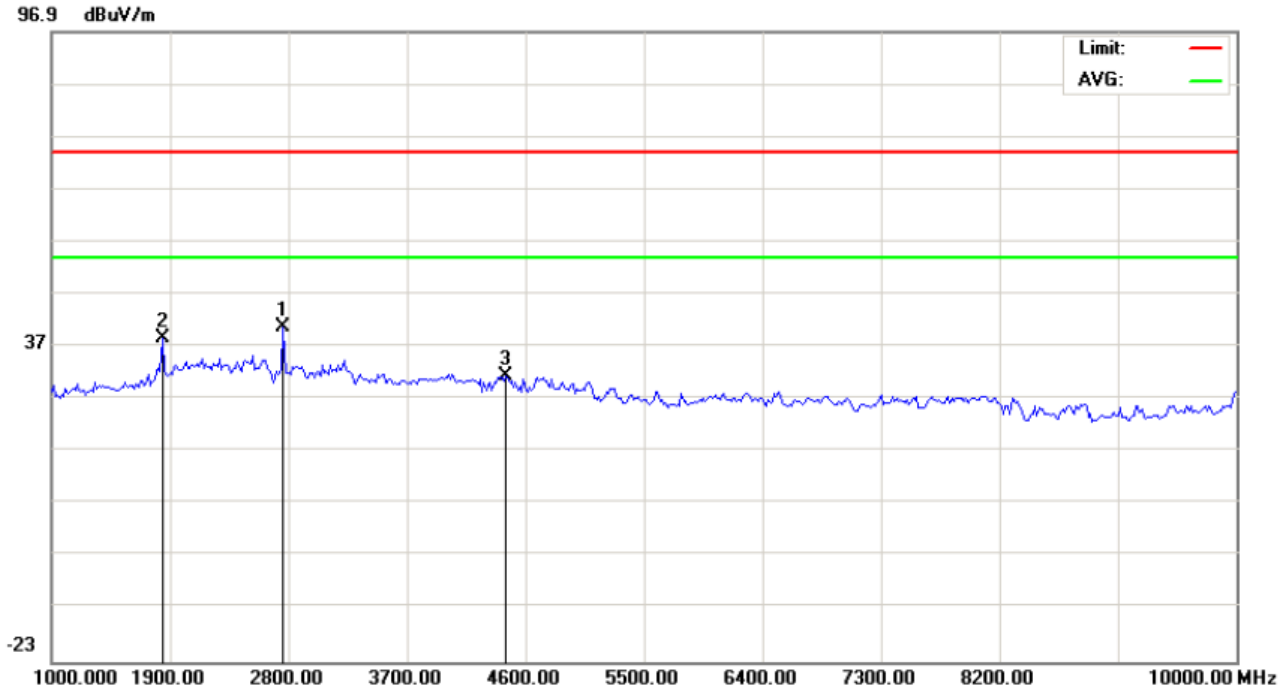


Site: site #1
Limit: FCC 3M Radiation above 1GHZ(PK)
EUT: UHF Reader
M/N: 9502
Mode: channel 25 TX
Note:

Polarization: ***Vertical***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		1840.000	29.86	8.20	38.06	74.00	-35.94	peak			
2	*	2755.000	30.99	11.05	42.04	74.00	-31.96	peak			
3		6520.000	29.36	-0.40	28.96	74.00	-45.04	peak			



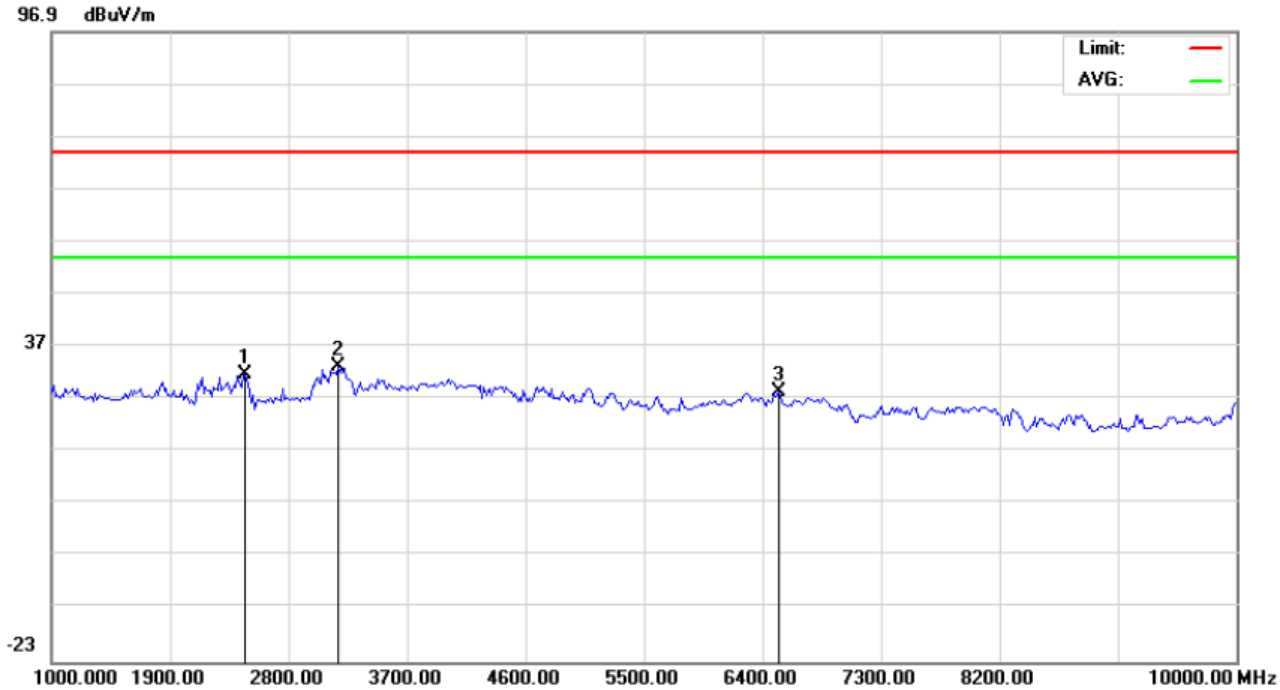
Site: site #1
Limit: FCC 3M Radiation above 1GHZ(PK)
EUT: UHF Reader
M/N: 9502
Mode: channel 25 TX
Note:

Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2755.000	29.49	11.05	40.54	74.00	-33.46	peak			
2		1840.000	30.36	8.20	38.56	74.00	-35.44	peak			
3		4450.000	32.51	-1.28	31.23	74.00	-42.77	peak			

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-High

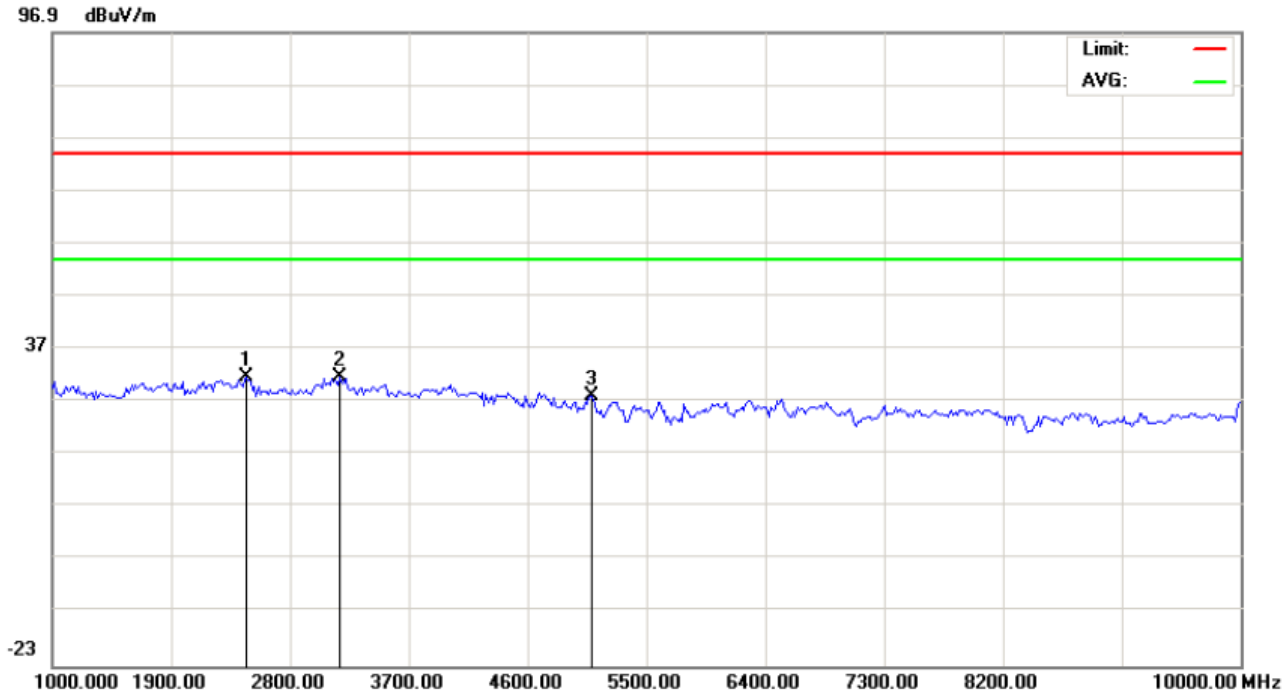


Site: site #1
Limit: FCC 3M Radiation above 1GHZ(PK)
EUT: UHF Reader
M/N: 9502
Mode: channel 50 TX
Note:

Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2470.000	21.40	10.40	31.80	74.00	-42.20	peak			
2	*	3175.000	21.22	11.80	33.02	74.00	-40.98	peak			
3		6520.000	28.86	-0.40	28.46	74.00	-45.54	peak			



Site: site #1
Limit: FCC 3M Radiation above 1GHZ(PK)
EUT: UHF Reader
M/N: 9502
Mode: channel 50 TX
Note:

Polarization: ***Vertical***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2470.000	21.40	10.40	31.80	74.00	-42.20	peak			
2		3175.000	19.72	11.80	31.52	74.00	-42.48	peak			
3		5080.000	29.87	-1.80	28.07	74.00	-45.93	peak			

Note: Factor=Antenna Factor+ Cable loss-Amplifier gain, Over=Measurement-Limit.

10 BAND EDGES EMISSION

10.1 MEASUREMENT PROCEDURE

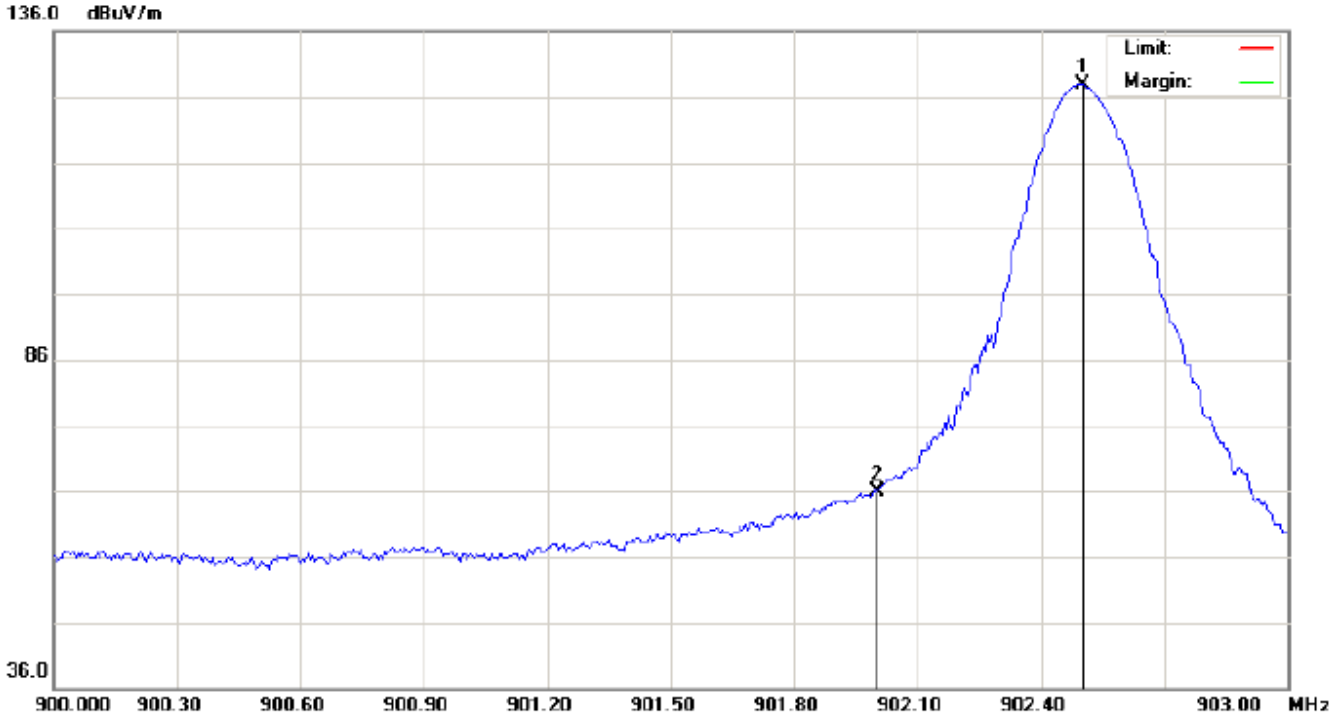
1, Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency = Operation Frequency, RBW>=1%span, VBW>=RBW
3. The band edges was measured and recorded.

10.2 TEST SET-UP

The Same as described in section 9.2

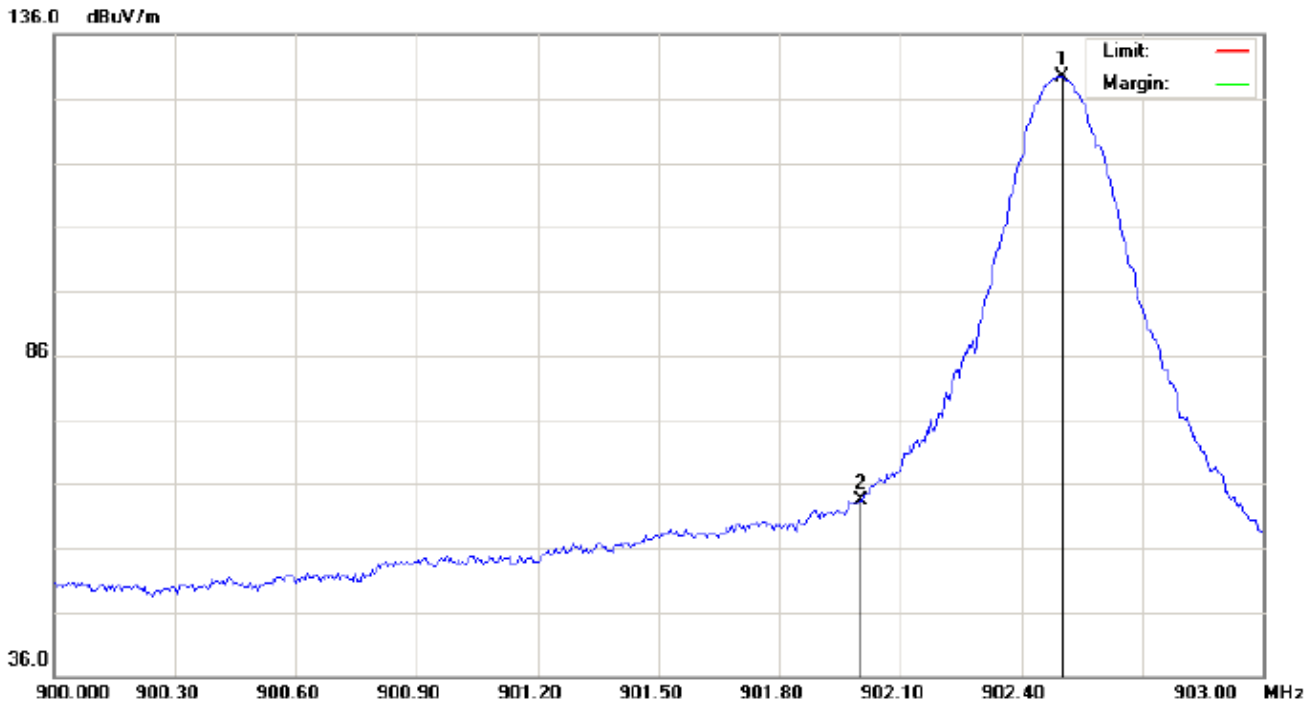
10.3 TEST RESULT

TEST PLOT OF BAND EDGE FOR LOW CHANNEL -H



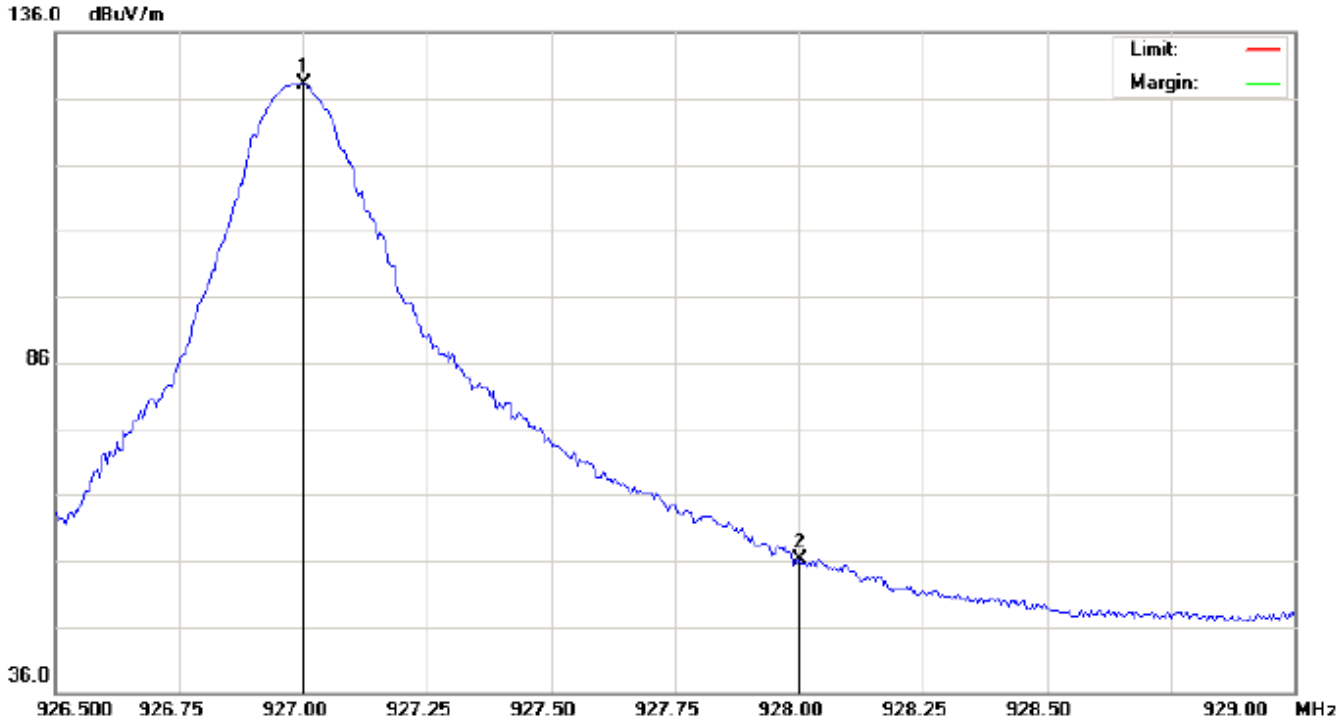
No.	Freq MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Margin	Detector	Result
1	902.0000	39.24	26.62	65.86	74	8.14	peak	pass

TEST PLOT OF BAND EDGE FOR LOW CHANNEL –V



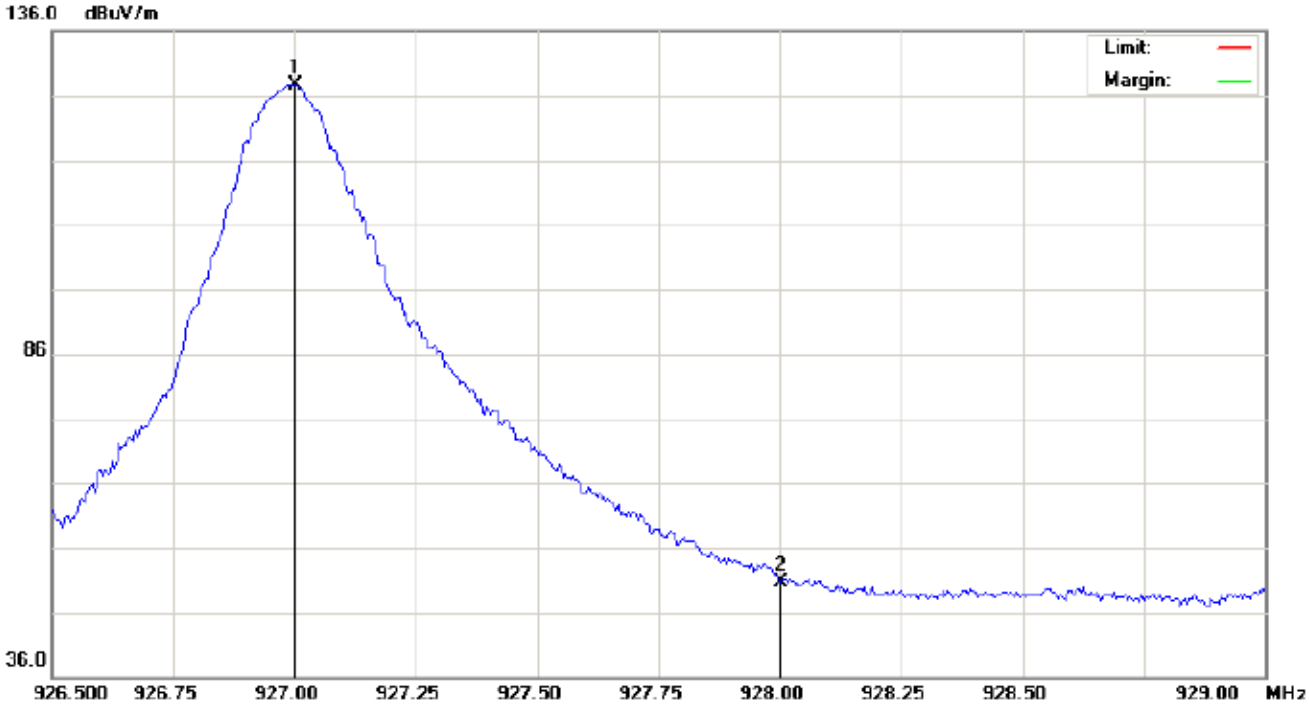
No.	Freq MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Margin	Detector	Result
1	902.0000	36.74	26.62	63.36	74	10.64	peak	pass

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-H



No.	Freq MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Margin	Detector	Result
1	928.0000	29.04	26.98	56.02	74	17.98	peak	pass

TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-V



No.	Freq MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Margin	Detector	Result
1	928.0000	23.54	26.98	50.52	74	23.48	peak	pass

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The “Factor” value can be calculated automatically by software of measurement system.

3. Hopping off and Hopping on have been tested and only worst case recorded

11. NUMBER OF HOPPING FREQUENCY

11.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer Start = 902MHz Stop = 928MHz
4. Set the Spectrum Analyzer as RBW>=1%span, VBW>=RBW.

11.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2
Conducted Method.

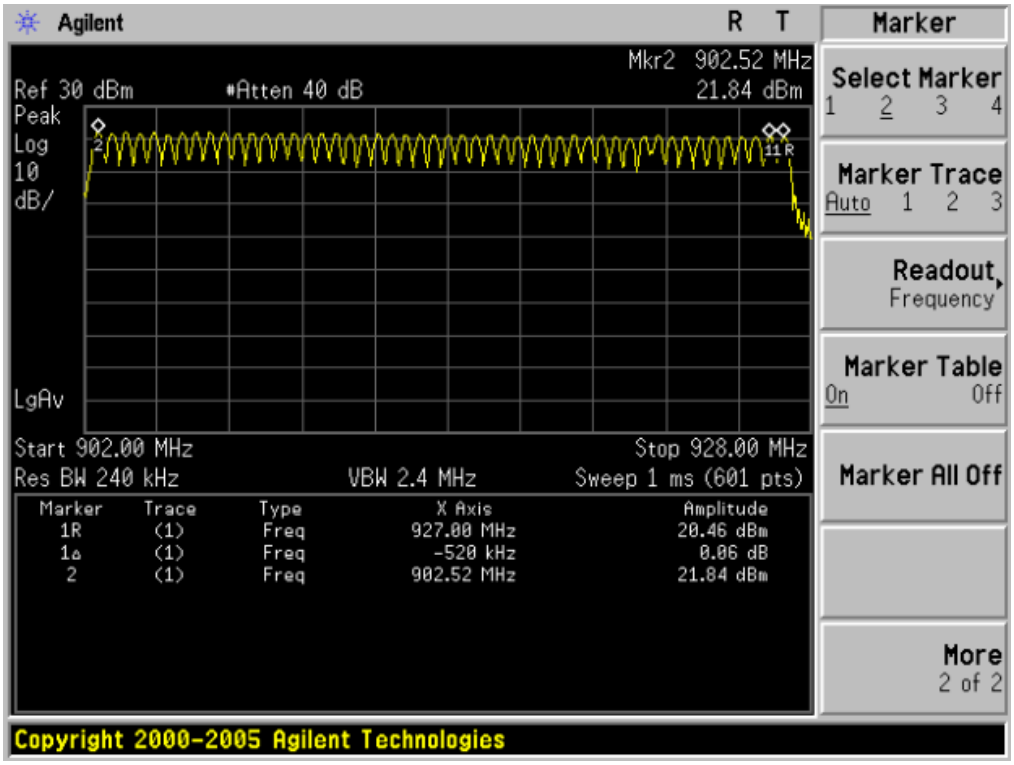
11.3 MEASUREMENT EQUIPMENT USED

The Same as described in section 5.3

11.4 LIMITS AND MEASUREMENT RESULT

TOTAL NO. OF HOPPING CHANNEL	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
	>=50	50	PASS

TEST PLOT FOR NO. OF TOTAL CHANNELS



12 TIME OF OCCUPANCY IN 20 SECONDS PERIOD

12.1 MEASUREMENT PROCEDURE

INTERVAL TIME OF TWO SINGLE TRANSMITTING:

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set Span = zero span, centered on a hoping channel
4. Set the spectrum analyzer as RBW=1MHz, VBW>=RBW, Span = 0 Hz, sweep time=10s

DURATION OF SINGLE TRASNSMITTING:

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set Span = zero span, centered on a hoping channel
4. Set the spectrum analyzer as RBW=1MHz, VBW>=RBW, Span = 0 Hz,.sweep time=auto

12.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2
Conducted Method

12.3 MEASUREMENT EQUIPMENT USED

The same as described in section 5.3

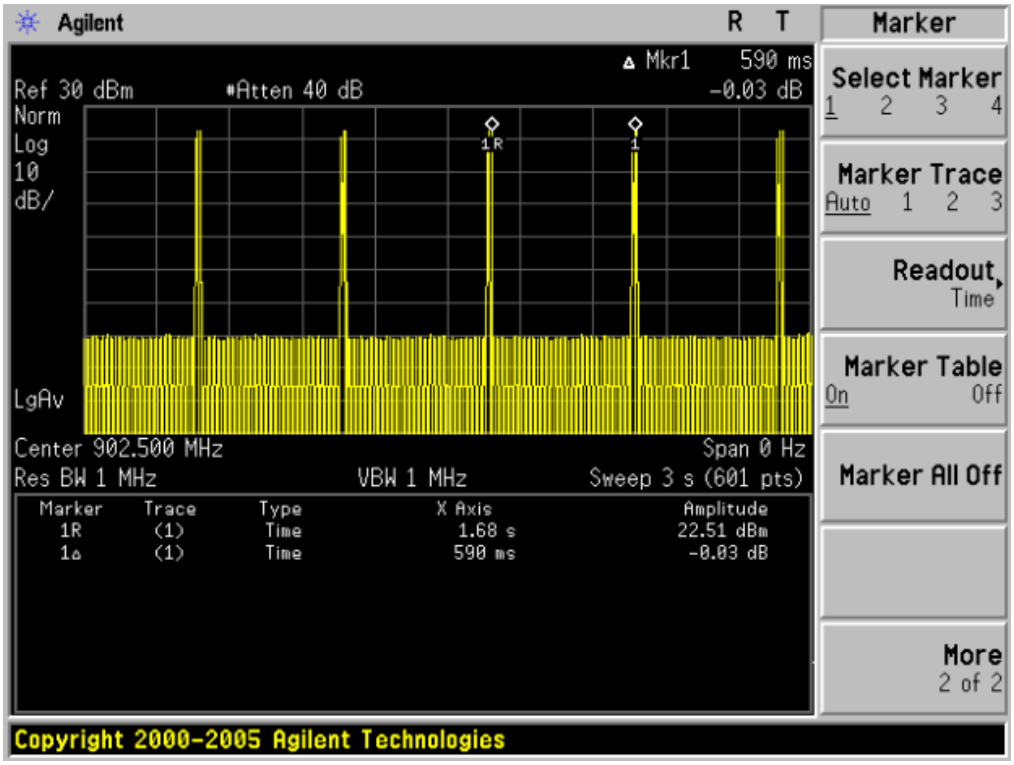
12.4 LIMITS AND MEASUREMENT RESULT

Test Result

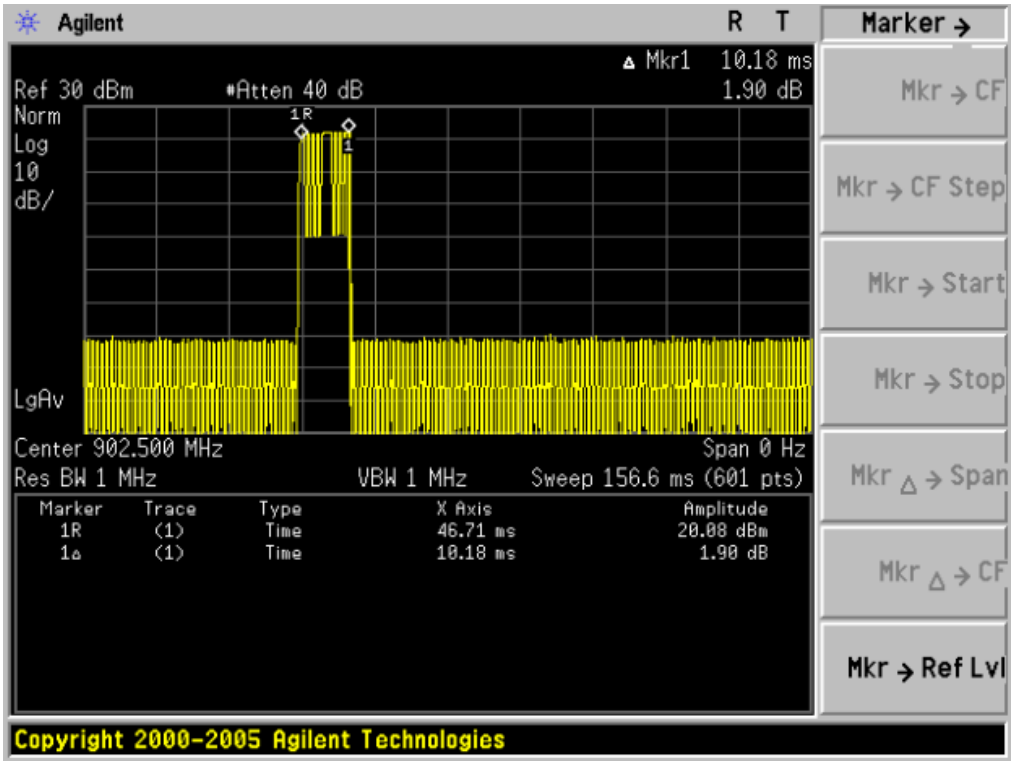
Interval Time (ms)	Time of Pulse (ms)	OCCUPANCY IN 20 SECOND PERIOD (ms)	Limit (ms)
590	10.18	345	400

Interval Time Of Two Single Transmitting=590ms
Duration Of Single Transmitting=10.18ms
Occupancy In 20 Seconds Period=20*1000*10.18(ms)/590(ms)=345(ms)

INTERVAL TIME OF TWO SINGLE TRANSMITTING



DURATION OF SINGLE TRASNSMITTING



13. FREQUENCY SEPARATION

13.1 MEASUREMENT PROCEDURE

1. Place the EUT on the table and set it in transmitting mode
2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
3. Set Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span Video (or Average) Bandwidth (VBW) ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold

13.2 TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)

Same as described in section 5.2

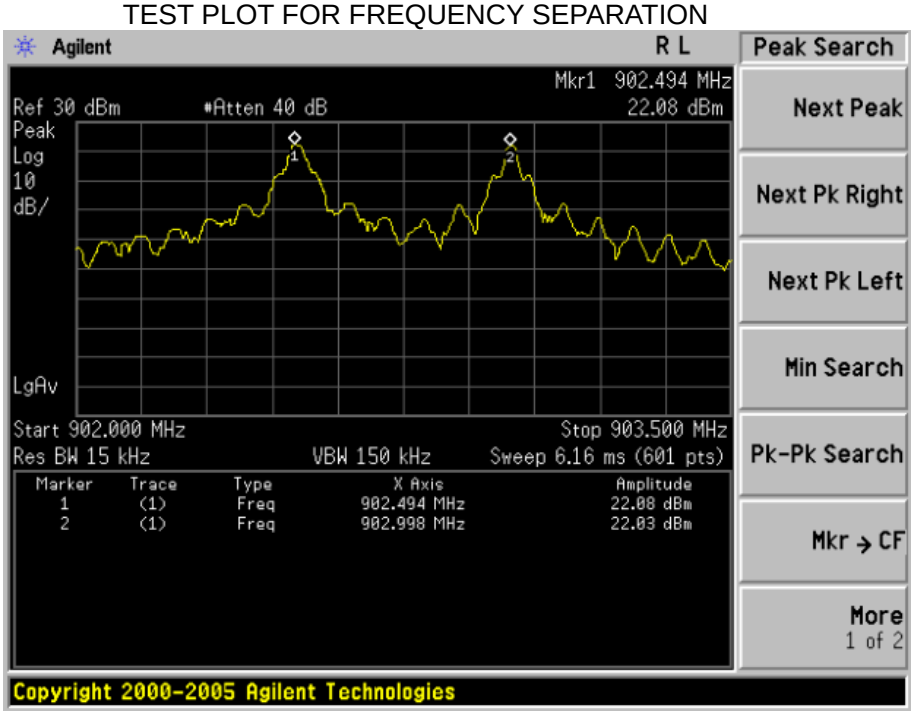
13.3 MEASUREMENT EQUIPMENT USED

The same as described in section 5.3

13.4 LIMITS AND MEASUREMENT RESULT

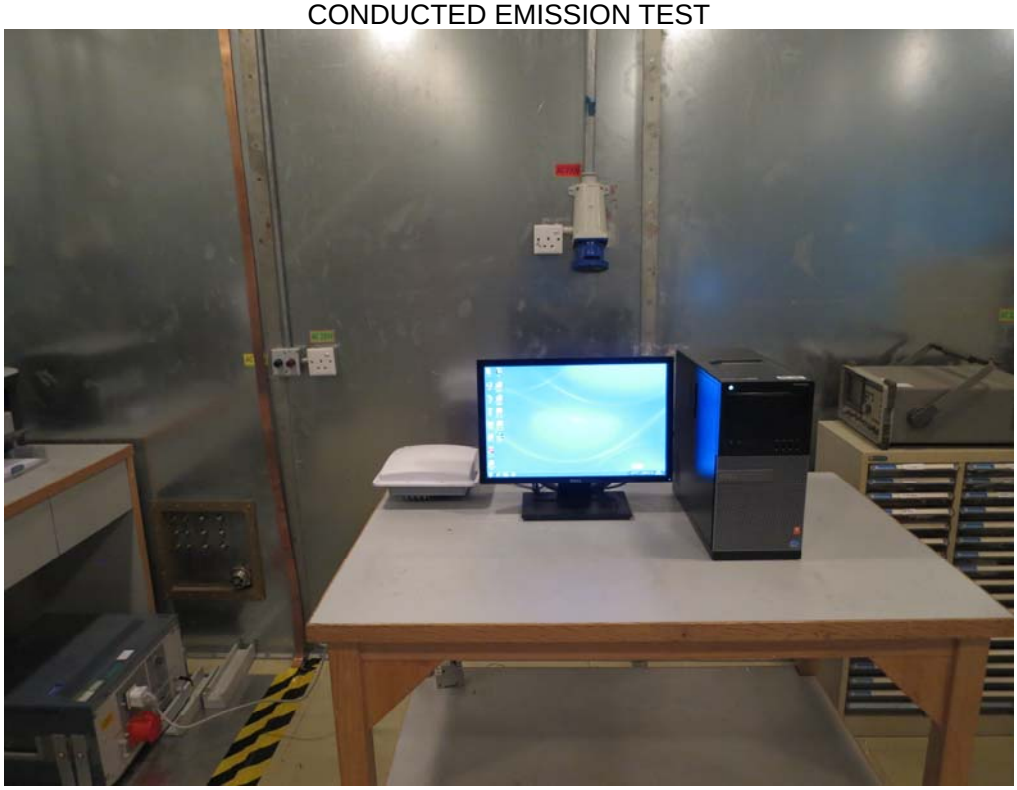
CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT
	KHz	KHz	
CH01-CH02	504	>=25 KHz or 2/3 20 dB BW	Pass

TEST PLOT FOR FREQUENCY SEPARATION



APPENDIX I
PHOTOGRAPHS OF THE TEST SETUP

CONDUCTED EMISSION TEST



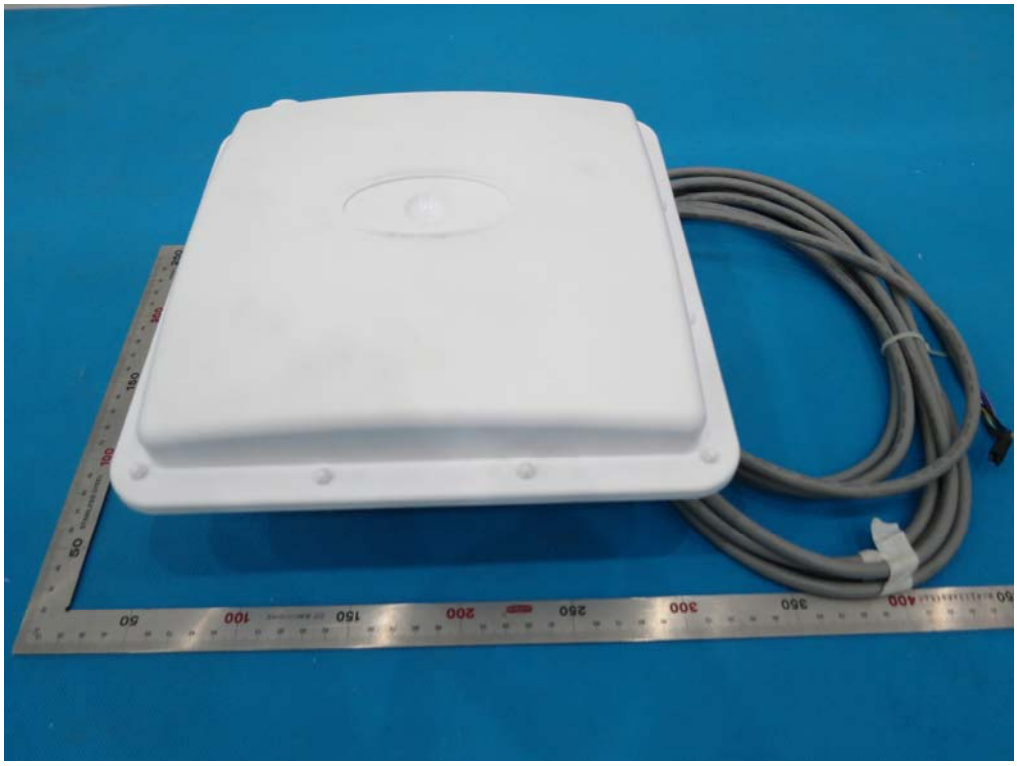
RADIATED SPURIOUS EMISSION

APPENDIX II
PHOTOGRAPHS OF THE EUT

TOP VIEW OF EUT

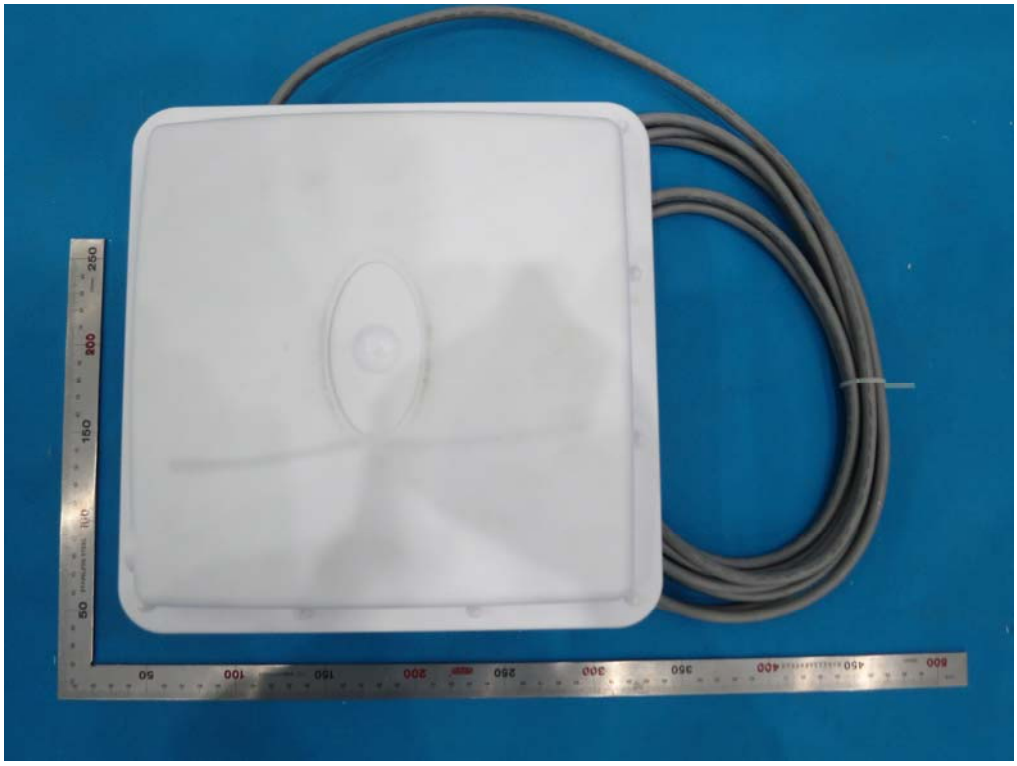
BOTTOM VIEW OF EUT

LEFT VIEW OF EUT



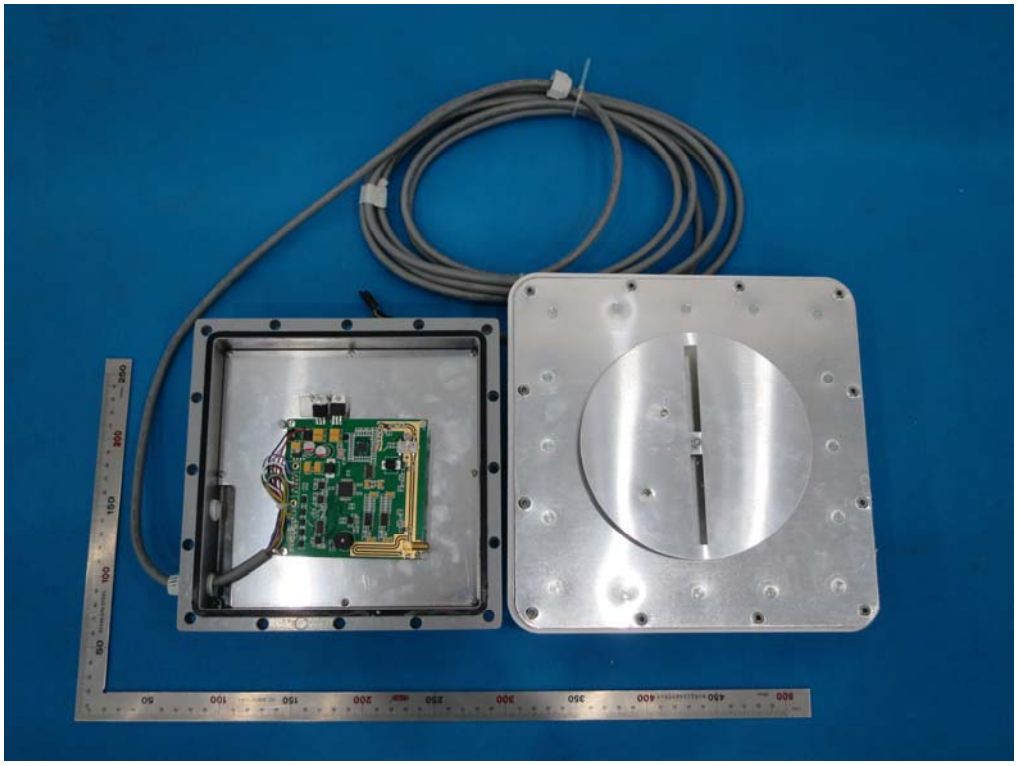
RIGHT VIEW OF EUT

FRONT VIEW OF EUT

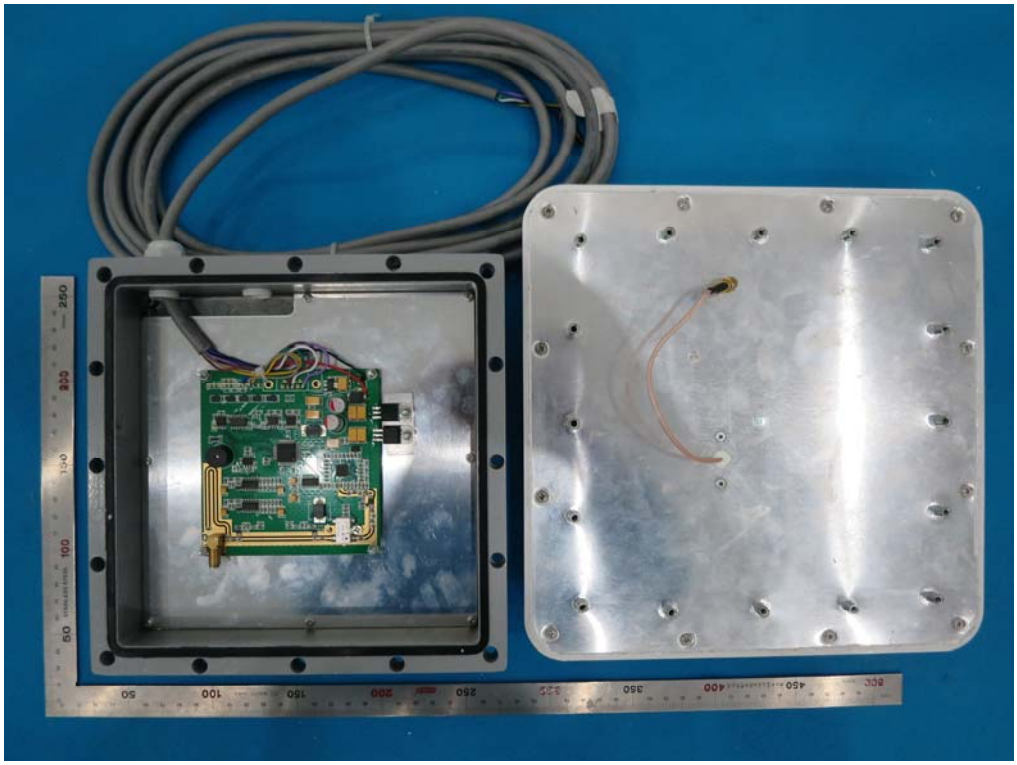


BACK VIEW OF EUT

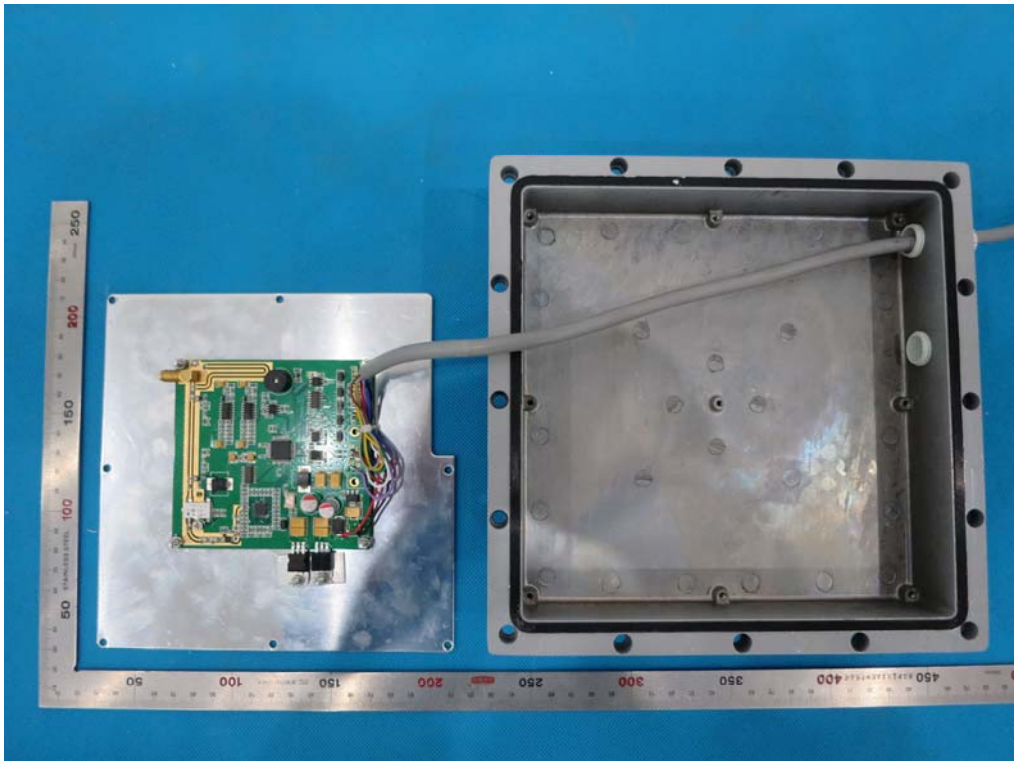
OPEN VIEW OF EUT-1



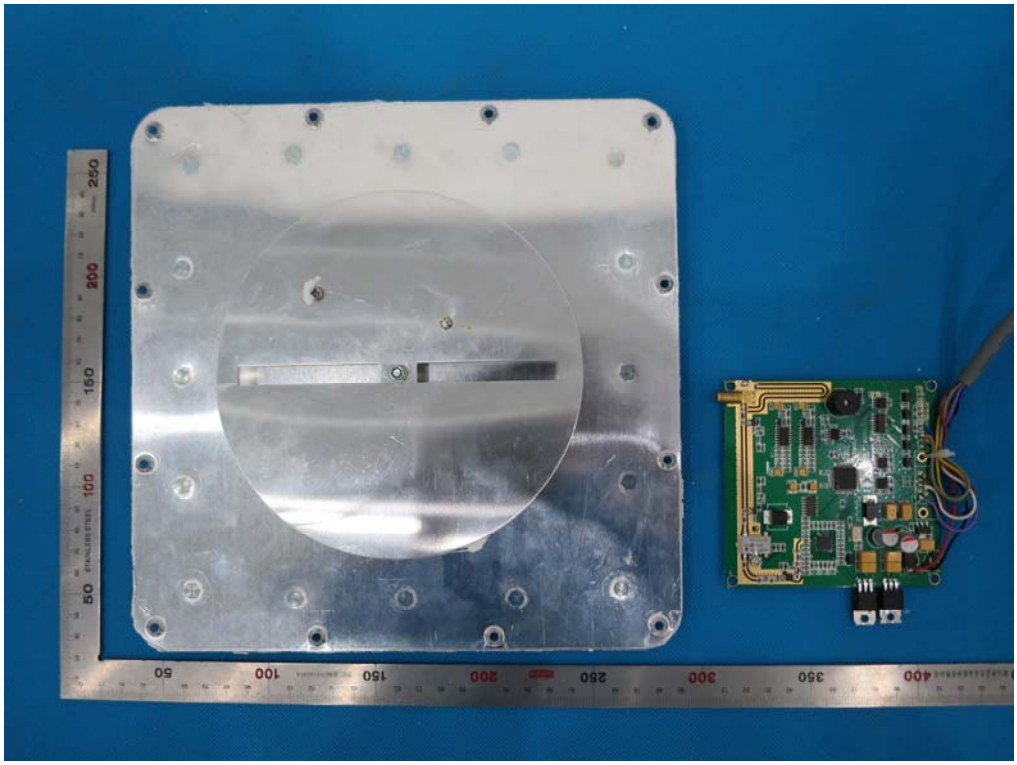
OPEN VIEW OF EUT-2



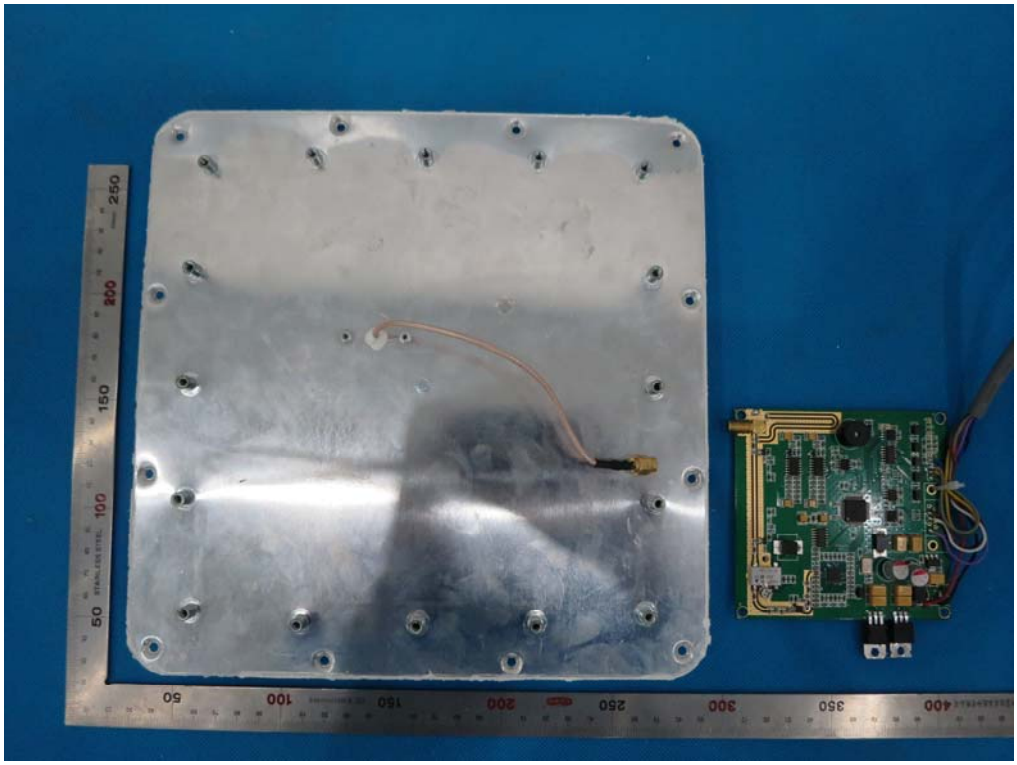
OPEN VIEW OF EUT-3



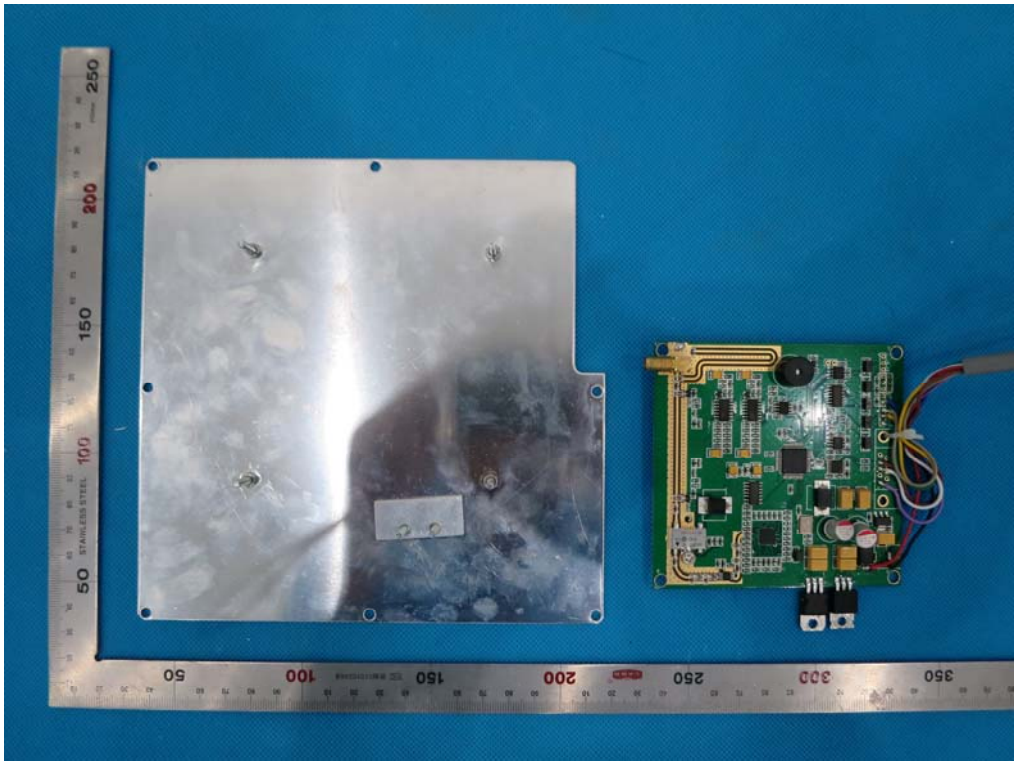
INTERNAL VIEW OF EUT -1



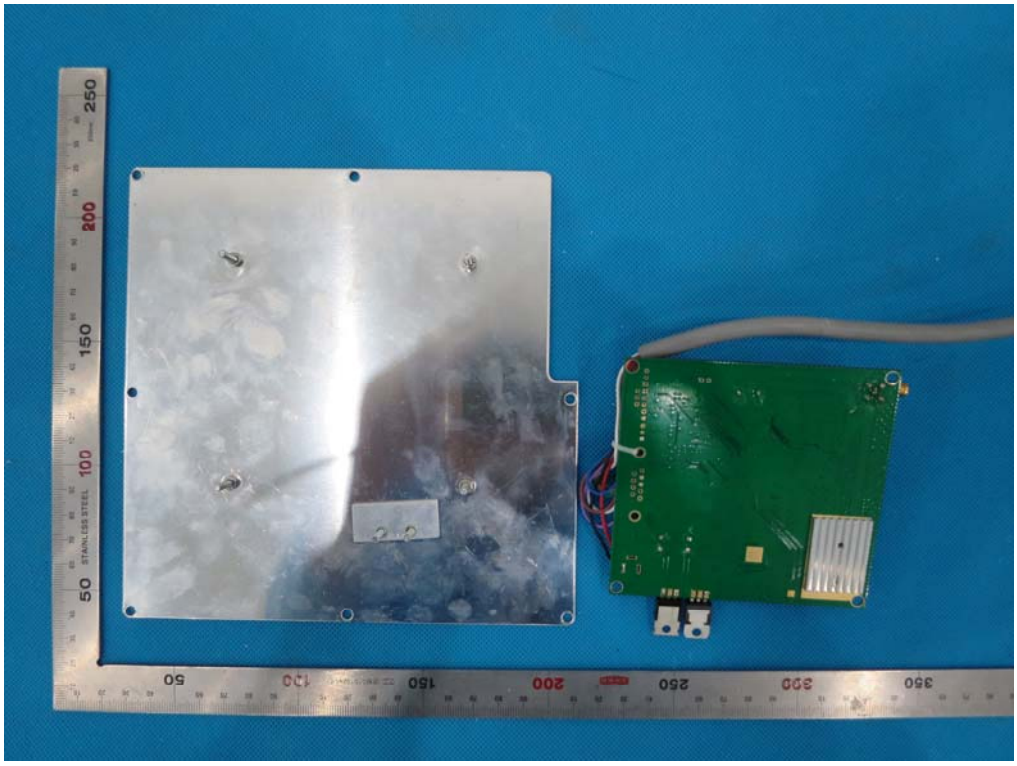
INTERNAL VIEW OF EUT – 2



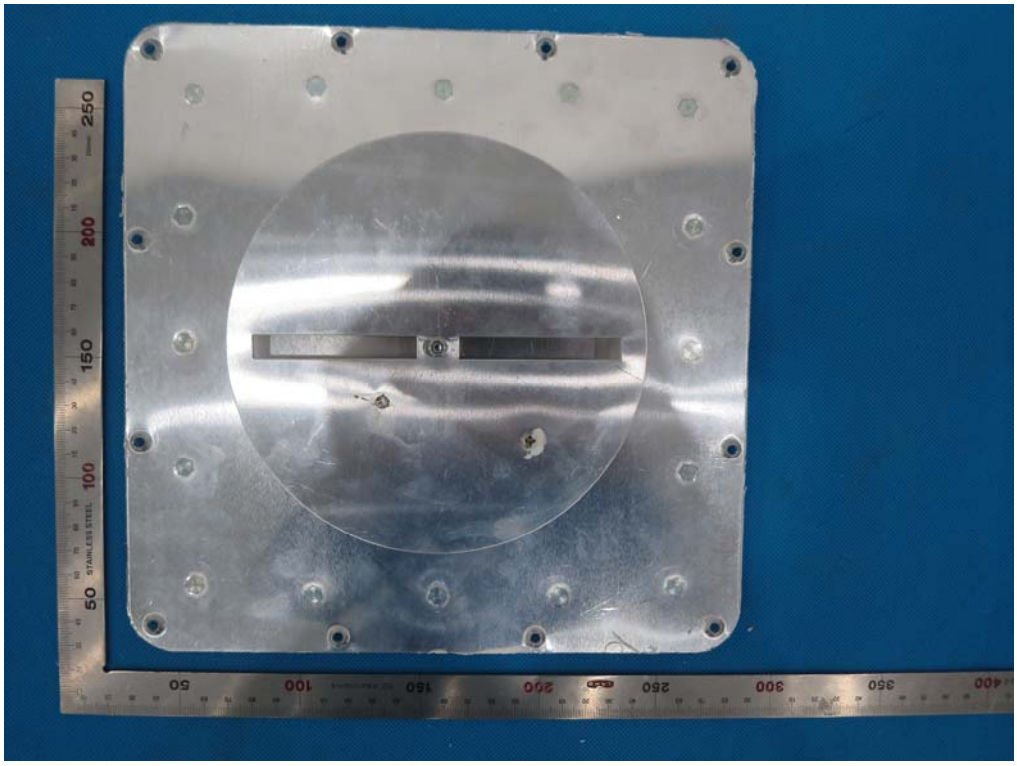
INTERNAL VIEW OF EUT – 3



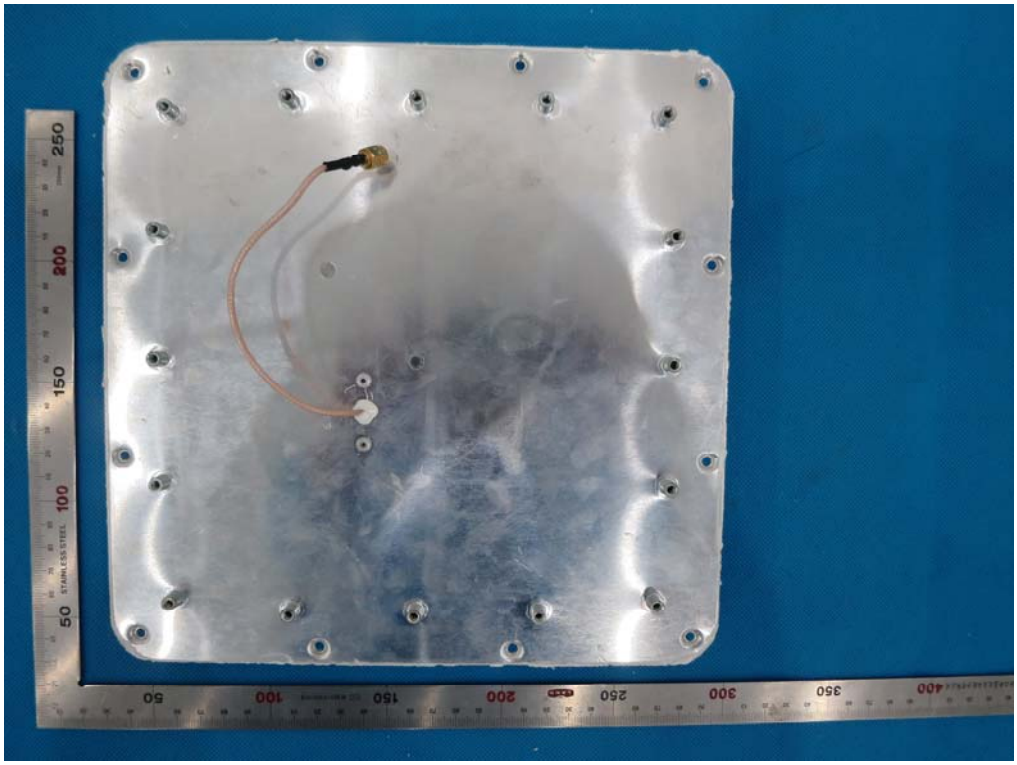
INTERNAL VIEW OF EUT -4



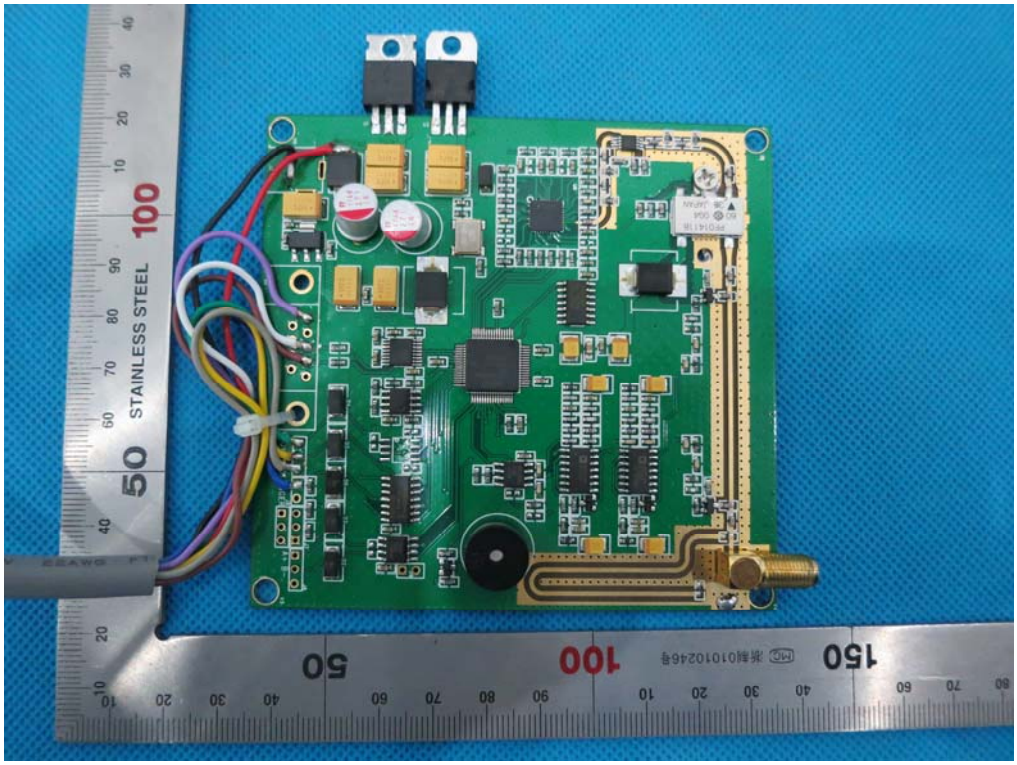
INTERNAL VIEW OF EUT -5



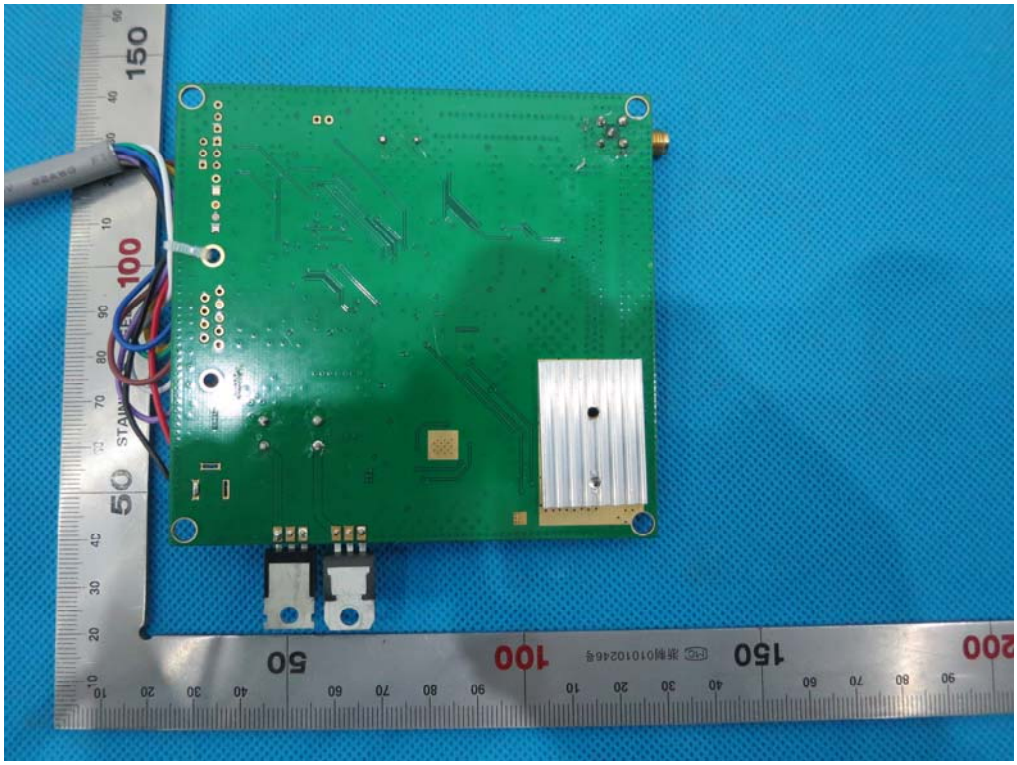
INTERNAL VIEW OF EUT -6



INTERNAL VIEW OF EUT -7



INTERNAL VIEW OF EUT -8



----END OF REPORT----