ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Applicant:	ID TECH 10721 Walker St. Cypress, CA 90630
Product Name:	VP6300
Brand Name:	IDTECH
Model No.:	IDVV-581821P; IDVV-581801P; IDVV-580821; IDVV-580801
Model Difference:	IDVV-581821P with Security Fence MESH FPCB; with SAM Board IDVV-581801P with Security Fence MESH FPCB; without SAM Board IDVV-580821 without Security Fence MESH FPCB; with SAM Board IDVV-580801 without Security Fence MESH FPCB; without SAM Board
Report Number:	E2/2017/A0024
FCC ID	WQJ-VP6300
FCC Rule Part	Part 15.225
Issue Date:	Nov. 21, 2017
Date of Test:	Oct. 03, 2017 ~ Nov. 21, 2017
Date of EUT Received:	Oct. 03, 2017

We hereby certify that:

The above equipment was tested by SGS Taiwan 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 C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.225.

The test results of this report relate only to the tested sample identified in this report.

Prepared By: Yuri Tsai

Yuri Tsai / Clerk

Approved By: Jim Chang

Jim Chang / Asst. Manager

Testing Laboratory
0513

Revision History

Report Number	Revision	Description	Issue Date
E2/2017/A0024	Rev.00	Initial creation of document	Nov. 21, 2017

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1 GENERAL INFORMATION

1.1 Product Description

General:

Product Name:	VP6300
Brand Name:	IDTECH
Model No.:	IDVV-581821P; IDVV-581801P; IDVV-580821; IDVV-580801
Model Difference:	IDVV-581821P with Security Fence MESH FPCB; with SAM Board IDVV-581801P with Security Fence MESH FPCB; without SAM Board IDVV-580821 without Security Fence MESH FPCB; with SAM Board IDVV-580801 without Security Fence MESH FPCB; without SAM Board
Hardware Version:	N/A
Software Version:	N/A
Power Supply:	9V DC from Power supply.

NFC:

Operating Frequency	13.56MHz
Transmit Power	< 79.45dBuV/m at 3m.
Number of Channels	1
Antenna Type	Loop Antenna
Modulation Type	ASK

This report complies with FCC regulatory radio rule with respect to RFID that operates on 13.56MHz.

1.2 Test Methodology

FCC Part 15, Supbpart C §15.225

ANSI C63.10:2013
Note: All test items have been performed and record as per the above standards..

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)
FCC Registration Number and Designation number are: 735305 / TW0002

1.4 Special Accessories

There is no special accessory used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

1.6 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

There is a comparison data of both open-field test site and semi-Anechoic, and test result came out very similar.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m above the reference ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.

2.4 Limitation

(1) Conducted Emission

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

a. The field strength of any emission within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
b. Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
c. Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.
d. The field strength of any emissions appearing outside of the 13.110-14.010 MHz shall not exceed the general radiated emission limits in section 15.209 as below.

Frequency (MHz)	Field strength μV/m	Distance (m)	Field strength at 3m dBμV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark : 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor = 40 log (required distance/ test distance) (dB);
4. The measurement was undertaken in closer distance at 3m, where extrapolation factor is offset to convert the limit of the measurement. Ex.20*log(30)+40*log(30/3) = 69.54dBuV/m
5. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of §15.205.
6. The general radiated emission limits in §15.209 apply for the spurious emission generate from UE, except for the fundamental emission where the respective section specifies otherwise.

(3) Frequency Tolerance

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

2.5 Configuration of Tested System

Fig. 2-1 Emission test set up configuration

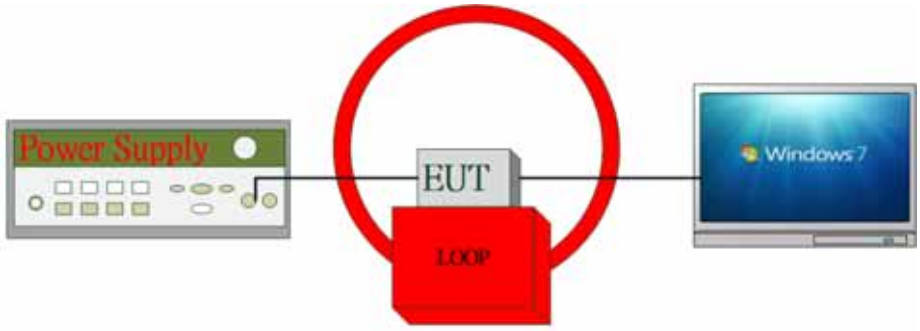


Fig. 2-2 Conduction test set up configuration

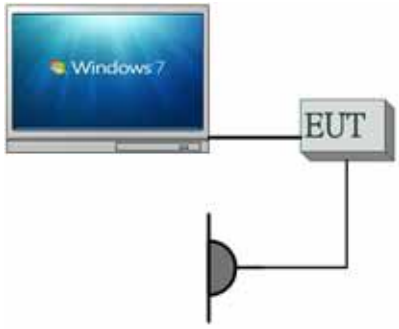


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	NFC Test software	Tera Term	N/A	N/A	N/A	N/A
2.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	Unshielded
3.	Notebook	Lenovo	L430	PK-OCGFF	N/A	Unshielded

3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207	AC Power Line Conducted Emission	Compliant
§15.225 (a)-(d)	Radiated Emission	Compliant
§15.209	Radiated Emission Limits, general requirement	Compliant
§15.225 (e)	Frequency Stability	Compliant
§2.1049 §15.215 (c)	99% & 20 dB OCCUPIED BANDWIDTH	Compliant
§15.203	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

The EUT stay in continuous transmitting mode. The frequency 13.56MHz is the default channel to test, where it is the only manipulative channel as this application supports.

The field strength of spurious radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode), the worst case E1 position was reported.

The data rate as the lowest supported is selected while tests are conducted.

5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Frequency Stability	+/- 123.36 Hz
20 dB OCCUPIED BANDWIDTH	+/- 123.36 Hz
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty	9kHz - 30MHz: +/- 2.3dB

Measurement uncertainty (Polarization : **Vertical**)	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB

Measurement uncertainty (Polarization : **Horizontal**)	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB

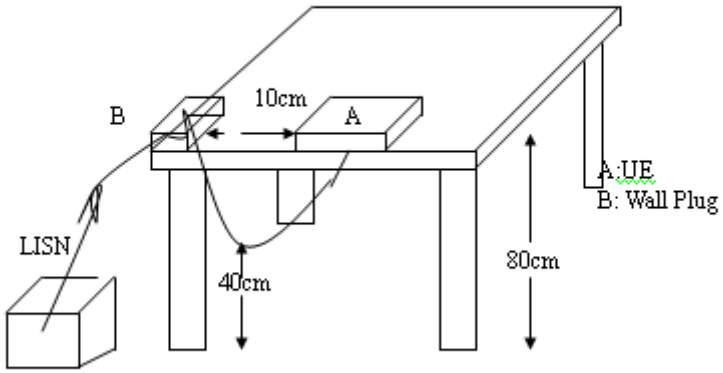
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

6 CONDUCTED EMISSIONS TEST

6.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Sweep frequency starting from 150 kHz to 30 MHz for phase L1.
4. Repeating the measurement as lists above for phase neutral.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
EMI Test Receiver	R&S	ESCI 7	100950	12/12/2016	12/11/2017
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	08/30/2017	08/29/2018
LISN	Schwarzbeck	NSLK 8127	8127-648	06/18/2017	06/17/2018
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

6.4 Measurement Result:

Operation Mode:	operation mode	Test By:	Pony

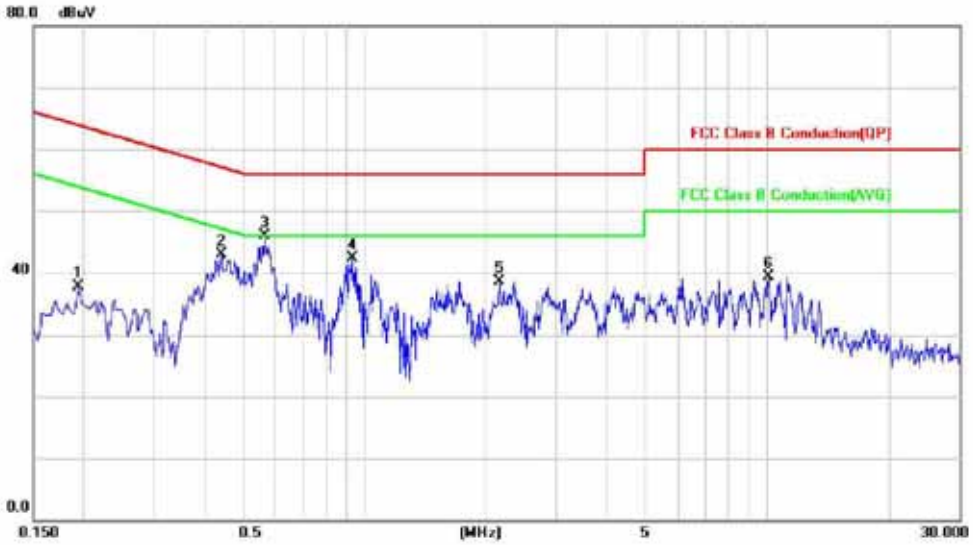
Site : Conduction Room
Limit: FCC Class B Conduction(QP)
Mode:
Note:

Phase: N
Power: AC 120V/60Hz

Temperature: 23 ℃
Humidity: 70 %

Conducted Emission

File :Condution Data :#827 Date: 2017/11/13 Time: 上午 09:36:28



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1940	18.17	19.49	37.66	63.86	-26.20	peak	
2		0.4420	22.93	19.89	42.82	57.02	-14.20	peak	
3	*	0.5660	25.95	19.96	45.91	56.00	-10.09	peak	
4		0.9380	22.57	19.75	42.32	56.00	-13.68	peak	
5		2.1660	18.18	20.40	38.58	56.00	-17.42	peak	
6		10.0940	19.45	19.94	39.39	60.00	-20.61	peak	

Site :	Conduction Room	Phase:	L1	Temperature:	23 ℃
Limit:	FCC Class B Conduction(QP)	Power:	AC 120V/60Hz	Humidity:	70 %
Mode:					
Note:					

Conducted Emission

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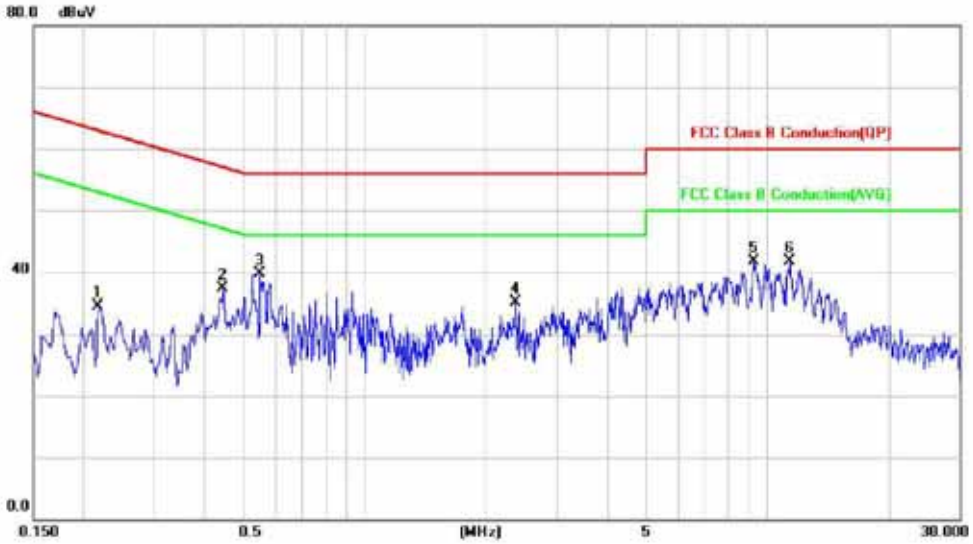


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2180	14.92	19.67	34.59	62.89	-28.30	peak	
2		0.4460	17.21	20.04	37.25	56.95	-19.70	peak	
3	*	0.5500	19.58	20.11	39.69	56.00	-16.31	peak	
4		2.3780	14.52	20.49	35.01	56.00	-20.99	peak	
5		9.2620	21.54	20.07	41.61	60.00	-18.39	peak	
6		11.3980	21.65	20.09	41.74	60.00	-18.26	peak	

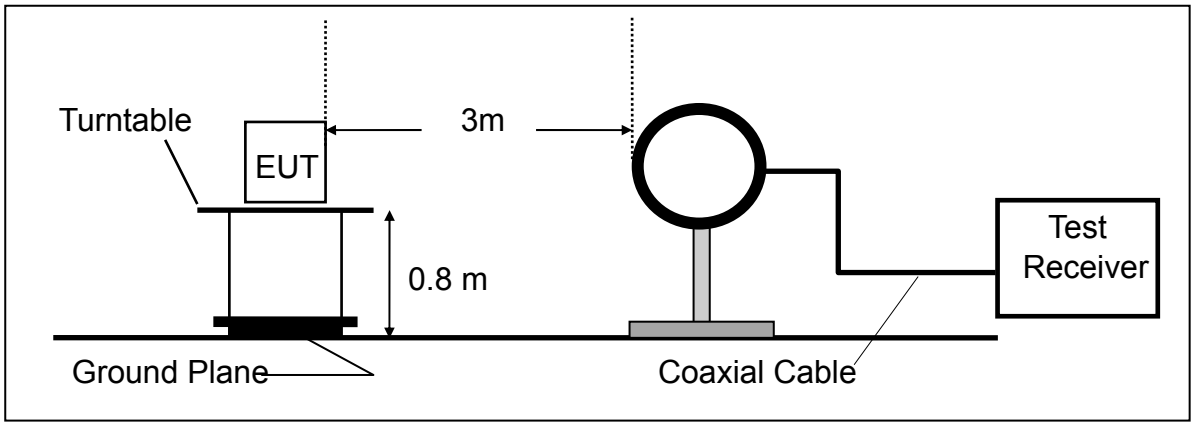
7 RADIATED EMISSION TEST

7.1 Measurement Procedure

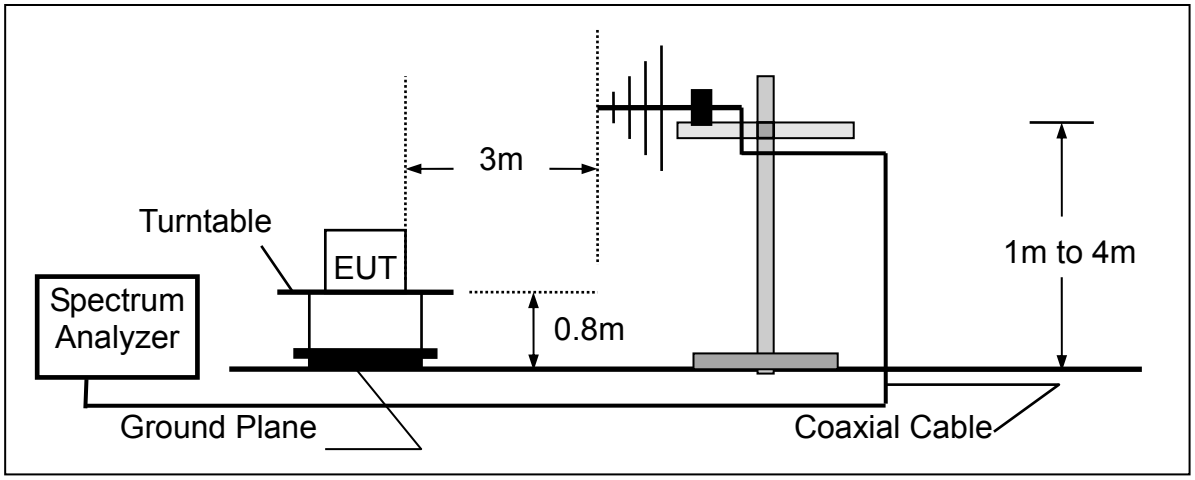
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

7.2 Test SET-UP (Block Diagram of Configuration)

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



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



7.3 Measurement Equipment Used:

SGS 966 Chamber No.C					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
EMI Test Receiver	R&S	ESU 40	100363	04/18/2017	04/17/2018
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2016	12/22/2017
Broadband Antenna	TESEQ	CBL 6112D	35240	11/03/2016	11/02/2017
Horn Antenna	ETS-Lindgren	3117	00143272	12/15/2016	12/16/2017
Horn Antenna	Schwarzbeck	BBHA9170	185	08/01/2017	07/31/2018
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2016	12/11/2017
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-18	10204	12/12/2016	12/11/2017
Pre Amplifier	R&S	SCU-26	100780	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2016	12/11/2017
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2016	12/11/2017
Attenuator	WOKEN	218FS-10	RF27	12/12/2016	12/11/2017
Site NSA	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
Site VSWR	SGS	966 Chamber C	SAC-C	03/02/2017	03/01/2018
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2017	05/03/2018
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.

7.4 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	

7.5 Field Strength of Fundamental Emission

7.5.1 Limit

Field strength of fundamental emissions limit:
The field strength of fundamental emissions shall not exceed 15848 micorvolts/meter at 30 meters. The Limit is converted to 123.90dBuV/m by offsetting the distance extrapolation factor as measurement distance is taken place at 3 meters.

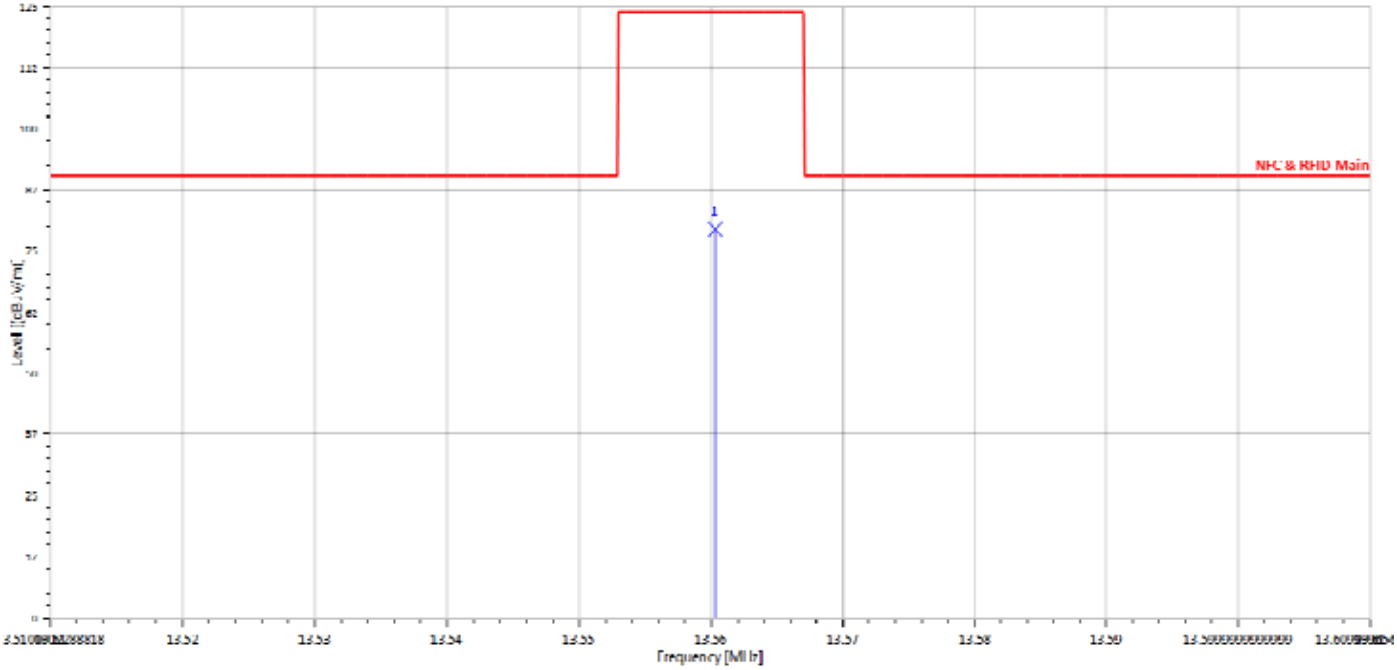
Distance extrapolation = 40 *log (30/3) = 40 dB

Limit is re-adjusted in terms of limit taken in 3m = 20 *log (15848 uV/m) + 40 = 124.00dBuV/m

Note:
Actual FS(dBμV/m) = Spectrum. Reading level(dBμV) + Factor(dB)
Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)
Note : “F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.
“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

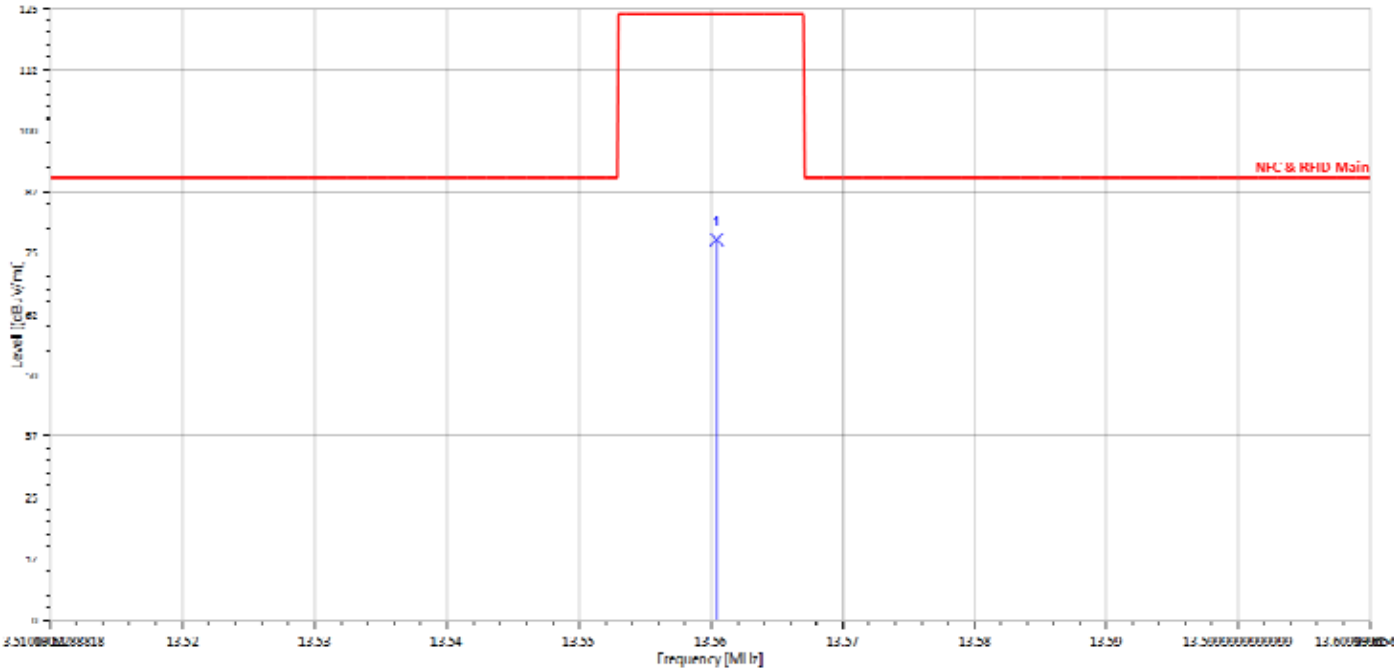
The trace on RE(radiation emission) plot is as colored blue, and the detection manner we’ve employed is peak detector.

Operation Mode :	NFC	Test Date :	2017/11/10
Fundamental Frequency :	13.56 MHz	Temp. / Humi. :	22.2deg_C/55RH
Operation Band :	Main CH Mid	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
13.56	F	Peak	67.78	11.67	79.45	123.9	-44.45

Operation Mode :	NFC	Test Date :	2017/11/10
Fundamental Frequency :	13.56 MHz	Temp. / Humi. :	22.2deg_C/55RH
Operation Band :	Main CH Mid	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
13.56	F	Peak	66.06	11.67	77.73	123.9	-46.17

7.5.2 Radiated Mask

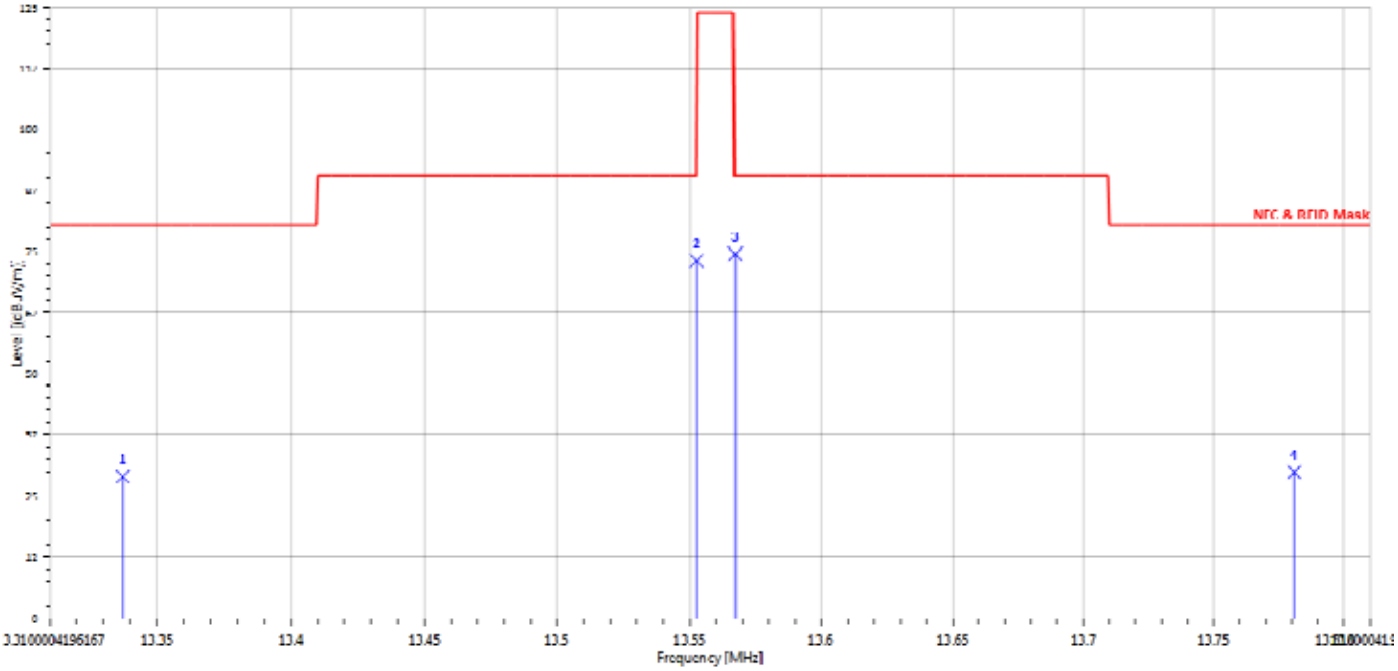
(a) 15.848 millivolts/m (84 dBμV/m) at 30 m, within the band 13.553-13.567 MHz.
(b) 334 microvolts/m (50.5 dBμV/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz.
(c) 106 microvolts/m (40.5 dBμV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz.

Distance extrapolation = 40 *log (30/3) = 40 dB

Limit is re-adjusted in terms of limit taken in 3m for the following frequency segment of the interest:

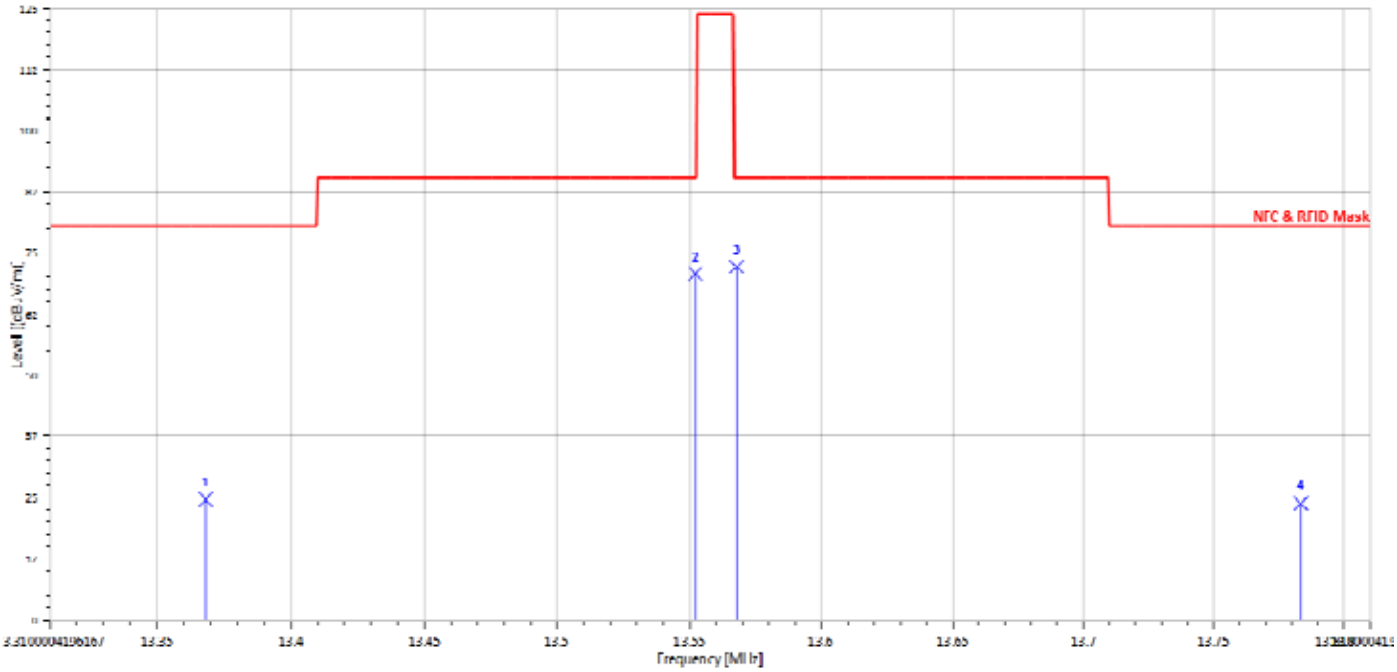
a) 20 *log (15848uV/m) + 40dB = 124.00dBuV/m
b) 20 *log(334uV/m) + 40dB = 90.47dBuV/m
c) 20*log(106uV/m) + 40dB = 80.50dBuV/m

Operation Mode :	NFC	Test Date :	2017/11/10
Fundamental Frequency :	13.56 MHz	Temp. / Humi. :	22.2deg_C/55RH
Operation Band :	Mask CH Mid	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
13.34	S	Peak	17.29	11.67	28.96	80.5	-51.54
13.55	S	Peak	61.44	11.67	73.10	90.47	-17.37
13.57	S	Peak	62.78	11.67	74.45	90.47	-16.02
13.78	S	Peak	18.20	11.66	29.86	80.5	-50.64

Operation Mode :	NFC	Test Date :	2017/11/10
Fundamental Frequency :	13.56 MHz	Temp. / Humi. :	22.2deg_C/55RH
Operation Band :	Mask CH Mid	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
13.37	S	Peak	12.89	11.67	24.56	80.5	-55.94
13.55	S	Peak	59.01	11.67	70.68	90.47	-19.79
13.57	S	Peak	60.47	11.67	72.13	90.47	-18.34
13.78	S	Peak	12.10	11.66	23.76	80.5	-56.74

7.5.3 Radiated Emission –

Limit:

§15.225

(d) 30 microvolts/m (29.4 dBμV/m) at 30 m, outside the band 13.110-14.010 MHz.

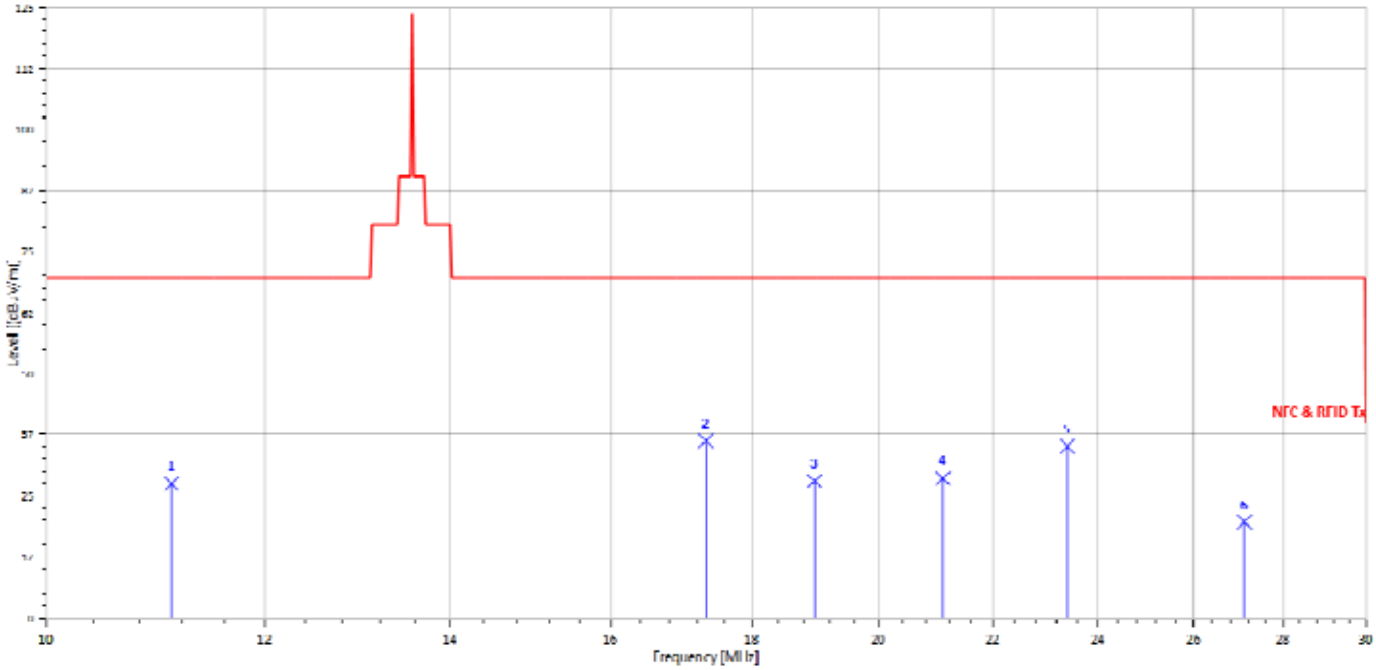
Limit is converted by adding the distance extrapolation factor as the measurement distance was taken place at 3m.

§RSS-210 A2.6

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

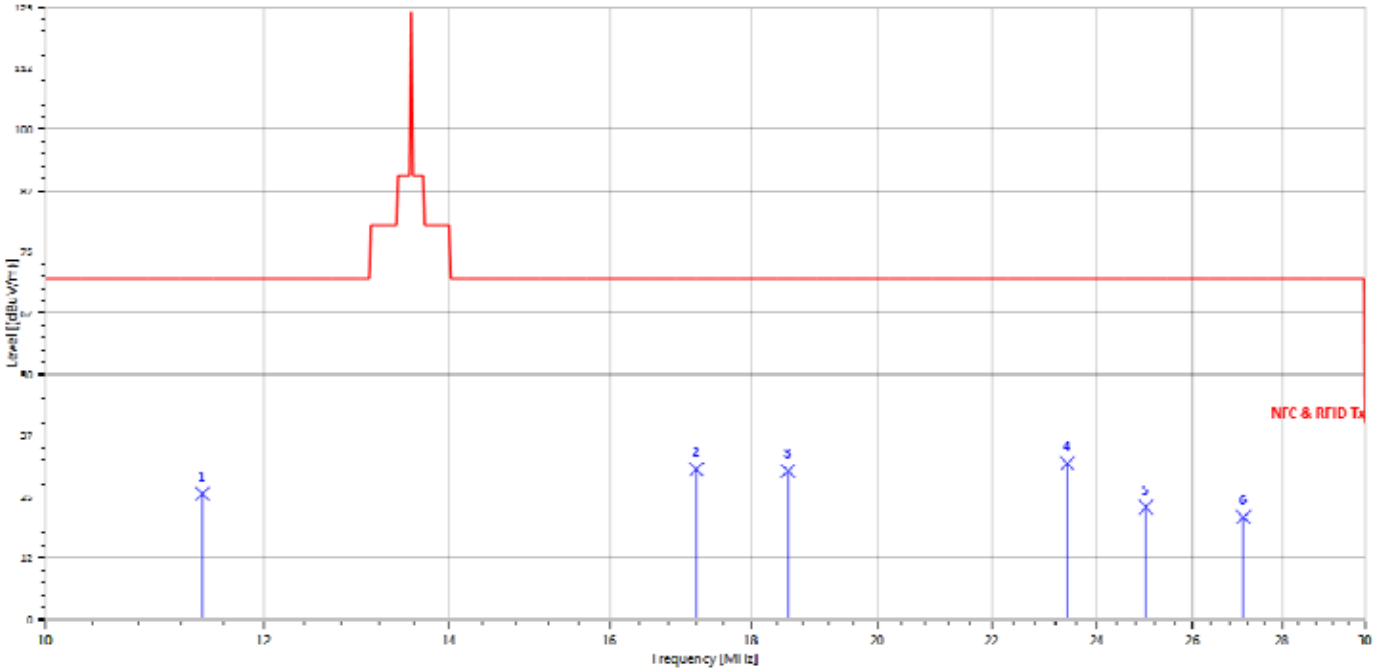
a) 20*log(30uV/m) + 40dB = 69.54 dBuV/m

Operation Mode :	NFC	Test Date :	2017/11/10
Fundamental Frequency :	13.56 MHz	Temp. / Humi. :	22.2deg_C/55RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Vertical



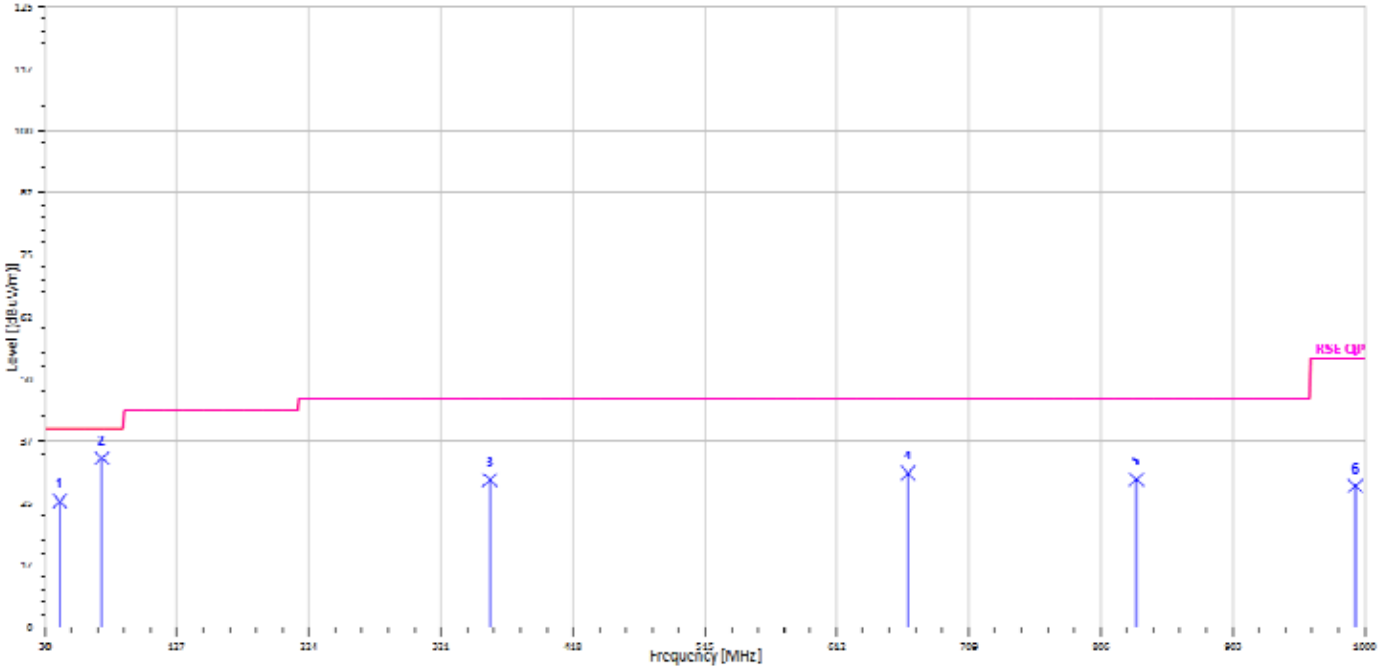
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBμV	dB	dBμV/m	dBμV/m	dB
11.10	S	Peak	15.72	11.72	27.43	69.54	-42.11
17.32	S	Peak	24.60	11.59	36.18	69.54	-33.36
18.96	S	Peak	16.45	11.55	28.00	69.54	-41.54
21.10	S	Peak	17.30	11.27	28.57	69.54	-40.97
23.40	S	Peak	24.38	10.71	35.09	69.54	-34.45
27.12	H	Peak	9.76	9.82	19.59	69.54	-49.95

Operation Mode :	NFC	Test Date :	2017/11/10
Fundamental Frequency :	13.56 MHz	Temp. / Humi. :	22.2deg_C/55RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Horizontal



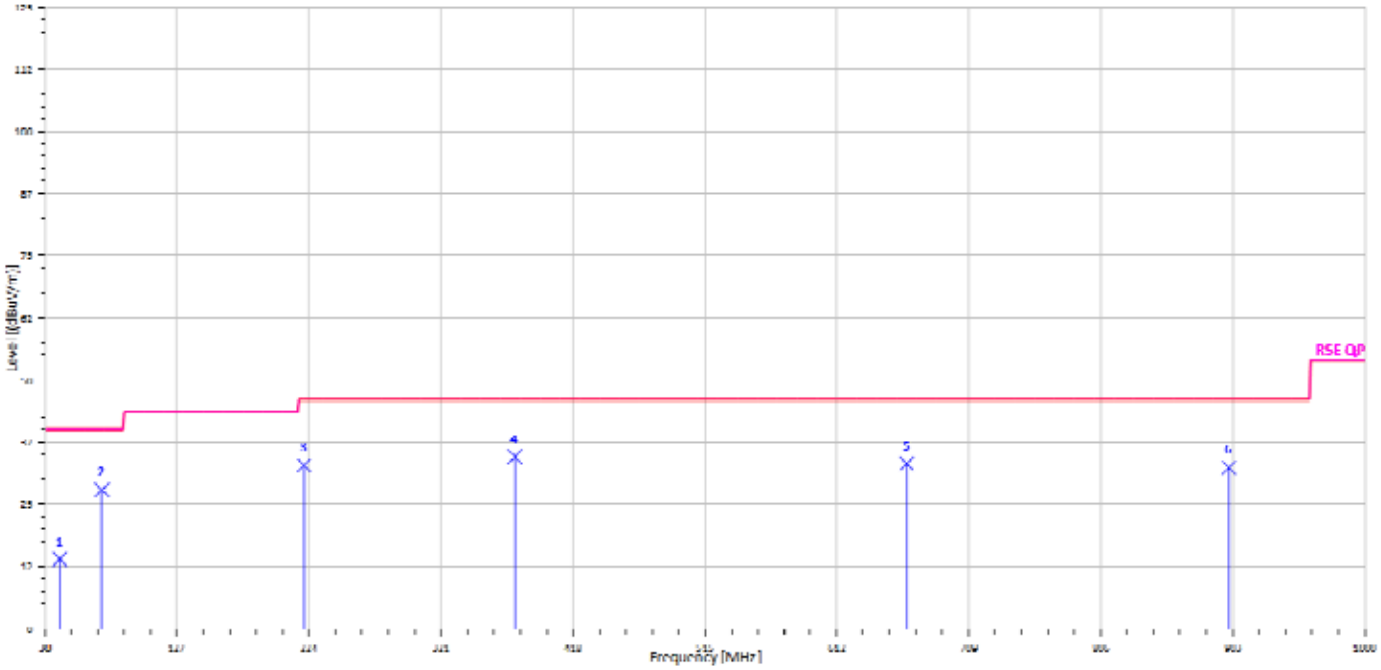
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11.40	S	Peak	13.89	11.71	25.60	69.54	-43.94
17.20	S	Peak	18.97	11.59	30.56	69.54	-38.98
18.56	S	Peak	18.69	11.56	30.25	69.54	-39.29
23.42	S	Peak	21.09	10.71	31.79	69.54	-37.75
25.00	S	Peak	12.52	10.33	22.85	69.54	-46.69
27.12	H	Peak	11.02	9.82	20.84	69.54	-48.70

Operation Mode :	NFC	Test Date :	2017/11/10
Fundamental Frequency :	13.56 MHz	Temp. / Humi. :	22.2deg_C/55RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
40.68	H	Peak	48.46	-23.12	25.33	40	-14.67
84.32	S	Peak	61.99	-27.79	34.20	40	-5.80
206.54	S	Peak	53.94	-25.21	28.73	43.5	-14.77
356.89	S	Peak	49.76	-20.10	29.66	46	-16.34
664.38	S	Peak	44.85	-13.89	30.96	46	-15.04
943.74	S	Peak	39.98	-9.65	30.32	46	-15.68

Operation Mode :	NFC	Test Date :	2017/11/10
Fundamental Frequency :	13.56 MHz	Temp. / Humi. :	22.2deg_C/55RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E1	Measurement Antenna Pol. :	Horizontal



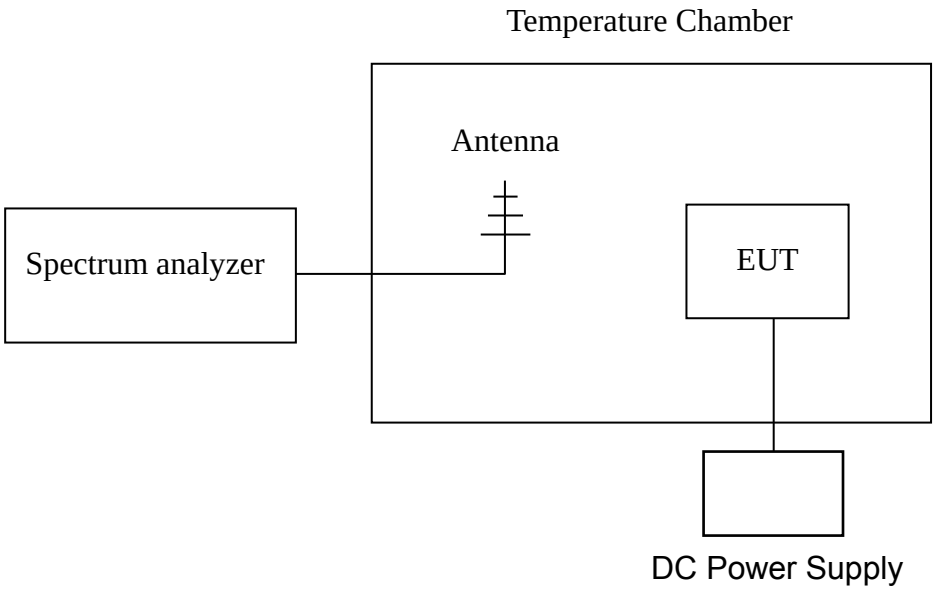
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
40.68	H	Peak	37.09	-23.12	13.97	40	-26.03
71.71	S	Peak	53.69	-25.78	27.91	40	-12.09
220.12	S	Peak	57.62	-24.79	32.83	46	-13.17
375.32	S	Peak	53.94	-19.43	34.51	46	-11.49
663.41	S	Peak	46.99	-13.83	33.16	46	-12.84
900.09	S	Peak	42.38	-10.03	32.35	46	-13.65

8 FREQUENCY TOLERANCE

8.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10kHz, Span =100kHz.
4. Set SPA Max hold. Mark peak.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY51440113	06/20/2017	06/19/2018
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2016	12/22/2017
DC Power Supply	Agilent	E3640A	MY53140006	05/02/2017	05/01/2018

8.4 Measurement Results

Startup

A. Temperature Variation

Power Supply Vdc	Environment Temperature (°C)	Frequency (MHz)	Delta (Hz)	Limit (KHz)
9	-20	13.56066	10.00000	+/- 1.356
9	-10	13.56065	20.00000	+/- 1.356
9	0	13.56065	20.00000	+/- 1.356
9	10	13.56066	10.00000	+/- 1.356
9	20	13.56067	0.00000	+/- 1.356
9	30	13.56066	10.00000	+/- 1.356
9	40	13.56065	20.00000	+/- 1.356
9	50	13.56066	10.00000	+/- 1.356

B. Supply Voltage Variation

Power Supply Vdc	Environment Temperature (°C)	Frequency (MHz)	Delta (Hz)	Limit (KHz)
45	20	13.56066	10.00000	+/- 1.356
9	20	13.56067	0.00000	+/- 1.356
7.5	20	13.56066	10.00000	+/- 1.356

2 minutes

A. Temperature Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature (°C)	(MHz)		
9	-20	13.56064	0.00000	+/- 1.356
9	-10	13.56065	-10.00000	+/- 1.356
9	0	13.56064	0.00000	+/- 1.356
9	10	13.56063	10.00000	+/- 1.356
9	20	13.56064	0.00000	+/- 1.356
9	30	13.56063	10.00000	+/- 1.356
9	40	13.56063	10.00000	+/- 1.356
9	50	13.56064	0.00000	+/- 1.356

B. Supply Voltage Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature (°C)	(MHz)		
45	20	13.56066	10.00000	+/- 1.356
9	20	13.56067	0.00000	+/- 1.356
7.5	20	13.56067	0.00000	+/- 1.356

5 minutes

A. Temperature Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature (°C)	(MHz)		
9	-20	13.56064	0.00000	+/- 1.356
9	-10	13.56063	10.00000	+/- 1.356
9	0	13.56063	10.00000	+/- 1.356
9	10	13.56062	20.00000	+/- 1.356
9	20	13.56064	0.00000	+/- 1.356
9	30	13.56065	-10.00000	+/- 1.356
9	40	13.56064	0.00000	+/- 1.356
9	50	13.56065	-10.00000	+/- 1.356

B. Supply Voltage Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature (°C)	(MHz)		
45	20	13.56066	10.00000	+/- 1.356
9	20	13.56067	0.00000	+/- 1.356
7.5	20	13.56065	20.00000	+/- 1.356

10 minutes

A. Temperature Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature (°C)	(MHz)		
9	-20	13.56063	-10.00000	+/- 1.356
9	-10	13.56063	-10.00000	+/- 1.356
9	0	13.56062	0.00000	+/- 1.356
9	10	13.56063	-10.00000	+/- 1.356
9	20	13.56062	0.00000	+/- 1.356
9	30	13.56064	-20.00000	+/- 1.356
9	40	13.56063	-10.00000	+/- 1.356
9	50	13.56064	-20.00000	+/- 1.356

B. Supply Voltage Variation

Power Supply	Environment	Frequency	Delta (Hz)	Limit (KHz)
Vdc	Temperature (°C)	(MHz)		
45	20	13.56064	30.00000	+/- 1.356
9	20	13.56067	0.00000	+/- 1.356
7.5	20	13.56066	10.00000	+/- 1.356

9 20 dB OCCUPIED BANDWIDTH MEASUREMENT

9.1 Standard Applicable:

§2.1049 & §15.215 (c)

9.2 Limit:

None

9.3 Test Set-up

Refer to section 6.2 in this report

9.4 Measurement Procedure

20dB bandwidth

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak mode.
2. 20dB Bandwidth the resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.

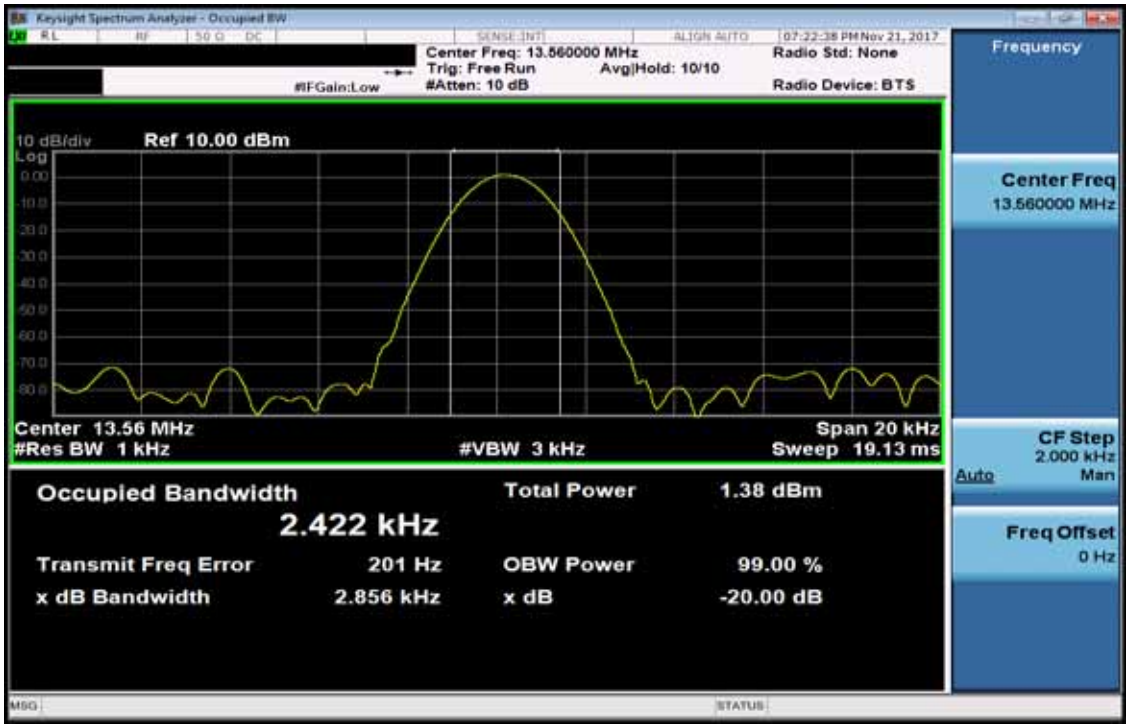
9.5 Measurement Equipment Used:

Refer to section 8.3 in this report

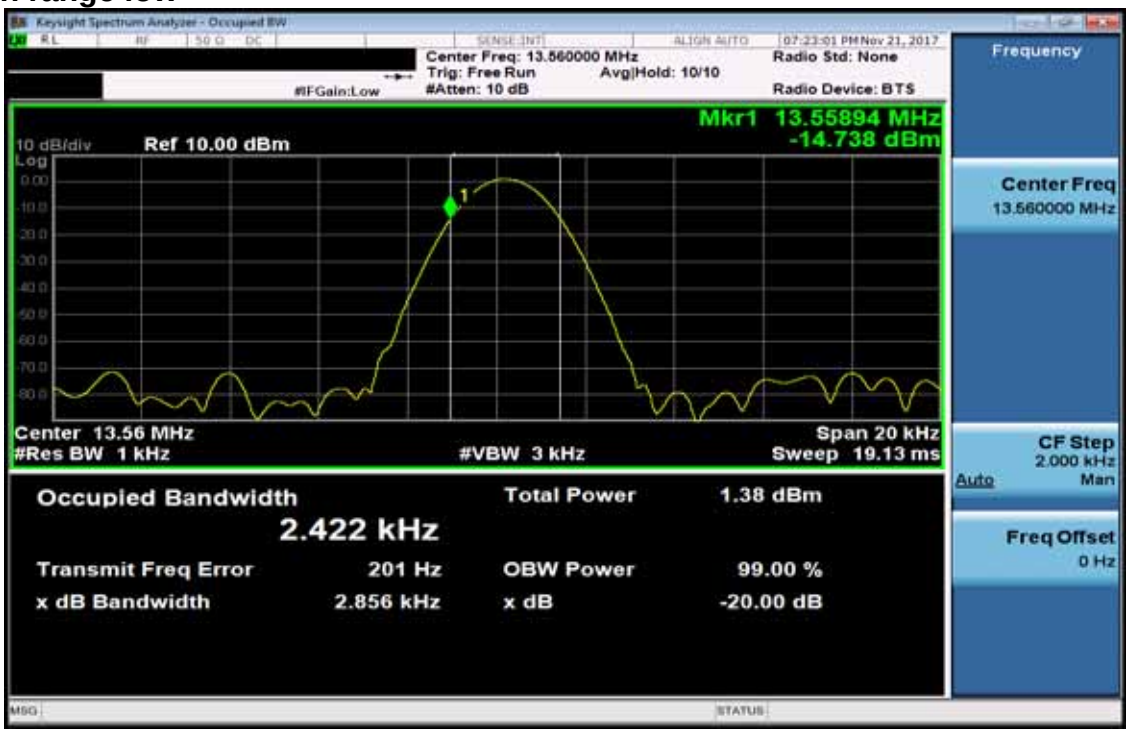
9.6 Measurement Result

20dB Bandwidth (kHz)	Opration range	Frequency (MHz)	Limit (MHz)
2856	Low	13.55415	>13.11
	High	13.56575	<14.01

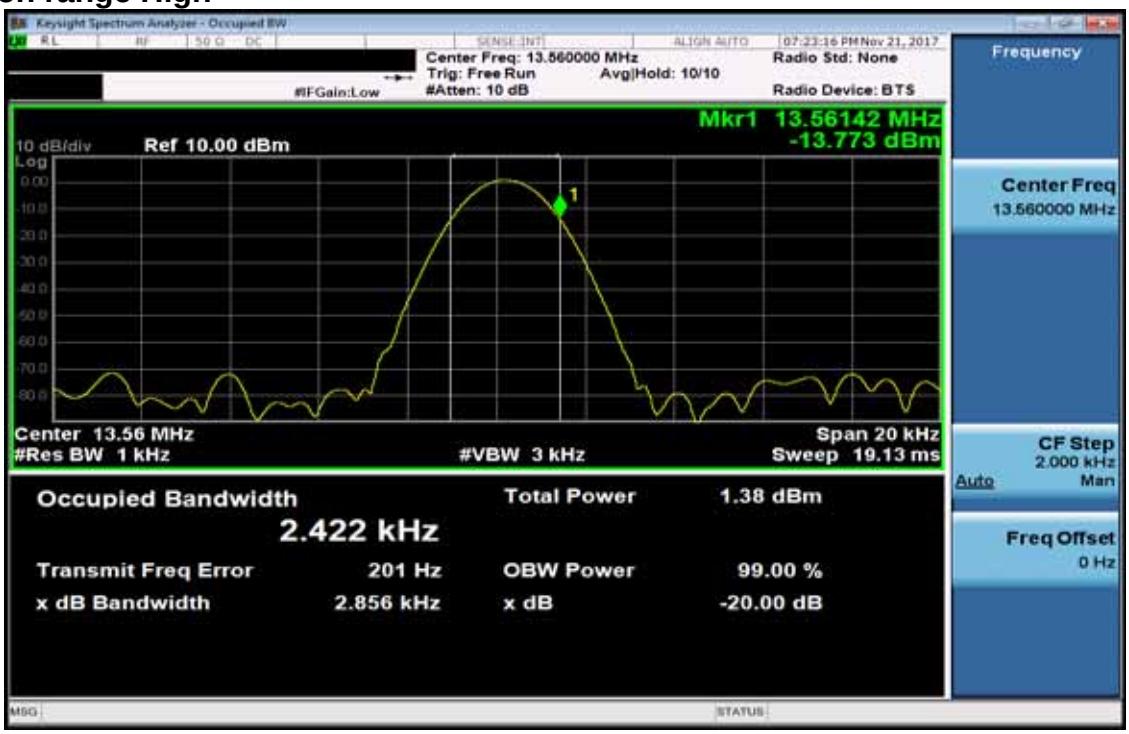
-20dB Bandwidth



Operation range low



Operation range High



10 ANTENNA REQUIREMENT

10.1 Standard Applicable:

According to §15.203, Antenna requirement.
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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

10.2 Antenna Connected Construction:

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

~ End of Report ~