Test Report of FCC Part 15 C for FCC Certificate

On Behalf of

ESI Cases and Accessories

Product description:	**DU FM Transmitter**
Model No.:	**DU7106,DUX8216,DUW9012**
FCC ID:	**UTO-DU7106-1**
Prepared for:	**ESI Cases and Accessories**
	240 Madison Ave 11 Floor, New York, NY 10016,USA
Prepared by:	**Bontek Compliance Testing Laboratory Ltd.**
	1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China
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Report No.:	BCT12JR-1909E
Issue Date:	November 30, 2012
Test Date:	November 01~29, 2012

Tested by: Lion Cai

Reviewed by: Kendy Wang

Approved by: Tony Wu

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	**ESI Cases and Accessories**
Address of Applicant:	240 Madison Ave 11 Floor, New York, NY 10016,USA
Manufacturer:	**ESI Cases and Accessories**
Address of Manufacturer:	240 Madison Ave 11 Floor, New York, NY 10016,USA
EUT Description:	DU FM Transmitter
Trade Name:	N.A.
Model No.:	DU7106,DUX8216,DUW9012 (Increase model and the main measurement model, just naming is not the same)
Rated Voltage	Input:12VDC
Frequency Range	88~108MHz
Channel Separation	20kHz
Product Class:	Low Power Communication Device Transmitter
EUT Cable:	Audio input cable, 0.8m long, unshielded

Remark: * The test data gathered are from the production sample provided by the manufacturer.

1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The following Declaration of Conformity report of EUT is prepared in accordance with FCC Rules and Regulations Part 15 Subpart C Section15.239

The objective of the manufacturer is to demonstrate compliance with the described above standards.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Test Facility

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China.

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 338263

BONTEK COMPLIANCE TESTING LABORATORY LTD. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 03, 2011.

IC Registration No.: 7631A

The 3m alternate test site of BONTEK COMPLIANCE TESTING LABORATORY LTD. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on January 25, 2011.

CNAS - Registration No.: L3923

BONTEK COMPLIANCE TESTING LABORATORY LTD. to ISO/IEC 17025:25 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. The acceptance letter from the CNAS is maintained in our files: Registration: L3923,March 22,2012.

TUV - Registration No.: UA 50203122-0001

BONTEK COMPLIANCE TESTING LABORATORY LTD. An assessment of the laboratory was conducted according to the"Procedures and Conditions for EMC Test Laboratories"with reference to EN ISO/IEC 17025 by a TUV Rheinland auditor. Audit Report NO. 17010783-002.

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 that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

2.3 General Test Procedures

Conducted Emissions: The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions: The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

2.4 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

Uncertainty figures are valid to a confidence level of 95%.

2.5Test Equipment List and Details

Test equipments list of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd.

No.	Equipment	Manufacturer	Model No.	S/N	Calibration date	Calibration due date
1	EMI Test Receiver	R&S	ESCI	100687	2012-4-6	2013-4-5
2	EMI Test Receiver	R&S	ESPI	100097	2012-7-25	2013-7-24
3	Amplifier	HP	8447D	1937A02492	2012-4-6	2013-4-5
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2012-4-6	2013-4-5
5	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2012-4-6	2013-4-5
6	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
7	Signal generator	Rhode & Schwarz	SMIQ 03HD + option SM-B1, SMIQB11, SMIQB12, SMIQB14, SMIQB17, SMIQB20	1125.5555.46	2012-4-6	2013-4-5
8	GSM system simulator	Rhode & Schwarz	CMU200 + option K20, K21, K22, K23, K24, K27, K28, K29, K42, K65, B12, B41, B52, B66, B56	1100.0008.34	2012-4-6	2013-4-5
9	GSM system simulator	Agilent	8960 Series 10 E1985A + GSM_AMPS	B.01.76 GB42450443	2012-4-6	2013-4-5
10	Spectrum Analyzer	Agilent	E4404B	US41192833	2012-4-6	2013-4-5
11	6dB Attenuator	Atten	Attenuator	DC-4GHz	2012-4-6	2013-4-5
12	Digital Multimeter	Fluke	15B	91280239	2012-4-6	2013-4-5
13	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2012-4-10	2013-4-9
14	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2011-11-28	2012-11-27
15	Active Loop Antenna	DAZE	ZN30900A	1200	2012-4-6	2013-4-6
16	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2012-4-6	2013-4-5
17	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2012-4-6	2013-4-5
18	Spectrum Analyzer	R&S	FSP	100397	2012-11-2	2013-11-1
19	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2012-4-6	2013-4-5
20	Temperature & Humidity Chamber	TOPSTAT	TOS-831A	3438A05208	2012-4-6	2013-4-5

3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
15.207	Disturbance Voltage at The Mains Terminals	N/A, without AC power supply
15.239	Radiation Emission	Pass
15.239	Occupied Bandwidth	Pass

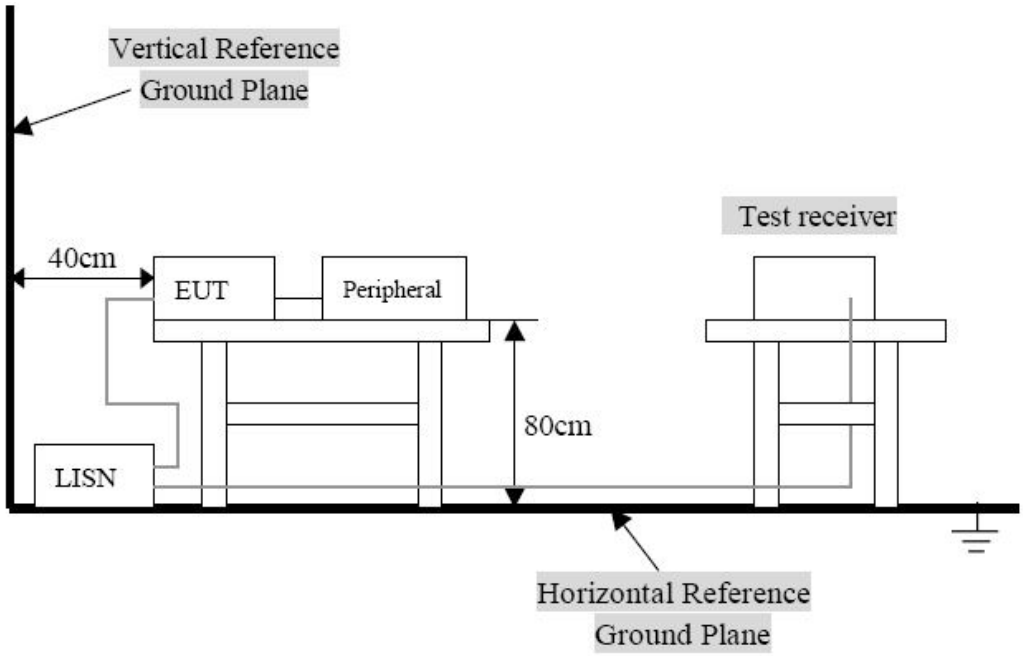
4. TEST OF CONDUCTED EMISSION

4.1 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, 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 below limits table.

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150～0.500	66～56	56～46
0.500～5.000	56	46
5.000～30.00	60	50

4.2 Test Setup Diagram



Remark:
1. The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC 15.207 limits.

2. The EUT is exclused from investigation of Disturbance Voltage at The Mains Terminals, for it is powered by DC 12V from car bettary. According to the Section 15.207(d),measurement to demonstrate compliance with the limits of Disturbance Voltage at The Mains Terminals are not required to the devices which only employed bettary power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

5- RADIATED EMISSIONS

5.1 Limit of Radiated Emissions (FCC 47 CFR 15.209 Class B):

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dBμV/m)
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.
(2) The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

5.2 EUT Setup

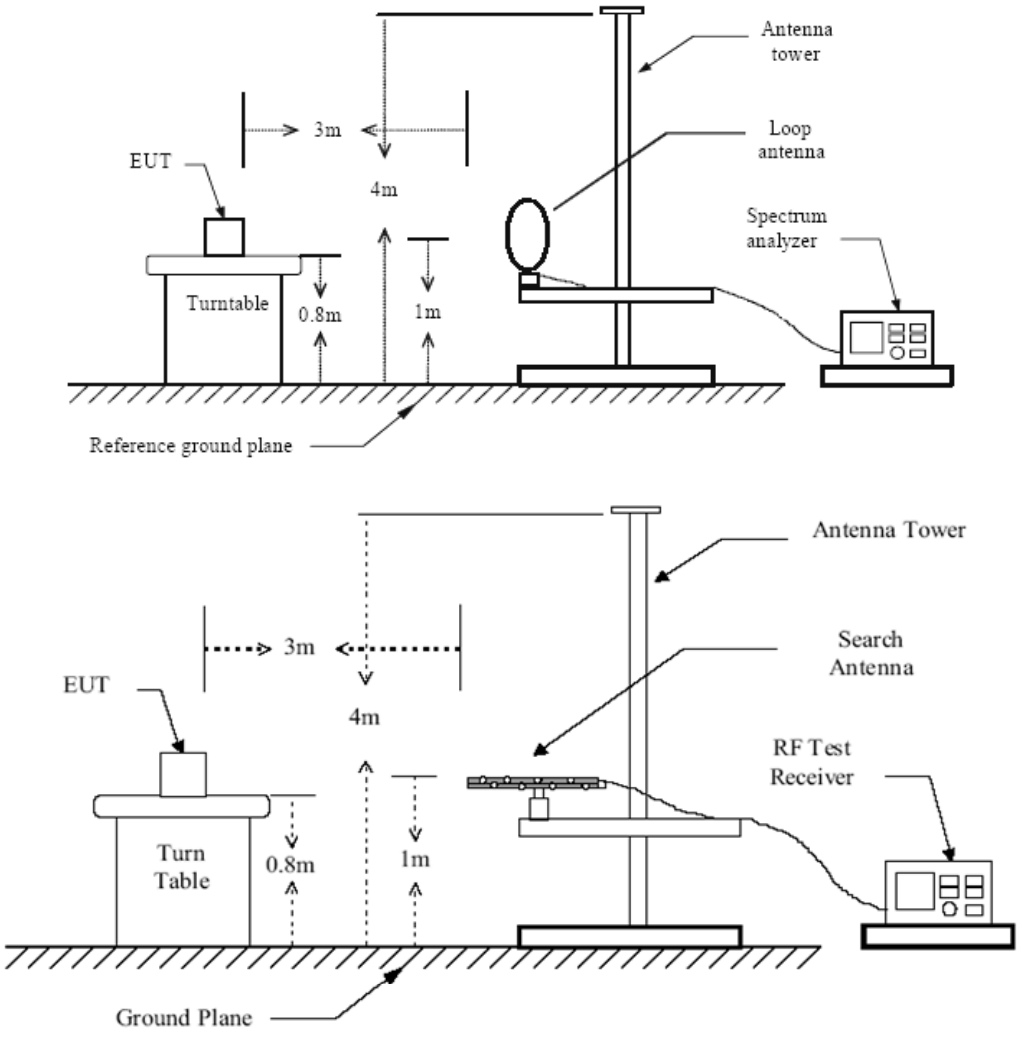


Figure 1 : Frequencies measured below 1 GHz configuration

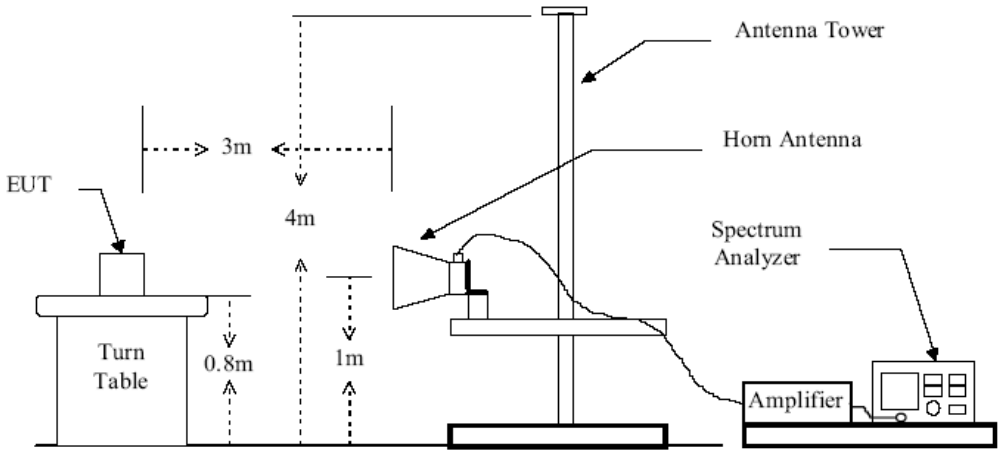


Figure 2 : Frequencies measured above 1 GHz configuration

5.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

1. Configure the EUT according to ANSI C63.4-2003

2. The EUT was placed on the top of the turntable 0.8 meter above ground.

3. Receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable. When the frequency spectrum measured started from 9 kHz to 30 MHz, a loop antenna is used. When the frequency spectrum measured started from 30 MHz to 1000 MHz and above 1000 MHz, a broadband receiving antenna and the horn antenna are used.

4. Power on the EUT and all the supporting units.

5. The turntable was rotated by 360 degrees to determine the position of the highest radiation.

6. The height of the receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.

7. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

8. Set the test-receiver system to Peak, CISPR quasi-peak or Average detect function with specified bandwidth according to different frequency spectrum measured under Maximum Hold Mode.

5.4 Test Result

Temperature (℃) : 22~23	EUT: DU FM Transmitter
Humidity (%RH): 50~54	M/N: DU7106
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal operating, playing music which ipod input

NOTE：
In this testing, the EUT was respectively tested in three different orientations. That is:
(1) EUT was lie vertically, and then its Antenna oriented upward

(2) EUT was lie vertically, and then its Antenna oriented downward

(3) EUT was lie flatwise, and then its Antenna oriented to the receiving antenna

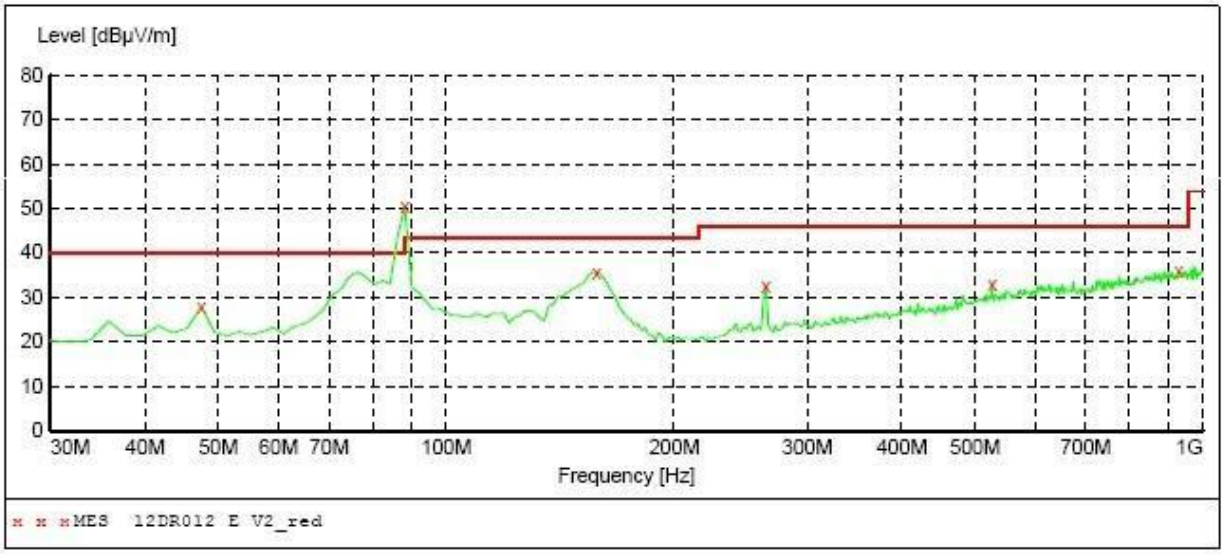
The worst test data see following pages When the EUT was lie vertically, and then its Antenna oriented upward, the worst test data was got as following table.

9KHz—30MHz Worst Case

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Levels (dBuV/m)	Limit (dBμV/m)	Margin (dB)	Detector Mode
0.398	21.32	7.91	1.01	23.62	67.0	34.47	QP
18.75	20.87	8.65	1.20	22.07	49.5	17.47	QP
22.34	20.97	8.84	1.05	23.07	49.5	16.15	QP
27.38	22.34	7.63	1.69	25.84	49.5	14.65	QP

Harmonics & Spurious Emission (Low Channel: 88.1MHz)

Antenna Polarization: Vertical

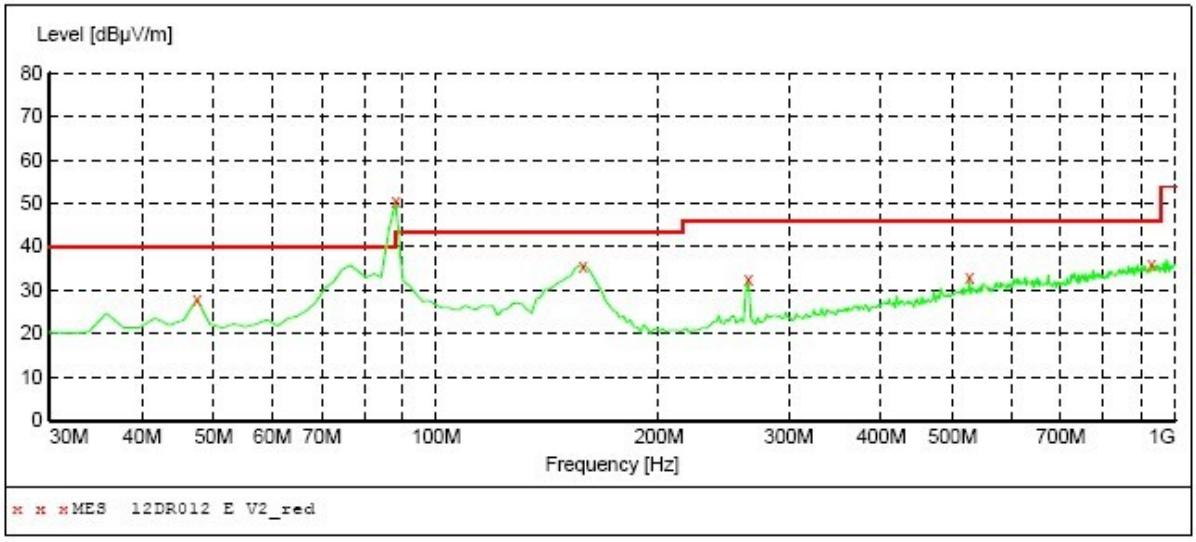


MEASUREMENT RESULT: "12DR012 E V2_red"

4/16/2012 21:02

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	27.90	15.8	40.0	12.1	QP	100.0	0.00	VERTICAL
88.200000	50.50	15.5	43.5	-7.0	QP	100.0	0.00	VERTICAL
158.040000	35.70	12.7	43.5	7.8	QP	100.0	0.00	VERTICAL
264.740000	32.60	17.5	46.0	13.4	QP	100.0	0.00	VERTICAL
526.640000	33.00	24.5	46.0	13.0	QP	100.0	0.00	VERTICAL
930.160000	36.10	29.4	46.0	9.9	QP	100.0	0.00	VERTICAL

Antenna Polarization: Horizontal



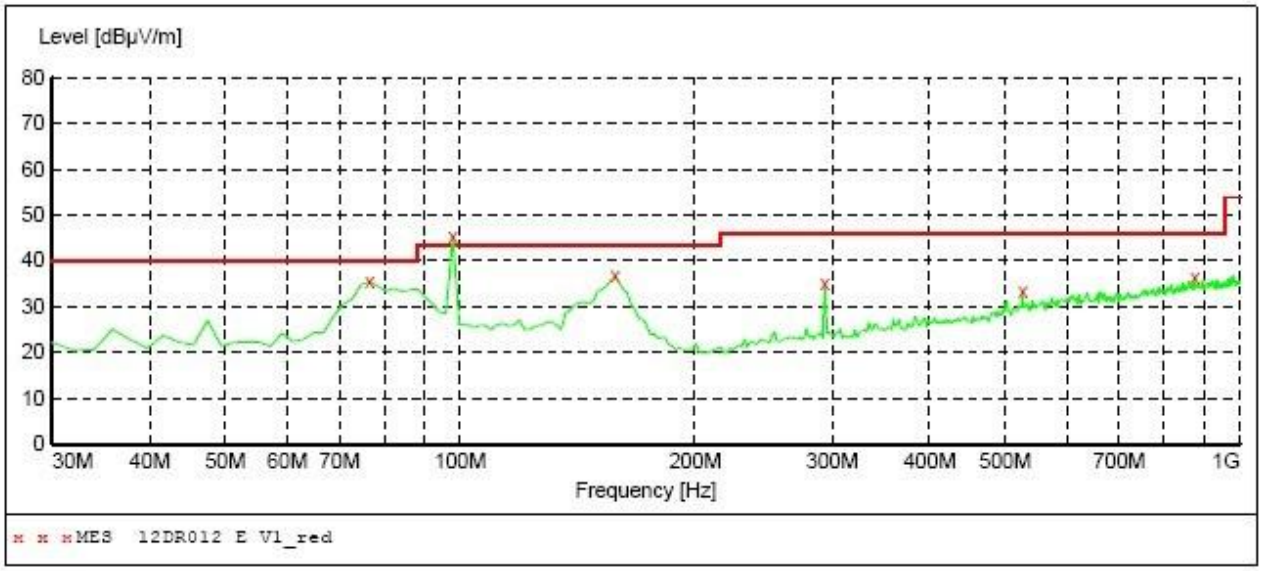
MEASUREMENT RESULT: "12DR012 E V2_red"

4/16/2012 21:02

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	27.90	15.8	40.0	12.1	QP	100.0	0.00	VERTICAL
88.200000	50.50	15.5	43.5	-7.0	QP	100.0	0.00	VERTICAL
158.040000	35.70	12.7	43.5	7.8	QP	100.0	0.00	VERTICAL
264.740000	32.60	17.5	46.0	13.4	QP	100.0	0.00	VERTICAL
526.640000	33.00	24.5	46.0	13.0	QP	100.0	0.00	VERTICAL
930.160000	36.10	29.4	46.0	9.9	QP	100.0	0.00	VERTICAL

Harmonics & Spurious Emission (Middle Channel: 98MHz)

Antenna Polarization: Vertical

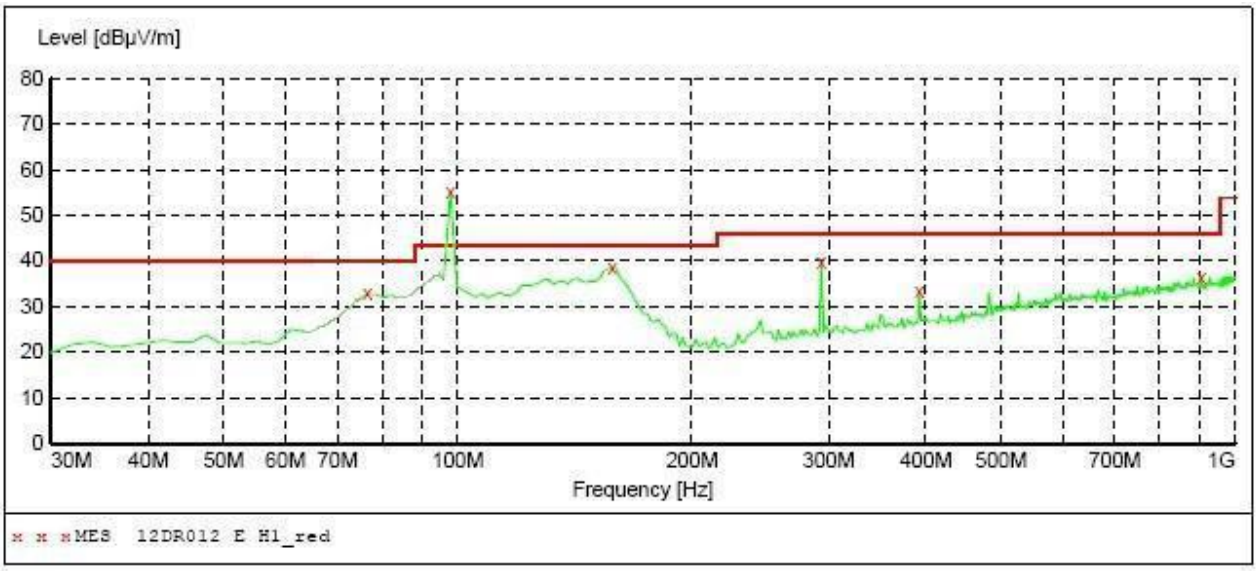


MEASUREMENT RESULT: "12DR012 E V1_red"

4/16/2012 20:56

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
76.560000	35.60	12.0	40.0	4.4	QP	100.0	0.00	VERTICAL
97.900000	45.50	17.4	43.5	-2.0	QP	100.0	0.00	VERTICAL
158.040000	36.60	12.7	43.5	6.9	QP	100.0	0.00	VERTICAL
293.840000	35.00	18.6	46.0	11.0	QP	100.0	0.00	VERTICAL
526.640000	33.30	24.5	46.0	12.7	QP	100.0	0.00	VERTICAL
875.840000	36.40	28.9	46.0	9.6	QP	100.0	0.00	VERTICAL

Antenna Polarization: Horizontal



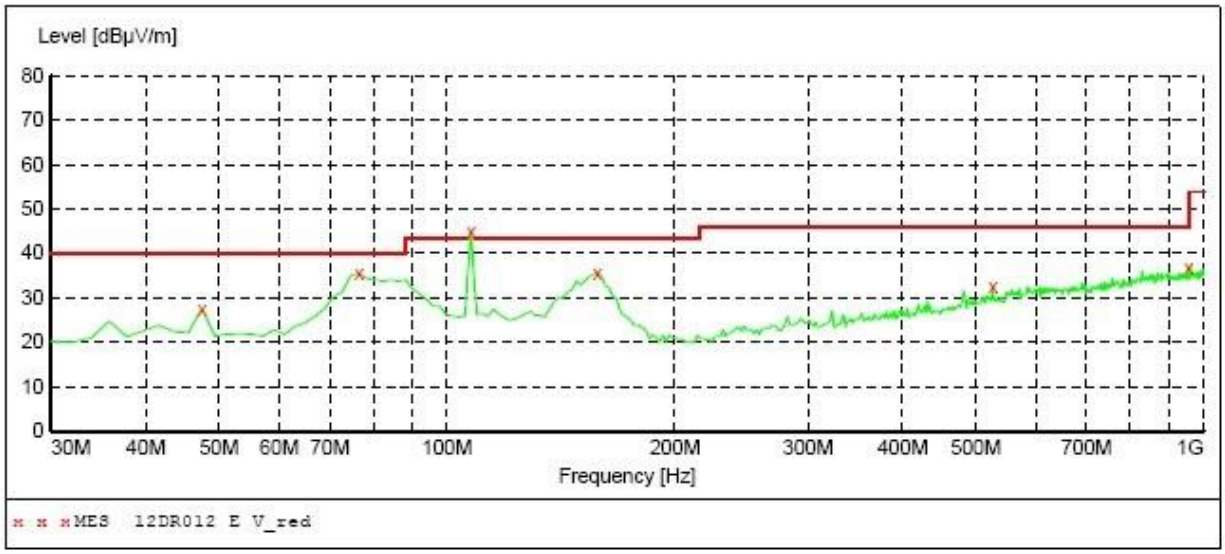
MEASUREMENT RESULT: "12DR012 E H1_red"

4/16/2012 20:59

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
76.560000	33.10	12.0	40.0	-6.9	QP	300.0	0.00	HORIZONTAL
97.900000	55.10	17.4	43.5	-11.6	QP	300.0	0.00	HORIZONTAL
158.040000	38.50	12.7	43.5	5.0	QP	100.0	0.00	HORIZONTAL
293.840000	39.80	18.6	46.0	6.2	QP	100.0	0.00	HORIZONTAL
392.780000	33.20	21.3	46.0	12.8	QP	100.0	0.00	HORIZONTAL
904.940000	36.40	29.2	46.0	9.6	QP	100.0	0.00	HORIZONTAL

Harmonics & Spurious Emission (High Channel: 107.9MHz)

Antenna Polarization: Vertical

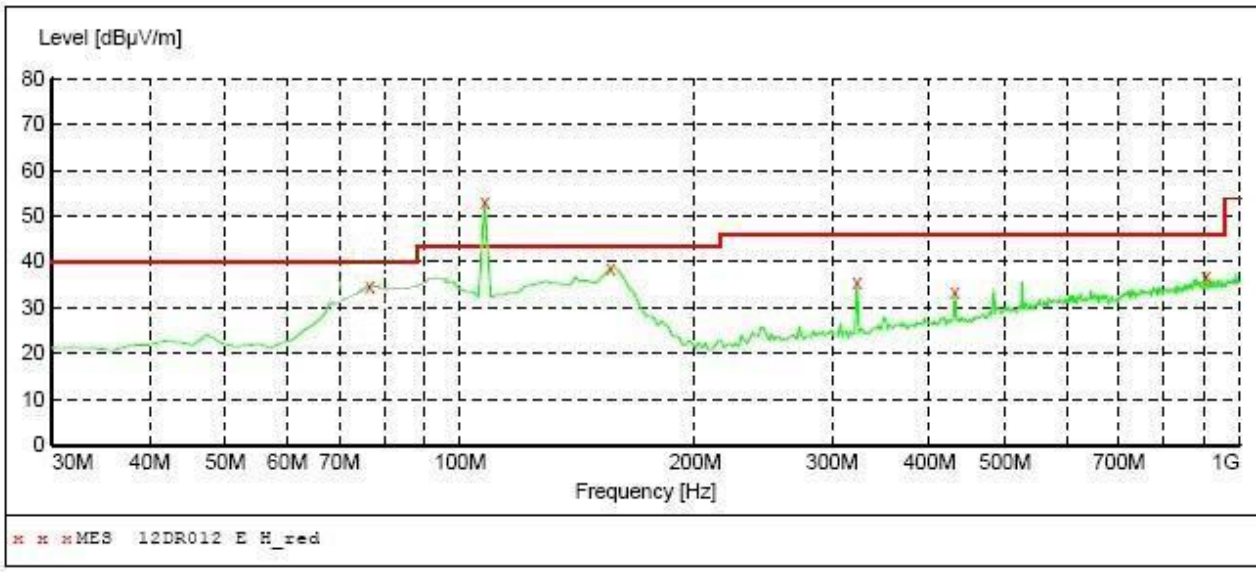


MEASUREMENT RESULT: "12DR012 E V_red"

4/16/2012 20:50

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	27.60	15.8	40.0	12.4	Qp	100.0	0.00	VERTICAL
76.560000	35.50	12.0	40.0	4.5	Qp	100.0	0.00	VERTICAL
107.600000	45.10	16.8	43.5	-1.6	Qp	100.0	0.00	VERTICAL
158.040000	35.70	12.7	43.5	7.8	Qp	100.0	0.00	VERTICAL
526.640000	32.70	24.5	46.0	13.3	Qp	100.0	0.00	VERTICAL
955.380000	36.70	29.6	46.0	9.3	Qp	100.0	0.00	VERTICAL

Antenna Polarization: Horizontal



MEASUREMENT RESULT: "12DR012 E H_red"

4/16/2012 20:54

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
76.560000	35.00	12.0	40.0	5.0	Qp	300.0	0.00	HORIZONTAL
107.600000	53.10	16.8	43.5	-9.6	Qp	300.0	0.00	HORIZONTAL
156.100000	38.70	12.6	43.5	4.8	Qp	100.0	0.00	HORIZONTAL
322.940000	35.60	19.3	46.0	10.4	Qp	100.0	0.00	HORIZONTAL
431.580000	33.50	22.0	46.0	12.5	Qp	100.0	0.00	HORIZONTAL
904.940000	36.60	29.2	46.0	9.4	Qp	100.0	0.00	HORIZONTAL

Fundamental Emission Test Data

Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Correction Factor (dBuV/m)	FS (dBuV/m)	Limit (dBμV/m)	Margin (dB)	Detector Mode
Low Channel: 88.1MHz						
88.7	41.9	16.4	58.3	68.0	-9.7	PEAK
88.7	17.0	16.4	33.4	48.0	-14.6	AVERAGE
Middle Channel: 98.0MHz						
98.1	39.3	18.2	57.5	68.0	-10.5	PEAK
98.1	15.6	18.2	33.8	48.0	-14.2	AVERAGE
High Channel:107.9MHz						
107.9	41.8	17.8	59.6	68.0	-8.4	PEAK
107.9	17.5	17.8	35.31	48.0	-12.69	AVERAGE

Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Correction Factor (dBuV/m)	FS (dBuV/m)	Limit (dBμV/m)	Margin (dB)	Detector Mode
Low Channel: 88.1MHz						
88.7	34.9	16.4	51.3	68.0	-16.7	PEAK
88.7	11.4	16.4	27.8	48.0	-20.2	AVERAGE
Middle Channel: 98.0MHz						
98.1	28.7	18.2	46.9	68.0	-21.1	PEAK
98.1	7.1	18.2	25.3	48.0	-22.7	AVERAGE
High Channel:107.9MHz						
107.9	28.5	17.8	46.3	68.0	-21.7	PEAK
107.9	7.3	17.8	25.1	48.0	-22.9	AVERAGE

6- OCCUPIED BANDWIDTH

6.1 Requirement of Occupied Bandwidth

Emission from the intentional radiator shall be confined within a band 200kHz wide centered on the operation frequency. The 200kHz band shall lie wholly within the frequency range of 88~108MHz.

6.2 Test Procedure

1). The EUT was placed on the top of the turntable 0.8 meter above ground.

2). 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.

3). Power on the EUT and all the supporting units.

4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.

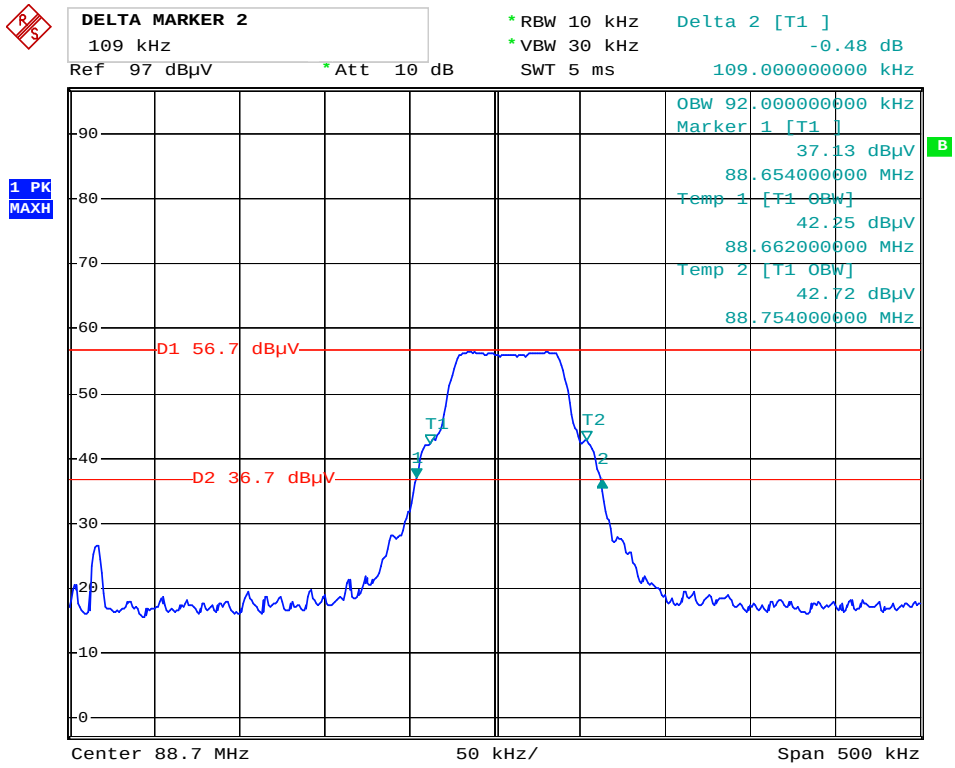
5). For each suspected emission, the antenna tower was scanned (from 1 m to 4 m) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading of both horizontal and vertical polarization.

6). Set EMI test receiver with Max hold. Mark peak, -20dB.

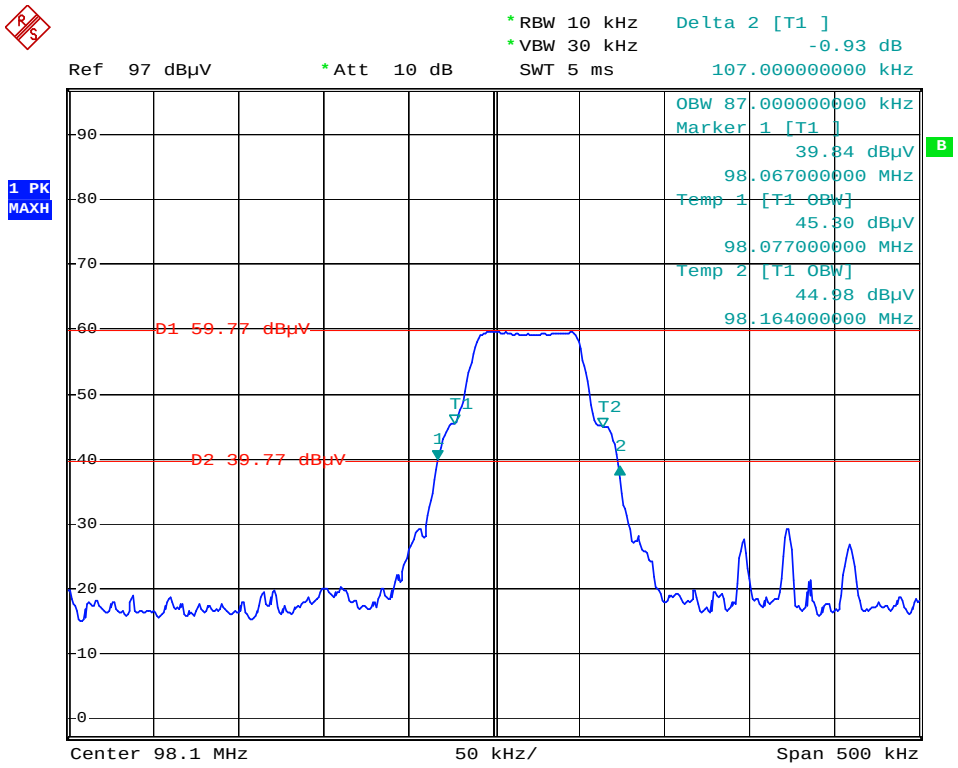
6.3 Emissions within Band Edges Test Result

Temperature (℃) : 22~23	EUT: DU FM Transmitter
Humidity (%RH): 50~54	M/N: DU7106
Barometric Pressure (mbar): 950~1000	Operation Condition: Normal operating, playing music with ipod input

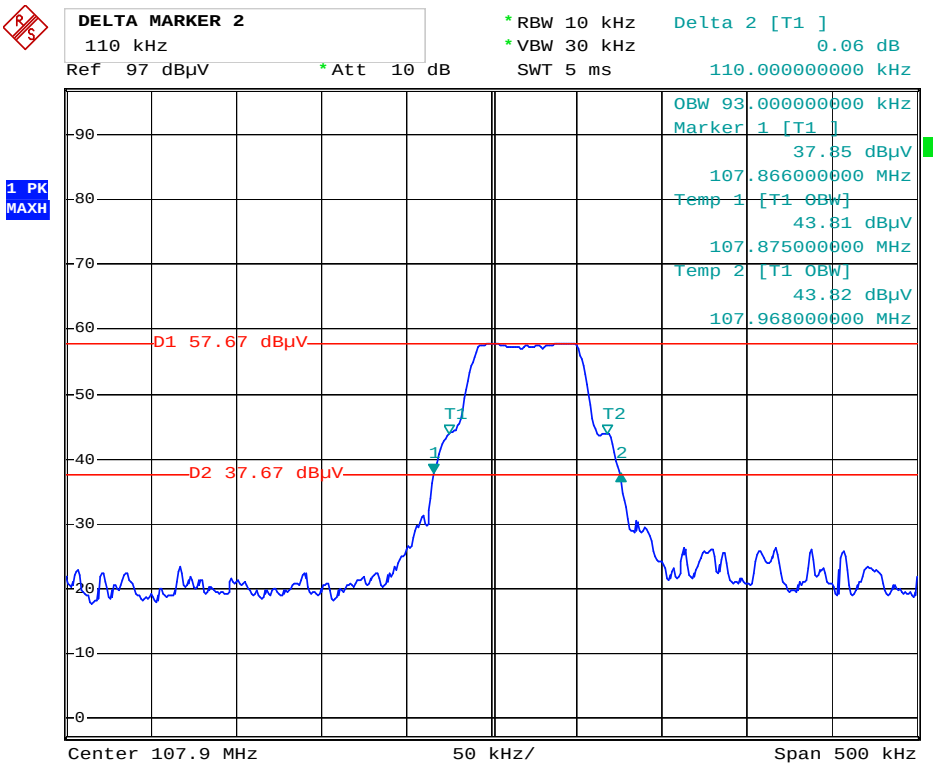
Low Channel: 88.7MHz



Middle Channel: 98.1MHz



High Channel: 107.9MHz



7. ANTENNA REQUIREMENT

7.1 Standard Applicable

Section 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. 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.

7.2 Antenna Connected Construction

The antenna is designed with permanent attachment and no consideration of replacement.