

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: Managing Member

Brand: N/A

Model Name: AM-WFBT-107

Model Different: N/A

FCC ID: VFK-WFBT-REV-12

Report No.: ER/2012/40021

Issue Date: May. 30, 2012

Rule Part: §15.231

Prepared by: Ascion LLC

341 Central Ave. Silver Creek, NY 14136
U.S.A.

Prepared by: SGS Taiwan Ltd.

Electronics & Communication Laboratory

No. 134, Wu Kung Rd., Wuku Industrial
Zone, Taipei County, Taiwan.



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VERIFICATION OF COMPLIANCE

Applicant: Ascion LLC
 341 Central Ave. Silver Creek, NY 14136 U.S.A.

Product Name: Managing Member

Brand / Marketing Name: N/A

FCC ID: VFK-WFBT-REV-12

Model No.: AM-WFBT-107

Model Difference: N/A

File Number: ER/2012/40021


Date of test: Apr. 30, 2012 ~ May. 29, 2012

Date of EUT Received: May. 29, 2012

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory 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 conducted and radiated emission limits of FCC Rules Part 15.231.

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

Test By:	 <hr/> Jimmy Lin / Engineer	Date:	<hr/> May. 30, 2012
Prepared By:	 <hr/> Gigi Yeh / Clerk	Date:	<hr/> May. 30, 2012
Approved By:	 <hr/> Jim Chang / Supervisor	Date:	<hr/> May. 30, 2012

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Version

Version No.	Date	Description
00	May. 30, 2012	Initial creation of document

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SGS Taiwan Ltd.No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan / 台北縣五股工業區五工路134號

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1. GENERAL INFORMATION

1.1 Product Description

Product Name:	Managing Member
Brand Name:	N/A
Model Name:	AM-WFBT-107
Model Difference:	N/A
Operation Frequency:	433.9 MHz
Channel number:	1 channels
Modulation Type:	ASK
Power Supply	5v from USB port
Antenna Designation:	Micro-Strip Antenna
Transmitting Time:	Periodic \leq 5 seconds

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1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **VFK-WFBT-REV-12** filing to comply with Section 15.231 of the FCC Part 15, Subpart C Rules.

1.3 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.

1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003. FCC Registration Number are: 990257 and 236194, Canada Registration Number: 4620A-1

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

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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 (Not apply in the report)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 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 and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above 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 hand-held 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. according to the requirements in Section 8 and 13 and Subclause 8.3.1.2 of ANSI C63.4-2003.

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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.

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(2) Radiated Emission

According to 15.231(b), the field strength of emissions from Intentional Radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental		Field Strength of Spurious	
	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)
40.66 - 40.70	67.04	2,250	40	100
70 - 130	61.94	1,250	34	50
130 - 174	* 61.94 - 71.48	* 1,250 - 3,750	* 34 - 43.5	* 50 to 150
174 - 260	71.48	3,750	43.5	150
260 - 470	* 71.48 - 81.94	* 3,750 - 12,500	* 43.5 - 54	* 150 to 500
above 470	81.94	12,500	74	500

- 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. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205
 4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of § 15.205, then the general radiated emission limits in § 15.209 apply.
 5. For the band 130-174MHz, uV/m at 3meters = $56.81818(F) - 6136.3636$;
For the band 260-470MHz uV/m at 3meters = $41.6667(F) - 7083.3333$;
Where F is the frequency in MHz.
 6. $433.92MHz$ limit = $41.6667 * 433.92 - 7083.3333 = 10996.681 uV/m$
= 80.8dBuV/m

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2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

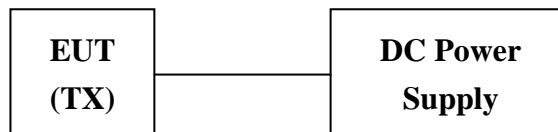


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1.	DC Power Supply	HOLA	DP-3303	N/A	N/A	N/A

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3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§ 15.207	Conducted Emission	N/A
§ 15.231	Radiated Emission	Compliant
§ 15.231(c)	20dB Bandwidth	Compliant
	Duty Cycle Test (Pulse Modulation)	Compliant
§ 15.231(a)(1)	Release Time Measurement	Compliant

4. Description of test modes

The EUT has been tested under engineering test mode condition. and the EUT staying in continuous transmitting mode. The Frequency 433.92 MHz is chosen for testing.

The X, Y and Z-axis of EUT were pre-test; X and Y mode were the worse case and report.

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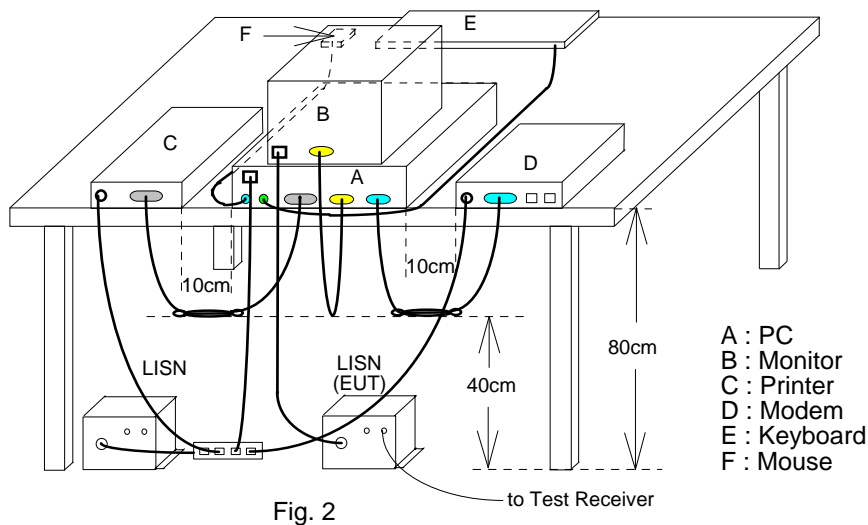
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5. CONDUCTED EMISSIONS TEST (NOT APPLY IN THE REPORT)

5.1 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. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100759	05/20/2011	05/19/2013
EMI Receiver	R&S	ESCS 30	828985/004	09/23/2011	09/22/2012
LISN	Rolf-Heine	NNB-2/16Z	99012	03/23/2012	03/22/2013
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/23/2012	03/22/2013
Coaxial Cables	N/A	WK CE Cable	N/A	01/04/2011	01/03/2013

5.4 Measurement Result:

N/A

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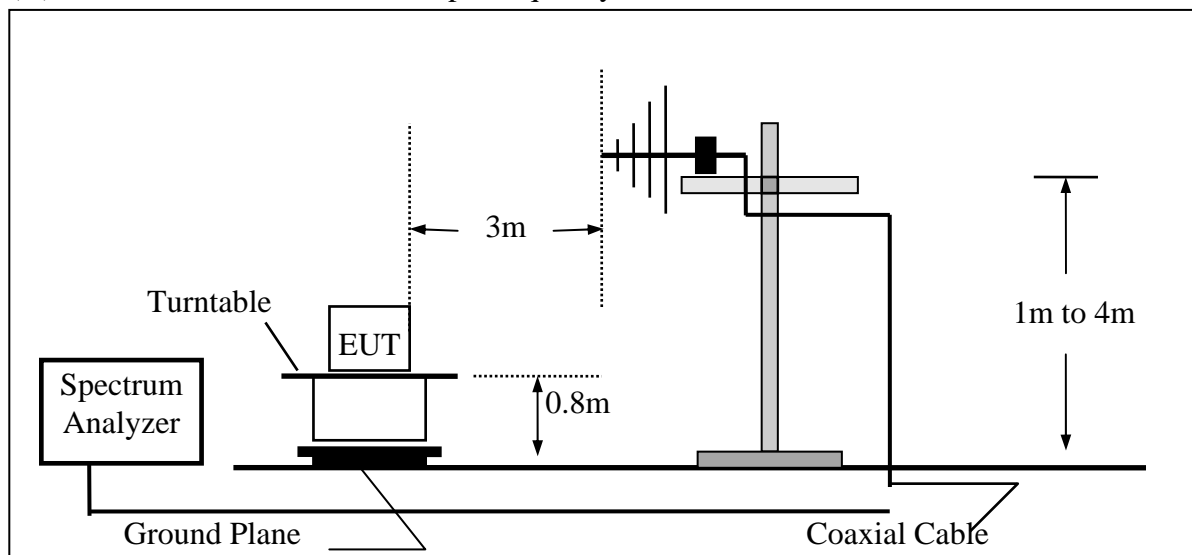
6. RADIATED EMISSION TEST

6.1 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.
4. Repeat above procedures until all frequency measured were complete.

6.2 Test SET-UP (Block Diagram of Configuration)

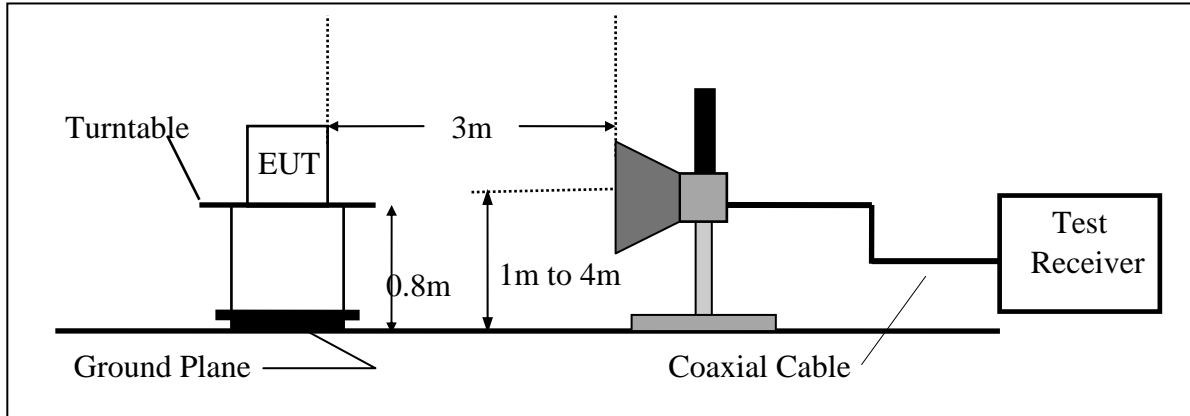
(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



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6.3 Measurement Equipment Used:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESC17	100759	05/20/2011	05/19/2013
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/15/2011	04/14/2013
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	02/15/2011	02/14/2013
Spectrum Analyzer	R&S	FSV-30	101398	10/18/2011	10/17/2013
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/10/2012	01/09/2014
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2011	05/18/2013
Horn Antenna	Schwarzbeck	BBHA9170	185	07/11/2011	07/10/2013
Pre-Amplifier	Agilent	8447D	2944A07676	01/04/2012	01/03/2013
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/04/2012	01/03/2013
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	02/28/2012	02/28/2013
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2012	02/27/2013
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_Rx	9	01/04/2012	01/03/2013
3m Site NSA	SGS	966 chamber	N/A	07/15/2011	07/14/2012

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:

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

Average Value = Peak Value + 20 Log (Ton/Tp) Pulse Modulation

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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6.5 Measurement Result

Operation Band	:433.92 MHz	Test Date	:2012-05-29
Fundamental Frequency	:433.92 MHz	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:MAIN	Engineer	:Jimmy
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. 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.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
433.82	F	Peak	77.70	-10.35	67.35	100.80	-33.45

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Operation Band	:433.92 MHz	Test Date	:2012-05-29
Fundamental Frequency	:433.92 MHz	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX	Engineer	:Jimmy
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBμV/m) = SPA. 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.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
39.70	S	Peak	46.74	-13.47	33.27	40.00	-6.73
176.47	S	Peak	52.92	-14.03	38.89	43.00	-4.11
208.48	S	Peak	52.05	-15.89	36.16	43.00	-6.84
256.01	S	Peak	45.36	-13.85	31.51	46.00	-14.49
600.36	S	Peak	41.82	-7.55	34.27	46.00	-11.73
867.84	H	Peak	46.39	-3.41	42.98	80.82	-39.84
1301.76	H	Peak	41.79	-0.30	41.49	80.82	-12.51
1735.68	H	Peak	50.84	1.89	52.73	74.00	-21.27
2169.60	H	Peak	47.25	4.00	51.25	80.82	-29.57
2603.52	H	Average	42.25	5.74	47.99	60.82	-12.83
2603.52	H	Peak	51.49	5.74	57.23	80.82	-23.59
3037.44	H	Peak	40.69	6.17	46.86	80.82	-33.96
3471.36	H	Peak	40.25	7.46	47.71	80.82	-33.11
3905.28	H	Peak	38.53	8.02	46.55	74.00	-27.45
4339.20	H	---					

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Radiated Spurious Emission Measurement Result

Operation Band	:433.92 MHz	Test Date	:2012-05-29
Fundamental Frequency	:433.92 MHz	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:MAIN	Engineer	:Jimmy
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBµV/m) = SPA. 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.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Safe Margin dB
433.82	F	Peak	85.24	-10.35	74.89	100.80	-25.91

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Operation Band	:433.92 MHz	Test Date	:2012-05-29
Fundamental Frequency	:433.92 MHz	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX	Engineer	:Jimmy
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. 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.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
39.70	S	Peak	47.03	-13.47	33.56	40.00	-6.44
176.47	S	Peak	55.82	-14.03	41.79	43.00	-1.21
208.48	S	Peak	55.69	-15.89	39.80	43.00	-3.20
256.01	S	Peak	56.69	-13.85	42.84	46.00	-3.16
288.02	S	Peak	54.56	-12.86	41.70	46.00	-4.30
867.84	H	Average	48.22	-3.41	44.81	60.82	-16.01
867.84	H	Peak	57.46	-3.41	54.05	80.82	-26.77
1301.76	H	Peak	42.28	-0.88	41.40	80.82	-39.42
1735.68	H	Average	49.91	2.85	52.76	54.00	-1.24
1735.68	H	Peak	59.15	2.85	62.00	74.00	-12.00
2169.60	H	Average	41.21	3.70	44.91	60.82	-15.91
2169.60	H	Peak	50.45	3.70	54.15	80.82	-26.67
2603.52	H	Average	40.87	6.05	46.92	60.82	-13.90
2603.52	H	Peak	50.11	6.05	56.16	80.82	-24.66
3037.44	H	Peak	37.56	6.47	44.03	80.82	-36.79
3471.36	H	Peak	38.55	7.22	45.77	80.82	-35.05
3905.28	H	Peak	40.08	8.14	48.22	74.00	-25.78
4339.20	---						

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Radiated Spurious Emission Measurement Result (Co-location Mode)

Operation Band	:433 MHz	Test Date	:2012-07-06
Fundamental Frequency	:433 MHz	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:VERTICAL

Actual FS(dBµV/m) = SPA. 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.

“---“ : denotes Noise Floor.

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Safe Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
176.47	S	Peak	51.57	-14.03	37.54	43.00	-5.46
191.99	S	Peak	51.15	-15.76	35.39	43.00	-7.61
208.48	S	Peak	54.79	-15.89	38.90	43.00	-4.10
224.00	S	Peak	50.08	-14.92	35.16	46.00	-10.84
803.09	S	Peak	42.39	-4.15	38.24	46.00	-7.76
824.43	S	Peak	46.71	-3.92	42.79	46.00	-3.21
2105.00	S	Peak	40.41	4.17	44.58	74.00	-29.42

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Operation Band	:433 MHz	Test Date	:2012-07-06
Fundamental Frequency	:433 MHz	Temp./Humi.	:27 deg_C / 66 RH
Operation Mode	:TX	Engineer	:Marcus
EUT Pol.	:E2 plan	Measurement Antenna Pol.	:HORIZONTAL

Actual FS(dBμV/m) = SPA. 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.

“---“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Safe Margin dB
191.99	S	Peak	55.60	-15.76	39.84	43.00	-3.16
224.00	S	Peak	58.62	-14.92	43.70	46.00	-2.30
303.54	S	Peak	52.35	-12.49	39.86	46.00	-6.14
320.03	S	Peak	52.94	-12.09	40.85	46.00	-5.15
768.17	S	Peak	47.81	-4.65	43.16	46.00	-2.84
783.69	S	Peak	47.58	-4.40	43.18	46.00	-2.82
2345.50	S	Peak	43.34	5.06	48.40	74.00	-25.60

Remark: Collocation Mode specifies how spurious emission would be impacted if other certified mobile transmitters are enabled.

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7. 20DBOCCUPIED BANDWIDTH

7.1 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, -20dB.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 6.3 Radiated Emission Measurement.

7.3 Measurement Equipment Used:

Same as 6.3 Radiated Emission Measurement.

7.4 Measurement Results

Refer to attached data chart.

The center frequency f_c is **433.92MHz**, according to the Rules, section 15.231(C), the Bandwidth of Center Frequency at-20dB should be calculated as following:

$$433.92 \times 0.0025 = 1.0848(\text{MHz})$$

So, the Uper/Lower frequencies limit should be specified as:

$$f_{(U)} = f_c + \Delta f/2 = 433.92 + 0.5424 = 434.46(\text{MHz})$$

$$f_{(L)} = f_c - \Delta f/2 = 433.92 - 0.5424 = 433.377 (\text{MHz})$$

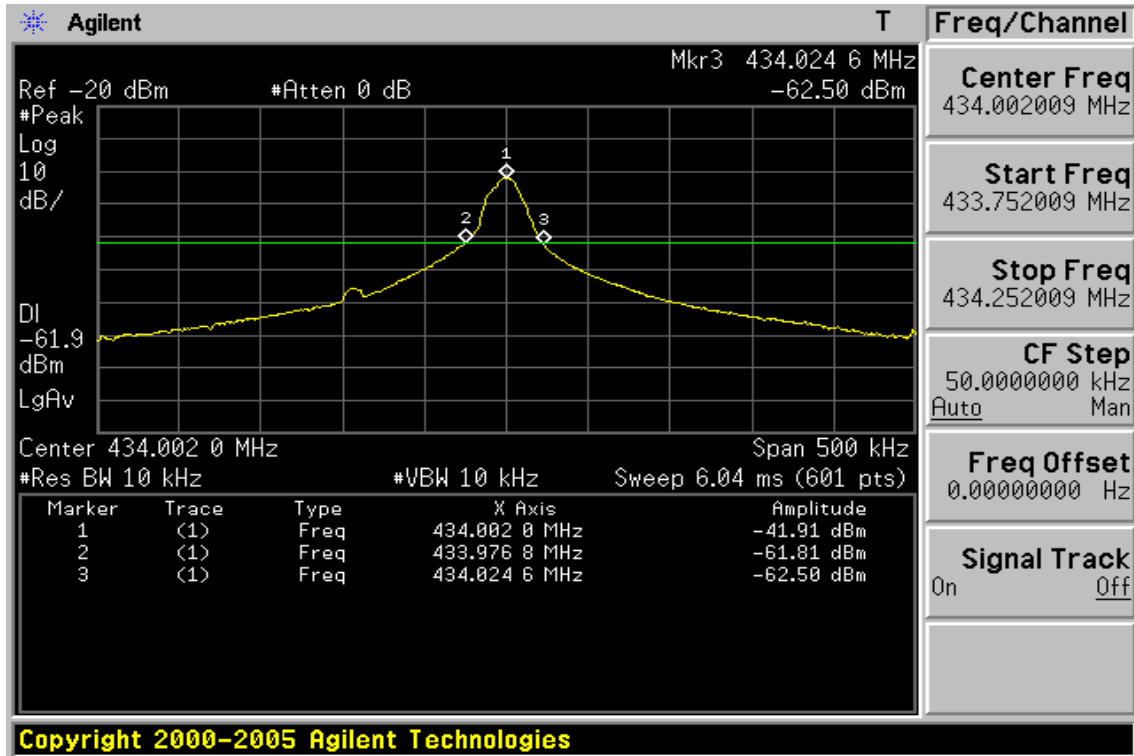
Measurement Result:

-20dB bandwidth = -65.50kHz within allowed frequency range.

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20dB Band Width Test Data



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8. DUTY CYCLE MEASUREMENT

8.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set ETU normal operating mode.
3. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 100KHz, Span =0 Hz. Adjacent sweep.
4. Set SPA View. Mark delta.

8.2 Test SET-UP (Block Diagram of Configuration)

Same as 6.3 Radiated Emission Measurement.

8.3 Measurement Equipment Used:

Same as 6.3 Radiated Emission Measurement.

8.4 Measurement Results:

$$T_{on} = 0.95(\text{ms}) * 14 + 4.85(\text{ms}) * 1 + 0.45(\text{ms}) * 19 = 26.7(\text{ms})$$

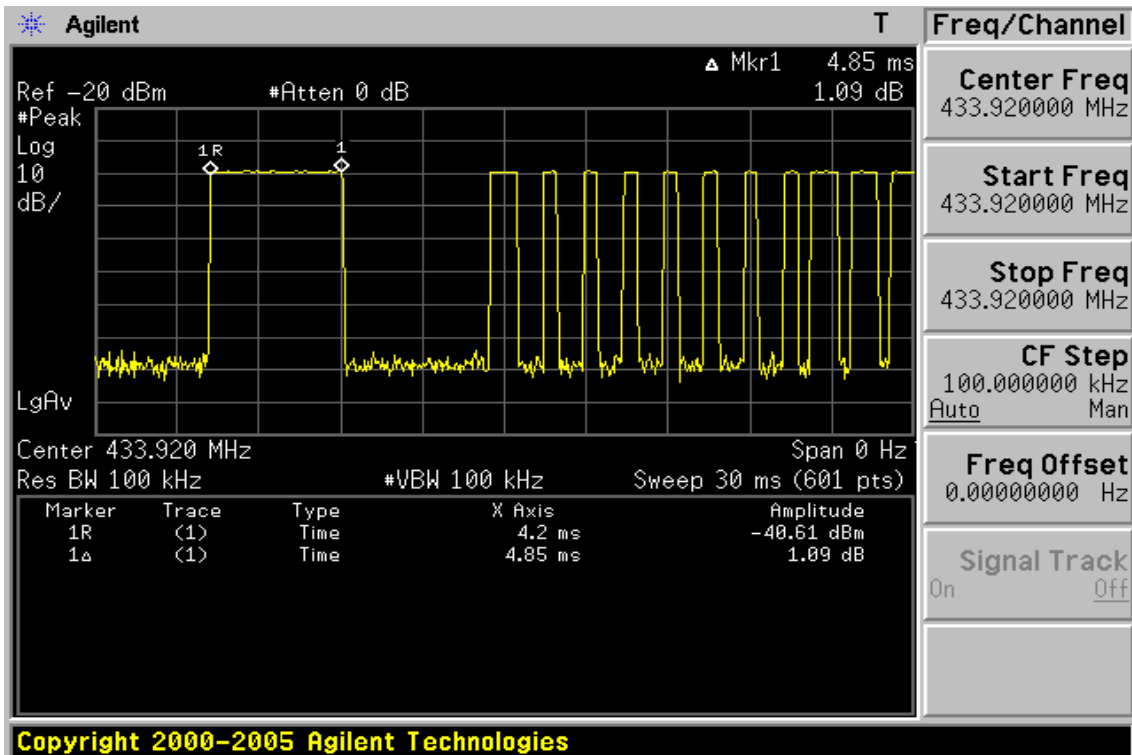
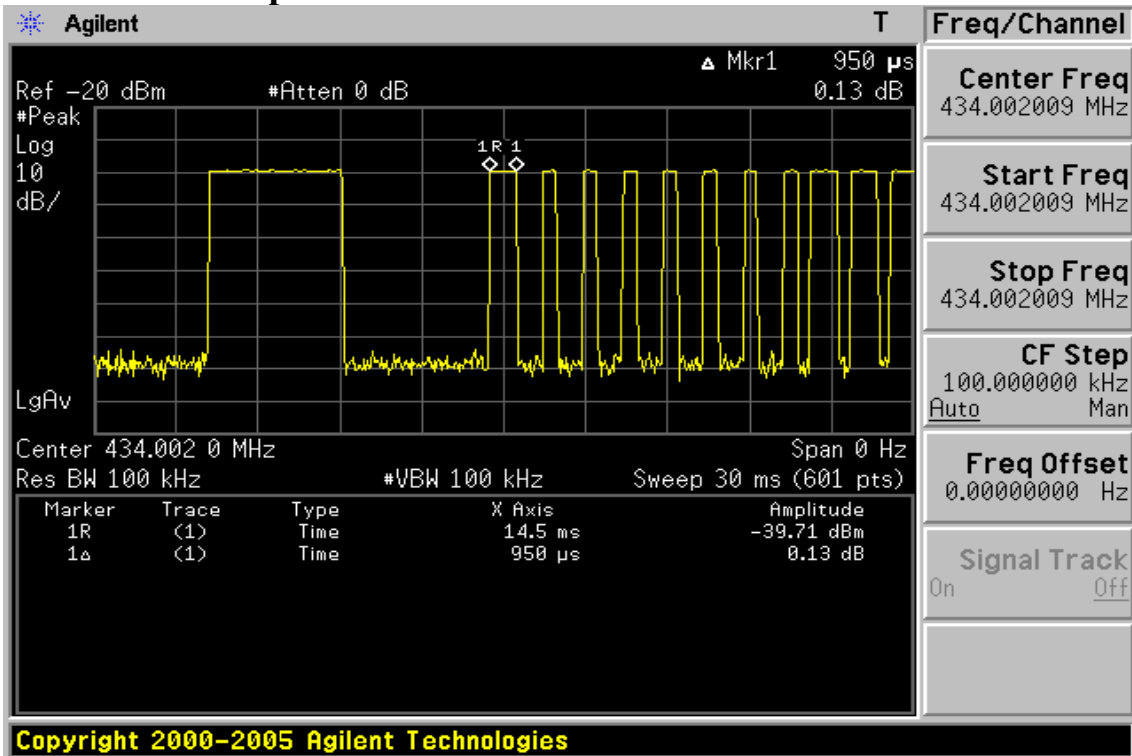
$$T_p > 100 (\text{ms}),$$

$$\begin{aligned} \text{Average Correction Factory} &= 20\log (T_{on}/T_p) = 20\log (26.7/77.33) \\ &= -9.24 \text{ dB} \end{aligned}$$

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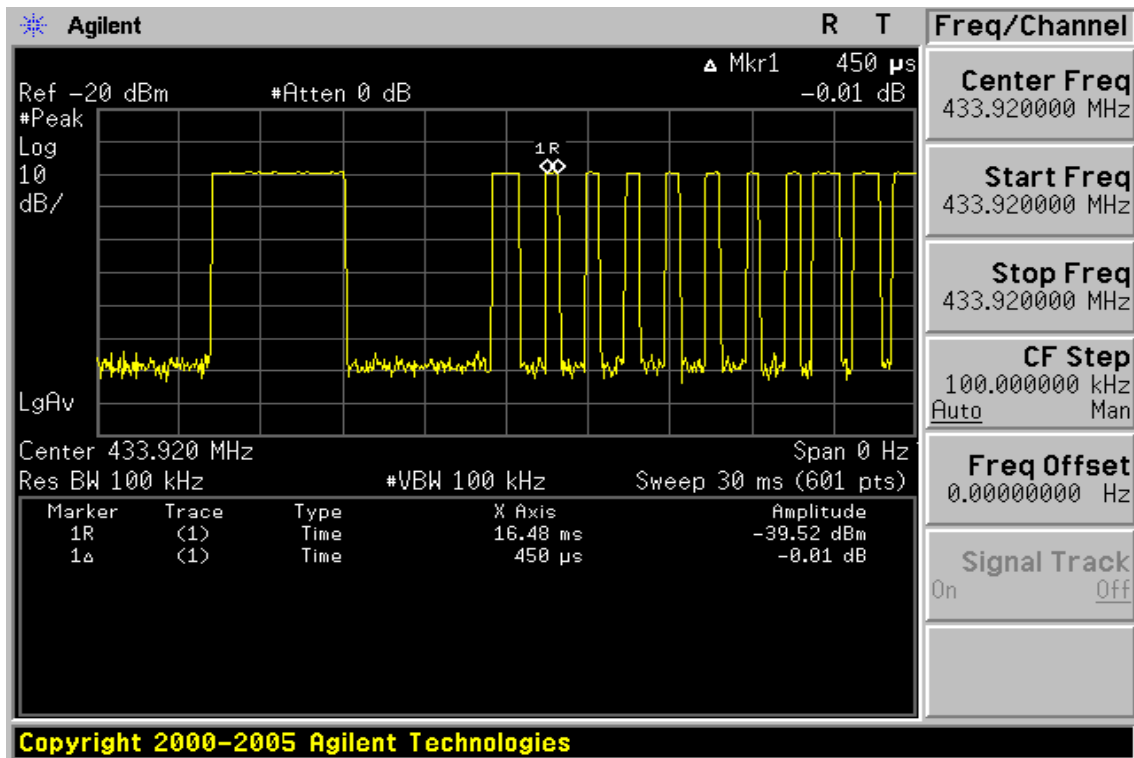
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Ton Measurement: Tp >100ms



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9. RELEASE TIME MEASUREMENT:

15.231 (a) (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

9.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set SPA Center Frequency = fundamental frequency, RBW, VBW= 100 KHz, Span =0Hz. Sweep Time= 5s.
3. Set EUT as normal operation and press Transmitter bottom for 2 s,
4. Set SPA Max hold. Delta Mark.

9.2 Test SET-UP (Block Diagram of Configuration)

Same as 6.3 Radiated Emission Measurement.

9.3 Measurement Equipment Used:

Same as 6.3 Radiated Emission Measurement.

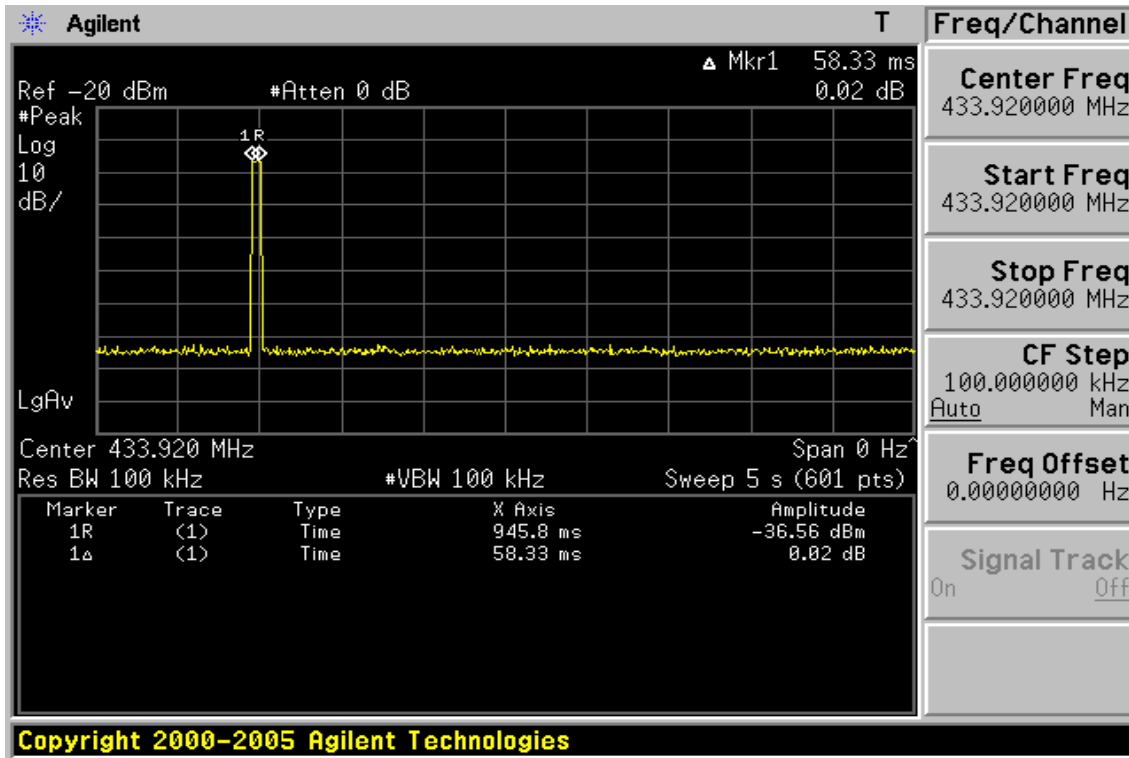
Measurement Results

The release time less than 5 s.

Refer to attached data chart.

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10. RF EXPOSURE COMPLIANCE ANALYSIS

As per KDB 447498 8) a) ii) & TCB workshop 2008, Oct, devices incorporating certified mobile transmitters (>20cm from users) shall comply with MPE compliance boundary requirement in order to ensure whether or not simultaneous transmission within a host remains compliance with RF exposure still.

The condition of collocated mobile certified transmitter:

Bluetooth: conducted power (10.14dBm) = 10.32761mW=0.010328W

Gain = -2.83 dBi (as reference from Report No.: W6M20703-7876-P-15 by ETS Product Service (Taiwan) Co., Ltd)

Wifi: Conducted Power (23.76dBm) = 237.684mW =0.237684W

Gain = 2.0 dBi (as reference from Report No.: GMIS15-A2 Rev A by MiCOMLabs)

433MHz Transmitter: Radiated Field Strength: 77.70dBuV/m

Converting to radiated power: EIRP (dBm) = E+20Log (d)-104.8,

, where EIRP= the equivalent isotropic radiated power in dBm, E=electric field strength in dBuV/m, d=measurement distance in meters.

$EIRP=77.20 +20*\log (3)-104.8=-17.56dBuV/m$

Conducted Power = -14.56dBm =0.00003501W, Gain=-3.0dBi

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Collocated MPE result:

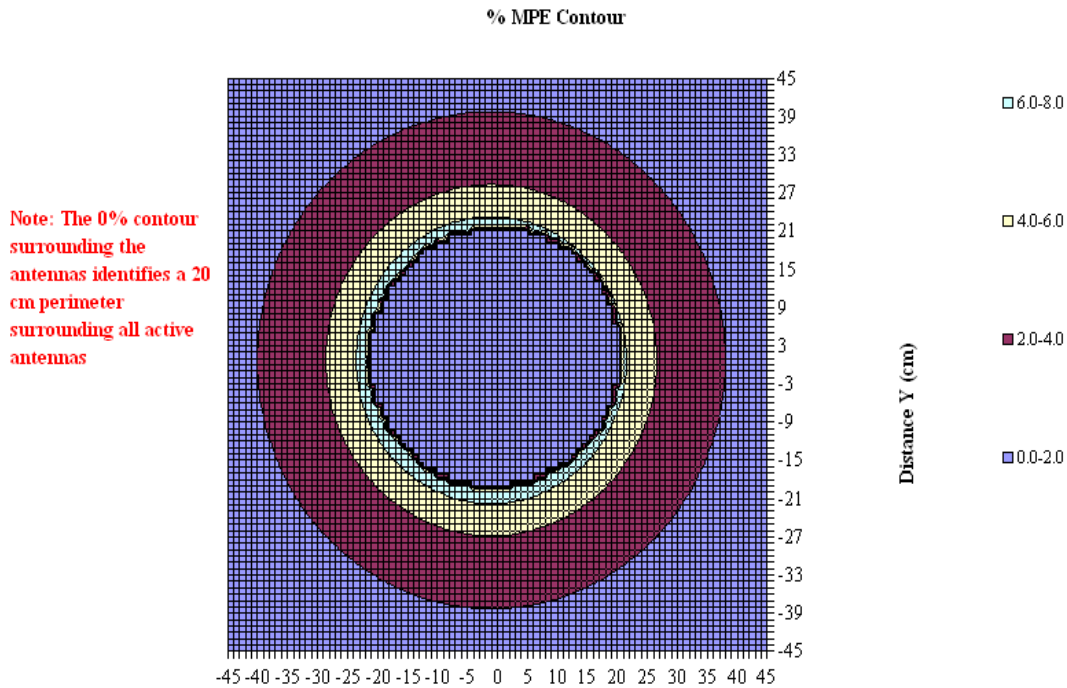
	A	B	C	D	E	F	G	H	I
1	Antenna No.		Total	1	2	3	4	5	6
2	Tx Status			On	On	On	Off	Off	Off
3	Frequency	MHz		433	2402	2412	2450	2450	5800
4	MPE Limit	mW/cm ²		0.29	1.00	1.00	0.00	0.00	0.00
5	Max % MPE	%	7.5	0.0	0.1	7.5	0.0	0.0	0.0
6	Power	(W)	0.248	0.000	0.010	0.238	0.000	0.000	0.000
7	Antenna Gain	dBi		3.00	2.83	2.00	1.50	0.50	1.00
8	EIRP	(W)	0.38	0.000	0.005	0.377	0.000	0.000	0.000
9	X	(cm)		0.7	-1.5	-1.0	4.0	-8.0	8.0
10	Y	(cm)		1.5	1.2	0.7	0.0	0.0	0.0
11	Sector			FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
12	Arc			FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
13	θ ₁	degs	input	-120	-120	-120	-120	-120	-120
14	θ ₂			60	60	60	60	60	60
15	θ ₁		actual	-120	-120	-120	-120	-120	-120
16	θ ₂			60	60	60	60	60	60

, where column D revealing specification of 433MHz Transmitter, column E containing specification BT transmitter, and column F show specification of WIFI Transmitter. Please refer to Internal View of Photo with the indication of “The Location of Collocated Transmitter.”

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The MPE Boundary Limit Plot:



Conclusion: By inspection of percent-MPE contour plot, compliance boundary is circle, and therefore simultaneous transmission of collocated transmitter remains compliant with RF exposure.

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