

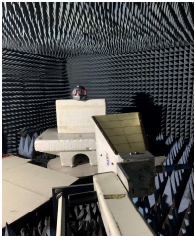
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- The schematic diagram illustrates the hardware circuit for the proposed system. Key components and their connections are as follows:
- PT244 Module:** A module with a UFL connector and a PT244 component. A red 'X' is placed over the UFL connector, indicating it should not be used.
 - BT Module:** A module with a BT module component. A red 'X' is placed over the BT module component, indicating it should not be used.
 - Microcontroller (U10):** An RFXC401C microcontroller with various pins connected to power (VDD, VSS), ground, and other components.
 - Passive Components:** Various capacitors (C146, C147, C148, C149, C150, C151, C152, C153, C154, C155, C156, C157, C158, C159, C160, C161, C162, C163, C164, C165, C166, C167, C168, C169, C170, C171, C172, C173, C174, C175, C176, C177, C178, C179, C180, C181, C182, C183, C184, C185, C186, C187, C188, C189, C190, C191, C192, C193, C194, C195, C196, C197, C198, C199, C200, C201, C202, C203, C204, C205, C206, C207, C208, C209, C210, C211, C212, C213, C214, C215, C216, C217, C218, C219, C220, C221, C222, C223, C224, C225, C226, C227, C228, C229, C230, C231, C232, C233, C234, C235, C236, C237, C238, C239, C240, C241, C242, C243, C244, C245, C246, C247, C248, C249, C250, C251, C252, C253, C254, C255, C256, C257, C258, C259, C260, C261, C262, C263, C264, C265, C266, C267, C268, C269, C270, C271, C272, C273, C274, C275, C276, C277, C278, C279, C280, C281, C282, C283, C284, C285, C286, C287, C288, C289, C290, C291, C292, C293, C294, C295, C296, C297, C298, C299, C300, C301, C302, C303, C304, C305, C306, C307, C308, C309, C310, C311, C312, C313, C314, C315, C316, C317, C318, C319, C320, C321, C322, C323, C324, C325, C326, C327, C328, C329, C330, C331, C332, C333, C334, C335, C336, C337, C338, C339, C340, C341, C342, C343, C344, C345, C346, C347, C348, C349, C350, C351, C352, C353, C354, C355, C356, C357, C358, C359, C360, C361, C362, C363, C364, C365, C366, C367, C368, C369, C370, C371, C372, C373, C374, C375, C376, C377, C378, C379, C380, C381, C382, C383, C384, C385, C386, C387, C388, C389, C390, C391, C392, C393, C394, C395, C396, C397, C398, C399, C400, C401, C402, C403, C404, C405, C406, C407, C408, C409, C410, C411, C412, C413, C414, C415, C416, C417, C418, C419, C420, C421, C422, C423, C424, C425, C426, C427, C428, C429, C430, C431, C432, C433, C434, C435, C436, C437, C438, C439, C440, C441, C442, C443, C444, C445, C446, C447, C448, C449, C450, C451, C452, C453, C454, C455, C456, C457, C458, C459, C460, C461, C462, C463, C464, C465, C466, C467, C468, C469, C470, C471, C472, C473, C474, C475, C476, C477, C478, C479, C480, C481, C482, C483, C484, C485, C486, C487, C488, C489, C490, C491, C492, C493, C494, C495, C496, C497, C498, C499, C500, C501, C502, C503, C504, C505, C506, C507, C508, C509, C510, C511, C512, C513, C514, C515, C516, C517, C518, C519, C520, C521, C522, C523, C524, C525, C526, C527, C528, C529, C530, C531, C532, C533, C534, C535, C536, C537, C538, C539, C540, C541, C542, C543, C544, C545, C546, C547, C548, C549, C550, C551, C552, C553, C554, C555, C556, C557, C558, C559, C560, C561, C562, C563, C564, C565, C566, C567, C568, C569, C570, C571, C572, C573, C574, C575, C576, C577, C578, C579, C580, C581, C582, C583, C584, C585, C586, C587, C588, C589, C590, C591, C592, C593, C594, C595, C596, C597, C598, C599, C600, C601, C602, C603, C604, C605, C606, C607, C608, C609, C610, C611, C612, C613, C614, C615, C616, C617, C618, C619, C620, C621, C622, C623, C624, C625, C626, C627, C628, C629, C630, C631, C632, C633, C634, C635, C636, C637, C638, C639, C640, C641, C642, C643, C644, C645, C646, C647, C648, C649, C650, C651, C652, C653, C654, C655, C656, C657, C658, C659, C660, C661, C662, C663, C664, C665, C666, C667, C668, C669, C670, C671, C672, C673, C674, C675, C676, C677, C678, C679, C680, C681, C682, C683, C684, C685, C686, C687, C688, C689, C690, C691, C692, C693, C694, C695, C696, C697, C698, C699, C700, C701, C702, C703, C704, C705, C706, C707, C708, C709, C710, C711, C712, C713, C714, C715, C716, C717, C718, C719, C720, C721, C722, C723, C724, C725, C726, C727, C728, C729, C730, C731, C732, C733, C734, C735, C736, C737, C738, C739, C740, C741, C742, C743, C744, C745, C746, C747, C748, C749, C750, C751, C752, C753, C754, C755, C756, C757, C758, C759, C760, C761, C762, C763, C764, C765, C766, C767, C768, C769, C770, C771, C772, C773, C774, C775, C776, C777, C778, C779, C780, C781, C782, C783, C784, C785, C786, C787, C788, C789, C790, C791, C792, C793, C794, C795, C796, C797, C798, C799, C800, C801, C802, C803, C804, C805, C806, C807, C808, C809, C810, C811, C812, C813, C814, C815, C816, C817, C818, C819, C820, C821, C822, C823, C824, C825, C826, C827, C828, C829, C830, C831, C832, C833, C834, C835, C836, C837, C838, C839, C840, C841, C842, C843, C844, C845, C846, C847, C848, C849, C850, C851, C852, C853, C854, C855, C856, C857, C858, C859, C860, C861, C862, C863, C864, C865, C866, C867, C868, C869, C870, C871, C872, C873, C874, C875, C876, C877, C878, C879, C880, C881, C882, C883, C884, C885, C886, C887, C888, C889, C890, C891, C892, C893, C894, C895, C896, C897, C898, C899, C900, C901, C902, C903, C904, C905, C906, C907, C908, C909, C910, C911, C912

Vertical position of EUT			
Frequency:	2480	MHz	
Angle (deg)	Spectrum Analyzer reading (dBuV/m)	EIRP, dBm	Antenna Pattern, dBi
0	89.62	-7.12	0.00
20	88.15	-8.59	-1.47
40	85.86	-10.88	-3.76
60	84.26	-12.48	-5.36
80	85.09	-11.65	-4.53
100	85.59	-11.15	-4.03
120	89.45	-7.29	-0.17
140	76.1	-20.64	-13.52
160	89.34	-7.4	-0.28
180	89.12	-7.62	-0.50
200	78.83	-17.91	-10.79
220	89.55	-7.19	-0.07
240	88.09	-8.65	-1.53
260	89.1	-7.64	-0.52
280	89.12	-7.62	-0.50
300	89.2	-7.54	-0.42
320	87.62	-9.12	-2.00
340	89.55	-7.19	-0.07
360	89.6	-7.14	-0.02
			-2.61

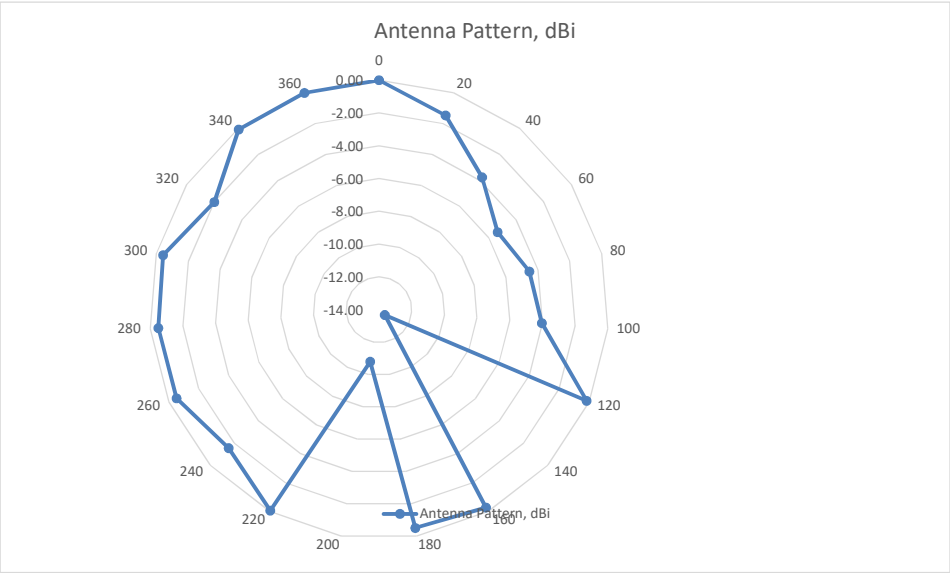
Spectrum Analyzer Data		
Span	10	MHz
RBW	1000	kHz
VBW	3000	kHz
Ref Level	120	dBuV/m
SG	0	dBm
F, MHz	2480	MHz
SA reading	103.87	dBuV/m
AG, dBi	10.3	dBi
Cable Loss	3.17	dB
Antenna polarization Vertical		
Antenna Horn HL 4474		

sweep time 20 ms

Substitution



Gain measurement calculation:
=-(Reference SA reading)+(SA reading of Antenna Power)+(Reference Signal Generator RF Power)+(Ref Antenna gain)-(Reference Antenna cable loss)

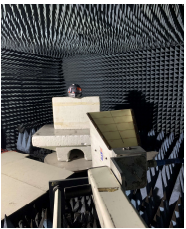


Vertical poztion of EUT			
Frequency:	2440	MHz	
Angle (deg)	Spectrum Analyzer reading (dBuV/m)	EIRP, dBm	Antenna Pattern, dBi
0	93.06	-3.36	0.00
20	91.76	-4.66	-1.30
40	89.58	-6.84	-3.48
60	86.75	-9.67	-6.31
80	91.16	-5.26	-1.90
100	83.21	-13.21	-9.85
120	93.01	-3.41	-0.05
140	84.13	-12.29	-8.93
160	92.98	-3.44	-0.08
180	92.98	-3.44	-0.08
200	88.02	-8.4	-5.04
220	93.01	-3.41	-0.05
240	93.04	-3.38	-0.02
260	92.99	-3.43	-0.07
280	92.98	-3.44	-0.08
300	89.53	-6.89	-3.53
320	93.02	-3.4	-0.04
340	92.91	-3.51	-0.15
360	92.46	-3.96	-0.60
			-2.19

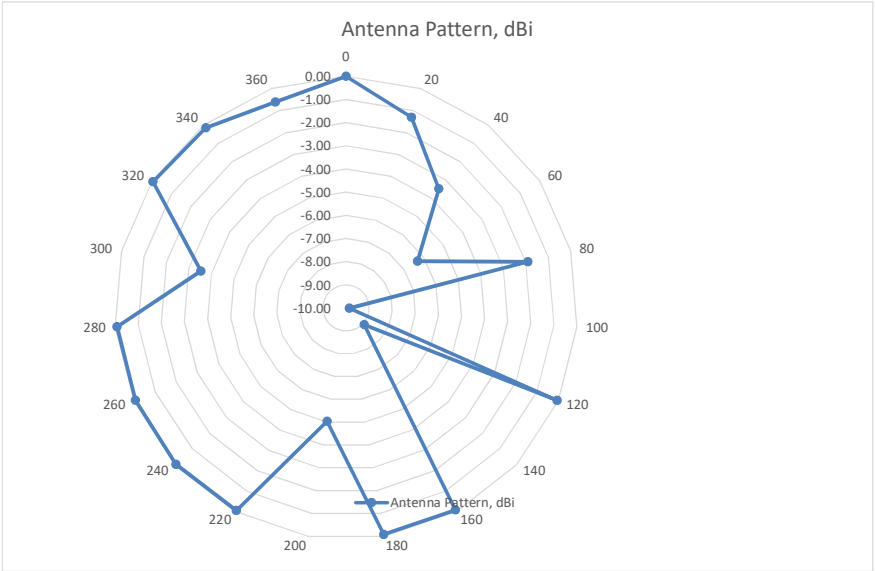
Spectrum Analyzer Data		
Span	10	MHz
RBW	1000	kHz
VBW	3000	kHz
Ref Level	120	dBuV/m
SG	0	dBm
F, MHz	2440	MHz
SA reading	103.5	dBuV/m
AG, dBi	10.2	dBi
Cable Loss	3.12	dB
Antenna polarization Vertical		
Antenna Horn HL 4474		

sweep time 20 ms

Substitution

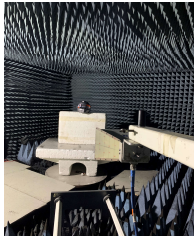


Gain measurement calculation:
=-(Reference SA reading)+(SA reading of Antenna Power)+(Reference Signal Generator RF Power)+(Ref Antenna gain)-(Refrence Antenna cable loss)

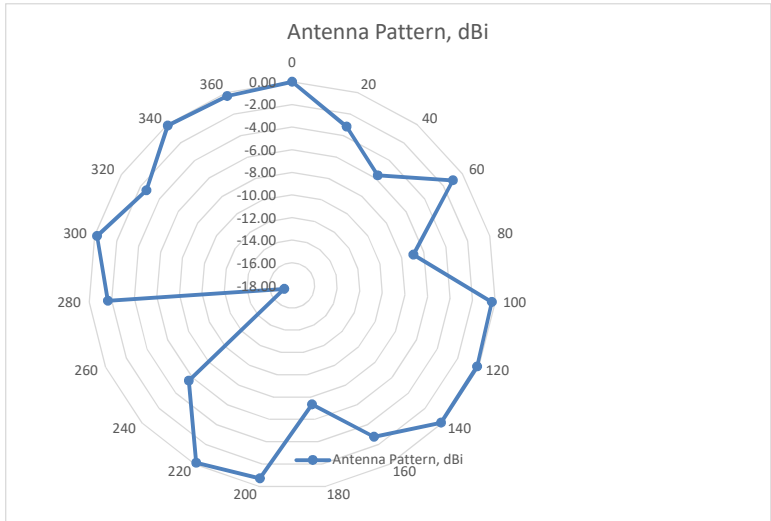


Vertical position of EUT			
Frequency:	2440	MHz	
Angle (deg)	Spectrum Analyzer reading (dBuV/m)	EIRP, dBm	Antenna Pattern, dBi
0	100.33	3.91	0.00
20	97.18	0.76	-3.15
40	94.66	-1.76	-5.67
60	99.31	2.89	-1.02
80	93.38	-3.04	-6.95
100	100.04	3.62	-0.29
120	100.18	3.76	-0.15
140	100.23	3.81	-0.10
160	97.54	1.12	-2.79
180	92.99	-3.43	-7.34
200	99.62	3.2	-0.71
220	100.15	3.73	-0.18
240	94.75	-1.67	-5.58
260	83.09	-13.33	-17.24
280	98.67	2.25	-1.66
300	100.11	3.69	-0.22
320	97.71	1.29	-2.62
340	100.23	3.81	-0.10
360	100.02	3.6	-0.31
			-2.95

Spectrum Analyzer Data		
Span	10	MHz
RBW	1000	kHz
VBW	3000	kHz
Ref Level	120	dBuV/m
SG	0	dBm
F, MHz	2440	MHz
SA reading	103.5	dBuV/m
AG, dBi	10.2	dBi
Cable Loss	3.12	dB
Antenna polarization Vertical		
Antenna Horn HL 4474		



Gain measurement calculation:
 =-(Reference SA reading)+(SA reading of Antenna Power)+(Reference Signal Generator RF Power)+(Ref Antenna gain)-(Reference Antenna cable loss)

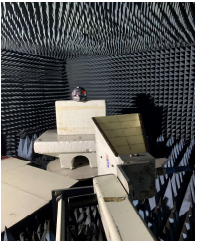


Vertical position of EUT			
Frequency:	2402	MHz	
Angle (deg)	Spectrum Analyzer reading (dBuV/m)	EIRP, dBm	Antenna Pattern, dBi
0	92.35	-4.04	0.00
20	91.23	-5.16	-1.12
40	92	-4.39	-0.35
60	92.14	-4.25	-0.21
80	92.23	-4.16	-0.12
100	92.08	-4.31	-0.27
120	92.29	-4.1	-0.06
140	88.33	-8.06	-4.02
160	92.32	-4.07	-0.03
180	92.24	-4.15	-0.11
200	91.72	-4.67	-0.63
220	91.46	-4.93	-0.89
240	92.12	-4.27	-0.23
260	92.29	-4.1	-0.06
280	92.32	-4.07	-0.03
300	85.92	-10.47	-6.43
320	92.12	-4.27	-0.23
340	86.39	-10	-5.96
360	92.19	-4.2	-0.16
			-1.10

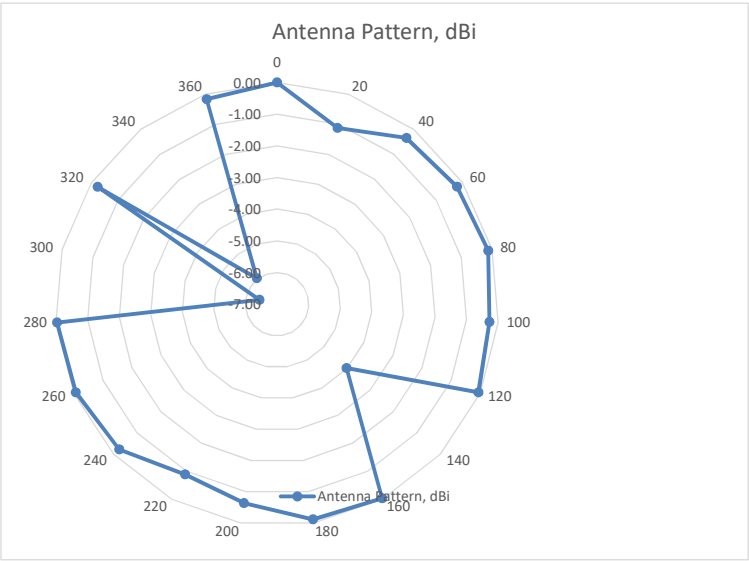
Spectrum Analyzer Data		
Span	10	MHz
RBW	1000	kHz
VBW	3000	kHz
Ref Level	120	dBuV/m
SG	0	dBm
F, MHz	2405	MHz
SA reading	103.2	dBuV/m
AG, dBi	9.9	dBi
Cable Loss	3.09	dB
Antenna polarization Vertical		
Antenna Horn HL 4474		

sweep time 20 ms

Substitution



Gain measurement calculation:
=-(Reference SA reading)+(SA reading of Antenna Power)+(Reference Signal Generator RF Power)+(Ref Antenna gain)-(Reference Antenna cable loss)

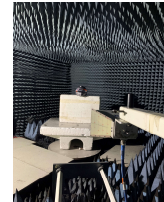


Vertical position of EUT			
Frequency:	2402	MHz	
Angle (deg)	Spectrum Analyzer reading (dBuV/m)	EIRP, dBm	Antenna Pattern, dBi
0	101.63	5.24	0.00
20	97.62	1.23	-4.01
40	98.01	1.62	-3.62
60	97.98	1.59	-3.65
80	86.51	-9.88	-15.12
100	98.26	1.87	-3.37
120	101.1	4.71	-0.53
140	101.45	5.06	-0.18
160	101.58	5.19	-0.05
180	98.16	1.77	-3.47
200	100.5	4.11	-1.13
220	101.23	4.84	-0.40
240	89.29	-7.1	-12.34
260	87.09	-9.3	-14.54
280	100.32	3.93	-1.31
300	101.24	4.85	-0.39
320	101.18	4.79	-0.45
340	100.47	4.08	-1.16
360	101.63	5.24	0.00
			-3.46

Spectrum Analyzer Data			sweep time	20 ms
Span	10	MHz		
RBW	1000	kHz		
VBW	3000	kHz		
Ref Level	120	dBuV/m		
SG	0	dBm		
F, MHz	2405	MHz		
SA reading	103.2	dBuV/m		Substitution
AG, dBi	9.9	dB		
Cable Loss	3.09	dB		

Antenna polarization Vertical

Antenna Horn HL 4474



Gain measurement calculation:

$$=-(\text{Reference SA reading})+(\text{SA reading of Antenna Power})+(\text{Reference Signal Generator RF Power})+(\text{Ref Antenna gain})-(\text{Reference Antenna cable loss})$$

